

City of Augusta, Georgia
and the cities of
Hephzibah & Blythe

Hazard Mitigation Plan

A Plan to Reduce the Impacts of Natural Hazards

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1.1 Purpose & Authority

The cities of Augusta, Blythe and Hephzibah undertook development of this *Hazard Mitigation Plan* (“the Plan”) because of increasing awareness that natural hazards, especially flood hazards, may affect many people and property in the area. The Plan is a requirement associated with receipt of certain federal mitigation grant program funds.

The Augusta Emergency Management Agency and the Augusta-Richmond County Planning Commission were designated by the Mayor and the Augusta Commission to coordinate with other appropriate departments and agencies, including the cities of Blythe and Hephzibah, to facilitate the development of the Plan in conformance with state and federal guidelines.

The Plan is a “multi-jurisdictional” plan that was prepared pursuant to the Hazard Mitigation and Pre-Disaster Mitigation Programs (44 CFR Parts 201 and 206), and the process outlined in materials prepared by the Federal Emergency Management Agency for the Community Rating System of the National Flood Insurance Program. Augusta’s *Flood Hazard Mitigation Plan (2004)*, has been incorporated into this Plan. That Plan was prepared pursuant to the Flood Mitigation Assistance Program (44 CFR 78.6) and was supported by a planning grant provided by the Federal Emergency Management Agency (FEMA) and administered by the Georgia Emergency Management Agency (GEMA).

This Plan was supported by a planning grant provided by FEMA and administered by GEMA. The City of Augusta appreciates the advice and encouragement of both agencies.

1.2 The Planning Process

1.2.1 Planning Committee Participants

During development of the Plan the formal Mitigation Planning Committee was composed of:

- Barbara Sims, Augusta Commission (District 3)
- Tommy Boyles, Augusta Commission (District 7)
- Councilman Donald Atkins, City of Hephzibah
- Mayor Tom Cobb, City of Blythe
- Frederick L. Russell, Augusta City Administrator
- Chief Howard Willis, Interim Fire Chief/Emergency Management Agency
- George Patty, Executive Director, Planning Commission
- Captain P.A. Williams, Sheriff’s Department
- Terri L. Turner, Assistant Zoning & Development Administrator, Planning Commission

The following Augusta departments and offices are tasked to support the Mitigation Planning Committee:

- Planning Commission – Floodplain Management
- License & Inspections
- Engineering & Environmental Services – City Engineer
- Public Services Department
- Emergency Management Agency/Fire Department
- Augusta Utilities
- Housing & Economic Development
- Recreation & Parks
- Information Technology
- Finance Department

The following agencies were notified, invited to participate, and asked to review and comment on the Plan:

- Georgia Emergency Management Agency
- Georgia Department of Natural Resources, NFIP State Coordinating Office
- Georgia Department of Transportation
- Federal Emergency Management Agency – Region IV
- Natural Resources Conservation Service – Augusta

The *Hazard Mitigation Plan* was facilitated by Rebecca C. Quinn, CFM, of RCQuinn Consulting, Inc., Annapolis, MD. The hazard identification and risk assessment work was performed by Greenhorne & O'Mara, Inc., Greenbelt, MD.

1.2.2 Step-by-Step Process

The overall mitigation planning process, summarized below, was facilitated by a mitigation planning consultant:

- **Get Organized.** Augusta's Planning Commission and the Emergency Management Agency were charged with coordinating a committee comprised of Augusta departments that are responsible for permits, subdivision approvals, neighborhood and community development, recreation, parks, utilities, and public works. The cities of Blythe and Hephzibah participated.
- **Coordinate.** The following agencies were notified of the planning activity and invited to participate:

-
- Georgia Emergency Management Agency, Georgia Department of Natural Resources (NFIP State Coordinator), Georgia Department of Transportation.
 - FEMA Region IV, U.S. Army Corps of Engineers – Savannah District, and the Natural Resource Conservation Service.
- **Identify Hazards.** As part of background for the flood mitigation plan interviews were conducted with City department representatives to understand how members of the Committee perceive the impacts past events and how hazards are incorporated into routine responsibilities (detailed notes on the interviews are on file in the Planning Commission). Flood maps prepared by FEMA can be used to show flood-prone areas, although some areas not shown are known problem areas. A number of dams are located within the City and on waterways that drain through the City. Other hazards examined include hurricanes/tropical storms, severe storms and high winds, drought, tornadoes, winter storms and urban wildland interface fires. Hazardous materials are generally confined to fixed facilities or within defined transportation corridors.
 - **Review How Hazards are Addressed.** During interviews, the roles of each program were described with respect to whether and how flood hazards are included in routine functions. City departments and representatives of Blythe and Hephzibah contributed descriptions of how other hazards are addressed.
 - **Assess Risks.** For the purpose of this Plan, site-specific risk assessments were not prepared. The available floodplain mapping is the Flood Insurance Rate Maps (panels are dated February 1987, January 1995, and March 1999). The City's GIS uses the digital version of the FIRM (Q3 Flood Data). The U.S. Army Corps of Engineers is developing new floodplain mapping for four watersheds and FEMA has indicated that revision of the City's maps is a high priority under the Map Modernization Program recently funded by the U.S. Congress. FEMA's loss estimation model (HAZUS-MH[®]) was used to estimate losses and identify risks for other hazards.
 - **Create Goal Statement.** The mitigation goal statement was established as part of the flood mitigation planning process; it was confirmed during the multi-hazard mitigation planning process.
 - **Review Mitigation Actions.** A list of tentative mitigation actions was prepared based on meetings and interviews as well as knowledge of successful actions implemented in other communities. The list was distributed to staff and discussed at committee meetings. Changes were made and a revised list was distributed for members to indicate priorities (Drop, No Opinion, Low, Medium, High) based on their program's functions and priorities; all rankings were composited to represent the consensus.
 - **Draft Action Plan.** Information collected and notes from meeting discussions were compiled into a format prescribed by GEMA. The draft was circulated to Mitigation Planning Committee members and staff and electronic copies were provided to adjacent communities and pertinent state and federal agencies.
 - **Hold Public Meetings.** On February 2, 2005 a public meeting was held to introduce the planning process to interested citizens. Three notices advising of the availability of the Public Review Draft Plan were published in the *Augusta Chronicle* and on the City's webpage. Prior to adoption, a public meeting to present the Draft Plan was held on

September 15, 2005. Multiple public notices were published, the City webpage included the announcement and the Draft Plan, and numerous flyers were posted in the City's main office building. The public notices and notifications are in Appendix A-1. No members of the public attended. One set of comments was received by e-mail, specifically addressing concerns not directly related to natural hazard mitigation, but addressing chemical companies in Augusta and surrounding counties, the transport of chemicals, petroleum pipelines, Volunteer Organizations Active in Disasters, citizen involvement in the Local Emergency Planning Committee, and responding to the concerns of special needs populations impacted by disasters.

- **Adopt Plan.** Copies of the resolutions of adoption are found in Appendix A-3.

1.2.3 Committee Meetings

Four meetings of the Mitigation Planning Committee were held (agendas and attendees are in Appendix A-2; meeting minutes are on file with the Planning Commission):

- **February 1, 2005.** Overview of the mitigation planning process, discussion of hazard identification and risk assessment and how hazards have affected the area in recent years.
- **February 4, 2005.** Reported on the public meeting and discussion of how agencies handle hazards as part of their responsibilities (pre-event and post-event).
- **April 28, 2005.** Confirm the mitigation goal statement, review on-going mitigation actions and actions identified in the *Flood Hazard Mitigation Plan (2004)*, and discuss potential mitigation actions.
- **September 16, 2005.** Discuss mitigation actions (to be circulated for members to indicate priorities for final ranking); designate lead agencies; discuss effectiveness statements, barriers and limitations. Upon inclusion of revisions to address GEMA's preliminary comments, the Committee anticipates forwarding the Plan for adoption by the Augusta Commission, the councils of Blythe and Hephzibah, and forwarding to GEMA and FEMA. Augusta and the cities will adopt the Plan in final form subsequent to FEMA's approval.

1.3 Organization of the Plan

This Plan is organized according to a template required by GEMA and prepared specifically to satisfy the requirements of FEMA's pre-disaster mitigation planning regulations. Some content is required as part of the planning requirements of FEMA's Flood Mitigation Assistance Program. The general organization of the Plan addresses:

- **Chapter 1 – Introduction.** Provides an overview of the Plan, the areas included in the Plan (Augusta, Blythe, and Hephzibah) and the process followed to produce the document
- **Chapter 2 – Natural Hazards, Risks and Vulnerabilities.** This chapter includes sections for the hazards examined: flooding, high winds (including tornadoes and severe storms), winter storms, drought, and urban wildland interface fires. Each section profiles

the hazard and past events, approximates the frequency of occurrences, inventories exposed assets and estimates losses.

- **Chapter 3 – Technological Hazard.** An overview of hazardous materials is provided.
- **Chapter 4 – Natural Hazards: Mitigation Actions.** For each hazard described in Chapter 2 that is determined to have the potential for significant impact, this chapter includes a brief description of how the hazard is addressed in existing policies and regulations. In addition, a range of mitigation options is briefly described and proposed mitigation actions that were determined by the Planning Committee to be high priority for the next five years are described.
- **Chapter 5 – Technological Hazard: Mitigation Action.** An action related to the intersection of flooding and hazardous materials is identified.
- **Chapter 6 – Capability to Address Hazards.** Provides an overview of how Augusta, Blythe and Hephzibah deal with hazards in their development processes.
- **Chapter 7 – Executing the Plan.** Details steps involved in implementation, evaluation and revision of the Plan.
- **Chapter 8 – Conclusion.**

1.4 The Planning Area

The planning area includes the City of Augusta and the cities Blythe and Hephzibah. In 1996, the City of Augusta and Richmond County consolidated governments and is now known as the City of Augusta, located in central eastern Georgia (Figure 1-1). Fort Gordon, a federal military installation, is not included in the planning area.

Augusta is a central city in the Augusta-Aiken, GA-SC Metropolitan Statistical Area (MSA). Other counties in the MSA are Columbia and McDuffie in Georgia, and Aiken and Edgefield in South Carolina.

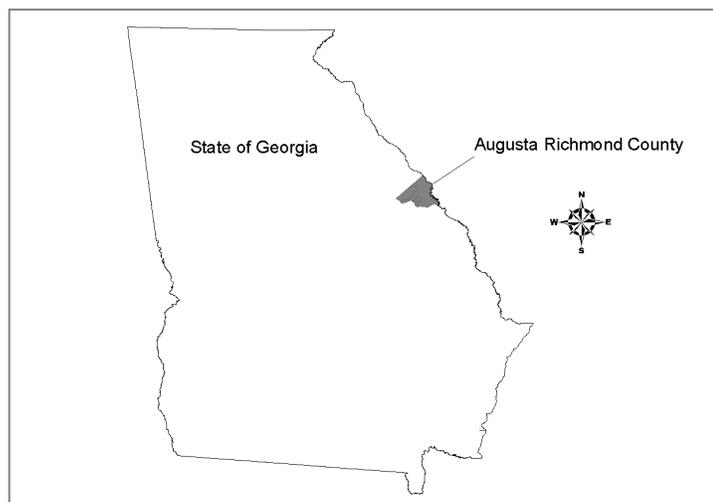


Figure 1-1. Vicinity Map: State of Georgia.

The total area is 210,029 acres (includes Blythe with 695 acres, Hephzibah with 11,976 acres, and Fort Gordon with 44,286 acres). Today, the City of Augusta comprises 152,072 acres (the former City was 13,108 acres and the former County was 139,964 acres).

1.4.1 Geography & Climate

The topography of the Augusta area consists chiefly of rolling hills, with occasional steep hills. The soils within the watersheds and floodplains are composed of highly erodible, coarse sands. Elevations of the terrain vary from approximately 110 feet in the swampy areas adjacent to the Savannah River to a maximum of approximately 520 feet in the headwaters.

In the east portion of Georgia, large storms that produce flooding are usually of the frontal type, lasting 2 to 4 days and affecting large areas. Summer thunderstorms with high rainfall intensities may result in local flooding. The Augusta area is vulnerable to storms associated with hurricanes and tropical storms that move through the area, primarily in late summer and early fall.

1.4.2 Population & Economy

Historically, Augusta's development was concentrated around the Savannah River and trading routes. Modern transportation, especially railroads, spurred growth to the south and west. In the twentieth century, the City annexed incorporated places and unincorporated areas. Rural patterns characterized most of Richmond County and the City of Augusta until about the 1940s.

Suburban development began in earnest following World War II and continued to the present. The character, age and condition of the housing stock reflect these trends and the expansion of commercial and industrial facilities that accompanied that growth.

Augusta's population and household characteristics reflect those of an older city that has merged with new suburbs (see Table 1-1). Although they are both small, the cities of Blythe and Hephzibah have both seen dramatic population increases in the past 10 years. The 2000 U.S. Census showed that compared to other counties in the immediate region and the rest of the state, the overall growth rate between 1990 and 2000 was relatively low at 5.3% (even slower than for the period 1980-1990). The state as a whole has experienced a 26.4% growth in population. Figure 1-2 shows population by census tract; the smaller census tracts, in the vicinity of the former city, indicate denser populations.

**Table 1-1
Past Population Trends (1980-2000).**

	1980	1990	2000	Growth for 1990-2000
Unincorporated Richmond County	132,280	142,314	195,182*	4.4%
City of Augusta	47,532	44,639		
City of Hephzibah	1,452	2,466	3,880	57%
City of Blythe	365	300	713	138%
Combined	181,620	189,719	199,775	5.3%

* Consolidation of City of Augusta and Richmond County occurred in 1996

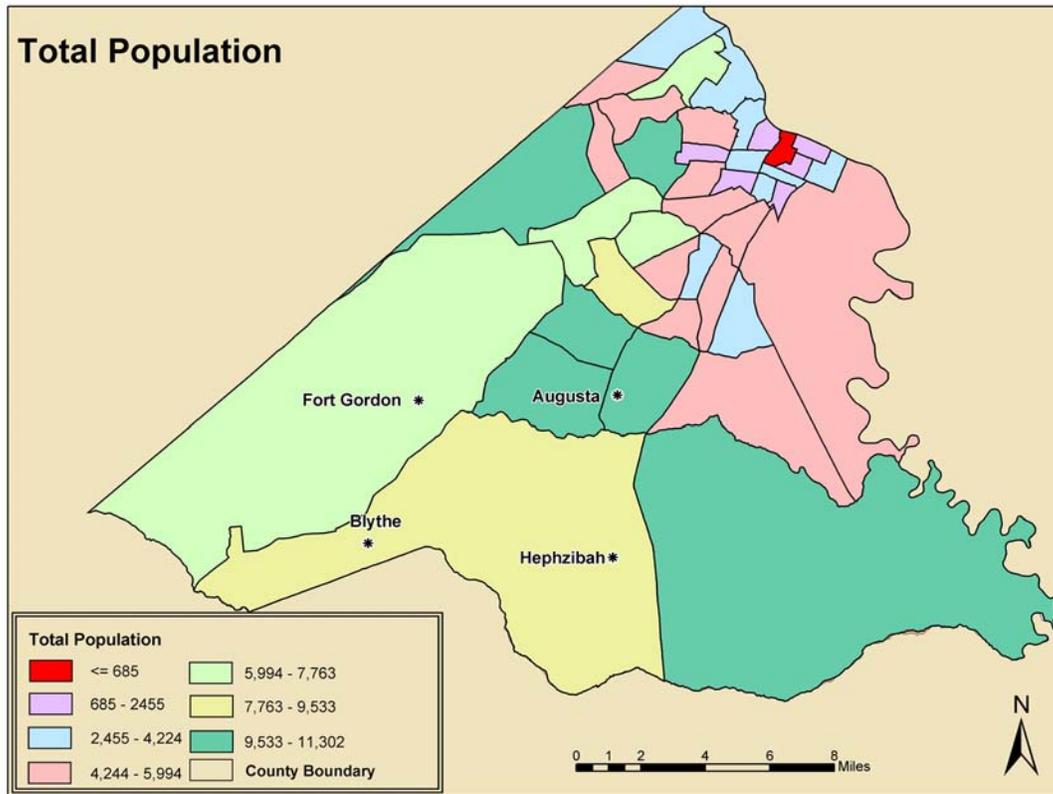


Figure 1-2 Population Density, by U.S. Census Tract (data from HAZUS)

Based on the results of the 2000 census, Augusta’s household estimate is 72,307 (up from 67,752 in 1990). The number of households in Hephzibah and Blythe has increased by 552 and 139, respectively. Projections of population growth for the next 20 years show an overall growth rate of 10.3% (Table 1-2).

Table 1-2
Future Population Trends (2005-2025).

	2005	2015	2025	Growth for 2005-2025
City of Augusta	199,084	208,856	219,642	10.3%
City of Hephzibah	3,953	4,148	4,263	7.8%
City of Blythe	743	769	810	9%
Combined	203,771	213,773	224,715	10.3%

The Augusta area has a diversified economy, with approximately 75% of employment in the service, retail trade and manufacturing sectors. Manufacturing facilities produce textiles, paper products, chemicals, transportation equipment, and food products. Retail is concentrated downtown and in shopping centers on major roads, with some individual sites. The large commercial Augusta Mall and Augusta Exchange draw customers from throughout the region.

Major employers in the service sector include health care and related facilities, educational institutions, and service businesses. Eight hospitals and numerous ancillary facilities provide a wide range of jobs. Major educational institutions providing employment include the Medical College of Georgia, Paine College, Augusta State University, Augusta Technical College, and the Richmond County Board of Education.

Fort Gordon is the home of the U.S. Army Signal Center, the world’s largest training facility for communications and electronics. The Fort accounts for employment of about 17,000 area residents, 10,000 of whom live off base. The Savannah River Site, located in South Carolina, is a key Department of Energy nuclear installation that draws employees from throughout the area, including approximately 1,600 residents of Augusta.

1.4.3 Land Use & Growth

The Augusta-Richmond County Comprehensive Plan (2004)* describes Augusta’s development has having been influenced by major historic events, changes in the nation’s economy, advancements in transportation and communication systems, improvements in building practices, and national trends in the growth of urban areas. Land use patterns also have been influenced by damaging events. In its early history, periodic outbreaks of disease and flooding along the Savannah River have made areas outside of low-lying downtown Augusta more desirable. The

* Available online at http://www.augustaga.gov/departments/planning_zoning/comp_plan.asp

March 1916 fire destroyed many downtown buildings and displaced residents of the Olde Town neighborhood.

More recently, growth has spread outside of the old city as residential subdivisions were developed in south and west Augusta in response to demand for newer housing. Suburban shopping centers, malls and office complexes were built to serve the new residential areas and provide more jobs. Figure 1-3 illustrates land use as of 2005 and Table 1-3 shows the breakdown, by land use, for 2003 and projections for 2025.

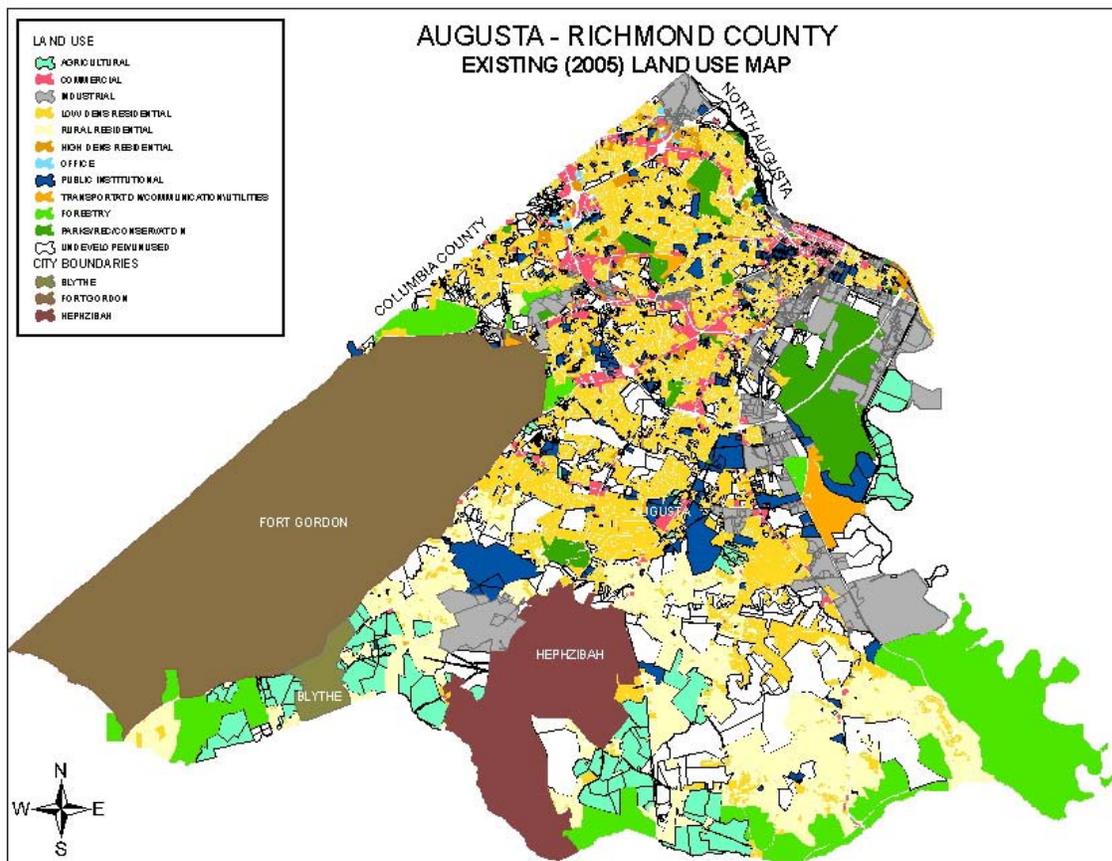


Figure 1-3. Existing Land Use (2005).

Table 1-3

Augusta: Current and Future Land Use.

Land Use	2003 (acres)	2025 (acres)	% Change
Residential	52,052	59,886	+15%
Professional Office	635	985	+55%
Commercial	5,081	6,371	+25%
Industrial	9,203	11,174	+21%
Public/Institutional	8,467	8,869	+5%
Fort Gordon	44,286	44,286	0
Transportation, communication, utilities	11,520	11,770	+2%
Park, recreation, conservation	5,873	12,296	+109%
Agriculture	10,528	6,228	-41%
Forestry	18,708	15,902	-15%
Undeveloped, unused, open water	29,794	18,380	-38%
Total	196,147	196,147	

Source: Table L-2 from Comprehensive Plan

The total number of parcels of land changes regularly, especially when subdivisions are created. However, as of mid-2003, a total of 75,281 parcels were platted in the land records (and available in the City’s computer mapping). Table 1-4 shows the distribution of parcels by Augusta’s Commission District (see Figure 1-4). At this time, limitations of the database do not allow determination of the number of vacant parcels (vacant parcels can be used to infer some characteristics of growth potential).

In terms of future development, over the next twenty years, new residential development in Augusta is expected to include a mix of housing types in a variety of settings. The majority of new units are expected to be single-family detached units in conventional suburban subdivisions. Areas in south Augusta and west of Augusta Mall are the most likely locations for both new site-built units and manufactured housing units. Higher-density single-family residences and apartments

Table 1-4

Number of Land Parcels.

Commission District	Total Parcels
District 1	11,438
District 2	10,243
District 3	8,067
District 4	8,279
District 5	8,585
District 6	8,502
District 7	9,008
District 8	11,159
Total	75,281

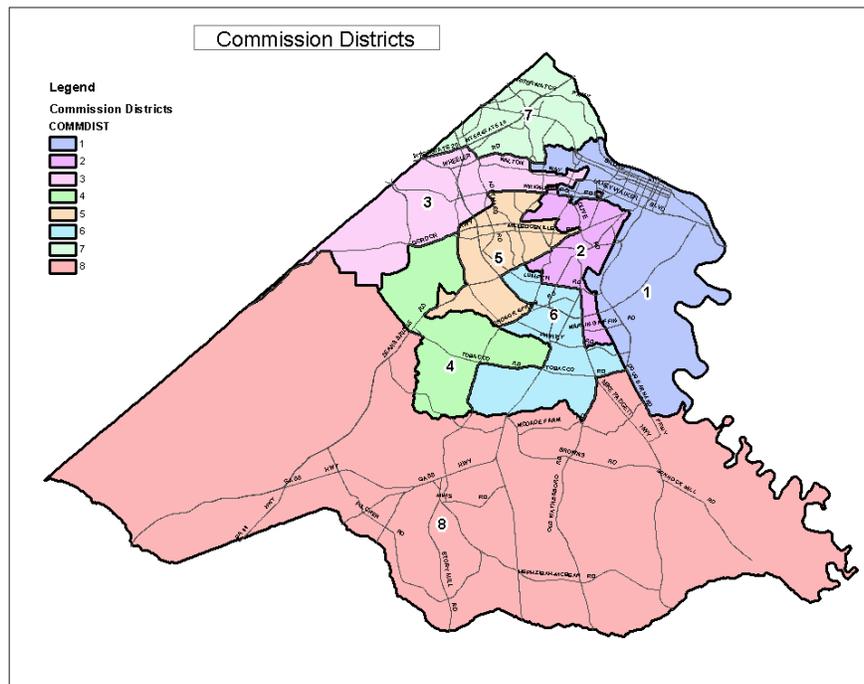


Figure 1-4. Augusta's Commission Districts

will be sited where land is in short supply and where proximity to employment and commercial centers is important. Infill residential development will continue in older neighborhoods and additional downtown buildings will be converted to residential use.

The majority of new commercial development will be attracted to sites located in the suburbs and transitional urban/rural areas. Sites on roads and intersections with high vehicle traffic counts will continue to be especially attractive. Some of the new and expanded retail and professional office development will be attracted to the revitalized downtown and inner city neighborhoods.

New industrial development will be located in the Augusta Corporate Park and on other sites suitably zoned and with good connections to the surface and air transportation networks, located mostly in east and south Augusta.

1.4.4 Building Inventory

Building inventory information is based in part on the U.S. Census of 2000 which is embedded in FEMA's loss estimation model (HAZUS-MH[®]) and the Geographic Information System (GIS) digital maps and data provided by Augusta. Appendix B-1 contains a brief description of

HAZUS-MH[®]), a GIS-based program designed to provide planning-level information to help communities estimate risks due to some natural hazards.

The GIS data from the City yields only building footprints, it is not connected to the database used for tax assessment purposes and therefore does not yield detailed information on individual structure age, building use, or type of construction. However, the characteristics of the building inventory can be inferred from the U.S. Census of 2000, which is summarized in the City's Comprehensive Plan.

Some very general statements can be made about the vulnerability of buildings to damage due to natural hazards, particularly those with wide-spread impacts such as wind and heavy snow loads. Flood hazards have more narrowly defined impact areas. General statements regarding vulnerability include:

- Residential buildings tend to be more susceptible to high winds and snow loads
- Older buildings that predate the building code may be more susceptible; and
- Manufactured housing is the most susceptible form of building.

For the Augusta area, Table 1-5 shows the distribution of the building inventory by building use as reported by the Tax Assessor's Office (2004 Digest). The average dollar values are intended only for comparison purposes. Table 1-6 shows that the majority of buildings in the area are wood-framed construction.

**Table 1-5
Augusta Area: Buildings and Estimated Values.**

Building Use	Number of Buildings⁺	Average Value	Total Assessed Value (40% of Fair Market)
Residential	63,995	\$22,150	\$1,417,809,000
Commercial	12,769	\$51,100	\$652,826,000
Industrial	353	\$103,600	\$36,563,000
Agriculture	383	\$21,600	\$8,287,000
Religious	1,826*	\$51,600	\$94,179,000
Government	2,077*	\$112,400	\$233,377,000
Educational	775*	\$53,300	\$142,967,000
Historic	80	\$76,600	\$6,126,000
Residential Transitional	6	\$14,000	\$84,000
Totals	82,264	-----	\$2,592,218,000

⁺ 2004 Digest, Augusta Tax Assessor's Office

* Include improved and unimproved/vacant parcels

Table 1-6
Building Inventory, by Type of Construction.

	Augusta, Hephzibah & Blythe
Wood	79%
Masonry	8%
Concrete	<1%
Steel	1%
Manufactured housing	11%

Source: U.S. Census 2000 embedded in HAZUS

For residential structures in Augusta, Hephzibah and Blythe, Table 1-7 breaks down building age and Figure 1-5 illustrates the average age of buildings in each census tract. For the region as a whole, most residential buildings were constructed in the 1970s and 1980s. Growth in the Augusta area was most significant in the 1970s, while Hephzibah and Blythe saw the most growth in the 1990s. Table 1-8 shows the distribution of housing by type (1-2 family, multifamily, and manufactured housing units).

Table 1-7
Housing, by Year Built (as a percent of all housing).

	Augusta	Hephzibah	Blythe	Combined	
Built 1999-2000	1.5%	3.2%	6.6%	1,244	1.5%
1990 to 1998	13.6%	28.9%	27.9%	11,406	13.8%
1980 to 1989	18.9%	25.2%	19.0%	15,616	19.0%
1970 to 1979	20.8%	21.7%	9.2%	17,140	20.8%
1960 to 1969	14.2%	9.5%	11.0%	13,764	16.7%
1950 to 1959	16.9%	5.7%	7.7%	11,589	14.1%
1940 to 1949	6.5%	0.7%	5.5%	5,300	6.4%
1939 or earlier	7.6%	5.1%	13.2%	6,253	7.6%
Housing Totals	80,646	1,393	273	82,312	

Source: U.S. Census 2000 Summary, shown in the Comprehensive Plan

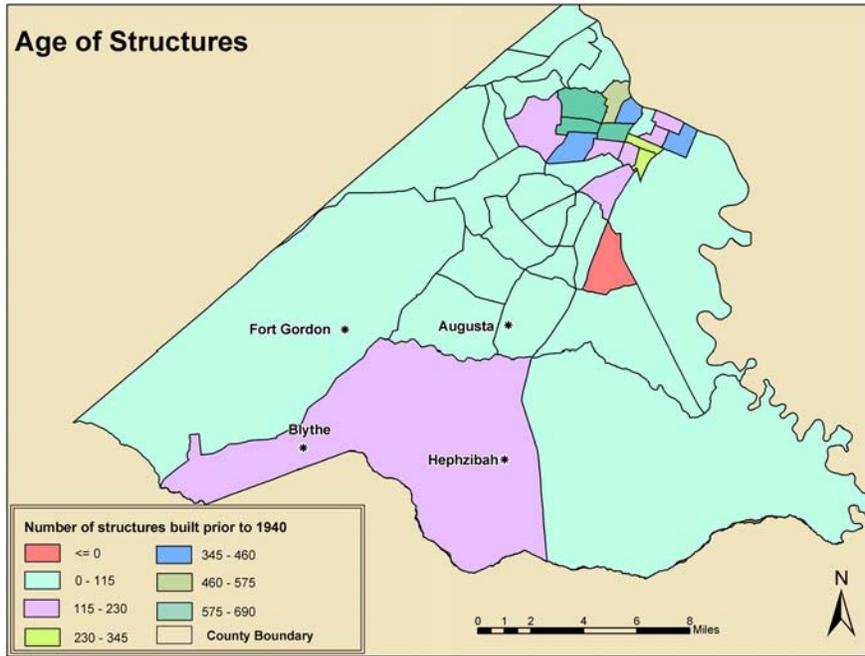


Figure 1-5. Average Age of Structures, by Census Tract

Table 1-8

Housing Units in Augusta, Hephzibah & Blythe (2000).

1-2 family dwelling units	56,436	68.6%
Multi-family dwelling units	18,299	22.2%
Manufactured housing units	7,580	9.2%
Total	82,312	

Source: U.S. Census 2000 Summary, shown in the Comprehensive Plan

1.4.5 Critical & Essential Facilities

Critical and essential facilities are facilities that warrant special attention in preparing for a disaster. They may provide important community services during and immediately after a disaster event, depending on the nature and duration of an event. Critical facilities are involved in response, such as police stations, fire/emergency medical services stations, and medical centers/hospitals, schools, public buildings, utility networks, and certain transportation facilities.

In late 2004, the GEMA and the Georgia Department of Community Affairs provided basic data on over 200 facilities in the Augusta, including “other points of interest,” which also include

parks, museums, and private schools. The State requested that additional data be collected and reported using an online tool (see listing in Appendix B-2). The data collection forms are retained by the Augusta Emergency Management Agency. Table 1-9 summarizes the number of facilities, by type, and Figure 1-6 shows the locations. All data and figures related to critical facilities are based on refined geocoded point data developed by Augusta GIS rather than the online data and mapping tools provided by GEMA.

**Table 1-9
Critical and Other Facilities*, by Jurisdiction (2005).**

Facility Type	Augusta	Hephzibah	Blythe	Total
Airport	3	-	-	3
Correctional	6	-	-	6
Educational (public & private)	95	4	1	100
Emergency Services	3	-	-	3
Fire Station	21	1	1	23
Landfill	1	-	-	1
Law Enforcement	6	1	1	8
Library	5	-	-	5
Medical	23	-	-	23
Public Building	10	1	1	12
Waste Water Treatment Plant	2	1	-	2
Water System	2	2	4	8
Other (recreational)	31	1	-	32
Total	208	11	8	227

* Includes multiple buildings on single property/facilities

Sources: Comprehensive Plan; reported by owners; on file with Augusta OEM and GEMA

1.5 Hazard Summary

Between 1965 and early 2005, the State of Georgia experienced 23 natural hazard events that were of sufficient magnitude that they were declared major disasters by the President: nine were for tornadoes (some including flooding impacts); six for flood; four for winter storms; three hurricane/tropical storms; and one dam failure. Of those declared events, only two flood disasters included the Augusta area (and damage was sustained only in the City of Augusta). Major disaster declarations are only one measure of a community's hazards and risks. Hazards are distinct from risks (see selected Key Terms in Appendix C). A hazard is the natural event that has the potential to cause damage or injury; risk is the potential losses associated with a hazard. A hazard does not necessarily present a risk, for example, a waterway that rises out of its banks to flood undeveloped areas does not cause damage and therefore it not a risk.

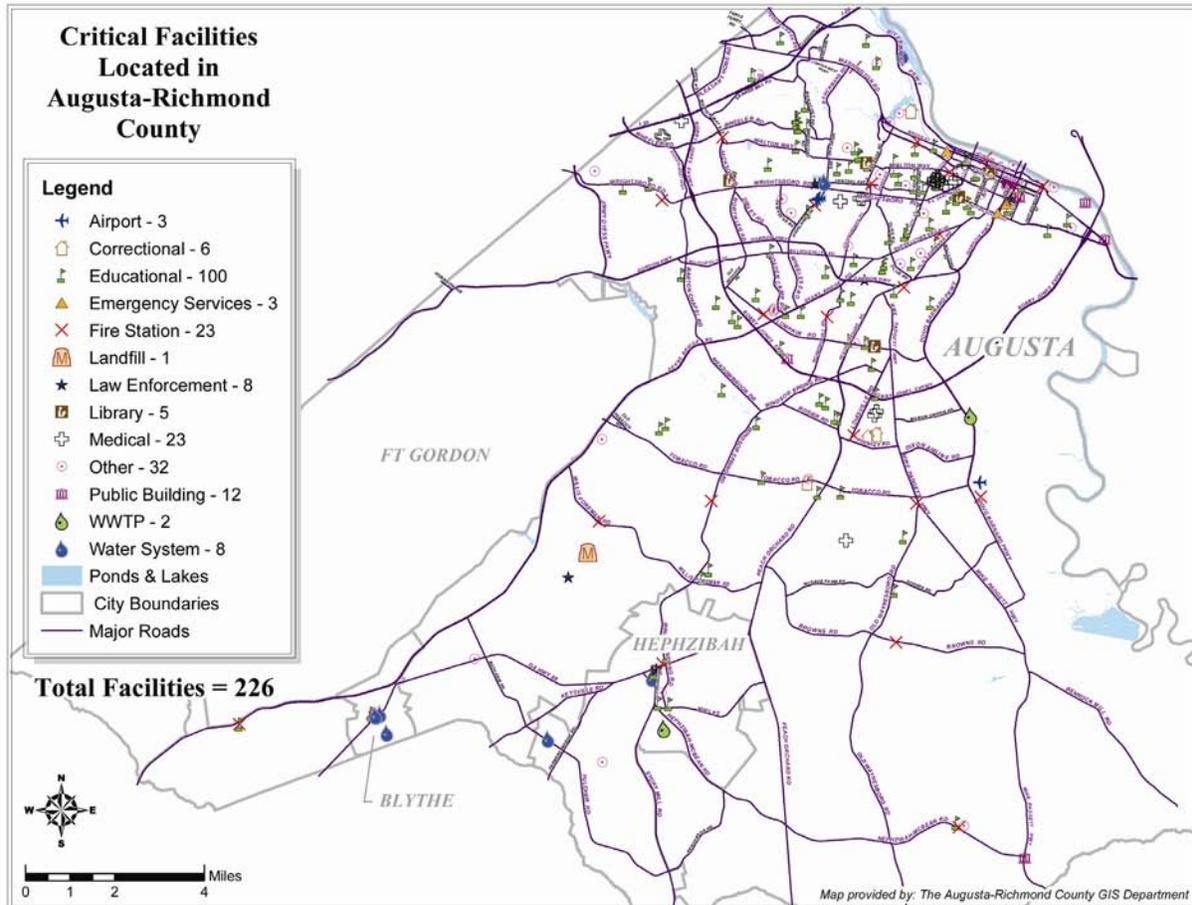


Figure 1-6. Critical & Essential Facilities.

The hazards considered in the Plan include flooding, tornadoes, urban wildland fire, hurricanes, winter storms, drought, high winds, and hazardous materials. When these hazards are reviewed, it becomes apparent that some events occur frequently and some are rare. Some hazards impact large numbers of people to a limited degree (e.g., winter storms), while others may cause very localized but very significant damage (e.g., tornadoes). Man-made or technological hazards are addressed in other emergency plans, including hazardous materials, radiological incidents, and terrorism.

1.5.1 Hazard History

Numerous federal agencies maintain a variety of records regarding losses associated with natural hazards. Unfortunately, no single source offers a definitive accounting of all losses. The Federal Emergency Management Agency maintains records on federal expenditures associated with declared major disasters. The U.S. Army Corps of Engineers and the Natural Resources Conservation Service collect data on losses during the course of some of their ongoing projects and studies. Additionally, the National Climatic Data Center of the National Oceanographic & Atmospheric Administration (NOAA) collects and maintains certain data in summary format, indicating injuries, deaths, and costs (<http://www.ncdc.noaa.gov/oa/climate/severeweather/extremes.html>). In the NCDC database, the basis of the cost estimates is not identified and the reports are not independently verified.

Information about past occurrences of hazard events is gathered from research into available anecdotal sources and sources of public data, including historical documents, newspapers, reports, and Internet websites. Online data and maps accessed include the U.S. Geological Survey (USGS), the Spatial Hazard Events and Losses Database for the United States (SHELDUS, <http://nationalatlas.gov/sheld0m.html>), and the Tornado Project (<http://www.tornadoproject.com>).

Natural hazard events that exceed the ability of state and local governments to respond may be declared major disasters and other events may be declared emergencies. Since 1965, the State of Georgia has received more than 20 major disaster declarations for flood, winter storms, tornadoes, high winds, heavy rains, hurricanes and one dam break.

Since 1965, Augusta area (Richmond County prior to consolidation) has been included in two major disaster declarations, both for flooding. Other significant events are listed in Table 1-10.

Table 1-10. Selected Recent Floods and Declared Disasters.*

Date & Disaster (DR)	Nature of Event
October, 1990 (DR 880)	Flood: Flooding caused by convergence of Tropical Storms Klaus and Marco, causing two days of rain, with amounts as much as 15" measured in places. Estimates of damage exceeded \$150 million.
October, 1990	Flood: Local rainfall exceeded 8.5 inches, producing flooding characterized as the 100-year flood.
August, 1992	Flood: Intense rain caused rapid local flooding of homes and numerous roads, resulting in evacuations in the Hollywood Subdivision.
August, 1994	Flood: The Weather Bureau reported 4.2 inches in a 24-hour period.

Table 1-10. Selected Recent Floods and Declared Disasters.*

Date & Disaster (DR)	Nature of Event
September, 1995	Flood: 3.75 inches of rain, characterized as a 10-year storm, caused flooding, resulting in evacuations of 12 families in the Hollywood Subdivision and traffic accidents along Rocky Creek.
March, 1996	Flood: Thunderstorms in the Augusta area send several streams over their banks and into homes, including the Hollywood Subdivision. The flash flooding also closed several major highways which were under water. Rainfall amounts of 2-4 inches occurred in a six to nine hour period over southern Columbia and northern Richmond counties.
March, 1996	Severe Storms & Wind: An intense microburst caused \$2 million in damage to 25 homes in Goshen, GA which is just south of Augusta. Nearly a thousand trees were damaged or destroyed, including 400 trees on a golf course. The damaged area of homes was 1/4 by 1/2 mile in size.
December, 1997	Flood: Flash flooding along several creeks flooded several highways including Richmond Hill Road.
March, 1998	Flood: Rae's Creek flooded low lying areas and approached some homes but no flooding in homes was reported.
March, 1998 (DR 1209)	Flood and Winter Storm: More than 3-inches of rain fell on saturated ground, resulting in approximately 10-year flooding; residential and road flooding in the Rocky Creek area.
September, 1998	Flood: EPD reported 8.5 inches of rain from Tropical Storm Earl over a 14-hour period caused flash flooding along several streams. About 50 people were evacuated from two subdivisions, several streets were closed, and one shelter was opened to house 82 people.
June, 2000	Flood: After a prolonged dry period, more than 3 to 5 inches of rain fell over the area, flooding I-20 and other streets, forcing sewage backups; and inundating many homes along Rocky Creek, Rae's Creek and Crane Creek.
December, 2000	Tornado: An F-2 tornado intermittently touched down along a 2-mile path. Extensive damage was done to the Timberridge Subdivision and to other homes and mobile homes along its path. Eight people were injured, one seriously. There were no deaths. [Begin 33°19'N / 81°58'W; end 33°20'N / 81°58'W]
May, 2002	Thunderstorm: Winds up to 70 miles per hour reportedly damaged trees and golf ball sized hail was observed near Hephzibah
May, 2002	Flood: The Augusta Emergency Operations Center reported several streams flooding with water covering roadways and stranding cars. Water was 3 to 4 feet deep in some areas.
July, 2003	Flood: Locally intense storms hit several watersheds, most significant damage appears to be due to overflow and washout of ponds sustained by Alexander Place Apartments, Brandywine Apartments, Iron Horse Apartments, Forest Hills Racquet Club Apartments, Thornberry Apartments, and Arborside Apartments). Numerous homes were surrounded by water or had flooded yards. About 30 roads were reported as flooded; one rescue was performed.
January, 2004	Ice Storm: Portions of Augusta were affected by a storm that deposited 0.25-0.75 inch of ice in Lincoln, Columbia and McDuffie counties. Due to the amount of debris, trash collections were delayed.
March, 2004	Brush Fires: Fanned by unusually high winds and dry conditions, the Augusta Fire Department responded to more than 18 brush fires, most thought to have been started by embers from trash burning.
July, 2004	Heat: Cooling centers were opened at 7 locations although usage was light.

Table 1-10. Selected Recent Floods and Declared Disasters.*

Date & Disaster (DR)	Nature of Event
March, 2005	High Winds: Augusta Regional Airport reported winds of nearly 30 mps with gusts of more than 40 mph. Downed power lines and tree limbs contributed to traffic problems and accidents.

* Sources: NCDC Online (1950-2004; some data gaps and few descriptions); NWS Local Climatological Data; City's 1998 Mitigation Plan; FEMA records (www.fema.gov), The Augusta Chronicle.

1.5.2 Weather-Related Deaths

The National Climatic Data Center, an agency of the National Oceanic and Atmospheric Administration, maintains records of reported weather events, including floods, tornados, thunderstorm winds, severe winter storms, and lightning. The database extends back to 1950, although more reports were made the last two decades. This is due to increased density of observation stations and population increases which result in more people exposed to weather events. The database is online at <http://www.ncdc.noaa.gov/oa/climate/severeweather/extremes.html> (under “Local Storm Events”). A summary of deaths and injuries in the State of Georgia and the Augusta area is shown in Table 1-11.

**Table 1-11
Weather-Related Deaths and Injuries (1950-2003).**

	State of Georgia		Augusta Area	
Hazard	Deaths	Injuries	Deaths	Injuries
Flood	29	16	0	0
Tornado/winds	129	2,843	1	21
Lightning	14	146	0	1

1.5.3 Losses Due to Major Disasters

No definitive record exists of all losses – public and private – due to disasters for the Augusta area. For the United States as a whole, estimates of the total public and private costs of natural hazards range from \$2 billion to over \$6 billion per year. The costs of responding to and recovering from events that do not rise to the level that prompts a Presidential disaster declaration are borne entirely by citizens and local governments. In most declared major disasters, the federal government reimburses 75% of the costs of cleanup and recovery, with the remaining 25% covered by the state and affected local jurisdictions who are responsible for all or a portion of costs associated with:

-
- Public assistance for debris removal, emergency works, roads and bridges, flood control facilities, public buildings and equipment, public utilities, and parks and recreational facilities;
 - Assistance paid out for individual and family grants, emergency food and shelter, and other assistance to individuals; and
 - Funds set aside to support hazard mitigation grants.

Although detailed records from past declared disasters are not available, Augusta’s staff report that the City has received payments to pay for repair of public infrastructure and public buildings; debris removal and staff overtime. GEMA reports that the City (and County prior to consolidation) received public assistance funds totaling \$3.7 million for the flood disaster in October 1990. Damaging events that do not prompt a major disaster declaration also generate debris. The City’s direct costs to handle debris due the severe ice storms in January 2004 were \$322,364. These costs were borne fully by the City without reimbursement from the State or FEMA. It is notable that these costs do not include foregone revenue due to waiving landfill fees.

1.5.4 Relative Ranking of Hazards

Based on a variety of readily-available data, including records from recent years, local input, and data from various State and Federal agencies, a statement can be made to characterize the frequency of occurrence of each hazard reviewed (flooding, drought, hurricane/tropical storm, high winds/severe storms, tornadoes, winter storms, wildfire/urban interface fire, hazardous materials). These characterizations are not statistical statements of probability, but are general in nature. They are simply derived by determining the average number of occurrences over a period of record.

Chapter 2 summarizes information about selected natural hazards: flood (including tropical systems and dam failure); high wind/severe storm (including tropical systems; tornado; winter storm; drought; and urban wildland interface fire. Chapter 3 addresses hazards associated with hazardous materials as they relate primarily to flood hazards. Appendix B-2 contains content related to selected hazards that is made available by GEMA via its online Critical Facility Inventory, along with a list of the facilities included.

Based on the summarized research, Table 1-12 shows that each hazard was assigned a relative risk ranking of low, moderate, or high. A relative risk ranking of low does not imply that a hazard with this ranking will not occur; it simply indicates that the hazard has not occurred or has occurred very infrequently during the period of record, or is unlikely to cause significant impact.

Table 1-12. Relative Risk Ranking.

Hazard	# Events	Years of Record	Frequency (#/year)	Relative Severity*	Relative Risk Ranking**
Flood (including tropical systems and dam failure)	16	15	1/year	Locally Severe	High
High Wind/Severe Storms	±100 (thunderstorms)	53	2/year	Moderate to Locally Severe	High
Hurricane/Tropical Storm (resulting in wind and flood damage)	35	53	< 1/year	Moderate Countywide	(Included in Flood & High Wind)
Tornado	8	53	< 0.2/year	Locally Severe	(Included in High Wind)
Winter Storm	8	24	< 0.3/year	Moderate Countywide	Moderate
Drought	2	53	< 0.1/year	Moderate Countywide	Moderate
Urban Wildland Interface Fire	3,800	46	82	Moderate Locally severe	Moderate
Hazardous Materials Incidents (weather-related)	0	30	N/A	Minor	Low

* A qualitative statement; some hazards affect small areas with considerable damage to buildings, others may affect the entire planning area with generally minor damage and impacts

** A qualitative statement based on a combination of frequency and relative severity

1.6 Mitigation Goal

State and federal guidance and regulations pertaining to mitigation planning require the development of a mitigation goal statement that is consistent with other goals, mission statements and vision statements. The Mitigation Planning Committee reviewed FEMA's national mitigation goals, several examples of goal statements from other states and communities, and the Georgia State Mitigation Goal. The committee also considered information about natural hazards that may occur in the City and their potential consequences and losses. The final mitigation goal statement is as follows:

The Augusta Area Hazard Mitigation Goal Statement

It is our goal to protect public health, safety and welfare and to reduce losses due to natural hazards (floods, high winds, winter storms, drought, and urban wildland interface fires):

- *By identifying hazards (especially flood and drainage problems);*
- *By guiding development away from flood hazard areas to support preservation of greenspace and sensitive areas;*
- *By identifying and pursuing mitigation measures to reduce exposure of citizens and property to natural hazards; and*
- *By increasing the public’s awareness of their obligations and responsibilities for personal planning, preparedness and recovery.*

The Mitigation Planning Committee discussed the value of making the goal statement broad to allow for comprehensive interpretation of its phrasing, for example:

- “Protect health, safety, and welfare” is broad enough to include the concept of applying development controls (permits) to avoid development in floodplains and, if avoidance is not feasible, to build according to regulations that reduce the potential for damage. The phrase is also broad enough to include undertaking projects intended to deal with specific properties, such as administering grants for acquisition, protecting park buildings, or working with others if a structural flood control project is deemed appropriate.
- The statement clearly distinguishes between new and existing development. The second bullet is focused on new development while the third bullet is specific to dealing with existing people and property that are exposed to flood hazards; in this statement “property” includes private property and public property and infrastructure.
- The last bullet is distinctly different in that it is directly related to what citizens can do – mitigation is a partnership. Citizens have obligations to comply with rules (for example, to dispose of yard waste properly rather than dump in drainageways and to obtain permits). Citizens have responsibilities to take reasonable preventive actions to protect themselves and their property and to facilitate their own recovery. In this context, “responsibilities” apply to safety (such as not driving through flooded roads); property protection (such as modifying buildings or how flood-prone space is used); and financial protection (buying flood insurance).

Table 1-13 shows how the mitigation actions summarized in Table 1-14 support the Mitigation Goal. Details on the actions are found in Chapter 4 and Chapter 6. A number of actions support more than one element of the goal.

Table 1-13
Linking Mitigation Goal & Actions.

Element of Goal Statement	Actions Relating to Goal
Identifying hazards (especially flood and drainage problems)	A, E, F, R
Guiding development away from flood hazard areas to support preservation of Greenspace and sensitive areas	A, E, F, J
Identifying and pursue mitigation measures to reduce exposure of citizens and property to natural hazards	A, B, D, E, G, H, J, K, M, N, O, P, Q, R, S
Increasing the public's awareness of their obligations and responsibilities for personal planning, preparedness and recovery	C, H, I, J, K, L, O, R

Table 1-14
Summary of Mitigation Actions.

Jurisdiction & Action	Action Title
Augusta Action A	Drainage and Stormwater Management
Augusta Action B	Sewer Line Infiltration & Inflow
Augusta Action C	Public Awareness Initiative
Augusta Action D	Soil Erosion and Sediment Control
Augusta Action E	Flood Mitigation Staffing
Augusta Action F	Flood Hazard Map Revisions and Updates
Augusta Action G	Policies & Procedures for Flood Mitigation Projects
Augusta Action H	Savannah River Flood Protection & Awareness
Augusta Action I	Flood Warning
Augusta Action J	NFIP Community Rating System
Augusta Action K	Dam Safety
Multi-Jurisdictional Action L	Severe Storm Awareness
Augusta Action M	Public Tree Maintenance
Multi-Jurisdictional Action N	Debris Management Plan
Augusta Action O	Water Conservation Awareness
Augusta Action P	Pre-Suppression Planning for City-Owned Lands
Augusta Action Q	Subdivisions & Driveway Access for Fire Vehicles
Augusta Action R	Environmental Safety and Flood Hazards
Augusta Action S	Downtown Railroad Safety

1.7 Multi-Jurisdictional Considerations

Two separate municipalities, Blythe and Hephzibah, are located in Augusta, GA. They have separate governing bodies and separate regulations that apply to development (see Chapter 6). The Augusta Service Delivery Strategy, an agreement between Augusta and each of the cities, designates the Augusta Emergency Management Agency as the coordinating agency for matters related to emergency management that involve the cities of Blythe and Hephzibah.

For the hazards examined for this Plan only flood hazards are sufficiently location specific to be separately identified in the cities. Hephzibah participates in the National Flood Insurance Program and has a Flood Insurance Rate Map; Blythe does not have identified flood hazard areas.

The likely impacts of the other hazards considered (high winds, severe winter storms, drought) are not significantly affected by location. Wildland interface fires are influenced by location, but the nature of landuse in and around Blythe and Hephzibah is similar to the rest of the Augusta area that is exposed to wildland fire. Therefore, the hazards are expected to uniformly affect all areas of Augusta, including the cities of Blythe and Hephzibah.

1.8 Public Involvement

1.8.1 Public Meetings

Consistent with the City's standard practice to inform and provide citizens the opportunity comment, and to fulfill the public involvement requirements of the mitigation planning programs, the City solicited input and notified and invited residents to review the Plan and attend a public meeting. A letter advising that the City was initiating the planning process, including a public meeting, was sent to selected state and federal government agencies, neighborhood associations, and other interested and related organizations. The letter and list of contacts is included in Appendix A-1. For the *Flood Hazard Mitigation Plan (2004)*, citizens who had previously contacted the Planning Commission regarding flooding problems were notified.

On February 2, 2005, a public meeting was held to introduce the planning process to interested citizens. Notices of the meeting were published in the *Augusta Chronicle* (January 19, January 26, and February 2, 2005). Notices were posted on the City's webpage, at the City Commission Chambers, on the front door of the Municipal Building, and on the front door of the Planning Commission office (see Appendix A-1). In addition, Appendix A-1 includes the list of contacts that received direct notification. No members of the public attended.

On September 15, 2005, a public meeting was held to present the Public Review Draft Plan and solicit comments on the proposed mitigation actions. A notice of the meeting hearing and availability of the Public Review Draft Plan was published in the *Augusta Chronicle* on September 1, September 8, and September 15. Notices were posted on the City's webpage, at the City Commission Chambers, on the front door of the Municipal Building, and on the front door of the Planning Commission office. No members of the public attended. One set of comments was received by e-mail, raising the following points:

- Concern that the Plan does not fully address hazards due to chemicals and hazardous materials and the need for alternate routes in some areas. [Response to such incidents is addressed in other plans.]
- Important for Augusta to develop and promote a Volunteer Organizations Active in Disaster group and more citizen involvement in the Local Emergency Planning Committee, which should extend beyond "right to know" and sheltering issues. [These matters are best addressed with the Augusta Emergency Management Agency that is responsible for planning evacuations and immediate responses to incidents.]
- The concerns of populations with special needs are not addressed. [The Augusta Emergency Management Agency encourages residents with special needs to register; a form is posted on the agency's webpage.]

For the *Flood Hazard Mitigation Plan (2004)*, public meetings that were held on June 23 and 24, 2003, were advertised in The *Augusta Chronicle*, on the City's Comcast public access channel, and by a number of local news media. Notices were posted at the City Commission Chambers, the front door of the Municipal Building, and the front door of the Planning Commission office. Examples of comments received included:

- Past channel work and drainage maintenance has been negated by build-up of sediment.
- Several houses have been abandoned or have been vacant since the early 1990s due to repetitive flooding.
- Georgia DOT work and big commercial developments have increased runoff and amount of sediment in the channel.
- Lakes are filling with sediment, pushing water into yards more frequently; Dredge creeks and Lake Olmstead (where bar of sand has built up).
- Need public access along Crane Creek and Rae's Creek so that citizens can monitor the waterways
- Parts of the City are in great need of greater preservation of greenspace.
- Who makes decisions on buyouts? What are the criteria? Is a list of eligible property owners maintained?
- Flood insurance is too expensive.
- Many waterways are clogged with sediment, causing them to overflow more frequently.

-
- Buyout more of the damaged homes and allow the land to be wet and greenspace.
 - Improve drainage from roads to ditches; keep ditches cleaned of debris and heavy grass.

For the *Flood Hazard Mitigation Plan (2004)*, a public meeting was held on August 26, 2003. Notice of the meeting was published in the August 14 edition of the *Augusta Chronicle*. Prior to the meeting, copies of the Public Review Draft were made available to the public in the Augusta-Richmond County Planning Commission office, at the Main Branch of the Augusta-Richmond County Public Library on Greene Street, and posted on the City's web page. A notification letter was sent to adjacent communities, federal and state agencies, and neighborhood associations. Despite these efforts, members of the public did not attend the meeting.

The near-final version of the *Flood Hazard Mitigation Plan (2004)* was reviewed at the September 8, 2003, meeting of the Engineering Services Committee of the Augusta Commission. At its September 16, 2003 meeting, the Commission discussed the Plan and directed the Augusta Emergency Management Agency, with support from the Planning Commission, to forward the Plan to the Georgia Emergency Management Agency for appropriate action. The *Flood Hazard Mitigation Plan*, in final form, was presented for adoption during the February 17, 2004 public session of the Augusta Commission and adopted effective immediately.

The meetings of the Augusta Commission and the councils of Blythe and Hephzibah are public meetings. Augusta publishes notices and agendas in the newspaper and on its webpage.

1.8.2 Public Awareness of Flood Hazards

The *Augusta Chronicle*, with region-wide distribution, has covered stories about storms, hurricanes, flooding and drainage problems for years. Over 100 such stories were printed between 1997 and 2003. Stories have focused on:

- Local flooding in numerous watersheds;
- Flood-prone roads and related incidents;
- The City's efforts to regulate flood-prone areas;
- Funding shortfalls to accomplish drainage projects;
- Federal flood insurance; and
- The City's plans and implementation of projects to buyout flood-damaged homes.

Even when media coverage of floods is extensive, many flood victims tend to discount the likelihood that flooding will occur again. This tendency is attributed to a general lack of understanding of probability (see Comparing Risks, below). All too often, people interpret the

phrase “100-year storm” to mean that it only occurs once every 100 years, rather than that such an event has a 1-in-100 chance of happening each year. FEMA reports that, based on insurance statistics, a building in the floodplain is five times more likely to be damaged by flood than to sustain major damage by fire.

The public becomes aware of local hazards in a number of ways, notable when an event has occurred recently. For example, public awareness of flood hazards is enhanced during the following activities:

- Buying property in a floodplain triggers the federal requirement to obtain flood insurance when obtaining a federally insured and regulated mortgage. Federally insured and regulated mortgage lenders are required to make homebuyers purchase flood insurance if the building is located in a mapped flood hazard area. Buyers are supposed to be notified well in advance of closing.
- Applying for permits may lead to a determination that the property or construction site is within a mapped floodplain and therefore subject to Augusta’s Flood Damage Prevention Ordinance.
- The City’s Emergency Management Agency routinely coordinates with local media through emails, telephone calls and facsimile transmissions. The agency can request a “crawl line” on local television stations to alert the public of pending flood conditions.
- Flood warnings reach the public as regional warnings from the National Weather Service.

Comparing Risks

*What’s the chance that in the next year, a person whose house is **in** the floodplain will:*

- *Be involved car accident? 3 chances in 100*
- *Be in 100-year flood? 1 chance in 100*
- *Have a car stolen? 1 chance in 300*
- *Be a victim of robbery? 1 chance in 1,000*
- *Have a residential fire? 4 chances in 10,000*

www.floodsafety.com

a project of the Texas Environmental Center

1.8.3 Communicating about Hazards

The City of Augusta participates in the State’s “Severe Storm Awareness Week” and informs citizens about the importance of planning by endorsing the “Family Protection Day” and posting on its web page FEMA’s publication “A Citizens Guide to Preparedness.”

The Augusta Emergency Management Agency uses its web page to encourage citizens to participation in the Community Emergency Response Team (CERT). This program trains people to be better prepared to respond to emergency situations in their neighborhoods. When emergencies occur, CERT members can give critical support to first responders, provide immediate assistance to victims, and organize spontaneous volunteers at a disaster site. CERT members can also help with non-emergency projects that help improve the safety of the community. With citizens better prepared to take care of themselves and their neighbors during a crisis, public safety officials will be able to focus their attention on the most critical, life threatening situations.

The City’s website features a special page for “Flood Plain Information.” It identifies heavy rain as the primary cause of flooding and points out that citizens can learn more by referencing the Flood Insurance Rate Maps prepared by FEMA and on file with the Planning Commission. Citizens are advised to heed warnings, to tune to media for alerts, and about basic family safety and driver safety information. Warnings about turning off utilities and the hazards of entering buildings after damage are outlined.

The web page explains flood insurance, with emphasis on the fact that property insurance policies do not cover flood damage. The 30-day warning period is highlighted, and citizens are advised not to wait until a flood warning is posted to seek financial protection.

The Augusta-Richmond County Planning Commission offers to check the official Flood Insurance Rate Map and tell property owners if their land and/or buildings are in a Special Flood Hazard Area. Advice on the permit requirements for new construction and substantial renovations or repairs of damage is offered.

The web page outlines a number of property protection measures to reduce flood damage, including:

- Temporary (emergency) measures such include relocating possessions to the highest floor and placing sandbags or similar barriers to keep water away from buildings;
- Retrofitting, more permanent means, include elevating existing buildings; and
- Floodproofing with wall coatings to make the building walls and floor watertight.

Web page viewers are advised to check with the Planning Commission before building on, altering, re-grading or placing fill on property because a Flood Plain Development Permit may be required. A separate section outlines the substantial improvement requirement and identifies the License and Inspections Department as responsible for enforcement.

The importance of drainage systems maintenance is highlighted as an important flood prevention effort that depends on citizen cooperation and assistance. Causes of drainage blockage are described so that citizens understand that plugged drainage channels, catch basins, ditches, detention ponds and drainage pipes cannot carry water.

Additional information is listed:

- Links to selected FEMA publications about disaster assistance and flood insurance;
- Insurance companies selling federal flood insurance;
- FEMA contact information for flood maps; and
- Frequently Asked Questions.

1.9 Adoption, Implementation, Reporting, Evaluation & Revision

Adoption. The Plan has been adopted by Augusta, Blythe and Hephzibah (see Appendix A-3). Augusta adopted it at the February 8, 2006, meeting of the Augusta Commission, Blythe adopted it at the February 13, 2006, meeting of the City Council, and Hephzibah adopted it at the April 3, 2006, meeting of the City Council.

Implementation. Throughout the mitigation planning process, the agencies that are involved in managing hazards and implementing measures to minimize future risk considered a range of mitigation actions. For each mitigation action determined to be “high priority,” a lead agency is identified and implementation is anticipated in the 5-year timeframe of the plan. Each lead agency is responsible for factoring the action into its work plan.

Reporting. As part of its responsibilities to coordinate matters related to emergency management, the Augusta Emergency Management Agency is charged with monitoring and preparing progress reports. Progress made on the mitigation action items will be noted in annual reports. A meeting of appropriate representatives may be convened to discuss and determine progress, and to identify obstacles to progress, if any.

Evaluation & Revision. Revisions that warrant changing the text of this Plan or incorporating new information may be prompted by a number of circumstances, including identification of

specific new mitigation projects, completion of several mitigation actions, or requirements to qualify for specific funding. Minor revisions may be handled by addendum.

An evaluation may be undertaken after the occurrence of natural hazard events that cause property damage to review the effects of such events. Based on those effects, adjustments to the mitigation priorities may be made or additional event-specific actions may be identified.

Major comprehensive evaluation and revision of this *Hazard Mitigation Plan* will be considered on a five-year cycle. Adopted in 2005, the Plan will enter its next review cycle sometime in 2009, with adoption of revisions anticipated in 2010. The Mitigation Planning Committee will be convened to conduct the comprehensive evaluation and revision.

The City of Augusta will involve the public in the Plan maintenance process and during the major comprehensive evaluation and revision in the same ways used during the original Plan development. The public will be notified when the revision process is started and provided the opportunity to review and comment on changes to the Plan and priority action items. It is expected that a combination of informational public meetings, surveys and questionnaires, draft documents posted on the web site, and public Commission meetings may be undertaken.

Damage and losses that are associated with hazards (including physical damage, indirect and economic losses, and injuries and deaths) result when an event affects the areas where people and improved property are located. After hazards are identified, then estimates of the degree to which people and property are exposed (how “at-risk”) can be prepared, especially if the hazards can be characterized by areas on a map.

Preparation of a risk assessment involves four steps: hazard identification; hazard profile; vulnerability assessment; and loss estimation. The risk assessment provides information on the history of previous occurrences, the extent of areas affected, and the potential severity of hazard events.

After the initial identification of natural hazards, a profile for each of the hazards was developed. Each profile includes a description of the hazard, history of the past hazard events, and where possible, a characterization of the frequency of occurrence based on about 50 years of records. The natural hazards addressed include: floods and related hazards; high winds (hurricanes, tornadoes, severe storms); winter storm; drought; and urban wildland interface fire. Appendix B-2 contains content related to selected hazards that is made available by GEMA via its online Critical Facility Inventory.

Hazards found to be not significant for the purposes of this Plan include:

- **Earthquake.** Historical records of the U.S. Geological Survey indicate that seismic activity has been felt in the Augusta area on several occasions since the early 1800s. The infamous Charleston, SC, earthquake of 1881 caused more damage in Augusta than in other parts of the state. Minor shaking has been felt on at least three other occasions during the Twentieth Century. The most recent tremblors to be felt in Augusta occurred in March 2003 (centered near Athens) and April 2004 (centered near Fort Payne, AL); no damage was reported in Georgia. The Committee determined that the apparent infrequency and small magnitude of seismic activity in the region offers insufficient exposure and evidence that earthquakes pose significant risks in the area that are not addressed through the state building code.
- **Subsidence.** Subsidence is characterized by a general and extensive lowering of the land surface due to the removal of subsurface support, such as caused by extensive withdrawal of ground water or oil products. Although very localized soil compaction has been observed during droughts (see Section 2.4.2), these effects are not comparable to subsidence and the Committee determined that there is no evidence of or exposure to general subsidence.
- **Landslide.** The downward and outward movement of rock and soils from slopes is the general description of a landslide. Such movements, including mudflows, mudslides, debris flows and the like, generally occur where slopes are relatively steep and become saturated due to prolonged rainfall. The Committee found that most of Augusta-Richmond County has relatively gentle sloping lands and thus determined that there is insufficient evidence that landslide hazards pose risks in the area.

Chapter 2: Natural Hazards, Risks and Vulnerabilities

2.1 Floods and Related Hazards

Floods have been and continue to be the most frequent, destructive, and costly natural hazard facing the State of Georgia. Most of the State's damage reported for major disasters is associated with floods.

Since 1990, Augusta has been impacted by significant flood events, although not all qualified for major disaster declarations. Localized flooding causes concern among citizens because it affects homes, yards and streets.

The floodplain maps of the Augusta area have been prepared by FEMA in a basic digital format known as "FEMA Q3 Flood Data." Using the City's Geographic Information System (GIS) and available data layers and databases, specific information about flood-prone buildings can be developed. For this Plan, the City uses these maps and data as the best available data, rather than the flood hazard map and report generated by GEMA's online tool for critical and essential facilities (Appendix B-2). GIS is a computer software application that relates physical features on the ground in mapping applications and analyses. The Augusta Information Technology Department manages the GIS functions.

When rainfall runoff collects in rivers, creeks, and streams and exceeds the capacity of channels, floodwaters overflow onto adjacent lands. Floods result from rain events, whether short and intense or long and gentle. In recent years, most flooding in Augusta has been associated with large regional storms, some that originate as hurricanes and tropical storms that subsequently move inland. Flood hazards are categorized as follows:

- **Flash floods** not only occur suddenly, but also involve forceful flows that can destroy buildings and bridges, uproot trees, and scour out new channels. Most flash flooding is caused by slow-moving thunderstorms, repeated thunderstorms in a local area, or heavy rains from hurricanes and tropical storms. Although flash flooding occurs often along mountain streams, it is also common in urban areas, where much of the ground is covered by impervious surfaces and drainageways are designed for smaller flows. Flood Insurance Rate Maps typically show the 1%-annual-chance (100-year) floodplain for waterways with at least 1 square mile of drainage area. The flood hazard area for waterways with less than one square mile of drainage area typically are not shown.
- **Riverine floods** are a function of precipitation levels and water runoff volumes, and occur when water rises out of the banks of the waterway. Flooding along waterways that drain larger watersheds often can be predicted in advance, especially where it takes 24 hours or more for the flood crest (maximum depth of flooding) to pass. In Augusta, riverine flooding is caused by large rainfall systems and thunderstorm activity associated

with seasonal cold fronts. These systems can take as long as a day to pass, giving ample opportunity for large amounts of rain to fall over large areas. The Flood Insurance Rate Maps show the 1%-annual-chance floodplains.

- **Urban drainage flooding** occurs where development has altered hydrology through changes in the ground surface and modification of natural drainageways. Urbanization increases the magnitude and frequency of floods by increasing impervious surfaces, increasing the speed of drainage collection, reducing the carrying capacity of the land, and, occasionally, overwhelming sewer systems. Localized urban flooding is not usually shown on the Flood Insurance Rate Maps in areas with less than one square mile of contributing drainage area.

The Flood Insurance Rate Maps (FIRMs) prepared by FEMA offer the best overview of flood risks. FIRMs are used to regulate new development and to control the substantial improvement and repair of substantially damaged buildings:

- Augusta’s revised Flood Insurance Study (FIS), dated March 23, 1999, is a combination of FIS and maps prepared separately for the City of Augusta and Richmond County prior to consolidation of governments in 1996.
- Hephzibah’s FIRM, dated June 25, 1976, shows that the city is “minimally flood prone” and flood hazard areas do not have flood elevations determined using engineering methods.
- Blythe was found not to have flood hazards and a FIRM was not prepared.

Figure 2-1* shows the extent of mapped Special Flood Hazard Areas in Augusta (i.e., the 100-year floodplain). At 58.77 square miles, the SFHA makes up nearly 25% of the total land area. Much of the land predicted to flood is on the east side of the City and includes the extensive wetlands of the Phiziny Swamp. Figure 2-2 shows the mapped floodplain in Hephzibah. FEMA’s maps show four types of flood zones:

- **AE Zones** along rivers and streams for which detailed engineering methods were used to determine Base Flood Elevations. AE Zones (or A1-30 Zones) are shaded in gray. Waterways that are mapped using detailed methods that result in designated floodways are listed in Table 2-1.
- **A Zones** are “approximate” flood zones, where detailed information has not been developed. Waterways that are shown with A Zones are listed in Table 2-1. Hephzibah’s flood zones are A Zones.
- **B Zones and Shaded X Zones**, which are areas of “moderate” flood hazard, typically associated with the 500-year flood (or 0.2% annual chance).

* Maps included in this Plan are available for viewing at the Augusta-Richmond County Planning Commission. The scale required for hardcopy maps does not allow sufficient detail to show all of the elements described.

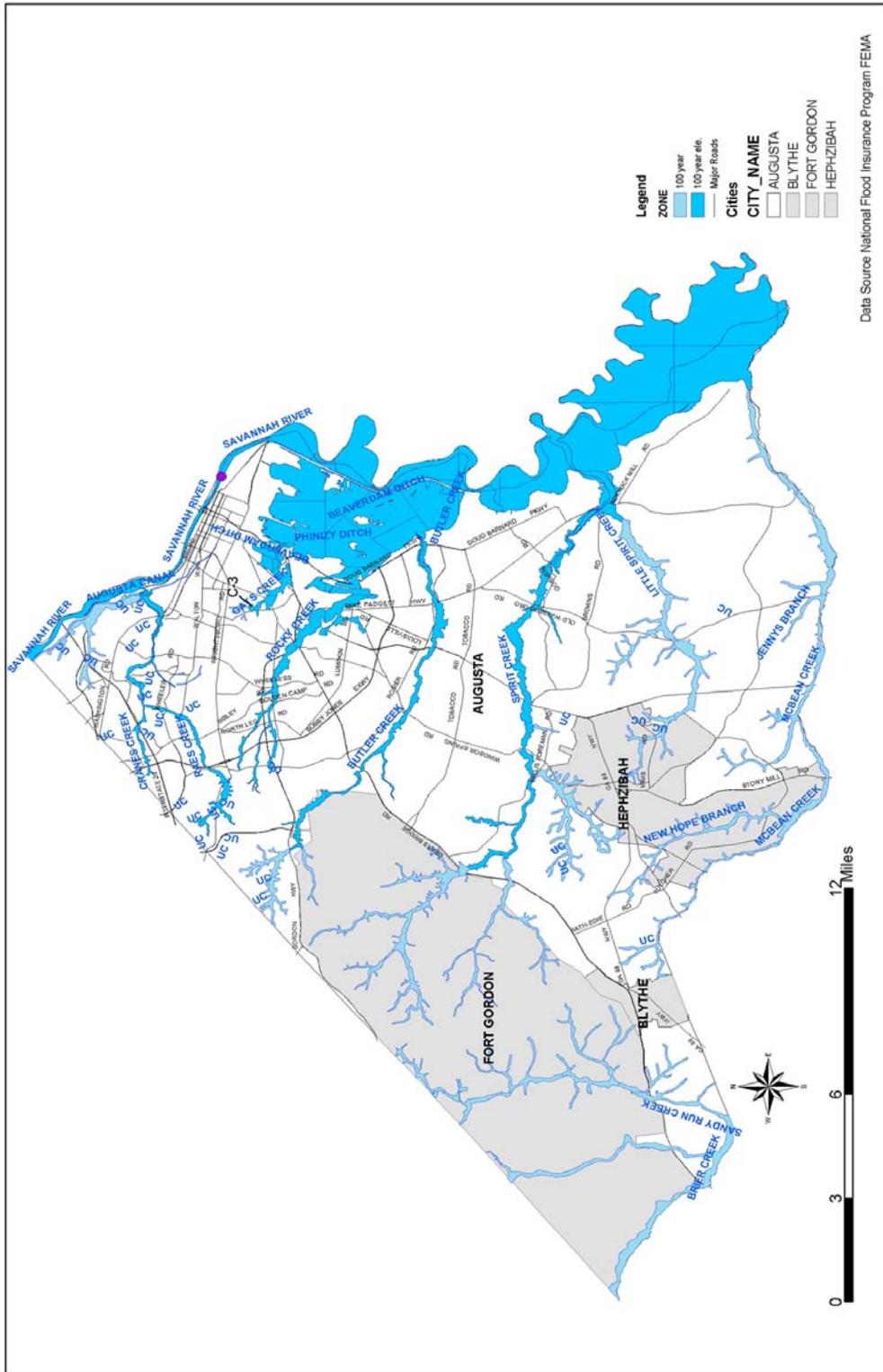


Figure 2-1. Flood Hazard Areas in Augusta

- **C Zones and Unshaded X Zones** are areas of “minimal” flood hazard, typically considered to be “out of the floodplain.” Although local drainage problems and ponding may still occur, these minor flood problems typically are not shown on the FIRM. It is notable that many smaller streams are shown but do not have mapped flood hazard areas.

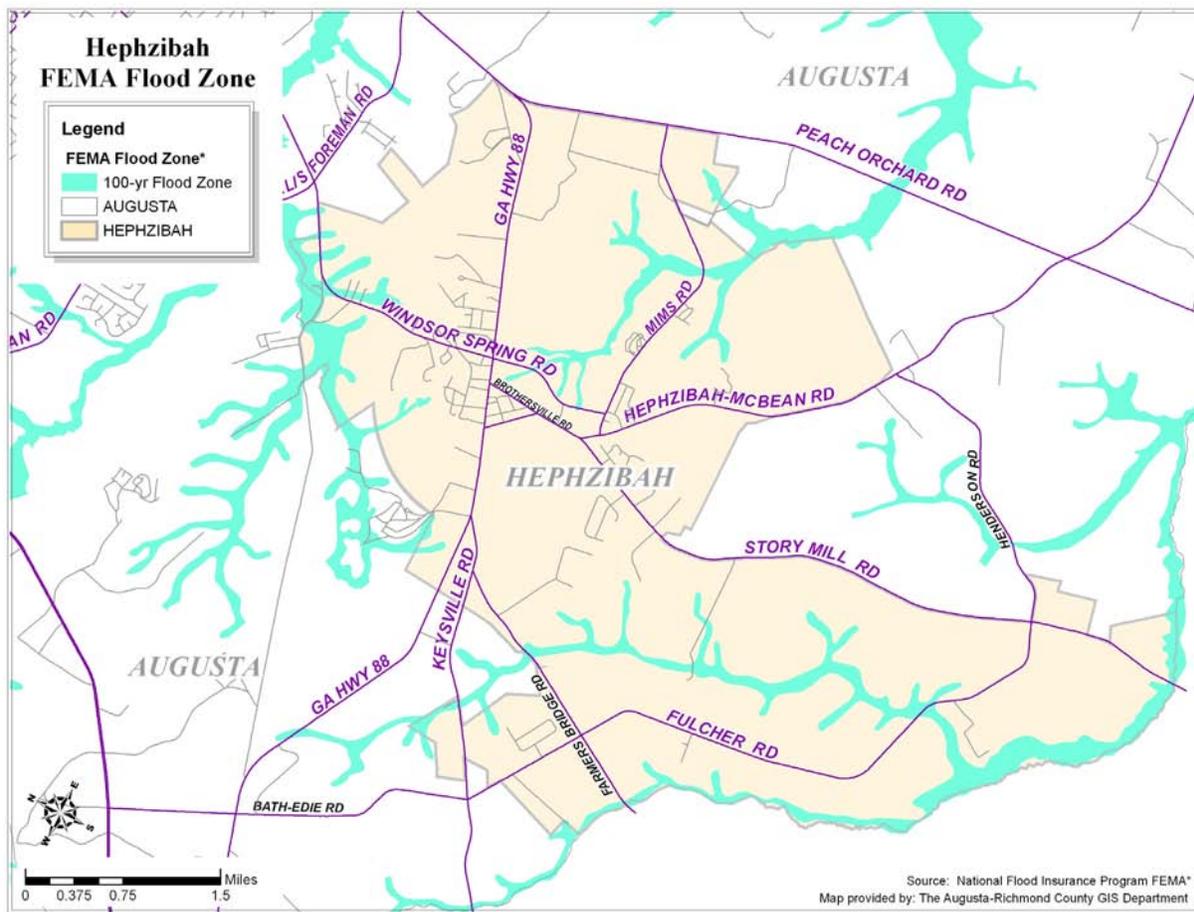


Figure 2-2. Flood Hazard Areas in Hephzibah.

**Table 2-1
Waterways on Augusta’s FIRM.**

Detailed Methods	Approximate Methods
Savannah River	Little Spirit Creek
Butler Creek and Tribs No. 1, 2	Rock Creek
Rocky Creek and Tribs No. 1-11	Augusta Canal

Table 2-1
Waterways on Augusta's FIRM.

Detailed Methods	Approximate Methods
Beaver Dam Ditch	McBean Creek
Spirit Creek and Trib No. 1	-
No Name Creek	-
Oates Creek and Trib No. 1	-
Horsepen Branch	-
Crane Creek	-
Rae's Creek and Tribs. 1-3	-

Savannah River. Discharges on the Savannah River are controlled by three flood control dams that create the J. Strom Thurmond/Clarks Hill Reservoir, the Hartwell Reservoir, and the Richard B. Russell Reservoir. The urban center of the City of Augusta is protected from Savannah River flooding by the Augusta Levee. Development on the river side of the Levee remains exposed to flood hazards, especially extreme flooding that occurs less frequently than the 1%-annual chance flood (100-year flood). The 1999 revision of the FEMA flood map lowered the predicted water elevations for the 100-year flood:

- Approximately 50 houses in the Water's Edge community (upstream of 13th Street) all appear to be out of the 100-year floodplain, although the water level predicted for the 500-year flood is likely to be under the buildings.
- For the most part, the buildings on Prep Phillips/Riverfront Drive appear to be subject to water depths ranging from 3 feet to 4 feet above the ground due to the 100-year flood. Property owners include the City, the Augusta-Richmond County Port Authority, and the Georgia Department of Transportation/Ports Authority. One or two privately-owned buildings appear to be located on City-owned property.
- The 48+ townhouses on Riverfront Drive and River Bend Drive (Goodale Landing, just east of Sand Bar Ferry Road) are all within the 100-year floodplain and the sites appear to be subject to several feet of flooding.
- The vacant lots and improved lots with 12+ homes on Albeclaus (8 are in the Floodway) appear to be subject to from 2-feet to 7-feet of water.
- On both sides of Sand Bar Ferry Road there are several clusters of buildings that appear to be in areas where flood depths are likely to be 2- to 6-feet deep.
- Below the downstream limit of the Augusta Levee, at the confluence of Butler Creek at New Savannah Bluff, the floodplain of the Savannah River is extensive, ranging from 5,000 to 10,000 feet wide. For the most part, there is little development in this area and there are no NFIP flood insurance policies in-force.

Urban Watersheds. The urban area of Augusta, including Butler Creek and northward, encompasses the former City and surrounding areas. Much of the area is densely developed, with the notable exception of the Phinizy Swamp on the eastern side. As shown on Figure 2-3, most of the federal flood insurance policies are for buildings in the urban watersheds, with most of them constructed before floodplain regulations were adopted.

Table 2-1 lists the urban waterways, all of which have been studied using detailed methods (Rock Creek, upper reaches of other streams, and small tributaries were evaluated using approximate methods). As part of a study underway by the U.S. Army Corps of Engineers (see Section 4.1.4), the FIRMs may be revised; preliminary results indicate that the areas subject to flooding will increase in many places. Generally, the floodplains of these streams can be described as follows:

- Rock Creek – 200-400 feet wide (restudied by the Corps of Engineers);
- Rae’s Creek – 200-500 feet wide (restudied by the Corps of Engineers; City flood control project);
- Crane Creek, a major tributary to Rae’s Creek – 100-300 feet wide;
- Oates Creek – highly modified, 100-500 feet wide, with a number of ponding areas;
- Upper and Lower Rocky Creek – 100-200 feet wide and 500-2,000 feet wide, respectively (restudied by the Corps of Engineers); and
- Butler Creek – 500-700 feet wide.

The Augusta Canal is a source of the City’s potable water. It also is the “collector” into which the other urban streams drain (except Butler Creek). From the Columbia County boundary, the Canal and its floodplain parallel the Augusta Levee. At its juncture with Rae’s Creek, a gate allows flows to discharge to the Savannah River (the mechanical gate is closed if high water is predicted on the River). The Canal is included in waterways that are being restudied by the Corps of Engineers; preliminary maps indicate that areas prone to flooding are more extensive than shown on the FIRM.

The extensive flood-prone areas are found on Augusta’s east side are associated with Butler Creek, Rocky Creek, and drainage from all streams in the urban district (former City). The area, also known as Phinizy Swamp, is generally flat and is predicted to experience relatively shallow flooding. There are few buildings that encroach into the floodplain, although a number of industries were built on fill prior to adoption of the Flood Damage Prevention Ordinance, and there are a number of active clay mining sites.

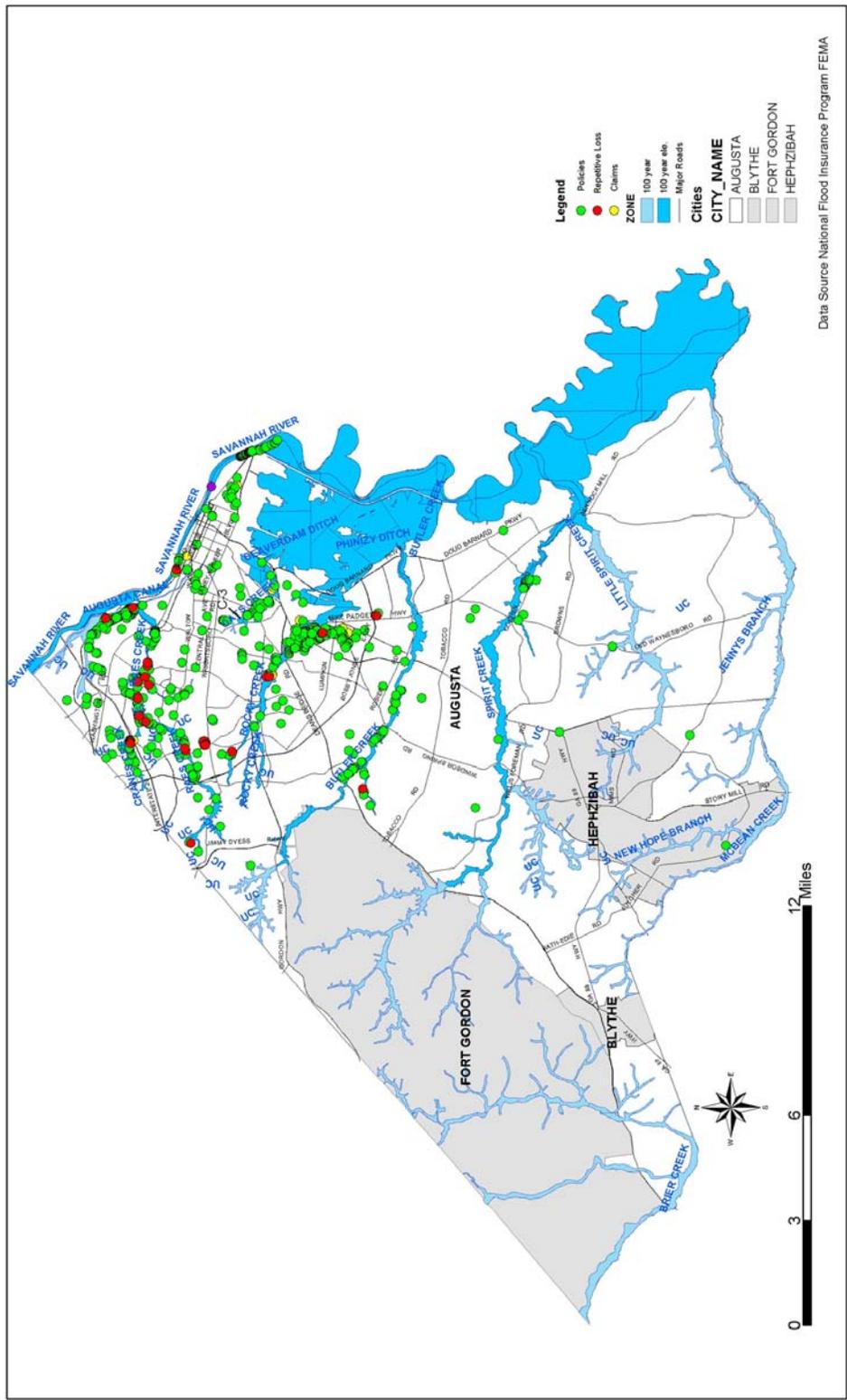


Figure 2-3. NFIP Flood Insurance Policies in Augusta

The Rocky Creek watershed was the focus on research conducted by the (former) Public Works and Engineering Department in 1998, as supporting documentation for mitigation grant funds. The estimates in Table 2-2 are based on newspaper accounts, local climatological reports, and personal interviews. It is notable that the U.S. Army Corps of Engineers has independently developed a preliminary estimate of average annual damages in Rocky Creek of \$1,450,000 (not including damage to industrial properties).

Table 2-2
Estimates of Damage Potential: Rocky Creek (1998)*.

Flood Magnitude	Estimated Number of Affected Structures	Estimated Damages
5-year	±20 residential	\$ 286,000
10-year	±25 residential	\$ 357,500
50-year	±168 residential ±10 commercial	\$2,402,00 \$1,484,000
100-year	±200 residential ±20 commercial	\$2,860,000 \$3,2566.50

* Augusta EMA letter to GEMA, June 29, 1998.

Rural Watersheds. The southern half of Augusta, below Butler Creek, is rural in character with dispersed development. As shown on Figure 2-3, few flood insurance policies are in-force in this area, primarily because floodplains are relatively narrow and easily avoided. As of the end of 2004, there are no flood insurance policies on buildings in Hephzibah.

Most of the streams shown on the Flood Insurance Rate Maps have been evaluated using approximate methods to delineate the flood hazard area, including: Little Spirit Creek, McBean Creek along the southern border, tributaries to Spirit Creek, and various other streams. The extent of flood hazard areas is limited (watershed boundaries are shown on Figure 2-4):

- Upper Spirit Creek and Johnson Branch – 200-400 feet wide;
- Lower Spirit Creek – 600-800 feet wide;
- Little Spirit Creek and Boggy Branch – 200-600 feet wide;
- McBean Creek – 500-1,000 feet wide;
- Tributaries to McBean – 100-300 feet wide; and
- Many small streams and tributaries do not have mapped floodplains.

Dams and Flooding. FEMA and the U.S. Army Corps of Engineers maintain the National Inventory of Dams (1998), a database of high and significant hazard dams. For the most part, data is provided by state agencies responsible for regulation and inspection of dams or by the Corps of Engineers. Figure 2-4 is based on that inventory and shows that seven high hazard dams (and 3 significant hazard dams) are located in Augusta and one high hazard dam is located outside the City in the upper portion of Spirit Creek. High hazard dams are those of specific height or volume of impounded water that, if failure occurred, there would be a high likelihood of loss of life and substantial property damage. Table 2-3 lists information on the high hazard dams. There is no requirement for owners to develop emergency action or maintenance plans, although high hazard dams are required to be brought up to state specifications to protect public safety and property.

**Table 2-3
High Hazard Dams Affecting Augusta.**

Dam Name Owner	NID # Waterway	Year Built Primary Purpose	Emergency Action Plan
Erin's Place Lake Dam (Helen Huffman Lake) Elijah Lightfoot, Jr.	224 Spirit Creek	1965 Recreation	Not required
Gordon Lake Dam Fort Gordon (DOD)	1722 Spirit Creek	1986 Recreation	Not listed
Goshen Lake Dam Goshen Plantation Country Club	2111 Spirit Creek	1950 Recreation	Not required
Carroll's Lake Dam Carroll	2121 Spirit Creek	1969 Recreation	Not required
Lake Aumond Dam Augusta-Richmond County	2129 Rae's Creek	(not listed) Recreation	Not required
Richmond Vo-Tech Detention Augusta-Richmond County	4940 Not listed	1979 Recreation	Not required
Wrightsboro Rd Detention Augusta-Richmond County	5233 Rae's Creek	1992 Flood Control	Not required

The Augusta Emergency Management Agency reports that the three Savannah River dams are the only high hazard dams for which a response plan and inundation maps are on-file (updated July 1994; DP 1130-2-16). The U.S. Army Corps of Engineers dams, not shown in Figure 2-4, are the Hartwell, Richard B. Russell, and J. Strom Thurmond. The Corps's document considered several dam failure scenarios and predicts the arrival times ranging from 4.5 to 13 hours, and peak flood elevations at various locations. The Corps' Savannah District operates the dams,

monitors flood conditions, and notifies emergency management officials in downstream jurisdictions if flooding is predicted. The Augusta Emergency Management Agency has prepared an Emergency Evacuation Plan based on the Corps' report and maintains a response plan for closing the levee openings.

In recent years, stormwater detention ponds have failed during storms that produce flooding conditions. For this reason, and because the consequence of a dam or pond failure is downstream flooding, such events are considered under the broader category of flood hazards rather than as a separate hazard. Without the benefit of analyses of failures of the high hazard dams shown on Figure 2-4, the impacts associated with such events cannot be estimated.

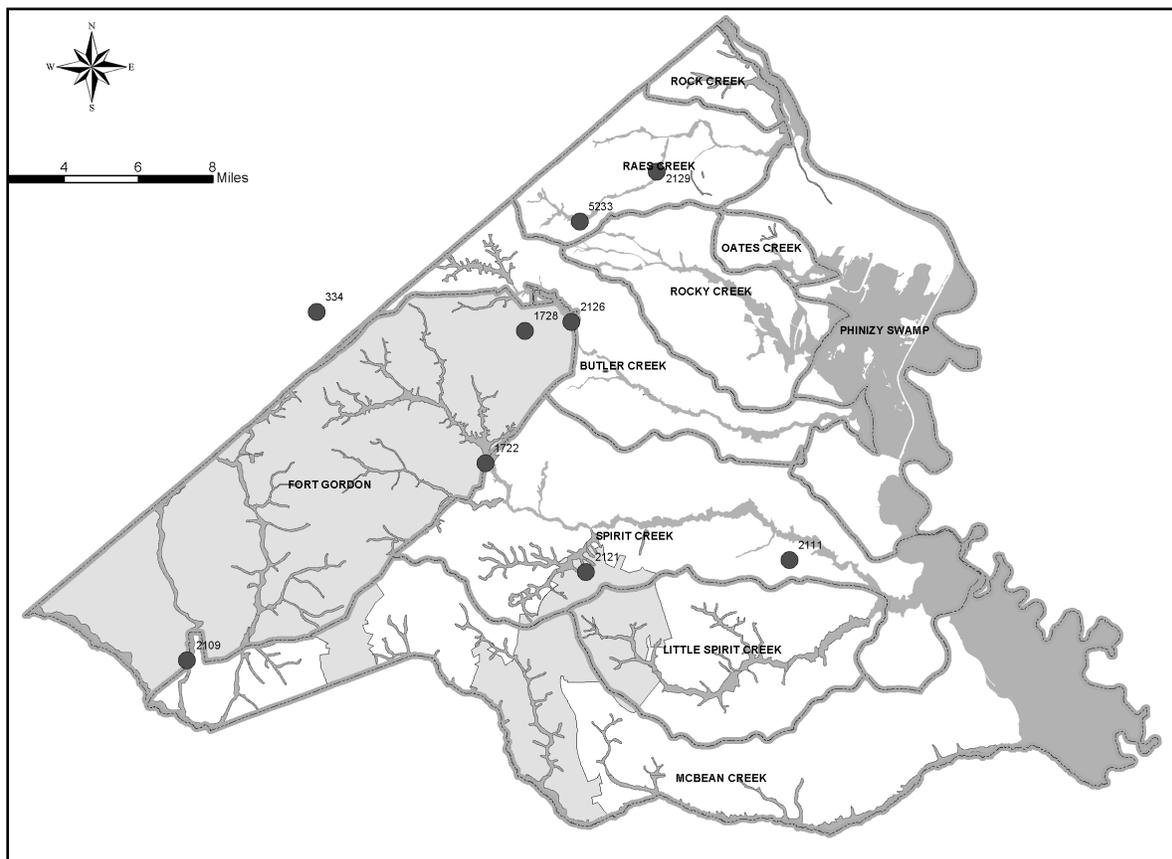


Figure 2-4. Watersheds and High Hazard Dams.

Source: National Inventory of Dams (1998)

2.1.1 Events, Frequency & Probability

Flooding in the Augusta area results both from widespread and prolonged rainfall (e.g., from large systems associated with hurricanes and tropical storms) or locally-intense downpours. Augusta's more significant flooding events since 1990 are listed and described in Table 1-10. That list indicates that sixteen damaging floods have occurred in nearly 15 years; thus the frequency of flooding somewhere in the area is once per year.

2.1.2 Assets Exposed & Potential Losses

Flood Risks – Buildings. Augusta's Information Technology Department coordinates and maintains the Geographic Information System (GIS). The system allows staff in many departments to access numerous digital map products and electronic data files. Among the data and maps is a digital map of the floodplain prepared as an overlay for the property parcel maps (derived from the Flood Insurance Rate Maps). Other GIS layers include county/city boundaries, waterways and watershed boundaries, and ground contours and building footprints from aerial photography data acquired in 2002, parcel boundaries, and National Wetlands Inventory data, from which a wide variety of maps and analyses can be prepared.

There are a number of ways to characterize buildings and potential development that is subject to flooding:

- Using GIS to compare the flood map with the locations of buildings yields an estimate that 3,755 buildings (greater than 400 square feet in footprint) are located “in” the City's mapped floodplains. It is important to recognize that this number underestimates the total number of buildings that might experience flooding, as evidenced by recent flood damage and the fact that nearly half of the buildings with flood insurance policies are shown to be “out” of the mapped flood hazard area.
- GIS analysis did not identify any buildings located in Hephzibah's mapped floodplain areas.
- U.S. Census data is used to develop a median value for residential buildings (\$76,800), yielding estimates of the total value of buildings that plot within the mapped floodplain (Table 2-4). It is notable that there are several clusters of non-residential buildings; those higher-values are not reflected in the table. Use of the median value to characterize risk is not intended to imply that every flood-prone building is likely to be a “total loss” due to flooding.
- Augusta GIS, using the flood hazard overlay to the property parcel data layer, determined that about 1,049 undeveloped/vacant parcels of land in Augusta and Hephzibah are wholly or partially affected by mapped floodplains (as of mid-2005). The development potential is, at least in part, a function of the available land subject to flooding (see Table 2-5).

- The addresses of buildings that have flood insurance policies and for which flood claims have been filed, shown on Figure 2-3, can be used to identify buildings in mapped floodplains (where lenders require insurance) and where flooding has occurred (where owners are sufficiently concerned that they purchase flood insurance even if not required). This characterization of flood risk is described in the following text.

Table 2-4
Floodplain Buildings, by Commission District.

Commission District	Buildings “in” the Floodplain*	Estimate Value** (millions)
District 1	381	\$29.26
District 2	1,646	\$126.41
District 3	283	\$21.96
District 4	28	\$2.15
District 5	178	\$13.67
District 6	44	\$3.38
District 7	735	\$56.45
District 8	460	\$35.33
Total	3,755	\$288.61

*Excludes buildings known to be flood-prone, but outside the mapped floodplain.

**Assumes all residential; based on City-wide median value of \$76,800

Table 2-5
Vacant Parcels Affected by FEMA Flood Zones.

Percent FHA	Augusta	Hephzibah	Totals
100%-75%	248	13	261
75%-50%	178	18	196
50%-25%	212	24	236
25%-0	291	65	356
Totals	929	120	1,049

NFIP Policies In-Force. Data available online from FEMA’s National Flood Insurance Program indicate that as of September 30, 2004, federal flood insurance policies were in-force on 961 buildings in Augusta (and none in Hephzibah). This represents a total face value of insurable property of \$118 million. The locations of buildings with flood insurance are shown on Figure 2-3. The majority of insured buildings are located in Commission District 2 and District 7.

It is notable that nearly half of the insured buildings geocode as being “out” of the floodplain. For the most part, two factors prompt people to purchase flood insurance: when mortgage lenders require it, and when actual flood damage makes it clear that a building is, indeed, located in a flood-prone area. Thus, the number and distribution of flood insurance policies is one way to characterize potential risk throughout the City. This is an indication of two important conclusions:

- That many homeowners outside the mapped floodplain are aware of the flooding risks throughout the area and have chosen to carry flood insurance even though it is not required by mortgage lenders.
- Augusta’s Flood Insurance Rate Maps do not reasonably reflect areas that experience frequent flooding; this conclusion in part supports the City’s expectation that revision of its FIS and FIRMs is a high priority with the State and FEMA Region IV.

Summary of Floodplain Buildings & Insurance

- *3,755 buildings are “in” Augusta’s mapped flood hazard areas.*
- *About 500 of them (only 13%) have flood insurance.*
- *Nearly 450 buildings have flood insurance but are not “in” the mapped flood hazard area.*
- *In Hephzibah, no buildings are “in” mapped floodplains and no flood insurance policies are written.*
- *Blythe does not have delineated flood hazard areas.*

As shown on Figure 2-3, there are a number of clusters of NFIP policies and claims, and a number of areas without data points. A review of this map yields the following observations:

- The majority of policies are in the urban district (former City), especially along Rae’s Creek and Rocky Creek.
- Several clusters outside of the mapped floodplain warrant consideration, especially north of Laney Walker Boulevard (east of Gordon Highway) and south of the Augusta Canal (along Walton Way).

NFIP Claims Paid. Data available online from FEMA indicate that just over 300 claims were paid between the end of 1978 and September 31, 2004. Just over half appear to have been paid

for claims on properties that geocode as being “out” of the mapped floodplain. It appears that the majority of these claims were for residential properties. The locations of properties that received claim payments are shown Figure 2-3. Total amount of claims paid for building and contents exceeds \$2.9 million.

NFIP Repetitive Loss Properties. Figure 2-3 also shows the locations of “repetitive loss properties” in Augusta. In recent years, FEMA has focused considerable attention on this subset of insured buildings. These properties have received two or more claim payments of at least \$1,000 over a ten-year period. FEMA’s database identifies 48 properties as “repetitive loss properties.” As with policies and claims, a large number of these properties geocode as being “out” of the mapped floodplain. Augusta’s floodplain buyout initiatives, funded in part with FEMA mitigation grants, have removed some of these buildings and maintain the land as open space.

The claims amounts attributed to the repetitive loss properties were not disclosed, therefore no conclusions can be drawn regarding whether specific mitigation measures would be effective. For example, a property that has received a number of claim payments not much higher than \$1,000 would be considered an unlikely candidate for mitigation using public funds. It may, however, be an excellent candidate for damage-reduction actions taken by the owner.

Manufactured Housing. Manufactured housing units are known to be highly vulnerable to flood damage. The same amount of water inside a site-built home causes considerably less damage (as a percent of total value of the home). One cluster of manufactured homes and three manufactured housing parks are affected by mapped flood hazards and some damage has been reported in the local press:

- Some units along Kissingbower Road and Haynie Drive, north of Cherokee Plaza, are in the floodplain fringe of Rocky Creek.
- Durand Trailer Court, south of Gordon Highway on Wylds Road just below the confluence with Tributary No. 7, was affected in June 2000. The City’s GIS maps indicate that one parcel of the property is marginally affected, but another parcel has perhaps 10 units shown within the mapped floodplain.
- Gaskins Trailer Park, north of Gordon Highway on private roads (between Sibley Road and Wheelless Road) was flooded by Tributary No. 6 in June 2000. A newspaper account indicated that some units were shifted off their foundations. Because the FEMA mapped floodplain area was artificially terminated in this area, only 6-8 units are in the mapped floodplain. However, it is apparent that many other units are similarly flood-prone.
- Gibbs Park, south of Wrightsboro Road near Maddox Drive, has a portion of the site within the floodplain of Rae’s Creek, but the units are shown as out.

Historic Resources. The Historic Preservation Commission, assisted by staff of the Augusta-Richmond County Planning Commission, evaluates activities that impact historic properties. There are no known reports of flood damage sustained by designated historic properties. The U.S. Army Corps of Engineers, as part of its flood reduction study (see Section 4.1.4), identified a small number of flood-prone historic structures in selected watersheds (other watersheds not examined):

- **Augusta Canal.** In addition to the Canal itself, 13 National Register individually listed buildings, 3 historic districts, and 12 archaeological sites have been identified. The extent to which specific buildings are at-risk has not been determined.
- **Rae's Creek.** Fruitlands (Augusta National Golf Club) is the only listed property affected; 7 archeological sites have been identified.
- **Rocky Creek.** No nationally listed properties are affected by flooding; 7 archaeological sites may be in the floodplain, primarily where the creek merges with Phinizy Swamp.
- **Phinizy Swamp.** No nationally-listed properties, but there is a recognized high potential for prehistoric and archeological resources in flood-prone areas.

Flood Risks – Public Properties. Using the City's database of 137 buildings and structures owned by the City and the Richmond County Board of Education (and over 500 vacant parcels of land owned by the City), it was determined that nine buildings are located in the floodplain. Figure 2-5 was prepared using the geo-location data collected for GEMA's online tool for critical and essential facilities; this map differs somewhat from a similar figure in Appendix B-2, because the City's geocoded point data are more refined and due to scale. For comparison with the following description of public properties identified as being at some risk of flooding, only two facilities were identified as at-risk using GEMA's tool (Fleming Athletic Office and The Boathouse).

Several City-owned buildings are located on the riverside of the Levee. Using only the digital topography available in the GIS and the Base Flood Elevation (100-year), predicted flood depths at these buildings ranges from 3.5-feet to as much as 8-feet. While most of the buildings would be unlikely to sustain major damage at that depth, the actual damage may be more related to velocity (which is not approximated). Contents damage may be more significant in terms of financial impacts on the occupants. Some City-owned buildings are occupied by private entities. Additional information and photographs of selected buildings along the Savannah River is in Appendix D.

The Mitigation Planning Committee requested that certain departments determine if any facilities were in the mapped floodplain (most City offices have access to the Geographic Information

System which includes a floodplain layer). This exercise not only identifies vulnerable facilities, but ensures that facility managers are aware that specific buildings are not flood-prone. Although not part of City government structure, the Richmond County Board of Education and all telephone, electric and gas utility providers were included in the request:

- The Board of Education reported no public schools in the floodplain; one building has experienced drainage problems.
- Georgia Power Company reported that no buildings or electric substations are in the floodplain (other utilities did not respond).

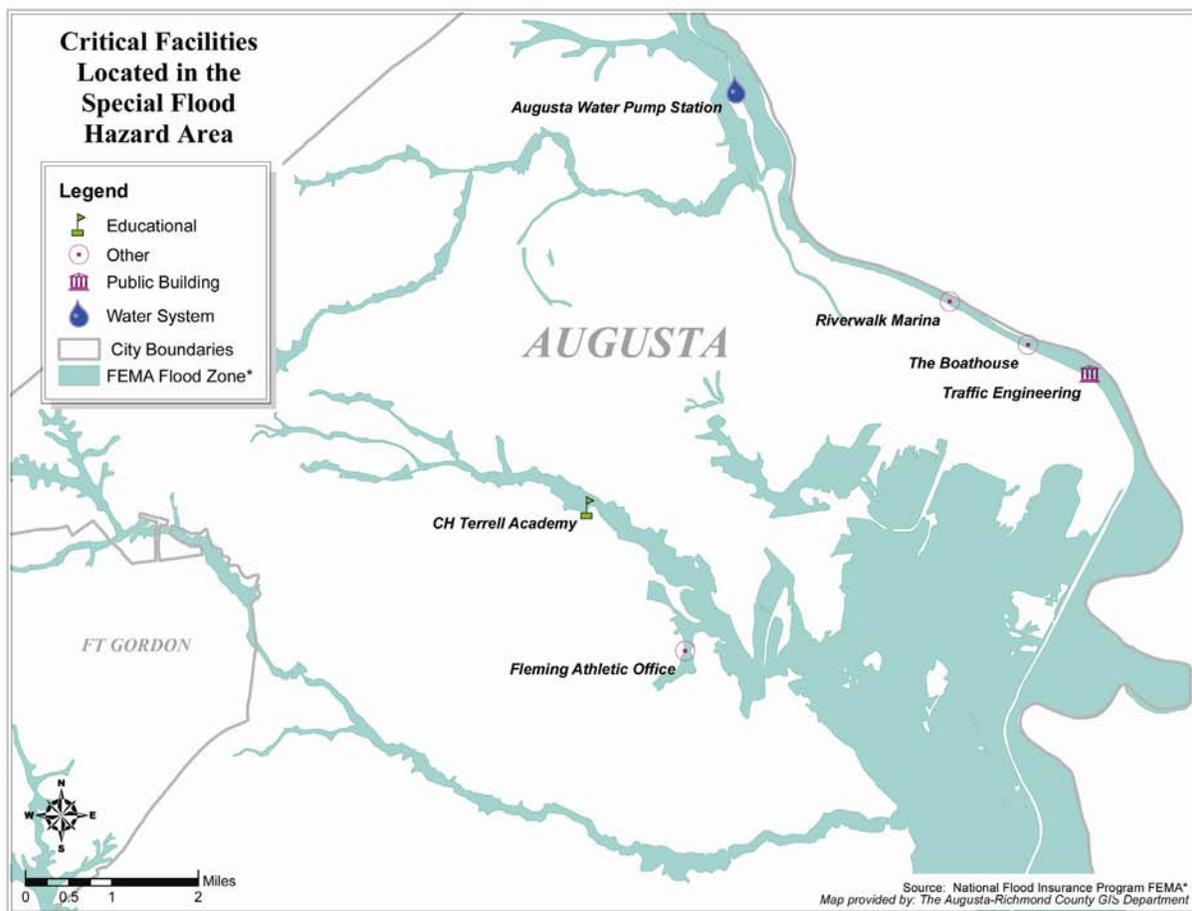


Figure 2-5. Critical and Essential Facilities in Mapped Flood Hazard Areas.

City Buildings. A small number of City buildings and facilities have sustained limited damage due to flooding in the past and, for the most part, are unlikely to experience significant future

damage. The following statements of potential flooding are based on the Flood Insurance Rate Maps and ground elevations interpolated from the City's topographic maps:

- The Traffic Engineering building, located on the river side of the Augusta Levee, may have 3-5 feet of water during the 100-year flood.
- The Augusta Marina Store, also located on the river side of the Augusta Levee, may have 4-5 feet of water during the 100-year flood.

Public & Private Schools. Using data collected for GEMA's critical facilities inventory (see Section 1.4.5 and Figure 2-5), a GIS analysis was prepared to determine whether mapped floodplains affect school sites and/or school buildings:

- Nine public schools have at least a portion of the site affected; one building appears to be within the floodplain (Jenkins-White Elementary).
- Nine private schools have at least a portion of the site affected; one building appears to be within the floodplain (C.H. Terrell Academy).

Recreation & Parks Facilities. The Augusta Recreation and Parks Department is responsible for numerous facilities throughout the City: 7 community centers, 15 neighborhood parks, a soccer complex, skate park, BMX track, tennis center, and the municipal golf course. The Department coordinates many programs, including: community athletics, aquatics, boating and fishing, after school, and summer day camps.

The Department uses many factors when selecting sites for new park facilities, primarily population and demand. The presence of mapped floodplain is a factor in site selection, although acceptable if there is sufficient land for the facility. The Diamond Lakes Regional Park, built in 1997, includes wetlands and floodplain areas. The site plan required avoidance of the floodplain and all improvements are on high ground.

With respect to floodplains and flood hazards, the Department reports the following:

- New Savannah Bluff Lock & Dam Park is owned by the Corps of Engineers and leased to the City. The City is responsible for buildings, including maintenance and repair. The entire 50-acre site is flat and has flooded 5-6 times since the initial lease. Damage to grounds includes erosion and debris; costs incurred to clear debris and for stabilization. Due to topography, there is no land outside the flood-prone area. The wood playground equipment was damaged and removed; the replacement equipment will use flood-resistant materials.
- City parkland on Lake Olmstead is flood-prone although the buildings are on high ground. Damage due to the flood in 1990 included picnic tables and trails. The Master Plan proposes new playground equipment in the floodplain that will use flood-resistant materials.

-
- Julian Smith pavilion, located above the Lake Olmstead floodplain, sustained water damage in 1999; the 2000 flood caused less damage due to the way the water was managed.
 - The “Boat House” Community Center is on the bank of the Savannah River. Because the main level of the building is elevated, it is not expected to be flooded during the 100-year event. However, the lower level is more susceptible; it is used for boat storage and a portion is finished space overlooking the river.
 - Other parklands are located in flood-prone areas, but have not experienced flood-related damage.

Flood Risks – Utilities. Augusta Utilities is responsible for the City’s potable water and wastewater treatment services. The department provides project management, construction inspection and land acquisition services for water and wastewater projects associated with commercial developments, some subdivisions, Georgia DOT projects, and the City’s Capital Improvement Program. To facilitate its workload, the department is establishing a computerized maintenance management and work order system for both the wastewater collection system and the water distribution system.

Potable Water Service. The Utility provides potable water to 67,500 customers (including 6,000 commercial/industrial users). The system includes 1,100 miles of water distribution lines. The Raw Water Pumping Station withdraws water from the Savannah River to provide 75% of the City’s potable water. The remaining capacity is provided by the Highland Avenue Surface Water Treatment Plant and three groundwater treatment plants. The City is phasing out groundwater withdrawal due to available surface water capacity (groundwater sources will be maintained for drought contingency). The New Tobacco Road Surface Water Treatment Plant is expected to come online sometime after 2005.

Wastewater Service. The Utility provides wastewater collection and treatment services for 40,000 customers. The system includes 650 miles of wastewater collection lines; many more miles of private lines feed the system. Treatment is provided at the Spirit Creek Plant and the J.B. Messerly Plant where constructed wetlands at the Phinizy Swamp Nature Park provide effluent treatment prior to discharge to Butler Creek.

Using the City’s GIS, the Augusta Utilities Department compared the physical location of its assets with the floodplain map and determined the following:

- Wastewater treatment plants: the City’s two plants, JB Messerly and Spirit Creek, are not within the floodplain.

-
- Sewage lift stations: the department is acquiring the GPS locations of the City's 24 lift stations. At this time the specific location within mapped floodplains is undetermined; however there is no record of flood damage or outages associated with flooding.
 - Sewer manholes: 1,265 manholes plot within the mapped floodplain, an expected outcome given that many sewer lines follow waterways to take advantage of gravity flow.
 - Water wells: of the 24 wells, three are located close to areas delineated as approximate floodplain (along Boggy Branch, a tributary to Little Spirit Creek).
 - Water storage tanks: by the nature of their function, water tanks typically are located on high ground; the City's 12 ground level and 13 elevated water tanks are not located within the floodplain.

With respect to flooding and flood impacts, Augusta Utilities reports the following:

- The Department is responsible for operation and maintenance of the control gates for the Augusta Canal and the Augusta/Savannah River Levee.
- The preferred construction method for water and sewer lines that run under creeks is jack and bore; there are some aerial crossings mounted on bridges.
- Wastewater treatment flow volumes (and consequently treatment costs) increase during storms and flooding due to infiltration through joints in the collectors and inflow through manholes (Figure 2-6). It is estimated that 70% of the problem is on private property and illegal connections of roof drains. Private property owners are responsible for installing sewer lines from buildings to the right-of-way.
- Through the waste distribution system backflow prevention program the department enforces current requirements for new construction.
- The department addresses backflow problems by educating the public and by planning installations for residential customers and any non-residential customers that are to install backflow devices.
- In 2004, three wet-weather overflows released a total of approximately 43,500 gallons; despite more rainfall events in 2005, only one wet-weather overflow released 15,000 gallons.

Flood Risks – Roads. With respect to roads and flood risks there are two important aspects to consider:

- Nationwide, flooded roads pose the greatest threat to people during floods – most of the more than 200 people who die in floods each year are lost when they try to drive across flooded roads.
- Flood-damaged roads require expenditures of local, state and federal funds for repair and replacement, and traffic flow can be disrupted during the time required to design and construct new crossings.

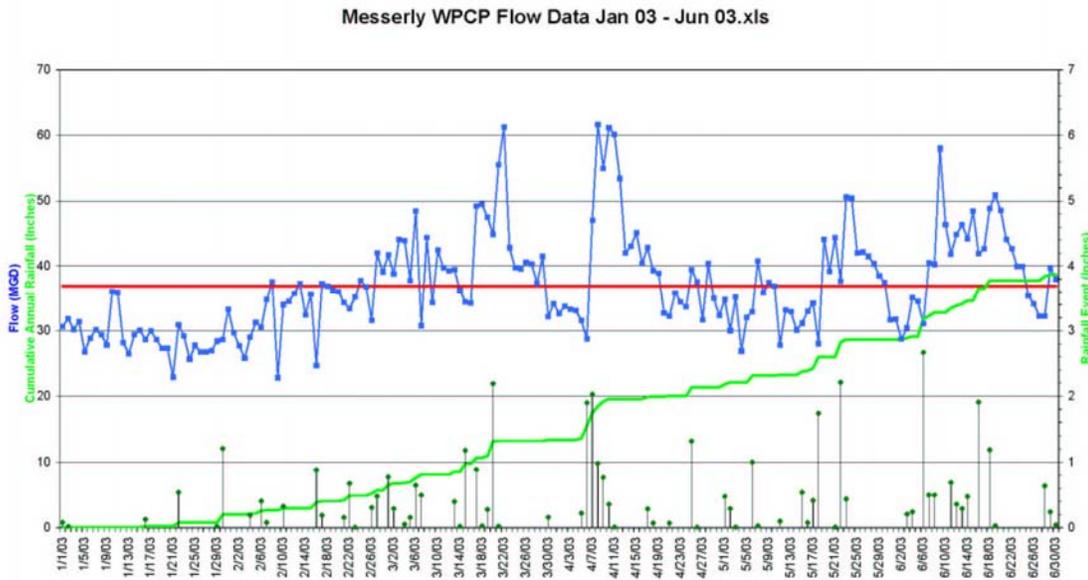


Figure 2-6. Rainfall Affects Wastewater Treatment Costs

Based on the roads data contained in Augusta’s GIS combined with the floodplain map layer indicates that there is a total of 1,391 miles of road in Augusta: Interstate highways (43 mi), state roads (85 mi), major county roads (196 mi), and other roads (1,067 mi). With 206 miles falling within mapped flood hazard areas, approximately 15% of all roads in the City are subject to some degree of flooding. This statement is not intended to imply that such flood-prone roads are likely to be damaged or pose significant risk to the public. The City does not have a definitive list of list of the more susceptible flood-prone roads. Table 2-6 was compiled from three sources: press accounts; citizen reports; and the Flood Insurance Study (profile sheets).

The City owns and maintains the majority of road miles within its bounds. Factors that are considered for upgrading roads include safety, traffic loads and capacity. While drainage is rarely a primary factor that prompts an upgrade, drainage improvements often are included in designs. State aid supports some road improvement projects, which may include drainage improvements; this aid is sought on a project-by-project basis.

Various flood events have damaged roads throughout the City, primarily causing erosion. The most significant recent damage includes:

- Willis Foreman Road on Spirit Creek washed out in June 1998;
- One lane of Frontage Road near Bobby Jones Expressway washed out in June 1998; and
- Barton Chapel Road at Glen Hills Road, damaged by Rocky Creek in July 1998.

Table 2-6. Flood-Prone Roads.

Flood-Prone Roads: Press Accounts (2003)			
Peach Orchard Rd	Wheeler Rd	Old Savannah Rd	
Gordon Hwy	Boy Scout Rd	East Boundary	
Bobby Jones Expwy	Berckmans Rd	Olive Rd	
Walker St	Milledgeville Rd	Deans Bridge Rd	
Walton Way (ponding)	Wheeless Rd	Meadowbrook Rd	
Flood-Prone Roads: Citizen Reports (2003)			
Aumond @ Willow Cr	Clark Dr	Rozella Dr	
Bobby Jones @ Wheeler Rd	East Boundary	Sheffield Circle	
Boy Scout Road	East & West Vineland	Weathers Terrace	
Butler Place	Gordon Hwy	Wrightsboro Rd @ I-520	
Central Ave @ Daniel	Ingleside Dr		
Chelsea Dr	Milledgeville Rd		
Flood-Prone Roads: Predicted Flood Depths, in feet (rounded up) from FIS			
Spirit Creek		Oates Creek	
Goshen Rd	1	New Savannah Rd	2
Windsor Spring Rd	2	Boykin St	1
Willis Forman Rd	2	Grant Blvd	1
Birdwell Rd	5	Dyer St	1
Spirit Creek Tributary 1		Milledgeville Rd	1
Willis Forman Rd	2	Rae's Creek	
Crane Creek		Boy Scout Rd	3
Warren Rd (d/s I-20)	1	Scotts Way	2
Pleasant Home Rd	3	Ramsgate Rd	1
Rocky Creek		Courtside Dr	2
Barton Chapel Rd	4	Jackson Rd	2
Rocky Creek Tributaries		Marks Church Rd	1
Nixon Rd (Trib 2)	1	Wrightsboro Rd	1
Lumpkin Rd (Trib 4)	2	Maddox Rd	1
Kings Grant Dr (Trib 4)	2		
Durham Ct (Trib 4)	2		
Virginia Ave (Trib 5)	1		
Coleman Ave (Trib 5)	1		
Peach Orchard (Trib 5)	1		
Wylde Rd (Trib 7)	2		
North Leg Rd (Trib 7)	1		
Sharon Rd (Trib 7)	2		
Barton Chapel Rd (Trib 8)	1		

When designing new state roads or upgrading existing roads, the Georgia Department of Transportation considers the NFIP's floodplain and floodway requirements to evaluate the impact of new and replacement structures. The Department inspects state bridges for structural integrity and to determine if erosion is a risk, in which case stabilization measures are put into place.

The City considers floodplain and floodway impacts in its planning and design for City roads. Developers must satisfy the City's drainage criteria and other aspects of road designs in order for the City to accept ownership.

When weather conditions suggest that road flooding is likely, the Augusta Emergency Management Agency and other City personnel monitor access routes that are prone to ponding and flooding and that are critical for fire and emergency medical response requirements, such as Walton Way at 13th and 15th Streets.

Flood Risks – Local Drainage. Experience shows that many local drainage problems in Augusta are not dramatic or life-threatening, yet contribute to the frequency of flooding, increase maintenance costs, and are perceived to adversely affect the quality of life in some neighborhoods. Many of these areas are not shown on the City's Flood Insurance Rate Maps. One measure of the magnitude of this problem is the evidence that nearly half of flood insurance policies in force on buildings appear to be outside of the mapped floodplain.

Many areas and streets experience accumulations of rainfall that are slow to drain away, which may cause disruption of normal traffic, soil erosion, and water quality problems. Drainage problems are associated with deteriorated culverts and undersized culverts (most older culverts were probably sized using "rule of thumb" rather than sized for specific discharge conditions). Areas that have experienced drainage problems include:

- Along Augusta Canal ponded water has affected City police cars
- Parking areas around the University Hospital experience more than a foot of ponded water.

2.1.3 Land Use and Development Trends

In areas where most of the development is occurring and is projected to occur, current floodplain management requirements are deemed adequate to prevent placing new buildings and infrastructure in flood hazard areas. Infrastructure that may not be able to avoid floodplains, such as roads and bridges and water and sewer lines, is required to be designed and constructed to minimize the potential for flood damage. Chapter 6 includes additional details.

Redevelopment in the older areas is subject to floodplain management requirements. New buildings built on the site of demolished buildings are treated as new construction and must meet all code requirements. Additions to and renovation of older buildings that are located in mapped flood hazard areas are subject to requirements to come into compliance under certain circumstances (see Section 6.2.4).

2.1.4 Multi-Jurisdictional Differences

The City of Blythe does not have mapped flood hazard areas; poor drainage results in standing water in low areas (see Section 6.8)

The City of Hephzibah has a map of flood hazard areas that was prepared by the National Flood Insurance Program (see Section 6.9). However, the GIS analysis indicates that no buildings are located in the mapped floodplain; 120 parcels of land are wholly or partially affected by mapped floodplain (Table 2-5).

2.1.5 Summary: Exposure to Flood Hazards

Digital maps of the floodplain are used for flood hazard identification and assessments of risk. The data, combined with the building footprints and other infrastructure asset information, allow estimations of what is “at risk” only by identifying whether such assets are “in” or “out” of the flood hazard area. No other characterization of flood risk can be made, i.e., depth of flooding or whether houses are in the floodway or the flood fringe.

Because of frequency of damaging events and the number of at-risk buildings, the relative risk ranking of flood hazards was determined to be “high” (see Table 1-12 for a summary of relative risks). As an overall summary of vulnerability to flood hazards is difficult to frame briefly; frequent flooding occurs in some low-lying locations every few years:

- 25% of the total land area is mapped as flood hazard area.
- More than 3,700 buildings are in mapped flood hazard areas.
- Potential for new development in flood hazard areas is characterized by 929 vacant parcels in Augusta’s floodplains and 120 vacant parcels in Hephzibah’s floodplains.
- Four manufactured housing parks are shown as partially affected by flooding.
- A small number of individually listed historic structures appear to be subject to flooding.
- Nine public buildings have some exposure to flooding.
- Two schools (one public, one private) may have some flood risk, expected to affect the sites.

-
- Infiltration due to saturated ground into the wastewater collection system increases the costs of treatment.
 - Flood-prone roads are identified by citizen reports, press reports, and examination of flood hazard mapping.
 - Stormwater management ponds have failed during intense rainfall events, contributing to downstream flooding.

2.2 Wind Hazards

Hurricanes & Tropical Storms. Hurricanes and tropical storms, as well as tropical depressions, are all tropical cyclones defined as warm-core non-frontal synoptic-scale cyclones, originating over tropical or subtropical waters, with organized deep convection and closed surface wind circulation about a well-defined center.

Hurricanes and tropical storms are classified using an intensity scale that is based on wind speed and barometric pressure measurements. Along the coast, these storms usually last only one or two tidal cycles, but have the potential to cause sustained flooding of low-lying coastal areas, damaging high winds, and erosion conditions.

Most storms degrade to tropical storms or tropical depressions shortly after making landfall. Resulting inland impacts include heavy rainfalls, riverine flooding, and high winds. Therefore, hurricanes/tropical storms are not, by themselves, separate and distinct hazards (see Section 2.1 for flood hazards).

Tornadoes. A tornado is a relatively short-lived storm composed of an intense rotating column of air, extending from a thunderstorm cloud system. Average winds in a tornado, although never accurately measured, are thought to range between 100 and 200 miles per hour; extreme tornadoes may have winds exceeding 300 miles per hour. The following definitions are used by the NWS:

- **Tornado** is a violently rotating column of air that is touching the ground. The Fujita Scale classifies tornados by wind speed and degree of damage (Table 2-7)
- **Funnel cloud** is a rapidly rotating column of air that does not touch the ground.
- **Downburst winds** are strong downdrafts, initiated by a thunderstorm, which induce an outburst of straight-line winds on or near the ground. They may last anywhere from a few minutes in small-scale microbursts to periods of up to 20 minutes in larger, longer macrobursts. Wind speeds in downbursts can reach 150 miles per hour and therefore can result in damages similar to tornado damages.

Table 2-7. Tornadoes: The Fujita Scale.

Scale	Wind Speeds (miles per hour)	Damage	Percent of all Tornadoes
F-0	40 to 72	Some damage to chimneys, TV antennas, roof shingles, trees and windows	29%
F-1	73 to 112	Automobiles overturned, carports destroyed, trees uprooted	40%
F-2	113 to 157	Roofs blown off homes, sheds and outbuildings demolished, mobile homes overturned	24%
F-3	158 to 206	Exterior walls and roofs blown off homes. Metal buildings collapsed or are severely damaged. Forests and farmland flattened.	6%
F-4	207 to 260	Few walls, if any, standing in well-built homes. Large steel and concrete missiles thrown far distances.	2%
F-5	261 to 318	Homes leveled with all debris removed. Schools, motels and other larger structures have considerable damage with exterior walls and roofs gone. Top stories demolished.	Less than 1%

The typical tornado path averages four miles in length, but paths have reached up to 300 miles long. Path widths average 300-400 yards, but severe tornadoes have cut swaths a mile or more in width, or have formed groups of two or three funnels traveling together. On the average, tornadoes move over land at speeds between 25 and 45 miles per hour, but speeds of up to 70 miles per hour have been reported. Tornadoes rarely linger more than a few minutes over a single spot or more than 15-20 minutes in a 10-mile area, but their short periods of existence do not limit the devastation. The destructive power of the tornado results primarily from its high wind velocities, sudden changes in pressure, and windborne debris. Since tornadoes are generally associated with severe storm systems, they are often accompanied by hail, torrential rain and intense lightning. Depending on intensity, tornadoes can uproot trees, bring down power lines and destroy buildings.

High Winds/Severe Storms. The term “severe storms” is used to describe weather events that exhibit all or some of these characteristics: high winds, heavy rainfall, lightning, and hail. Thunderstorms are convective storms produced when warm moist air is overrun by dry cool air. As the warm air rises, thunderhead clouds form and generate strong winds, lightning, thunder, hail and rain. Generally, thunderstorms form on warm-season afternoons and are local in effect. Storms that form in association with a cold front or other regional-scaled atmospheric disturbance can become severe, thereby producing strong winds, frequent lightning, hail, downbursts and even tornadoes.

Of the estimated 100,000 thunderstorms that occur each year in the U.S., only about 10% are classified as severe (produces hail at least ¾ inch in diameter, winds of at least 58 miles per hour, or tornadoes).

Thunderstorms produce lightning – a greater threat to people than tornadoes. Lightning is defined as a sudden and violent discharge of electricity from within a thunderstorm due to a difference in electrical charges and represents a flow of electrical current from cloud-to-cloud or cloud-to-ground. Nationally, lightning causes extensive damage to buildings and structures, kills or injures people and livestock, starts many forest fires and wildfires, and disrupts electromagnetic transmissions.

Hail accompanies some thunderstorms; in the U.S., hail causes nearly \$1 billion in damage to property and crops each year. Hailstorms are violent and spectacular phenomena of atmospheric convection, always associated with heavy rain, gusty winds, thunderstorm, and lightning. Hail is a product of strong convection and occurs only in connection with a thunderstorm where the high velocity updrafts carry large raindrops into the upper atmosphere where the temperature is well below the freezing point of water. Hail stones grow in size when the frozen droplet is repeatedly blown into the higher elevations. The hailstone ascends as long as the updraft velocity is high enough to hold the hailstone. As soon the size and weight of the hailstone overcomes the lifting capacity of updraft, it begins to fall freely under the influence of gravity.

2.2.1 Events, Frequency & Probability

Figure 2-7 shows the tracks of hurricanes and tropical storms that passed over or within 65 miles of Augusta between 1950 and 2003 (<http://hurricane.csc.noaa.gov/hurricanes/viewer.htm>).

In order to estimate the frequency of occurrence, the number of storms that have come close to the Augusta area (35) is compared to the length of the period of record, the 53 years from 1950-2003. Based on this record, on average 0.7 hurricanes or tropical storms occur somewhere in the area each year (see Table 1-12). The recurrence interval based on this record is an estimate of the amount of time, on average, during which one occurrence of a storm of a given magnitude will take place. It is important to note that, in reality, a storm can occur multiple times during one recurrence interval, and that the recurrence interval is only an estimated average time period.

For any given season, predictions of hurricane activity are prepared annually by the members of the Colorado State University Hurricane Forecast Team. The forecasts include individual monthly predictions of activity and seasonal and monthly U.S. hurricane landfall probabilities.

The predictions vary each year based on several atmospheric and oceanic factors and are available at <http://typhoon.atmos.colostate.edu/forecasts>.

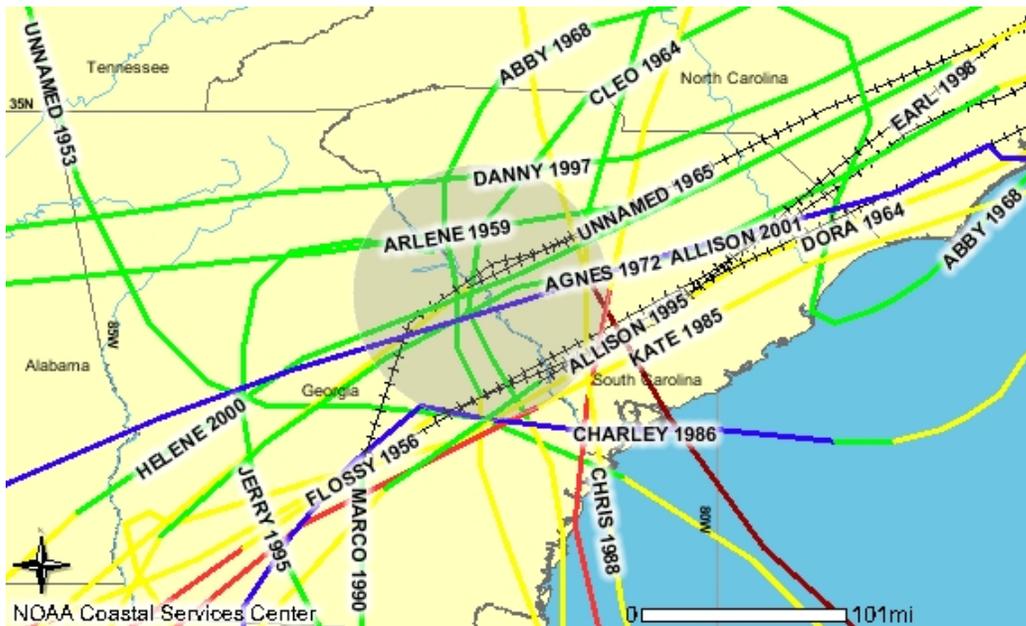


Figure 2-7. Hurricanes & Tropical Storm Tracks (1950-2003).

High Wind Probability and Experience. Figure 2-8 shows the “basic wind speed” map from the 2003 International Building Code[®]. This map is used to design buildings to withstand reasonably anticipated winds in order to minimize property damage. In the Augusta area, the “design wind” speed is 100 miles per hour (3-second gust measured at 33 feet above the ground); the State building code requires 80 miles per hour. A probability or recurrence interval is not assigned to the design wind speed.

As reported to the National Weather Service, since 1950, there have been over 100 thunderstorms and high wind events affecting the Augusta area, resulting in nearly \$80 million in property damage and \$50 million in crop damage (<http://www.ncdc.noaa.gov/oa/climate/severeweather/extremes.html>). Of these, nearly 20 events included hail in excess of 1.5 inches in diameter. During this period, one storm was reported to have notable lightning. Based on this record, on average two significant wind events occur somewhere in the area each year.

The most damaging thunderstorm in the area occurred in March 1996, when an intense microburst caused \$2 million in damage to 25 homes in a small area of Goshen, just south of Augusta. Nearly a thousand trees were damaged or destroyed, including 400 on a golf course.

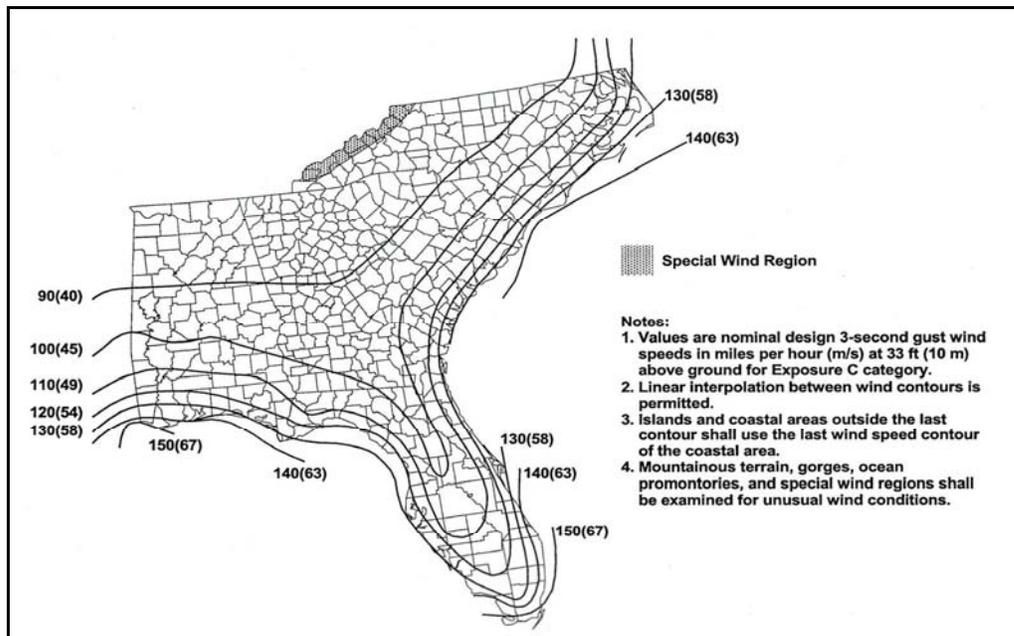


Figure 2-8. Basic Wind Speed Map: Eastern Gulf of Mexico and Southeastern U.S.

In May 2003, wind and hail in the Milledge area damaged county vehicles. A microburst in mid-2003 damaged some buildings (primarily on the South Carolina side of the Savannah River).

Tornado Probability and Experience. The Georgia State Climatologist's office maintains records on tornadoes and information on events that were reported between 1950 and 1995 (<http://climate.engr.uga.edu/tornado/>). Figure 2-9 is a graphical summary of tornadoes between 1950 and 2002. Tornadoes can occur in any month and at all hours of the day or night, although nearly half of the State's tornadoes have hit during the months of March, April and May.

The National Weather Service maintains national data on deaths associated with tornadoes as a function of location (<http://www.spc.noaa.gov/climo/torn/locations.html>). Fifteen years of data reveal that nearly 70% of deaths during this period occurred in residential structures; of these deaths, over 40% were in manufactured homes. Manufactured homes are more easily overturned and destroyed due to their low wind resistance. In order to estimate the frequency of occurrence,

Table 2-8. Tornadoes Reported to the National Weather Service (1950-2004).

Date	Fujita Scale	Deaths	Injuries	Property Damage
August 17, 1954	F-1	0	0	\$25,000
February 24, 1961	F-1	0	0	\$25,000
May 8, 1978	F-1	0	0	\$2.5 mill
April 23, 1983	F-0	0	0	\$250,000
January 29, 1990	F-2	0	6	\$250,000
May 19, 1993	F-0	0	0	\$50,000
December 17, 2000	F-2	0	8	0
June 12, 2001	F-0	0	0	0

Source: NOAA, NCDC

2.2.2 Assets Exposed & Potential Losses

By the time hurricanes and tropical storms move inland as far as the Augusta area, their effects are usually heavy rainfall that produces drainage problems and flooding, and high winds. Although there is no definitive source of damage records for all storms, the local offices of the National Weather Service record reported deaths, injuries and damage (these records are not independently verified).

High Wind Loss Estimation. High winds can damage roofs, ranging from loss of roofing materials to total loss of the roof structure. A great deal of wind damage is due to wind-borne debris which breaks windows and thus opens building envelopes to additional wind damage as well as the entry of wind-drive rains which soak contents and interiors. Debris can inflict injuries on people who have not sought shelter, or even in result death. High winds can dislodge manufactured homes that are not adequately anchored, and bring down electric and telephone lines and poles.

In general, older structures are expected to be more susceptible to wind damage in part because their construction pre-dated building codes but also because older structures may not have been maintained. The type of construction also influences the likelihood of damage, with shingled, overhanging roofs (common on residences) more vulnerable to wind damage than are flat asphalt roofs (common on nonresidential buildings).

Using HAZUS-MH, an analysis was performed to assess the relative vulnerability of structures to high wind hazards. Tropical storms, thunderstorms, and tornadoes were the types of events

considered most probable to have a widespread effect on the county. Wind vulnerability of structures is dependent on several factors including:

- Level of engineering design (code compliance);
- Quality of materials and construction;
- Structure exposure and height;
- Beneficial or adverse effects of nearby trees and structures;
- Age and condition; and
- Degree of rainfall or water penetration.

The high wind scenario was simulated for a Category 1 hurricane (where 1-minute sustained wind speeds range from 74-95 mph) that passes directly through or within close proximity of the county. This scenario is reasonable because two storms of this magnitude have passed within 65 miles of Augusta between 1950 and 2003. It was assumed that all parts of the area are equally likely to experience similar wind speeds.

The HAZUS analysis for this scenario analysis indicates that on the order of 50 buildings will suffer minor damage and at least 1 building will incur moderate damage. It is highly unlikely that any buildings would be completely destroyed. No households are expected to be displaced due to the hurricane, and consequently, no one is expected to seek temporary shelter in public shelters. The total economic loss is estimated at \$2.8 million or approximately 0.02 percent of the total replacement value of the entire building stock of the area.

Perhaps the more significant consequence of a high wind event that affects the whole area is due to debris and the associated costs to manage and dispose of the material. HAZUS-MH projects that as much as 331 tons of woody debris could be generated throughout the area, including forested and undeveloped areas. Thus, it is important to qualify this estimate because a large portion of the area is forested, and thus the amount of debris that would need to be cleared from streets and developed areas after a storm is considerably less.

The costs of managing debris are not included in regular budgets. When events prompt massive debris cleanup, staff from the Engineering, Environmental Services, Public Services, and Recreation & Parks departments are diverted from other work, often causing delays. In recent years, events with large quantities of debris have prompted the City to waive landfill fees, thus reducing potential income.

Tornado Loss Estimation. There are no standard loss estimation models and tables for tornadoes. Except for structures such as “safe rooms” that are engineered as refuges, buildings

are not designed to resist the effects of tornadoes. Therefore, when buildings are in the path of a tornado, it is expected that the damage will be total. Tornadoes are not location specific, that is, within a geographic area as small as a county, there are no factors that suggest that tornadoes will affect one area more than another.

Most estimates of likely tornado damage are based on distribution of older structures and manufactured housing units. In Augusta, fewer than 10 percent of all buildings were built before 1940. Manufactured homes are particularly vulnerable to tornadoes and high winds. Approximately 10 percent of the area's housing stock is manufactured homes. Of particular importance are areas where over 25 percent of the total housing stock consists of manufactured homes (southern part of Augusta, including around Blythe and Hephzibah, and areas close to Fort Gordon).

2.2.3 Land Use and Development Trends

All new buildings must be designed and constructed to meet current building code requirements, including wind loads. Manufactured homes are to be installed on permanent foundations with tie-downs in compliance with engineered designs provided by the manufacturer. Accessory buildings are required to be anchored; reroofing projects are subject to permit and code compliance. It is not cost-effective to require buildings to withstand tornadic winds.

The effects of high winds and the exposure of the built-environment to high winds are not influenced by land use and development trends.

2.2.4 Multi-Jurisdictional Differences

There are no differences in exposure to high winds associated with jurisdictional boundaries between Augusta, Blythe and Hephzibah.

2.2.5 Summary: Wind Hazards

Most high winds accompany large storms such as hurricanes; the exception is microbursts. Large storms are tracked and predicted with reasonable accuracy and advance warning. An overall summary of vulnerability to wind-related hazards is relatively straightforward because every building in the planning area is equally likely to be exposed to high winds. The most significant consequence associated with high winds are due to downed trees, falling limbs, accumulated woody debris on roads and private property, and power outages. Buildings are damaged by falling tree limbs and may be destroyed by tornadoes; roof damage due to winds is unusual. Primarily because of frequency (not the anticipated extent or severity of damage for

any single event), the relative risk ranking of wind hazards was determined to be “high” (see Table 1-12 for a summary of relative risks).

2.3 Severe Winter Storms

Severe winter storms bring the threat of freezing rain, ice and snow accumulation. Heavy accumulations of ice, especially when accompanied by high winds, can result in extensive damage to trees and above-ground electric transmission lines. The most significant and widespread effects are due to ice and snow covered roads which pose hazardous conditions for traffic and can complicate response and recovery efforts. Building damage may result if snow loads become significant.

Severe winter storms could result in the loss of utilities, expected increase in traffic accidents, impassable roads, debris clean-up from downed trees and limbs, and short-term lost income and productivity if normal commuting is hindered. Critical facilities are exposed to the effects of severe winter storms, but vulnerability is a function of the potential disruption of services (primarily electricity) and transportation systems.

Winter storms can vary in size and strength and include heavy snowstorms, blizzards, freezing rain, sleet, ice storms and blowing and drifting snow conditions. Extremely cold temperatures accompanied by strong winds can result in wind chills that cause bodily injury such as frostbite and death. A variety of phenomena and conditions occur during winter storms. The National Weather Service uses the following terminology:

- Heavy snowfall - the accumulation of six or more inches of snow in a 12-hour period or eight or more inches in a 24-hour period.
- Blizzard - the occurrence of sustained wind speeds in excess of 35 miles per hour accompanied by heavy snowfall or large amounts of blowing or drifting snow.
- Ice storm - an occurrence where rain falls from warmer upper layers of the atmosphere to the colder ground, freezing upon contact with the ground and exposed objects near the ground.
- Freezing drizzle/freezing rain - the effect of drizzle or rain freezing upon impact on objects that have a temperature of 32° Fahrenheit or below.
- Sleet - solid grains or pellets of ice formed by the freezing of raindrops or the refreezing of largely melted snowflakes; this ice does not cling to surfaces.
- Wind chill - an apparent temperature that describes the combined effect of wind and low air temperatures on exposed skin.

2.3.1 Events, Frequency & Probability

The 2003 International Building Code[®] includes a map of the United States showing “ground snow loads” associated with the 2%-annual probability of being exceeded (50-year recurrence interval). This information is used in design and construction so that buildings will withstand reasonably anticipated snow loads in order to minimize property damage (reference: ASCE 2002). The City falls within the area where the “ground snow load” is five pounds per square foot. In comparison, buildings and roofs in extreme northern Georgia must be designed to resist twice that snow load.

Records maintained by the State Climatologist’s office (<http://climate.engr.uga.edu>) indicate that Augusta is in the region that usually receives less than 3-inches of snow per year. Although six winter storms in Georgia have prompted federal disaster or emergency declarations between 1976 and 2000, none of those events affected Augusta. Online records available from the National Climatic Data Center (<http://www.ncdc.noaa.gov/oa/climate/severeweather/extremes.html>) indicate that two recent winter events affected the Augusta area, although the hardest hit areas were nearby counties. The January 2002 storm was centered over Lincoln County north of Augusta and the January 2004 ice storm affected the Augusta area but was reported to be most severe in Lincoln, Columbia, and McDuffie counties just north of Augusta. There is no evidence that these storms should be characterized as “severe.” The ice storm caused scattered power outages that affected about 100,000 homes for several days.

Winter weather affects the Augusta area nearly every year although there is a low probability of winter storms of such magnitude and severity that widespread property damage and power outages will occur. For the state as a whole, it appears that major severe winter storms occur, on average, every three years. For 24 years of record, eight winter storms have been noted in the historical records suggesting a frequency of 0.3 storms per year.

2.3.2 Assets Exposed & Potential Losses

All buildings and above ground utilities are exposed to the effects of winter storms. Because most damage is associated ice accumulations that result in falling tree limbs and downed electric lines, it is not feasible to estimate the cost of building damage. The License & Inspection Department reported no known building damage due to heavy snow or ice loads. The Fire Department indicates that the number of structure fires tends to increase when winter storms cause power outages due to “creative” ways that people may attempt to warm their homes.

Backup power is available for the jails, the 911 Center, the Court House and the newer fire stations. Some older fire stations have emergency generators. City recreation facilities that are designated as emergency shelters do not have backup power.

Severe winter storms, especially those with heavy icing, generate a lot of downed trees and limbs, requiring cleanup of the resulting debris. The costs of managing debris are not included in regular budgets. When events prompt massive debris cleanup, staff from the Engineering & Environmental Services, Public Services, and Recreation & Parks departments are diverted from other work, often causing delays in scheduled projects. In recent years, events with large quantities of debris have prompted the City to waive landfill fees, thus reducing potential income. The January 2004 ice storm cost the City \$322,354 (excludes estimate of lost income due to waiver of landfill fees).

Icing of roads and bridges affects traffic but is not considered a major factor in physical damage to roads. A growing problem associated with periods of freezing weather is road icing due to automatic outdoor sprinkler systems.

2.3.3 Land Use and Development Trends

All new buildings must be designed and constructed to meet current building code requirements, including snow loads. The effects of winter storms are not influenced by land use and development trends.

2.3.4 Multi-Jurisdictional Differences

There are no differences in exposure to winter storms associated with jurisdictional boundaries between Augusta, Blythe and Hephzibah.

2.3.5 Summary: Winter Storms

Most winter storms are tracked and predicted with reasonable accuracy and advance warning. When roads are covered with snow and ice, the traveling public is adversely affected. Other than damage due to falling tree limbs, building damage due to severe winter storms is rare. An overall summary of vulnerability to winter storms is relatively straightforward because every building and above-ground utilities in the planning area are equally likely to be exposed. The relative risk ranking of winter storms was determined to be “moderate” (see Table 1-12 for a summary of relative risks).

2.4 Drought

Drought is a condition of climatic dryness that is severe enough to reduce soil moisture and water and snow levels below the minimum necessary for sustaining plant, animal, and economic systems. Drought is a complex physical and social process of widespread significance, although rarely does a single period of drought affect an entire state. Despite all of the problems that droughts have caused, as a hazard it has proven to be difficult to define and there is no universally accepted definition. Unlike some hazard events such as floods, drought does not have a clearly defined onset.

The most commonly used definitions of drought are based on meteorological, agricultural, hydrological and socioeconomic effects:

- **Meteorological** drought is defined by a period of substantially diminished precipitation duration and/or intensity. This definition is usually expressed as an interval of time, generally on the order of months or years, during which the actual moisture supply at a given place consistently falls below the climatically appropriate (or normal) moisture supply.
- **Agricultural** drought occurs when there is inadequate soil moisture to meet the needs of a particular crop at a particular time. Agricultural drought usually occurs after or during meteorological drought, but before hydrological drought, and can also affect livestock and other dry-land agricultural operations.
- **Hydrological** drought refers to deficiencies in surface and subsurface water supplies. It is measured in terms of stream flow and as lake, reservoir and groundwater levels. There is usually a delay between lack of rain and resultant reduction in measurable water in streams, lakes and reservoirs. Therefore, hydrological measurements tend to lag other drought indicators.
- **Socio-economic** drought occurs when physical water shortages start to affect the health, well-being, and quality of life of residents, or when restricted water supplies affect the supply and demand of an economic product.

2.4.1 Events, Frequency & Probability

Table 2-9 lists some of the more extreme droughts in Georgia, only some of which affected the Augusta area. Not listed is the June 2000 drought which affected several counties with total estimated damage of \$306 million. Information about drought status at any given time can be viewed online at <http://www.griffin.peachnet.edu/caes/drought/>. Regional droughts appear to occur, on average, every ten years.

Table 2-9. Historical Occurrence of Drought in Georgia.*

Date	Area Affected	Recurrence Interval	Remarks
1903-05	Statewide	25 to 50	Severe in places
1924-27	Altamaha, Chattahoochee, Coosa River Basins; north-central part of state	25 to 80	One of the more severe droughts of this century
1938-44	Statewide	10 to >50	Regional drought
1950-57	Statewide	10 to >25	Regional drought
1968-71	Southern, central, and northwestern part of state	10 to >25	Severity extremely variable
1980-82	Statewide	10 to 25	Low flow recurrence intervals of main stem of Flint River > 50 years
1985-90	Northern and central parts of State	<10 to 100	Regional drought
1998-Present	Most of the State	<10 to 100	Regional drought

* Source: Georgia Hazard Mitigation Strategy – 2000

Droughts result from prolonged periods of dry weather accompanied by extreme heat and usually occur during the summer months (July and August) in the Augusta area when high pressure systems settle over the area and dry prevailing winds come from the west and southwest. The area is subject to periodic droughts that may impact the ability of the cities to meet all water needs. In Section 1.4.3, Figure 1-3 shows land use and Table 1-3 indicates that about 5% of Augusta is in agricultural use.

A significant drought affected counties in the area in 1986, contributing to three deaths and over \$300,000 in crop damage. The long heat spell and drought that affected the area in July 1992 saw record temperatures: 47 of 61 days reached 95° or higher, including 21 days with 100° or higher. In Georgia alone, crop losses exceeded \$500 million.

The drought during the summer of 1998 saw reduction in the normal flows of the Savannah River, the area’s primary source of raw water. Lowered levels affected tourism and river usage, prompting more river accidents (groundings and impacts with exposed snags). The State was concerned with water quality due to higher concentrations of effluent from plants and factories that withdraw water and return it to the river.

2.4.2 Assets Exposed & Potential Losses

The entire planning area is expected to experience drought conditions without variations. Physical damage to buildings is not associated with droughts. Exterior plantings that depend on periodic watering are at risk and such watering is restricted in the early phases of water conservation.

Augusta Utilities currently has sufficient capacity to provide water to the current service area with two surface water treatment plants (groundwater wells are being phased to backup status for extreme drought events) and a new plant due to come online in 2005.

The License & Inspections Department reported that during prolonged dry periods some older homes have experienced settling due to the falling water table which leads to local consolidation and compaction of soils. Individual homeowners have had to employ engineers to determine appropriate solutions that usually include reconstruction of foundations. Only about 20 homes have experienced this problem in the past decade.

Prolonged drought conditions can increase the risk of urban wildland fires (see Section 2.5).

2.4.3 Land Use and Development Trends

Availability of water through the existing distribution system is a factor that influences new land development activities. Augusta Utilities is planning a new water plant to serve the southern part of the City; the Savannah River will be the source. This will likely stimulate additional development. In areas not served by Augusta Utilities, lot sizes are larger to accommodate on-site septic systems; lot sizes may range from 0.86 to 3.3 acres depending on soil types and topography. Blythe reports that 1 acre lot sizes are required in areas on well and septic.

2.4.4 Multi-Jurisdictional Differences

In terms of landscape impacts due to drought, there are no jurisdictional differences – the planning area is uniformly affected. However:

- The City of Blythe provides water to its residents, relying on two wells. As of 2004, Blythe's system is interconnected with Augusta Utilities for contingency service.
- The City of Hephzibah operates its own water pumping, treatment and distribution system, obtaining all of its water supply from groundwater sources. Three elevated tanks have a combined capacity of 285,000 gallons. The City worked with Augusta Utilities and can connect to the regional water supply in emergencies; in a recent drought Hephzibah supplied South Richmond County with approximately 1 million gallons per day.

2.4.5 Summary: Drought

Sustained drought conditions can adversely affect agricultural and forestry interests, lead to loss of horticultural and decorative plantings, and contribute to increased risk of wildland fires. An overall summary of vulnerability to drought is relatively straightforward because drought is assumed to uniformly affect the area and because most of the planning area is served by public water delivered by Augusta Utilities. The relative risk ranking of droughts was determined to be “moderate” (see Table 1-12 for a summary of relative risks).

2.5 Urban Wildland Interface Fire

A wildland fire is an uncontrolled fire spreading through vegetative fuels, such as brush, marshes, grasslands or field lands, exposing and possibly consuming structures. They often begin unnoticed in sparsely populated areas and may spread quickly. The risk of wildland fire, and the nature fire behavior, is associated with a combination of several factors, notably stands of timber and open areas of vegetative fuels, prolonged dry weather, sloping topography, and development within the zone commonly referred to as the “urban-wildland interface.” Within this zone, buildings become additional fuel for fires and prompt fire-fighting efforts. The causes of urban-wildland fires include lightning, human carelessness and arson.

Wildland fires can occur during any month of the year, and the season length and peak months may vary appreciably from year to year. Generally, fires are more likely when seasonal precipitation levels are low, ambient humidity is low, and vegetation is dry. The potential for property damage increases as development continues to take place in the interface. In areas with active forest-based economy, including tourism, extensive wildfires can have adverse economic impacts. If burned-out woodlands, grasslands, and farmlands do not quickly revegetate, increased erosion may contribute to reduced water quality or increased downstream flooding.

2.5.1 Events, Frequency & Probability

Data from the Georgia Forestry Commission indicates that over 3,800 incidents of forest or brush fire (i.e., all non-structural fires) were reported in the Augusta area between 1957 and mid-2004, with over 16,000 acres burned. In 1998, a large woods fire on Bobby Jones came close to several houses.

These fires were attributed to various causes, including lightning, campfire, debris burning (residential, agricultural fields, household garbage, construction land clearing, etc.), incendiary, and the use of machines. With an average acreage per fire of just over 4 acres, the Planning Committee considers that forest and wildland fires do not represent a major hazard to the built-

environment – and the small areas affected also suggest effective response on behalf of local and state agencies.

Although an average of about 80 incidents per year were reported, the general wildland fire risk in the Augusta area is considered to be relatively low; very few occur in locations where buildings could be threatened. Because the risk is seasonal and changes with many factors, the Georgia Forestry Commission produces a Fire Danger Map each day using the National Fire Danger Rating System that is based on weather data obtained from stations across the State. As shown in Figure 2-10, on December 15, 2004 the risk in the Augusta area was rated as moderate.

The probability of wildland fires may be influenced by other events, such as drought or the build-up of underbrush and fallen trees and limbs following severe wind storms or ice storms. State law restricts outdoor burning between May 1 and September 31, except for certain agricultural practices. The Commission and the Fire Department may issue warnings and tickets.

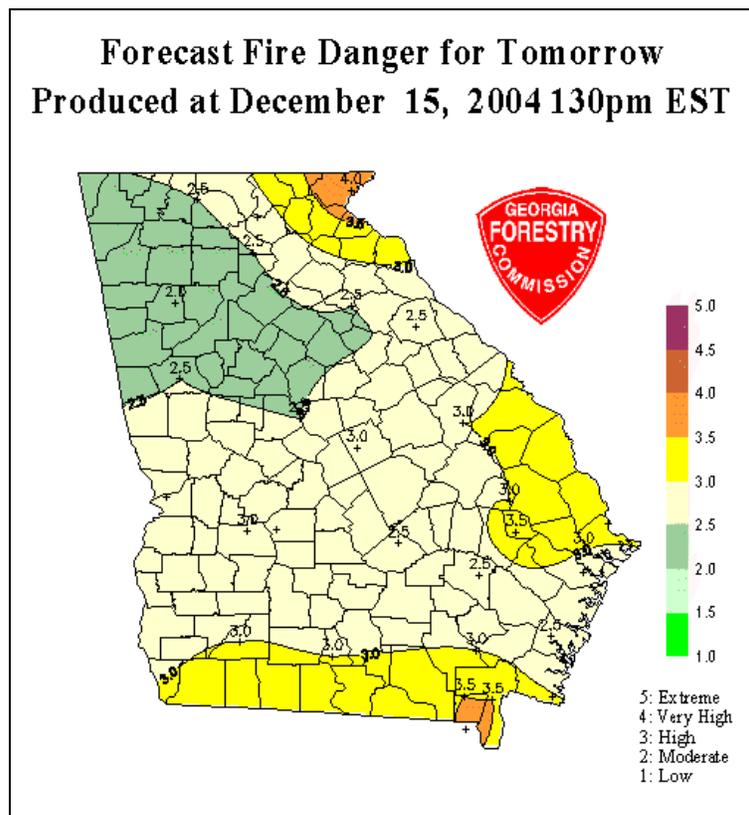


Figure 2-10. Georgia Counties: Fire Danger Rating.
<http://weather.gfc.state.ga.us/Maps.aspx>

2.5.2 Assets Exposed & Potential Losses

Table 1-3 on land use indicates that only about 10 percent of Augusta is zoned for forested land use. When added to other categories of land use that likely are subject to wildland fires (public/institutional, Fort Gordon, park/recreation/conservation, agriculture and undeveloped/unused), nearly 60% of the area could experience a non-structural type fire that could be characterized as “wildland urban interface” fire; Fort Gordon accounts for nearly one-third (see Figure 2-11). Approximately 2,200 structures are located in these land use zones and thus have some risk in the event wildland fires are not controlled. The Georgia Forestry Commission has indicated that nearly 60 percent of the Augusta area is forested lands.

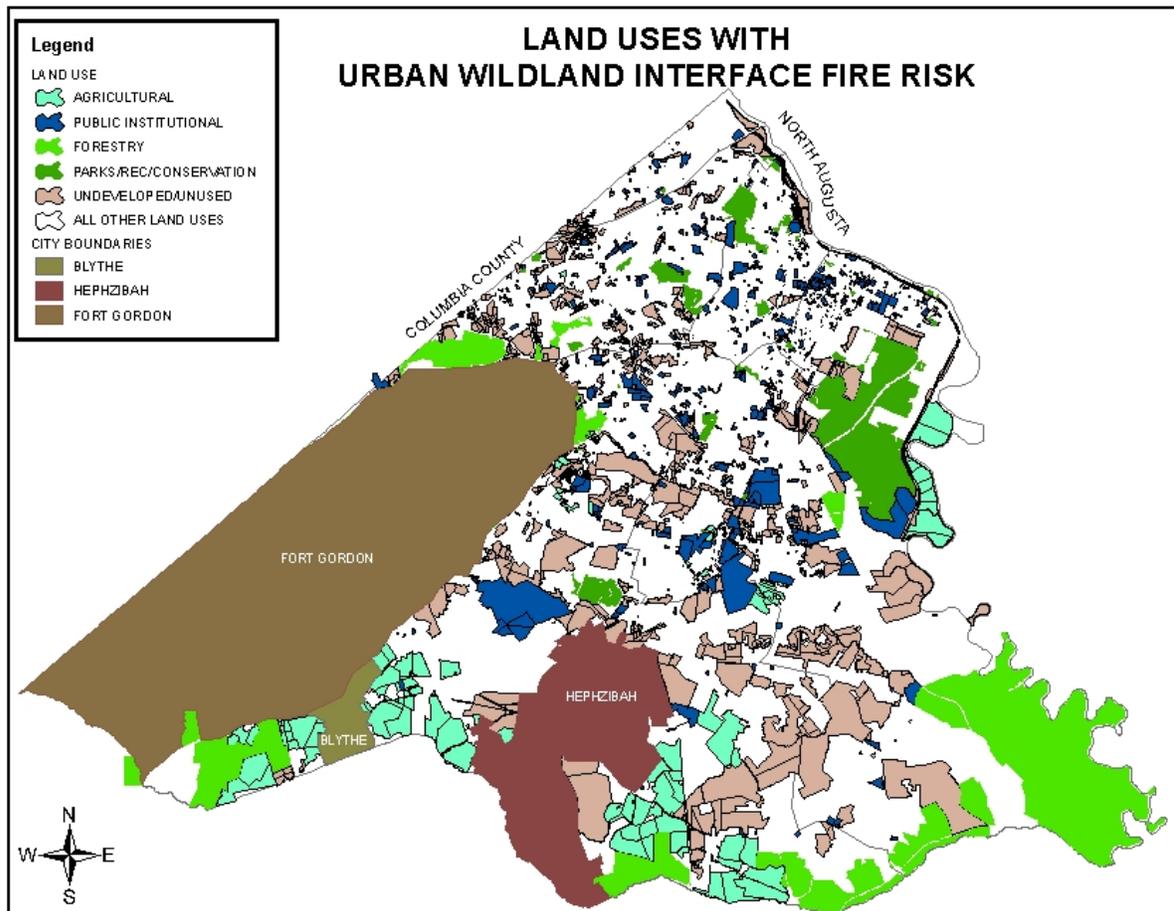


Figure 2-11. Land Uses Exposed to Urban Wildland Interface Fire.

It is unreasonable to approximate the characteristics of just 2,200 buildings by applying area-wide percentages, although it is likely that most of the interface buildings are residential, recreational, or used for farming and forestry purposes. More information about specific properties in or near wooded areas would be necessary to estimate the potential damage and losses associated with interface wildland fire (this level of detail is not available through the City's GIS data layers). The more significant economic impact of a large wildfire would be on the forest-based industries; however, given the efficiency of fire suppression (based on small acreage of the average fire), it is unlikely that any single fire would affect a large area.

Figure 2-12 was prepared using the reported locations of critical facilities (see Section 1.4.5), fifteen facilities are located in areas where the land use suggests that wildland fires may occur (forested, agricultural, conservation/recreational and undeveloped). While no single wildfire incident would likely affect more than one of these facilities, the total value of these at-risk critical and essential facilities is reported to be over \$200 million:

- Richmond County Board of Education (transportation)
- Freedom Park Elementary
- Fort Gordon Fire Department
- Augusta Water Pump Station
- Riverwalk Marina
- Julian Smith Bar-B-Que Pit
- Sue Reynolds Park
- Augusta Aquatic Center
- Eastview Park
- Augusta Municipal Golf Course
- Dyess Park
- Augusta Fire Department (#16)
- Julian Smith Casino
- Warren Road Community Center
- Gracewood Park

The GEMA online tool described in Appendix B-2 uses a different methodology to characterize urban wildland fire risk. The method, developed by the USDA Forest Service, was intended for a state-wide analysis, but has been offered by GEMA as a source of data on wildfire risk.

Application of the GEMA online tool to the critical and essential facilities database yields 10 facilities that are located in areas identified as having a “moderate” wildfire risk (hazard score of 3). Those facilities are: Fleming Athletic Office; Merry Elementary School; National Hills

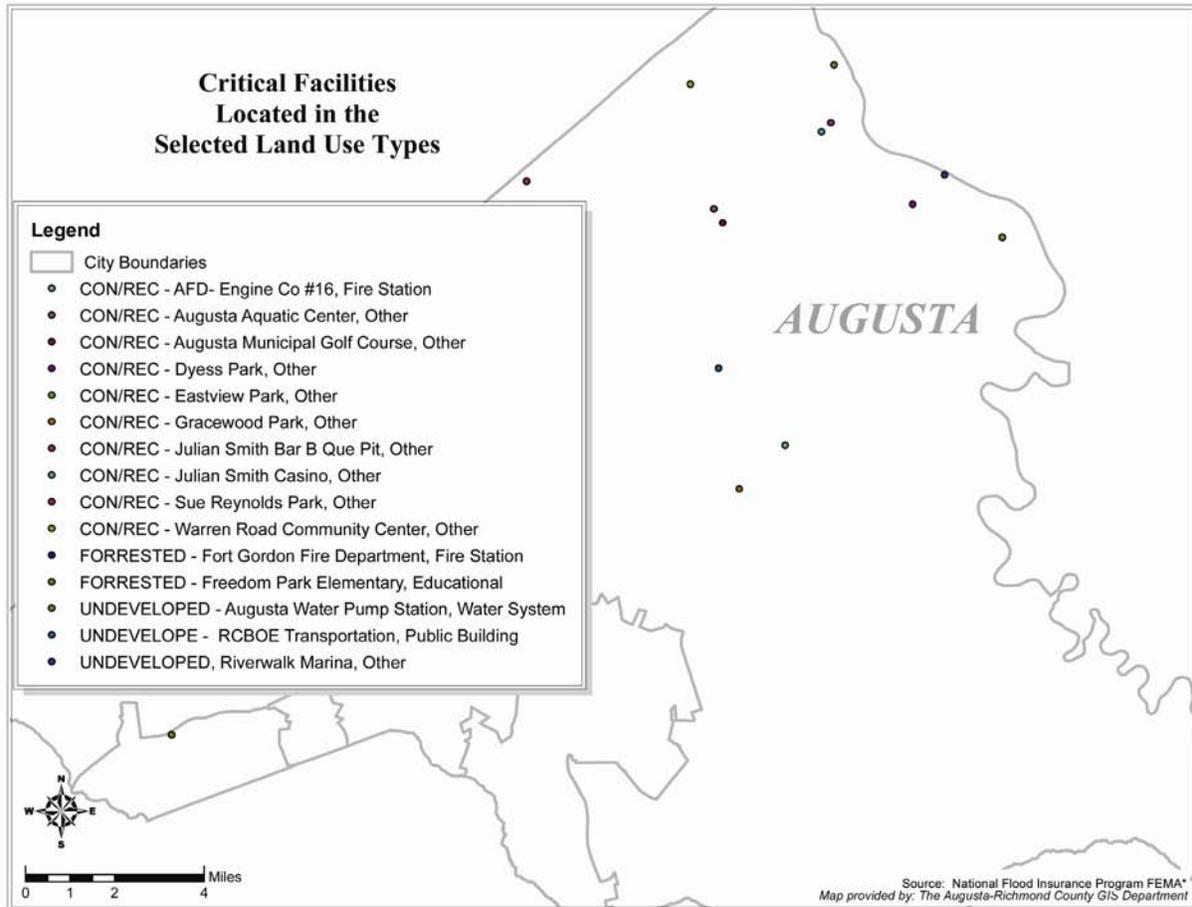


Figure 2-12. Critical and Essential Facilities in Land Uses Exposed to Urban Wildland Interface Fire.

Elementary School; AFD- Engine Co #5; Richmond County Alter. & Opportunity Magnet School; Jeff Maxwell Branch Library; Bernie Ward Community Center; Carrie Mays; Westminster Schools Maintenance Shop; and Westminster Schools Prep School Gym. While no single wildfire incident would likely affect more than one of these facilities, the total value of these at-risk critical and essential facilities reported to be \$12.4 million. Another 22 facilities are noted as having a “low” risk.

2.5.3 Land Use and Development Trends

Development is moving outward from the urban areas, with considerable growth in the southern part of Augusta, GA. There has been an increase in the number of subdivisions and single-

family homes that are built in forested areas. This trend increases the likelihood that wildland fires may affect buildings.

The Fire Department anticipates having to build new stations in the future in order to serve increases in population and to maintain response times as more growth occurs. The Department reviews subdivision plans primarily for the number and location of hydrants and to determine if access roads have adequate width and turning radius for the newer, large apparatus. Some roads in the rural part of the City and some driveways are very narrow for the current tanker trucks.

The Georgia Forestry Commission undertakes some preventive, pre-suppression work, including plowing pre-defined fire breaks. Importantly, the Forestry Commission staff can work with local governments and private land owners (fee based) to develop prevention plans to improve forest health. The Forestry Commission views public education as an important part of its mission and provides booths for local fairs and events and speakers for homeowner associations and schools.

2.5.4 Multi-Jurisdictional Differences

Blythe and Hephzibah are surrounded by and include agricultural and forested lands. Therefore, the risk of urban wildland interface fire is the same in the two cities as it is in similar land uses elsewhere in Augusta.

2.5.5 Summary: Urban Wildland Interface Fire

An overall summary of vulnerability to urban wildland interface fire can be made by examining the land use map for those land uses assumed to have a higher risk of such fires: over 60% of Augusta's area and about 2,200 buildings are located in those land uses. Because any given outbreak of wildland fire is suppressed rapidly, no single incident is likely to cause severe damage. However, due to the relatively large numbers of such fires that occur each year, the relative risk ranking of urban wildland interface fire was determined to be "moderate" (see Table 1-12 for a summary of relative risks).

Chapter 3: Technological Hazard, Risk and Vulnerability

The Augusta Emergency Management Agency maintains and exercises response plans, including responses to technological hazards and hazardous materials incidents. This Plan addresses only hazardous materials as a hazard that intersects with flood hazards that can be mapped.

3.1 Hazardous Materials

Hazardous materials are chemical substances, which, if released or misused, can pose threats to the environment or to the health of people who are exposed to the materials. Chemicals of this nature are used in industry, agriculture, medicine, research, and the manufacture of some consumer goods. Hazardous materials come be explosives, flammable and combustible substances, poisons, and radioactive materials. Since their chemical properties vary significantly, an incident could be obvious (e.g., airborne plume, spill on the ground, bad smell) or not readily apparent (e.g., beneath the surface of the ground, no odor or color).

Hazardous material incidents are among the most common technological threats to public health and the environment. Most incidents of release result from transportation accidents or accidents in manufacturing facilities that use the materials. Hazardous materials are transported on railroads, state roads, interstate highways, as well as local roads, during delivery. A hazardous materials accident is usually a localized event and response is managed locally.

The Emergency Planning and Community Right-to-Know Act of 1986 establishes requirements for Federal, State and local governments, Indian Tribes, and industry regarding emergency planning and “Community Right-to-Know” reporting on hazardous and toxic chemicals. The Act’s provisions help increase the public’s knowledge and access to information on chemicals used at individual facilities and releases into the environment. States and communities, working with facilities, can use the information to improve chemical safety and protect public health and the environment.

Reports on hazardous materials are prepared by handlers and submitted to and maintained by the Local Emergency Planning Committee (staffed by the Augusta Emergency Management Agency). Twenty-one facilities make or store sufficient quantities of chemicals to require preparation of risk management plans mandated by the U.S. Environmental Protection Agency. A risk management plan is a detailed analysis of risk that includes a 5-year history of actual incidents, the likely consequences of a “worst case” scenario, and strategies for improving safety.

3.1.1 Events, Frequency & Probability

Incidents involving releases of hazardous materials are not assigned a probability of recurrence as are natural hazards. However, past data can be used to characterize the likelihood of future incidents. The Environmental Protection Division of the Georgia Department of Natural Resources is the state's lead agency in regulating public and private facilities that use hazardous substances. The agency maintains a database of reported spill incidents and releases, which are declining, probably because manufacturers, users, and transporters of hazardous materials are becoming more aware of the financial and political costs of hazardous materials incidents.

In the City of Augusta, transportation of hazardous materials poses a daily threat, given that the Railroad and U.S. Routes 20 and 520 that run through the City are major transportation routes.

3.1.2 Assets Exposed & Potential Losses

A general spatial analysis can be performed to estimate general impacts associated with accidental releases of hazardous materials. In the Augusta area, sites with reported materials are concentrated in four clusters (Figure 3-1). Using the GIS building footprints, the concentration

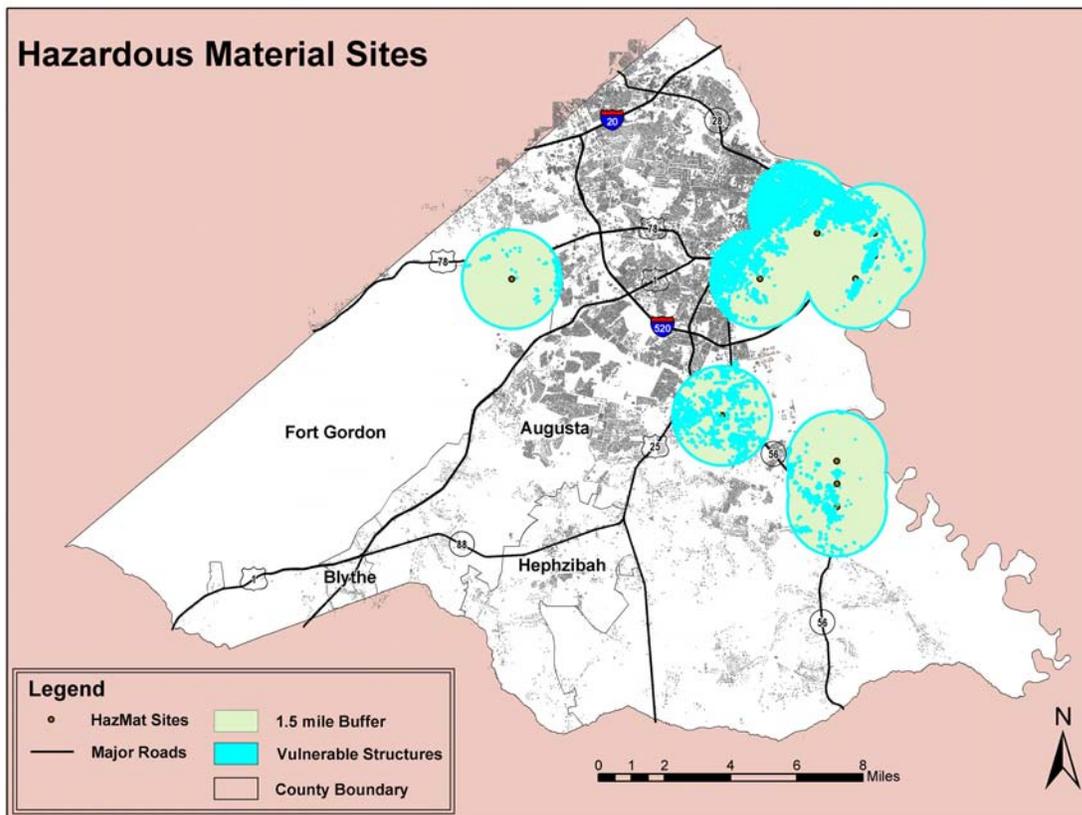


Figure 3-1. Clusters of Hazardous Materials Sites, with 1.5-Mile Buffer.

of development (and thus number of people) located within a given distance around the sites can be determined. The analysis takes into account only the geographic distribution of buildings with respect to the manufacturers, users, and storage facilities, and does not characterize specific types of hazardous materials and the potential effects should a release occur. Different types of hazardous material have different potential impacts, and in all cases the total effects would be influenced by weather and the efficiency of response and containment.

The American Society for Testing and Materials (ASTM) develops standards for regulated facilities that manufacture, use, store or are disposal sites for hazardous or potentially hazardous materials and waste. According to these standards, the 1.5 mile radial distance was considered in evaluating each of the clusters' potential influence on surrounding properties.

Considering the clusters of HazMat sites and applying a 1.5-mile radius, over 25% of all buildings in Augusta are within areas broadly characterized as “potential impact areas.” This estimate is very high, given several simplifying assumptions made in the analysis, and certainly does not represent the potential impact of any single incident.

Using the reported locations of the critical facilities (see Section 1.4.5), fifty-nine are located in areas delineated by applying the 1.5-mile buffer to clusters of sites where hazardous materials are used or stored (see Figure 3-2).

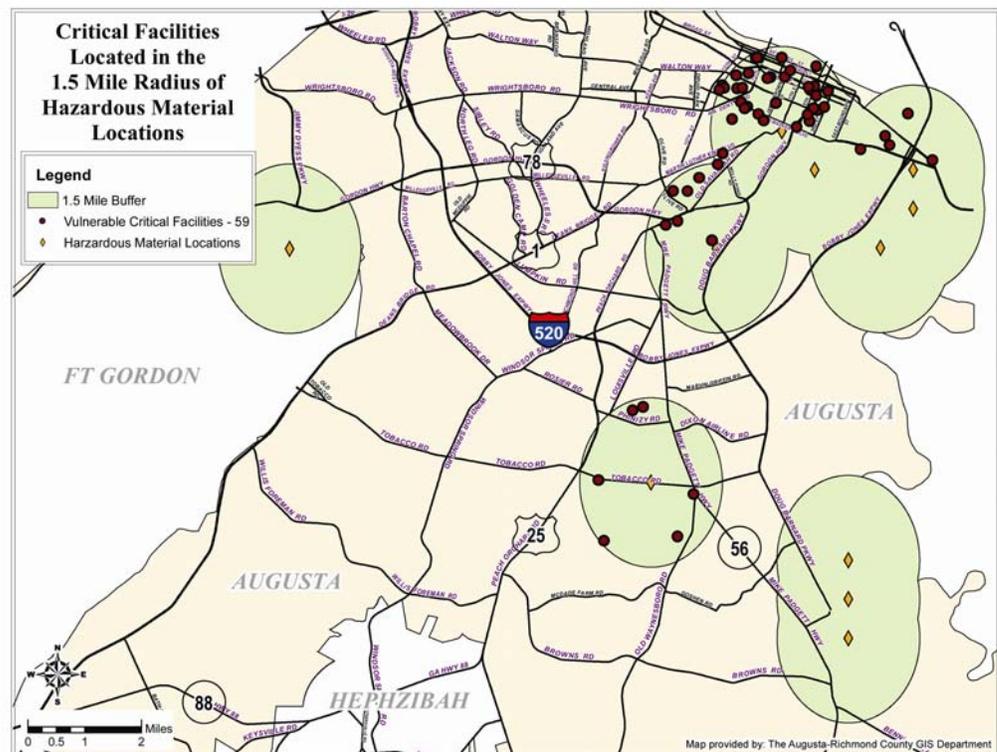


Figure 3-2. Critical & Essential Facilities in HazMat Buffers.

Flood Risks – Hazardous Materials. Extensive flood-prone areas are found on Augusta’s east side and are associated with Butler Creek, Rocky Creek, and drainage from all streams in the urban district (former City). The area, also known as Phinizy Swamp, is generally flat and is predicted to experience relatively shallow flooding. Industries in the area are familiar with flood hazards and containment areas (around chemical storage tanks) that are located in floodplain areas are sized to protect against flooding up to the predicted level of the base flood (100-year).

Figure 3-3 uses the best available location data for hazardous materials (which may be represented by office address rather than physical location of material handling facility). Of the 156 locations, eleven plot as falling within the mapped flood hazard area. This determination does not imply that such facilities are subject to flooding or transport offsite during a flood event.

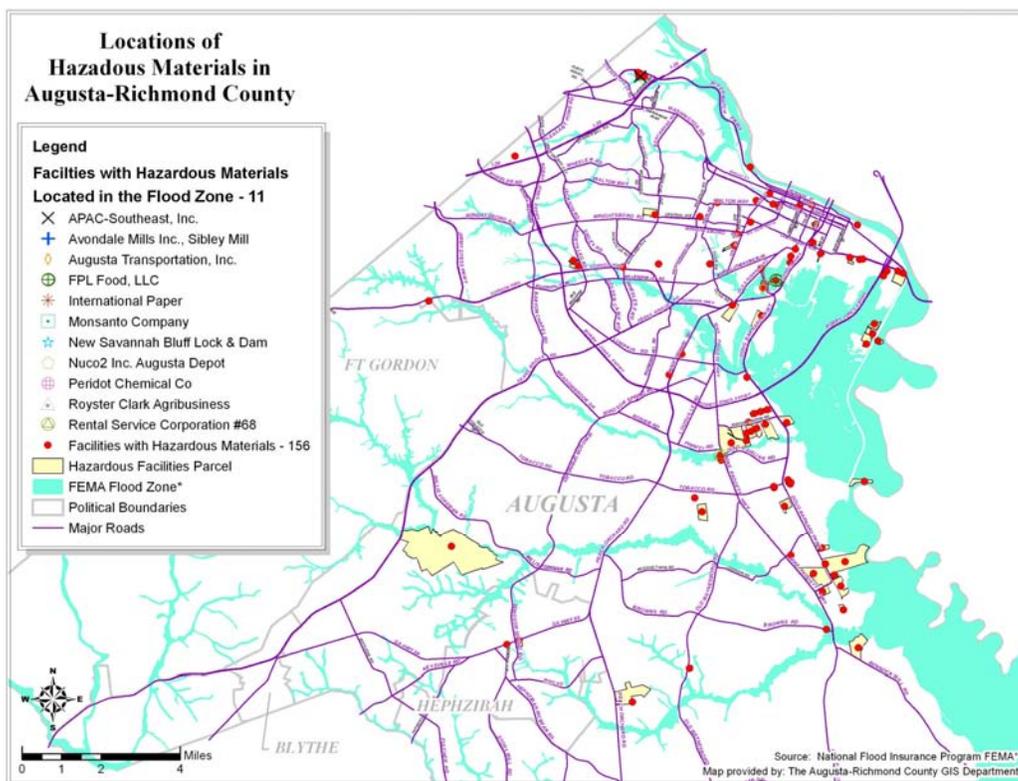


Figure 3-3 Locations of Hazardous Materials (flood map).

Through the Local Emergency Planning Committee, the Augusta Emergency Management Agency asked handlers about past impacts due to flooding – none were reported.

3.1.3 Land Use and Development Trends

The Augusta Zoning Ordinance specifies that certain uses are prohibited in the Savannah River Corridor Protection District (plus 100-foot buffer), including “handling areas for the receiving and storage of hazardous wastes and disposal facilities for hazardous or solid wastes” (Sec. 25-D-5).

Augusta’s Groundwater Protection Standards (Title 8) requires that in certain significant groundwater recharge areas:

- No land disposal of hazardous waste shall be permitted;
- The handling, storage and disposal of hazardous materials shall take place on an impermeable surface having spill and leak protection approved by the Georgia Department of Natural Resources, Environmental Protection Division; and
- New above-ground chemical or petroleum storage tanks larger than 660 gallons must have secondary containment for 110 percent of tank volume or 110 percent of the largest tanks in a cluster of tanks.

3.1.4 Multi-Jurisdictional Differences

Blythe reports that the only reported hazardous materials are those used by the City’s water department (Section 6.8).

Hephzibah reports that the only reported hazardous materials are those used by the City’s water department (Section 6.9).

3.1.5 Summary: Hazardous Materials

For the purposes of this Plan, the only technological hazards considered are those risks associated with hazardous materials locations that are also subject to flood hazards. Although many facilities in Augusta’s industrial area use hazardous materials and the transport of materials via highway and railroad poses considerable threat, a relative risk ranking of “low” was assigned to the likelihood of a HazMat incident occurring coincident with flooding (see Table 1-12 for a summary of relative risks).. This assessment in no way minimizes the seriousness of impacts due to HazMat incidents, especially transportation-related incidents.

Chapter 4: Natural Hazards Mitigation Actions

Throughout the planning process, the Mitigation Planning Committee considered hazards, the number of people and types of property that are exposed, and the development review process. Table 4-1 summarizes the relative ranking of risk due to the hazards that are considered in this Plan (from Table 1-12).

Table 4-1. Relative Risk Ranking.

Hazard	Relative Risk Ranking
Flood (including tropical systems and dam failure)	High
High Wind/Severe Storms	High
Hurricane/Tropical Storm (resulting in wind and flood damage)	(Included in Flood & High Wind)
Tornado	(Included in High Wind)
Winter Storm	Moderate
Drought	Moderate
Urban Wildland Interface Fire	Moderate
Hazardous Materials Incidents (weather-related)	Low

Based on these relative risk rankings and the Committee's understanding of how hazards are addressed in ongoing processes related to development, several potential actions were identified, circulated, reviewed, and prioritized. A list of tentative mitigation actions was distributed and discussed at Committee meetings. Changes were made and a revised list was distributed for members to indicate priorities (Drop, No Opinion, Low, Medium, High) based on their program's functions and priorities; all rankings were composited to represent the consensus.

Factors that influenced prioritizing of actions included the Committee's review of available information on flood hazards, other hazards, past hazard events, the number of people and types of property exposed to those hazards, and the elements of the development approval process. High priority was placed on those actions that are consistent with current City policies, those that are technically feasible and have good anticipated political and social acceptance, and those that can be achieved using existing authorities, budget levels, and staff. However, the Committee noted that short-term constraints should not significantly influence long-term priorities, as those priorities may support budgetary shifts and staff efforts.

The Committee agreed that progress should be made on all identified actions within the 5-year planning period, although it is recognized that many may not be completed in that timeframe, in part due to their on-going nature.

For each mitigation action, the following are noted: designation of departments/offices to take the lead and support roles, anticipated support by elected officials and the community at-large, funding limitations and status, and a qualitative statement regarding cost effectiveness. In this context, the “cost” of accomplishing the action was compared to the perceived “benefits,” including community-wide safety. Because most actions are programmatic (as opposed to projects), rigorous benefit-cost analyses were not prepared. If Augusta submits applications for funding sources that require such analyses, the results will be used to help determine which properties to prioritize for mitigation.

Medium priority actions and low priority actions are scheduled for further consideration when the City undertakes the comprehensive review. Lead offices and other factors will be discussed and documented during the Plan revision. At that time, it is expected that new actions will be identified and a process to prioritize all remaining actions will be undertaken.

4.1 Flood Hazards

4.1.1 Identification & Analysis of Range of Mitigation Options

Four categories of options are generally considered when addressing flood hazards:

- Programmatic actions that prevent exposing new development to flood risks and that protect natural resources (land use, open space, regulations and codes, stormwater management, drainage maintenance, wetlands protection, erosion and sediment control).
- Property protection actions that address site-specific existing problems (acquisition, elevation, retrofit, backflow prevention).
- Structural solutions (dams/ponds, levees/floodwalls, channel modification).
- Public information and emergency actions (outreach projects, web page content, library materials, flood map determinations, flood warning).

As described in Chapter 6, Augusta addresses flood hazards through a number of existing mechanisms, including some actions from each of the above-listed categories. Section 1.4.4 describes existing mitigation initiatives for which site-specific problems were examined to identify feasible and cost-effective solutions, including drainage improvements and property acquisition.

4.1.2 Existing Policies, Regulations, Ordinances & Land Use

Chapter 6 contains a detailed overview of Augusta’s capability to address hazards, including how the City plans and grows and how different departments have been affected by and how they handle hazards. Similarly, Sections 6.8 and 6.9 briefly describe the cities of Blythe and Hephzibah and how hazards are addressed in normal city functions.

4.1.3 Existing Flood Mitigation Initiatives

Floodplain Acquisitions. Prompted by significant flooding in 1998, which resulted in Presidential Declaration DR 1209, the City began to consider seeking federal grant funds to acquire a number of flood-damaged homes. There were many more damaged homes than available funding; for the most part the selection was driven by federal and state emphasis and the limited amount of available funds.

The City’s first federal grant for acquisition of flood-prone homes provided \$618,928 from the Hazard Mitigation Grant Program to cover 75% of eligible costs. The grant was awarded through the Georgia Emergency Management Agency for the acquisition and removal of 12 substantially damaged and repetitive loss properties (8 were in FEMA’s “repetitive loss target group”). Although homes were located in several places (green circles on Figure 2-3) many were concentrated in the Hollywood Subdivision. For this first grant, the State provided 15% and the City provided 10% towards the 25% non-federal match (Table 4-2).

Another flood in 2002, although not qualifying as a major disaster declaration, caused extensive damage to homes in Augusta. As a result, the City applied for and received a grant to pursue more floodplain acquisitions (Phase 2). Phase 3 was funded by a grant that was approved in late August 2003, and Phase 4 was funded by a Pre-Disaster Mitigation Grant approved in 2004.

Table 4-2
Floodplain Acquisition Grants (as of mid-2005).

	Federal & State	Local Share	Total Project Cost
Phase 1: Original Application Approved 3/2001 (12 homes)	\$618,928	\$68,770	\$687,698
Phase 2: Approved 2/2003; Dominion Way (4 homes)	\$301,612	\$33,512	\$335,124
Phase 3: Approved 4/2004 (6 homes)	\$303,509	\$33,729	\$337,238
Phase 4: Approved 4/2004 (13 homes and properties)	\$146,308	\$48,769	\$195,077
35 homes/properties	\$1,370,357	\$184,780	\$1,555,137

As a condition of the mitigation grants, the acquired lands must be retained as open space. As shown on Figure 2-3, these lots are in several locations, complicating re-use for recreational purposes or other compatible open space purposes. The Hollywood area, where some homes have been acquired and several others have been abandoned due to repetitive flood damage, may be a suitable site for wetlands restoration. If buildings can be removed from a large, contiguous area, the land would likely revert to wetlands, given the frequency of flooding.

Augusta/Savannah River Levee. The Augusta/Savannah River Levee is about 11.5 miles long, running from the high ground on the south side of Rae’s Creek to the high ground at New Savannah Bluff, just south of Butler Creek. There are 5 gate structures; 2 railroad crossings, 1 road crossing, 2 combined road/rail crossings, and several road ramps, and one section of sheet pile wall.

Started in 1908 and completed between 1914 and 1916, the Flood of 1929 damaged certain sections that were rebuilt to “stand up against greater floods.” In 1936, the U.S. Congress authorized improvements by the U.S. Army Corps of Engineers, which completed work in 1941. Initially, the Levee was designed to have two-feet of freeboard under a design discharge of 550,000 cubic feet per second (measured at the 5th Street Bridge water level gage, which is not operational).

The Clarks Hill Dam and Lake project began impounding water in December 1951 and continues to control the Savannah River. Analyses in the early ‘80s suggested the Levee would overtop during flows greater than 55,000 cfs, which had a stage of 30-feet

on the Butler Creek gage and 51.8-feet at the 5th Street gage. At the time, this was characterized as the 0.2% annual chance flood (500-year). However, as shown in Figure 4-1, USGS measurements at Gage 02197000 (Savannah River at Augusta), discharges on this well-regulated river have exceeded 50,000 cfs only 5 times since 1950.

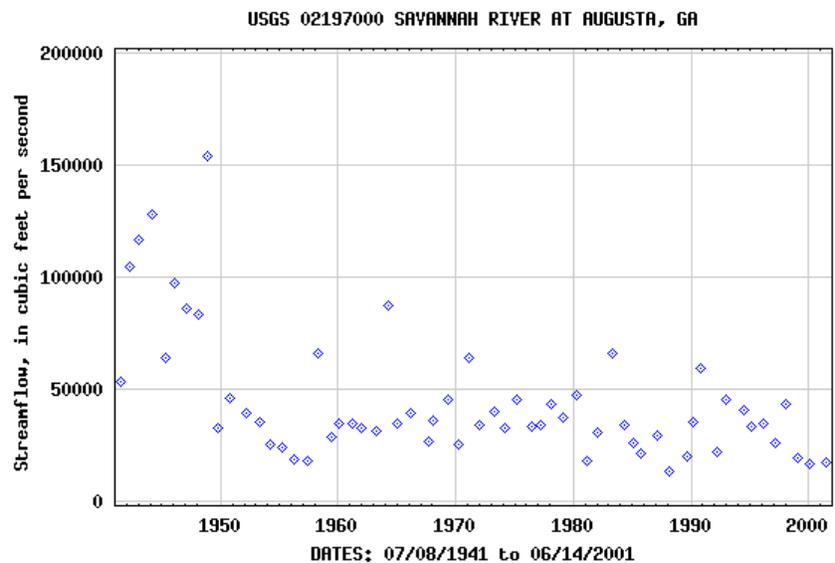


Figure 4-1. USGS Savannah River Gage at Augusta.

The City of Augusta is the local sponsor and owns, operates, and maintains the Levee. The Operations and Maintenance Manual, prepared in 1984 by the Corps of Engineers, acknowledges that the effectiveness of the levee depends on people in three key ways, each is addressed in detail: routine maintenance; inspection and periodic reporting; and operations and flood fight. In conjunction with the Corps, the Augusta Emergency Management Agency prepared the *Emergency Levee Closure Plan* (1999), which is exercised every two years (last exercise was in 2004). The exercise includes mobilization all City departments involved, deployment of a crane, and the actual closure of at least one gate structure.

With respect to permanent development on the Levee, the Corps did not have the authority (under then-current legislation) to approve permanent modifications. General criteria for encroachments are set forth and a procedure is outlined, including a requirement that the City Engineer certify that the design of any encroachment “does not affect the levee integrity or impair his ability to operate or maintain the levee and perform flood fights.”

Oates Creek Project. In 1986, the U.S. Army Corps of Engineers prepared the Oates Creek Flood Control Project design. The project, constructed in the late 1980s, was expected to provide an average annual flood damage reduction benefit of \$1.78 million (1979 dollars). The project was designed to carry discharges for the 10-year to 25-year floods and is expected to reduce or eliminate flooding of 218 homes by the 1%-annual chance flood (100-year). The channel improvement project modified the Oates Creek mainstream and Tributary No. 1 and consisted of several components:

- Realignment of the waterway from its confluence with Beaver Dam Ditch upstream to the New Savannah Road Bridge;
- Just over a mile of rectangular cross-section, concrete-lined channel, ranging from 30- to 40-foot wide;
- Over 6,600 feet of grass-lined channel with sloped sides and bottom widths of 10- to 60-feet;
- A low earth levee on the south bank downstream of Central of Georgia Railroad crossing, extending 1,800 feet long and ranging from 4- to 9-feet high; and
- Modifications to a bridge and utilities.

Richmond County was the original non-federal sponsor and project owner. As part of the consolidation of governments, the City of Augusta became the project owner. The City, in conjunction with the Corps of Engineers, inspects the project twice a year. Reportedly, “high flood control efficiency” is achieved, but modifications are planned to reduce excessive annual maintenance requirements and costs. To concentrate low flows and to minimize sediment

deposition, the bottom of the upper portion of earthen channel will be regraded and concrete pilot channel will be constructed in the lower portion of earthen channel. Rip-rap will be placed on channel slopes and at other locations to reduce erosion. Construction was expected to be completed by the end of 2004.

Rae's Creek Improvements. Prompted by repeated flooding in the early 1990s, the City undertook a \$1.4 million stream improvement project on Rae's Creek. From Lake Olmstead upstream to about Wrightsboro Road, the stream was cleaned and widened. To reduce streambank erosion, riprap was placed on the banks.

Georgia DOT and Crane Creek Project. Georgia Department of Transportation is designing two projects in the Crane Creek watershed that are anticipated to provide some flood relief, although the degree of relief has not yet been determined due to on-going design factors:

- The I-20/Crane Creek project to prevent flooding of Interstate 20 at Crane Creek; and
- The I-20/I-520 Interchange project with stormwater detention ponds

Two other DOT projects in Crane Creek are in the design phase; both will include stormwater management measures to manage runoff increases associated with the project only:

- The Davis Road Widening project; and
- The Interstate 20 Widening project from Bel-Air Road to the Augusta Canal.

A significant flooding event occurred on June 20, 2000, when Crane Creek overtopped Interstate 20. Interstate 20 is a major hurricane evacuation route for this area of Georgia and South Carolina. Many homes in the area were also flooded. These homes have had repetitive flood losses and several were abandoned as a result of the June 20, 2000 flooding. In late spring of 2003, the concept for the final alternative and the environmental document were approved by the Georgia Department of Transportation and FHWA.

The Georgia DOT project for the I-20/I-520 Interchange Reconstruction includes grade separation of one nearby intersection (I-520 at Scott Nixon Memorial Drive), new loop ramps that will be reconfigured to flyover ramps, and realignment of the other two loop ramps. The new loop ramps and flyovers allow for construction of twelve stormwater detention ponds to provide additional flood relief by staggering the peak release rates of stormwater flows along Crane Creek. These ponds were designed beyond the Georgia Department of Transportation guidelines for detention ponds to provide "over-detention" of the stormwater flows draining to the ponds, although the degree to which the "over-detention" may reduce downstream flood elevations will not be finalized until the final design phase is completed.

Corps of Engineers: Flood Reduction Study. The U.S. Army Corps of Engineers, Savannah District, initially looked at six watersheds in the City of Augusta. Four were selected for further consideration and basic studies were completed in 2004: Rae's Creek; Augusta Canal; Phinizy Ditch; and Rocky Creek (not selected were Beaver Dam Ditch and Butler Creek). As of early 2005, progress is slowed due to funding constraints; examination of flood reduction alternatives will be undertaken only for the Rae's Creek and Rocky Creek areas.

As of late 2004, the Corps had requested additional funding in order to complete the feasibility work to identify specific projects and those elements that do and do not qualify for funding. Any project that is eligible for Corps funding will require a non-federal cost share. Effective projects that do not qualify under the Corps' programs may be considered by the City. Alternatives that will be considered include nonstructural measures (such as acquisition, elevation-in-place, and floodproofing). A Corps expert consulted with the Corps Team in the Spring of 2003, resulting in an emphasis on nonstructural measures.

The hydrology and hydraulic analyses for both existing conditions and future conditions (extrapolated from the 1995 Land Use Plan and the 1992 Comprehensive Plan) have been completed. FEMA is represented on the team. The Corps' modeling meets FEMA specifications and is expected to support FEMA's planned map revisions (scheduled to be effective and ready for adoption in 2007). Detailed elevation data (ground, lowest floor) have been collected by survey. Initial impacts indicate:

- Rocky Creek: average annual damages of \$1,450,000 (not including industrial). Flood-prone structures include approximately 1,000 homes (average value \$30,000) and 200 commercial/industrial facilities.
- Rae's Creek: average annual damages of \$1,480,000 (for only about half the number of structures in Rocky Creek, reflecting higher home values). The confluence with Crane Creek is a primary damage area. The upper reach was not analyzed in detail, in part because of assumed flood reduction benefits associated with a Georgia DOT project.

Rae's Creek Hydrology Study (2001). In 2000, the City contracted for a study to examine four known or potential problem areas along Rae's Creek between Jackson Road and Walton Way. As of mid-2003, no specific actions have been implemented pending the outcome of the Corps of Engineers' study. The report recommended:

- Repair existing spillway and construct additional emergency spillway capacity at Walton Way/Lake Aumond.

- To meet target flood elevations at West Lake Forest Drive and Heirs Pond, construction additional outlet culvert at Heirs Pond and stabilize downstream banks to correct existing slope erosion.
- Discontinue routine operation of gates on Heirs Pond and Lake Aumond because they do not provide any peak flow reduction benefits for Forest Hills Racquet Club and downstream areas; without measurable benefits, City personnel are placed at risk unnecessarily while operating the gates.
- Widen Rae’s Creek from the upstream end of Heirs Pond upstream to Jackson Road; throughout this reach, remove block walls that obstruct and divert flows; replace Courtside Drive with box beam bridge.

4.1.4 Mitigation Actions

Augusta Action A: Drainage and Stormwater Management. As evidenced by the nature and number of drainage improvement needs identified by the City, the number and distribution of stormwater management facilities, and citizen complaints, the City’s drainage system infrastructure is stressed. To facilitate identifying critical needs that may help minimize flooding:

Augusta Action A: Drainage and Stormwater Management.	
Lead Office	Lead: Engineering Services Support: Planning & Zoning
Priority	High
Status & Funding Notes	Planning is underway to acquire the software and develop methods to help prioritize projects.
Cost Effectiveness¹	For optimal implementation, additional staff and/or funding are required. Long-term benefit, short-term high costs.

- Implement central database for staff to record drainage and flooding problems (build on existing software).
- Train staff of all departments that receive citizen calls to use the database to register appropriate information to ensure quality data.
- Develop method to consider the database contents in setting priorities for drainage projects and to support identification of flood mitigation opportunities.
- Formalize detention basin maintenance procedures and system to prioritize maintenance.

Augusta Action B: Sewer Line Infiltration & Inflow. Continue to undertake projects to identify and resolve infiltration and inflow. During wet weather and flooding conditions, water infiltrates into sewer lines and flows into the system through submerged manhole covers,

Augusta Action B: Sewer Line Infiltration & Inflow.	
Lead Office	Lead: Augusta Utilities Support: --
Priority	High
Status & Funding Notes	Ongoing program funded through existing capital improvement program
Cost Effectiveness	Long term effectiveness limited due to extent of problems on private property

¹ Based on qualitative assessment of cost/effort and long-term benefits

increasing treatment costs. It is estimated that 70% of the problem is on private property and includes illegal connections of roof drains. Section 2.1.2 describes increased treatment costs associated with rain and flood events.

Augusta Action C: Public Awareness

Initiative. Mitigation is a partnership and citizens are both obligated and responsible for certain actions to help reduce exposure to flooding and to improve the City’s ability to recover from flooding. To increase public awareness and responsibility, convene a work group (e.g.,

Augusta Action C: Public Awareness Initiative.	
Lead Office	Lead: Administrator’s Office Support: All Departments
Priority	High
Status & Funding Notes	Implementing most elements within existing budget; some elements will require additional funding, handout/mailer developed during planning;
Cost Effectiveness	Cost effective to encourage citizen action

City departments, neighborhood associations, NRCS/SCS, Corps of Engineers, others) to prepare and implement a multi-year plan for public awareness, which may include but is not limited to such elements as:

- Encourage property owner purchase of flood insurance to provide financial protection that helps personal recovery
- Encourage property owner purchase of flood insurance to increase options for post-flood mitigation (because of Increased Cost of Compliance insurance coverage).
- Prepare articles for publication emphasizing what property owners can do to plan and prepare for floods and to reduce losses (flooded road safety, low cost mitigation measures, insurance, the automated 911 Message flood warning alerts).
- Coordinate with campaigns undertaken by the State (flood awareness, winter storm awareness, etc.).
- Develop web-based materials; link to selected other sites (GEMA, FEMA, Red Cross, Extension Service).
- Co-op with stormwater management initiative to distribute periodic mailing to property owners along waterways to inform them of their responsibility to keep drainageways clear (don’t dump debris, yard clippings, tree limbs, etc.).
- Develop materials for the Planning Commission and License & Inspections to handout with permits or mailings (tailored for homeowners, business owners, and owners of vacant lands). Topics to include flood insurance, mitigation options, flood safety, permit requirements, others.
- Improve consistency of communication to the public regarding flooding, prepare briefing of basic information for City staff who field calls or meet with citizens groups.
- Establish a hotline for citizen reports of flooding and drainage problems.
- Request and sponsor periodic NFIP workshops provided by others (GADNR, FEMA) for lenders, insurance agents, real estate professionals and others.

- To facilitate preparation of Elevation Certificates and other uses, post database of elevation benchmarks and reference marks on the City’s webpage and notify local surveyors and engineers of its availability.
- Research options to improve disclosure of flood hazards as part of the property transfer process.

Augusta Action D: Soil Erosion and Sediment Control. Based on experience throughout the City, public comments, and other factors, it appears that sedimentation in waterways may be contributing to drainage problems and flooding. While streams naturally carry some sediment during high water events, material that washes off of construction sites can contribute to excessive loading. The City requires erosion control measures for certain land disturbing activities (see Section 6.2), including its own projects, and certain activities are excluded.

Augusta Action D: Soil Erosion and Sediment Control.	
Lead Office	Lead: Engineering Services (commercial; site plans) and License & Inspections (single family homes) Support: Soil Conservation; Planning & Zoning
Priority	High
Status & Funding Notes	For optimal implementation, additional staff and/or funding are required, especially to perform additional inspections
Cost Effectiveness	Potential to reduce long-term channel maintenance and enhance environment

- Due to the significant size and duration of four projects proposed by Georgia DOT for the upper part of the Crane Creek basin, and the high visibility of downstream flooding, request GDOT’s continued attention to exemplary sediment and erosion control practices.
- Communicate with City crews and contractors that City projects are to be undertaken with exemplary sediment and erosion control practices.
- Examine the feasibility of offering training for local contractors to reinforce proper installation and maintenance of sediment control measures; seek cooperative partners, including the District Soil Conservation Office, Georgia DOT, and GA Department of Natural Resources.
- Increase frequency of inspections of sediment control measures and work with project owner/contractor to maintain effective measures throughout construction.
- Continue cooperative efforts with Columbia County regarding installation and maintenance of sediment and erosion control measures on active construction sites in the upper portions of waterways that drain into Augusta, with particular attention to Crane Creek, Rae’s Creek, and Butler Creek).

Augusta Action E: Flood Mitigation

Staffing. Seek new staff position to coordinate the City’s floodplain management and mitigation efforts. Functions would include: leadership for implementation and tracking of priority action items identified in the Plan; provide staff review of permit applications for floodplain development; function as the City’s Community Rating System Coordinator; develop flood mitigation policies and procedures; apply for and administer mitigation grants; coordinate the City’s interaction with the U.S. Army Corps of Engineers; coordinate multi-year effort to revise FIRMs; coordinate the Flood Damage Assessment Team (with L&I) for substantial damage determinations; serve as liaison with press and the public on matters related to flooding.

Augusta Action E: Flood Mitigation Staffing.	
Lead Office	Lead: Planning & Zoning Support: Emergency Management, License & Inspections
Priority	Medium
Status & Funding Notes	Concern regarding overall progress unless leadership role is created; not within existing budget
Cost Effectiveness	Cost effective to invest in damage reduction over the long term; increases likelihood of grant funding

Augusta Action F: Flood Hazard Map Revisions and Updates.

The FEMA flood maps are used in several ways, and the uses are increasing. The maps are used to determine which lands are subject to the provisions of the Flood Damage Prevention Ordinance, to identify “at risk” buildings and infrastructure, to delineate those portions of properties that may be considered for Greenspace, to guide development to less hazardous areas, to identify property owners for public awareness initiatives, and for other purposes. The U.S. Army Corps of Engineers has prepared revised floodplain models and draft maps for four waterways and FEMA Region IV has indicated that preparing a new, digital flood map for Augusta is a high priority. To facilitate the City’s floodplain management efforts:

Augusta Action F: Flood Hazard Map Revisions and Updates.	
Lead Office	Lead: Planning & Zoning Support: Engineering Services, Information Technology
Priority	Medium
Status & Funding Notes	Generally within existing budget; City to provide topography; GIS effort to incorporate City-specific annotations may exceed available staff time.
Cost Effectiveness	Low cost, high benefit.

- Pursue City-wide revision of the Flood Insurance Rate Maps, building on the City’s new digital topography and work underway by the U.S. Army Corps of Engineers to prepare flood studies as part of the *Flood Reduction Study* (including Rocky Creek, Rae’s Creek, Crane Creek, Augusta Canal and Phinizy Swamp), and including other studies and identified watersheds.
- Communicate to the Georgia Department of Natural Resources and FEMA Region IV the importance of receiving revised maps in the Digital Flood Insurance Rate Map format.

- When available for local use, annotate digital map with the “lower floodway fringe” delineation to facilitate awareness of and application of the Flood Damage Prevention Ordinance and to more clearly identify areas targeted for Greenspace purposes.
- Incorporate the new flood maps into the City’s GIS.
- Develop a database of property owners for use in public awareness activities.

Augusta Action G: Policies & Procedures for Flood Mitigation

Projects. As of mid-2004, based on the Q3 digital flood data, it is estimated that 61 buildings are located within floodways (not all waterways have mapped floodways), and about 50 separate properties have received multiple NFIP flood insurance claim payments (about 13 of these properties have been acquired, along with 11 other properties). Augusta will continue to mitigate future flood damage of older buildings in high-risk problem areas by undertaking the following:

Augusta Action G: Policies & Procedures for Flood Mitigation Projects.	
Lead Office	Lead: Planning & Zoning Support: Committee of other departments
Priority	Medium
Status & Funding Notes	For optimal implementation, additional staff and/or funding are required.
Cost Effectiveness	Improves likelihood of qualifying for funding to implement projects.

- Develop Flood Mitigation Project Policies and Procedures Manual.
- Establish systematic method for using and prioritizing funds, including a mechanism to account for changes in priorities as a function of several variables (such as the funding agency’s priorities, recent flooding, degree of damage, damage history, predicted depth of flooding, existing drainage problems, sewer infiltration, proximity to other public open space/Greenspace, etc.).
- Gather data on buildings in FEMA-mapped floodways and repetitive loss areas to have available in the post-flood period; use to target efforts for recovery, permitting, and grant application development.
- Obtain FEMA’s Residential Substantial Damage Estimator software and maintain ability to use it to facilitate damage estimates and substantial damage determinations.
- Develop policy on abandoned homes in SFHA (donations, condemn, demolish, HUD funds).
- Examine the Corps’ database of buildings in the SFHA and pre-identify those most likely to sustain significant damage if floods equivalent to the SFHA or greater occur, i.e., those predicted to have more than 2-feet of water above the lowest floor. Use the identified list to target post-flood inspections.
- Maintain awareness of different sources of mitigation funding (pre-disaster, post-disaster, CDBG/HOME, NFIP flood insurance claims payments, etc).
- Continue to seek mitigation grant funds to implement mitigation in high priority actions.
- Explore with GDOT whether, as part of its environmental enhancement and wetlands mitigation requirements, funding could support additional buyouts areas where the

frequency of flooding indicates the hydrology would support allowing areas to return to wetland functions.

- Include consideration of flood mitigation opportunities in the City’s identification of projects for which ISTEAs applications will be prepared, which may include projects to preserve floodway greenspace or floodplain buyouts in areas where detention is required or wetlands are desirable.

Augusta Action H: Savannah River Flood Protection & Awareness. Although there is a very low probability that flood levels on the Savannah River would prompt closure of the 8 breaches in the Levee, the consequences of such flooding would be catastrophic. Residential and non-residential uses exist on the riverside of the levee (some on City-owned land) and may be subject to damage at different floodwater levels. Section 2.1.2 summarizes apparent risk (using the Base Flood Elevation (100-year) information shown on FEMA’s map). To enhance protection and awareness:

Augusta Action H: Savannah River Flood Protection & Awareness.	
Lead Office	Lead: Emergency Management, Public Services Support: Departments with role in Levee Closure
Priority	Medium
Status & Funding Notes	Within existing budget and staff
Cost Effectiveness	Unknown (very low probability, high consequence)

- Convene a City work group to review and revise the *Emergency Levee Closure Plan* (see Section 4.1.3).
- For City-owned property on the riverside of the Levee that is leased to private entities, examine lease conditions with respect to adequate advisory language to protect the City. Consider whether lessees should be notified of the risk of flooding; that the City periodically conduct a levee closing exercise; and that certain conditions of flooding predicted by the U.S. Army Corps of Engineers may prompt the City to require evacuation. Other topics for consideration: the availability of flood insurance to cover losses (for both structure and contents); the requirement to obtain permits for building improvements, additions, and repair of damage; termination of leases under certain circumstances (e.g., if buildings are substantially damaged by any cause (e.g., flood or fire); etc.
- Notify owners of private property on the river side of the Levee about the risk of flooding, levee closing procedures, requirement to evacuate, availability of flood insurance, and the requirement to obtain permits.
- Continue to exercise the *Emergency Levee Closure Plan* every two years.

Augusta Action I: Flood Warning.

Augusta’s watersheds are relatively small and tend to respond rapidly to heavy rainfall, making it difficult to use the traditional door-to-door notification to adequately warn residents to evacuate. For the same reason, placing barricades or stationing City personnel at flood-prone roads is problematic, especially in the upper reaches of watersheds. To enhance flood safety:

- Use GIS and flood maps to identify buildings within flood hazard areas and develop phone groups for automated, generalized flood warning announcements through 911 Message; exercise the announcement system periodically.
- Explore whether the automated rain gages that may be installed by Augusta Utilities as part of watershed assessments can be used to augment the City’s preparations during times when flooding is likely.
- Improve the list of flood-prone roads; evaluate whether the most frequently flooded areas warrant signs to alert the traveling public.

Augusta Action I: Flood Warning.	
Lead Office	Lead: Emergency Management Agency Support: Information Technology, Engineering Services, Augusta Utilities
Priority	Medium
Status & Funding Notes	Exploring grant funds to support gages; implementation with existing budget
Cost Effectiveness	Low investment, potential significant benefits to improve response

Augusta Action J: NFIP Community Rating System.

Based on current digital flood maps, approximately 4,000 buildings may be located in Augusta’s floodplains, yet fewer than 15% are covered by flood insurance (other buildings that are “outside” of the mapped floodplain also are insured). On questionnaires, a number of citizens indicated flood insurance is “too expensive.” The NFIP Community Rating System credits communities for sound floodplain management practices that exceed federal minimum requirements and results in discounts on flood insurance premiums. To encourage the purchase of flood insurance and to save citizens money, pursue a Class 8 or higher in the Community Rating System. One measure of the benefits of joining the CRS is suggested by considering that existing policyholders pay about \$394,000 in annual premium on 901 policies; a 5% discount would save about \$19,000; a 10% discount would save about \$38,000.

Augusta Action J: NFIP Community Rating System.	
Lead Office	Lead: Planning & Zoning Support: License & Inspections, Engineering Services
Priority	Medium
Status & Funding Notes	For optimal implementation, additional staff is required
Cost Effectiveness	Savings for citizens; City costs for staff & documentation

Augusta Action K: Dam Safety. For State-designated Category I dams that are located in the City or on waterways that drain through the City (Table 2-3), estimate potential impacts and determine if the downstream risks are sufficient to contact owners to encourage their development of limited emergency action plan procedures, and periodic inspections, that are coordinated with the City.

Augusta Action K: Dam Safety.	
Lead Office	Lead: Emergency Management Support: Public Services
Priority	Low
Status & Funding Notes	Within existing budget and staff
Cost Effectiveness	Effective, given number of past damage events

4.2 Wind Hazards

4.2.1 Identification & Analysis of Range of Mitigation Options

Mitigation options to address potential damage due to winds include structural (e.g., strengthening critical facilities), programmatic (e.g., requirements related to design and construction of buildings, public safety and information), and non-structural (e.g., efficiently handling debris). Despite the relative ranking of “high” (due to frequency of wind events rather than degree of past damage), the Mitigation Planning Committee determined that building-specific retrofits were inappropriate and unnecessary.

4.2.2 Existing Policies, Regulations, Ordinances & Land Use

Current building code requirements administered by Augusta, Blythe and Hephzibah that are related to resisting certain wind conditions apply to new construction, installation of manufactured homes, and some work on existing buildings such as reroofing and additions. There is no evidence to suggest that the code requirements are inadequate. Application of the building code continues to be the best mitigation against damage to new buildings and structures (for damage other than direct impacts from tornadoes).

Public projects and construction projects that are undertaken by Augusta, Blythe and Hephzibah must comply with current building codes, including:

- New buildings and critical facilities (such as the new Fire Station #15 on Flowing Wells Road);
- Work on existing buildings and critical facilities (such as recent renovation of a Fire Station); and
- Rehabilitation and reconstruction housing projects managed by Housing & Economic Development.

The entire planning area is exposed to the same potential wind conditions; there are no land use or zoning elements that are directly related to wind hazards.

4.2.3 Mitigation Actions

Multi-Jurisdictional Action L: Severe Storm Awareness. Continue public outreach on severe storm and tornado risks; encourage families to prepare Disaster Supply Kits; encourage people with special medical needs to notify Augusta Emergency Management Agency. Convene a working group of representatives from Augusta, Blythe, Hephzibah, and members of the public, including nonprofit and neighborhood organizations and others, to look at outreach efforts and materials provided by the National Weather Service, FEMA, the American Red Cross, and others and determine whether changes are appropriate. Expand use of Augusta’s website to make information readily available to the public.

Multi-Jurisdictional Action L: Severe Storm Awareness	
Lead Office	Lead: Augusta Emergency Management Support: City of Hephzibah, City of Blythe
Priority	High
Status & Funding Notes	Within existing budget; changes to existing outreach may require additional funding
Cost Effectiveness	Ongoing (already determined effective use of resources)

Augusta Action M: Public Tree Maintenance. Continue tree maintenance on city streets and city-owned property (reduce debris, impacts of falling).

Augusta Action M: Public Tree Maintenance	
Lead Office	Lead: Public Services/Trees & Landscape Support: Recreation & Parks
Priority	High
Status & Funding Notes	Within existing budget and staff
Cost Effectiveness	Ongoing (already determined effective use of resources)

Multi-Jurisdictional Action N: Debris Management Plan. Work with the cities, Georgia Forestry Commission, power companies, and other entities to develop a Debris Management Plan. Note: FEMA has a guidebook for developing debris management strategies and examples from other jurisdictions are available.

Multi-Jurisdictional Action N: Debris Management Plan	
Lead Office	Lead: Public Services/Trees & Landscape Support: Recreation & Parks; City of Hephzibah; City of Blythe; Georgia Forestry Commission; Power Companies
Priority	High
Status & Funding Notes	Within existing budget and staff
Cost Effectiveness	Expected to reduce cleanup and landfill costs; more efficient use of personnel

4.3 Winter Storms

4.3.1 Identification & Analysis of Range of Mitigation Options

Other than ice on roads and bridges, which limits traffic and may contribute to accidents, the most significant damage due to winter storms is tree damage, downed power lines, and an increase in structure fires when occupants employ unsafe methods to stay warm.

The power companies respond to downed lines. As part of Augusta's response activities, emergency transportation assistance may be coordinated by the Emergency Management Agency.

Public education about preparing for cold weather and power outages can address the most significant impacts of winter storms. Messages should explain safe use of heaters and the importance of turning off automatic outdoor watering systems to prevent road icing.

4.3.2 Existing Policies, Regulations, Ordinances & Land Use

Within budget constraints, Augusta maintains and trims City trees to improve tree health and to minimize damage during storms.

All new buildings must be designed and constructed to meet current building code requirements, including snow loads. New and renovated public buildings must meet current building code requirements for snow loads.

The effects of winter storms are not influenced by land use and development trends. The Augusta Emergency Management Agency posts storm awareness materials on its web page and distributes materials to citizens.

4.3.3 Mitigation Action

Multi-Jurisdictional Action L: Severe Storm Awareness. (See Above)

Augusta Action M: Public Tree Maintenance. (See Above)

Multi-Jurisdictional Action N: Debris Management Plan. (See Above)

4.4 Drought

4.4.1 Identification & Analysis of Range of Mitigation Options

Other than the effects of drought on crops, landscaping, street trees, and forested areas, drought rarely causes physical property damage. Since the early 1990s about 20 older homes have sustained foundation damage due to settling associated with falling water table and soil consolidation; current foundation requirements appear to adequately guard against this problem.

Public education and water conservation, along with imposed water use restrictions, can address the most significant impacts of drought.

4.4.2 Existing Policies, Regulations, Ordinances & Land Use

The City prepared the *Augusta Water Conservation Plan* pursuant to State and federal rules for outdoor water use. The purpose of the Plan is to conserve the available water supply and to protect the integrity of water supply facilities. The Plan places emphasis on domestic water use, sanitation, and fire protection, and protection of public health, welfare, and safety. To minimize the adverse impacts of water supply shortage or other water supply emergency conditions, the Plan calls for restrictions on water use as a function of drought conditions and available supplies. Certain non-essential uses are regulated and may be curtailed during times of water shortage or other emergency water supply conditions. Violators may be assessed penalties. Augusta Utilities sends notices to its 66,000 customers about water restrictions.

The Georgia Forestry Commission and the Augusta Fire Department restrict outside burning with particular attention during prolonged periods of rainfall deficit.

The availability of water is a significant factor that influences development. Land use and development patterns show that most growth occurs in areas served by City water.

4.4.3 Mitigation Action

Augusta Action O: Water Conservation Awareness. Augusta Utilities to continue implementation of the Water Conservation Plan; continue to comment on proposed development site and landscaping plans; continue to report on and encourage conservation in The H2O Newsletter and to highlight water conservation tips on its web

Augusta Action O: Water Conservation Awareness.	
Lead Office	Lead: Augusta Utilities; Hephzibah Support: Augusta Trees & Landscaping; County Extension Service; Georgia Natural Resources
Priority	High
Status & Funding Notes	Within existing budget
Cost Effectiveness	Ongoing (already determined effective use of resources)

page. The City of Hephzibah will continue to follow and implement the State’s water conservation guidelines.

4.5 Urban Wildland Interface Fire

4.5.1 Identification & Analysis of Range of Mitigation Options

Many communities in the Western U.S. adopt regulations that require property owners to maintain separation between buildings and forest interfaces and some building codes in those communities specify fire-resistant roofing materials. Given the low occurrence of wildland interface fires, such measures are not appropriate for the Augusta area.

Public education about outdoor fire risks – especially during periods of drought – can address the most significant impacts of urban wildland interface fires (most of which are started by carelessness). The Georgia Forestry Commission undertakes a variety of activities to educate the public about outdoor burning and risks of forest and wildland interface fires.

4.5.2 Existing Policies, Regulations, Ordinances & Land Use

The Augusta Fire Department’s capability to suppress wildland fires is an important factor that prevents small fires from growing into large fires. In 2004, the department purchased wildland firefighting protective clothing.

When regional conditions warrant it, the State may impose bans on outdoor burning. In addition, Augusta, Blythe and Hephzibah all have the authority to impose burn bans independent of whether the State restricts such activities.

Augusta does not have specific provisions in land use regulations and ordinances related to minimizing the effects of urban wildland interface fires. However, as growth extends south into forested areas, it will be important that fire suppression capability be increased to maintain adequate response time.

4.5.3 Mitigation Action

Augusta Action P: Pre-Suppression Planning for City-Owned Lands. Request assistance from the Georgia Forestry Commission to evaluate fire risks on City-owned parks and greenspace to develop prevention plans to improve forest health.

Augusta Action P: Pre-Suppression Planning for City-Owned Lands.	
Lead Office	Lead: Administrator’s Office; Trees & Landscape; Recreation & Parks Support: Georgia Forestry Commission
Priority	High
Status & Funding Notes	Within existing budget and staff
Cost Effectiveness	Effective due to availability of state resources and assistance

Augusta Action Q: Subdivisions & Driveway Access for Fire Vehicles.

Request that the Quarterly Subdivision Regulations Review Committee consider new standards for widths of subdivision roads and shoulders, and for common driveways for multiple flagpole lots to provide safer access by larger fire trucks.

Augusta Action Q: Subdivisions & Driveway Access for Fire Vehicles.	
Lead Office	Lead: Planning Commission Support: Fire Department
Priority	High
Status & Funding Notes	Within existing budget and staff
Cost Effectiveness	Implementation would result in some increased costs to develop new subdivisions, but improved fire service response will improve public safety

Chapter 5: Technological Hazard: Mitigation Actions

5.1 Hazardous Materials

5.1.1 Identification & Analysis of Range of Mitigation Options

Mitigation does not replace the importance and need for a response plan tailored to the presence of hazardous materials in a community. The Augusta Emergency Management Agency is responsible for planning, coordinating and responding to hazardous materials incidents. For the purposes of the *Hazard Mitigation Plan*, the focus of mitigation is related to the intersection of flood hazards and the presence of reported hazardous materials.

5.1.2 Existing Policies, Regulations, Ordinances & Land Use

The responsibilities of the Augusta Fire Department include environmental compliance by handlers of hazardous materials. State licensed facilities are inspected annually; other locations with hazardous materials also are scheduled for annual inspections. Section 3.1.3 summarizes pertinent provisions of the Zoning Ordinance and the Groundwater Protection Standards.

The Augusta Commission established the Augusta-Richmond County Local Emergency Planning Committee (LEPC). The LEPC consists of members of the community who represent industry, chemical transporters, local government, emergency response departments, schools, environmental groups, citizens, utility companies, and the news media. The primary purpose of the LEPC is to address many of the public concerns of industry and the community regarding the use, storage, manufacturing, and transporting of hazardous materials. In cooperation with local industries, the LEPC sponsors numerous annual events such as community meetings, open houses, bus tours of industries, training exercises, shelter-in-place training, and special seminars about risk management plans.

5.1.3 Mitigation Actions

Augusta Action R: Environmental Safety and Flood Hazards. Improve geo-location data for the actual physical locations of hazardous materials and use the GIS-based mapped flood hazard areas to identify sites that are in or near mapped floodplains, (improving the data behind Figure 3-2). For sites determined to have some degree of flood risk, request that the LEPC use the information to inform owners/operators and encourage including flood threat recognition and protective measures into risk management plans.

Augusta Action R: Environmental Safety and Flood Hazards.	
Lead Office	Lead: Emergency Management Support: GIS; LEPC
Priority	High
Status & Funding Notes	Within existing budget & staff
Cost Effectiveness	Improved decision-making by facility owners; improved public health and safety

Augusta Action S: Downtown Railroad Safety. Continue to pursue activities (engineering, land acquisition, etc.) related to relocating NS Railroad mainline off of 6th Street right-of-way. This action is contained in the Augusta-Richmond County Comprehensive Plan.

Augusta Action S: Downtown Railroad Safety.	
Lead Office	Lead: Planning Commission; Emergency Management Support: LEPC, Georgia DOT, railroad companies
Priority	Low
Status & Funding Notes	Ongoing
Cost Effectiveness	Improved public health and safety

Chapter 6: Capability to Address Hazards

Section 6.1 is an overview of Augusta’s capability to address hazards as set forth in existing ordinances and agency responsibilities. Section 6.8 and Section 6.9 are overviews of Blythe and Hephzibah, respectively.

6.1 Augusta’s Government Structure

In 1996, the City of Augusta and Richmond County consolidated to form one government – Augusta, GA. The consolidated government consists of the Mayor and the Augusta Commission. The Commission is composed of ten members: eight members are elected by district; two members are elected by “super district” (each composed of half the districts). Figure 1-2 illustrates the district boundaries.

The Augusta Commission is authorized by Home Rule Provision of the Constitution of the State of Georgia of 1983 to: establish planning commissions; provide for the preparation and amendment of overall plans for the orderly growth and development of municipalities and counties; provide for the regulation of structures on mapped streets, public building sites, and public open spaces; repeal conflicting laws; and for other purposes.

The City’s daily operations are handled by the City Administrator who reports to the Commission and oversees the Operations Portfolio. Two Deputy Administrators oversee the operations in the Public Safety Portfolio and the Administrative Services Portfolio. The City employs 2,600 people. The departments and offices included in the three portfolios:

- **Administration Portfolio.** Board of Elections; Extension Service; Finance; Human Relations; Human Resources; Information Technology; Law; Library; Purchasing; Tax Assessor; Tax Commissioner
- **Operations Portfolio.** Augusta Regional Airport; Housing & Economic Development; License & Inspections; Planning & Zoning; Engineering Services, Public Services, Solid Waste, Recreation & Parks; Special Events; Soil Conservation; Transit; Utilities
- **Public Safety Portfolio.** 911; Animal Control; Fire; RCCI; Civil Magistrate Court; Clerk of Superior Court; Coroner; District Attorney; Emergency Management; Forestry; Jury Clerk; Juvenile Court; Marshal; Probate Court; Sheriff; Solicitor-State Court; State Court; Superior Court

The Augusta-Richmond County Planning Commission, a 12-member appointed body, was created and organized under the Home Rule Provision to "make such careful and comprehensive surveys and studies of existing conditions and probable future developments and to prepare such plans for physical, social and economic growth as will best promote the public health, safety,

morals, convenience, prosperity, or the general welfare as well as efficiency and economy in the development of" the City.

The Planning Commission is a recommending body – it makes written recommendation to the Augusta Commission on matters such as rezoning petitions, Zoning Ordinance and Subdivision Regulations amendments, and Final Plat approvals. In particular, the Planning Commission has the power and duty to:

- Prepare a Master Plan (Comprehensive Plan) or parts thereof for the development of Augusta;
- Prepare and recommend for adoption a Zoning Ordinance and map or maps; and
- Prepare and recommend for adoption regulations for the subdivision of land within its political jurisdiction.

The Planning Commission employs a staff of administrative personnel, professional planners, and technical support personnel who are charged with certain planning and development review functions, including:

- Coordinating the City's established process for the review of applications and plans by various City departments and agencies to ensure conformance with all applicable development documents. The process recognizes all types of development: subdivisions; small subdivisions; site developments; and single lot developments.
- Preparing transportation plans, maintaining an information bank, developing the Greenspace program, coordinating activities that impact historic resources, and pursuing grants.

6.2 How Augusta Plans and Grows

City of Augusta department directors and others were interviewed to gain an understanding of awareness of hazards and how they are addressed, and to gather information about damage associated with past hazard events. Notes from the interviews are on file in the Planning Commission. Ordinances, plans, studies, and other documents were reviewed to identify specific provisions pertinent to flood hazards (detailed report on file with the Planning Commission).

6.2.1 Planning for the Future

The City of Augusta uses the comprehensive planning process and land use zoning procedures to set the stage for its future. These documents, prepared according to state requirements and subject to extensive public review, establish policies that guide development and redevelopment. Augusta's development documents are available online at http://www.augustaga.gov/departments/planning_zoning/dev_docs.asp.

Comprehensive Plan (February 2004). Augusta's 2004 Comprehensive Plan is a long-range plan for managing and guiding development over a 20-year period. It examines existing conditions affecting development, enumerates the needs and goals for the future, and spells out the strategy for addressing the needs and achieving the goals. The Plan serves as the basis for local decision-making and a general resource for information about the present and future condition of the City.

The three-step process outlined by the State was followed and included: conduct inventory and assessment; develop a statement of needs and goals; and develop an implementation strategy. Meetings were held with major stakeholders (neighborhood associations, development organizations, realtors, builders, utilities, environmental organizations, the school board, and interested private citizens) and numerous public meetings were held throughout the process.

The planning elements addressed are: population; housing; economic development; transportation; community facilities and services; historic resources, natural resources and greenspace; and land use. The Implementation Strategy is outlined, listing goals, needs and strategies for each plan element. The Short Term Work Program identifies specific projects, including estimated cost and responsible entities, to be undertaken from 2003-2007. Selected goals, objectives and strategies that are pertinent to reducing flood hazards include:

- Promote a land use pattern that accommodates growth and revitalization while protecting established residential areas and natural resources, by accommodating additional residential, commercial and industrial development in the areas designated on the Future Land Use Map.
- Provide public facilities and services that meet the needs of residents and businesses, enhance the quality of life, and protect natural resources, by:
 - Making improvements to roads and bridges that enhance safety, reduce congestion and respond to expected growth patterns.
 - Providing and maintaining recreation and park facilities that meet the needs of residents and visitors, contribute to economic development, and help protect natural resources.
 - Making the Greenspace Plan an integral part of the City's Land Use Plan.
- Protect natural resources and use them as appropriate to provide recreation opportunities, educate the public and increase tourism, by:
 - Preserving and enhancing water quality in the Savannah River and along creeks and tributaries
 - Protecting floodplains and wetlands
 - Reducing soil erosion
 - Reducing non-point source pollution of groundwater and surface water sources
 - Assessing the health of local watersheds and develop procedures to maintain the water quality in the Savannah River and local creeks and tributaries

A Short Term Work Program is established for 2003-2007, with an update of the Plan due in 2008. Projects identified in the program (some dependent on inclusion in future phases of SPLOST) that have bearing on natural hazards and exposure to risk (see Section 6.6).

Comprehensive Zoning Ordinance (revised August 3, 2004). The Comprehensive Zoning Ordinance, consisting of maps and regulations, was originally adopted in 1963 (the former City began to zone in the 1930s). The most recent amendments were approved in August 2004 (§8-1-1). The Ordinance sets forth the legal uses of land within each of the various districts, which are illustrated on the official Zoning Map. Generally, land uses are categorized as agricultural, residential, professional, commercial, or industrial. Augusta utilizes a "pyramidal" zoning system, where, with some exceptions, land uses permitted in more restrictive zones are also permitted in less restrictive zones.

The purpose of the Comprehensive Zoning Ordinance is to promote health, safety, morals and the general welfare of the people of Augusta. It is intended to guide and accomplish coordinated, adjusted, and harmonious development to meet a variety of goals. Among those goals are drainage, adequate public utilities, recreation, conservation and development of the State's natural resources, and lessening traffic and other hazards to life, limb, and health.

Provisions specific to managing floodplains are included in the following:

- Planned Development Riverfront Zone, along the Savannah River, is recognized as an economic, historic and visual resource that also is of critical and sensitive concern. A wide variety of uses are permitted, including residential uses. The Ordinance provides for the orderly and aesthetic development or redevelopment, including oversight by the Riverfront Development Review Board:
 - Applications for development in the zone must provide for public access to any areas designated as floodplain;
 - The floodway of the Savannah River and access easement must be dedicated to the Augusta Commission; and
 - Buildings and site planning are to comply with the Floodplain Ordinance.
- Savannah River Corridor Protection District, defined as all areas within 100-foot horizontally from the river bank, is to remain in undisturbed vegetative buffer.
- Manufactured Home Regulations, specifically those pertaining to Manufactured Home Parks, specify that no park “shall be so located as to be subjected to hazards of flood, poor soil conditions, poor drainage, or other hazardous conditions.”

6.2.2 Regulating Development (General)

The City of Augusta has developed a set of coordinated documents that pertain to the regulation of land uses and development in order to protect against the potential negative impacts of converting land from its natural state to urban land uses. Negative impacts include poorly constructed streets, water systems and sewers, soil erosion, flooding, and reduction of property value are only a few examples of the health, safety and welfare issues that compel the regulation of development.

Augusta's Development Regulations Guide provides an overview of the various regulatory documents that have been adopted by the City. Along with an easy-to-read overview, it is made available to the public on the City's web page, along all of the Development Documents.

The Quarterly Subdivision Review Committee is charged with conducting periodic review of the City's development documents and considering resolution of issues and regulation changes related to development (including development other than subdivisions). The committee includes members of the public (developers and property owners) who are appointed by the Augusta Commission, the Soil Conservation Service, and City staff representing departments that have a role in regulating and guiding development (Planning & Zoning, License & Inspections, Public Works, Augusta Utilities, Fire, Health).

Provisions of Development Documents that pertain to managing flood hazard areas are summarized below. The Flood Damage Prevention Ordinance and related materials is summarized in Section 6.2. Because they related to managing natural resources, three documents are summarized in Section 6.7: Greenspace Program, Tree Ordinance, and Groundwater Recharge Area Protection Ordinance.

Land Subdivision Regulations. The Land Subdivision Regulations (adopted by reference at §8-3-1) regulate the subdivision of land by providing a process for the approval of plats and by providing general infrastructure construction standards. The former City first adopted subdivision rules in the 1950s, while Richmond County's rules dated to 1971. The stated purposes of the current regulations include, among others: to protect natural, economic and scenic resources; to encourage public open spaces; to ensure proper consideration of drainage; to promote a safe and healthy environment and control the spread of blight; and to encourage wise development in harmony with the Comprehensive Plan.

The Planning Commission coordinates the City’s subdivision reviews, including coordination with state agencies. The City Engineer inspects and approves certain required improvements before the City accepts easements, improvements, and dedications.

Extensive and detailed specifications for Site Plans and Final Plats are listed and include information necessary to review drainage and floodplain impacts. With respect to managing flood hazards, applicants are required to:

- Show the outline of the 100-year floodplain boundary and notes; a note is required if the property is not affected by the floodplain.
- Note on each lot to identify the minimum finished floor elevation that must be 3-feet above the base flood elevation; this requirement also applies to those lots that are impinged by the floodplain but the building footprint is not within the hazard area.

Site Plan Regulations. These regulations (adopted by reference at §8-8-1) require Site Plan approval for construction or expanding a structure (other than a single family home and certain other exempted activities). The Site Plan is an accurately scaled plan and supporting documentation that illustrates the existing conditions and the details of proposed developments.

Procedures for Site Plan approvals are outlined and the Planning Commission coordinates reviews by all appropriate City offices. The requirements for Site Plans are specified. With respect to managing flood hazards, applicants are required to:

- Define the acreage of all on-site and off-site drainage areas contributing flow through the site.
- Specify the stormwater management plan, including hydrology studies.
- Show the outline of the 100-year floodplain boundary and notes; a note is required if the property is not affected by the floodplain.
- Note on each lot to identify the minimum finished floor elevation that must be 3-feet above the base flood elevation; administratively, this requirement is applied to sites that are impinged by the floodplain but the building footprint is not within the hazard area.

Stormwater Management. The Stormwater Management Ordinance (adopted by reference at §5-1-1) is administered by the Engineering & Environmental Services Department. It provides minimum requirements regarding the design and construction of public/private stormwater management facilities. Provisions outline the acquisition, design, standards and guidelines, operation and maintenance, and inspection of stormwater management facilities. Water quality controls are required of all developments. Facilities are:

- Privately-owned and maintained, if serving single lot developments or commercial/industrial development; or
- City-owned and maintained, if accepted by the City (primarily in subdivisions).

Stormwater Management Plan Technical Manual. Adopted by reference at §5-6-1, the Stormwater Management Plan Technical Manual establishes minimum requirements for the design and construction of individual and collective stormwater management systems. It is written to provide engineers, developers, land planners, and others with the technical information necessary to design and construct stormwater management systems that minimize the increase in volume and intensity of stormwater due to development activity. This is necessary to protect adjacent property owners, public infrastructure, and waterways when land is developed.

A stormwater management plan required for Site Plans (single lot) and subdivision Development Plans. Certain exemptions are allowed in the urban district, where there will be no increase in runoff, if the site is less than 1 acre and the increase in runoff is less than 1 cfs for the 50-year storm. Hydrology/hydraulics reports are required to establish the pre- and post-development rainfall-runoff relationships. The analyses are required to consider the 2-, 5-, 25-, 50-, and 100-year return frequency storms (and use of the 24-hour storm is required if the drainage area is more than 100 acres). Design specifics:

- Storm drains are designed for the 25-year return frequency storm and applicants must evaluate the “overall storm drainage system in the event of a 100-year return frequency storm.”
- Open channels are designed for the 25-year return frequency storm; additional capacity may be required if damage to surrounding properties could occur; erosion protection may be required.
- Culverts are designed for the 25-year return frequency storm; backwater elevations are not to rise higher than 6-inches below the shoulder of the roadway; minimum velocities are specified to minimize sediment build-up.
- Detention basins are generally required and designs must manage post-development runoff at pre-development rates for the 2-, 5-, 25- and 50-year return frequency storms; provision for conveying the 100-year flood flows is required, and detention facilities not allowed in the FEMA-mapped floodplain

Special Basin Restrictions. Due to past damage to property and infrastructure, additional stormwater management facility design considerations are required in: Rae’s Creek; Rocky Creek; and Rock Creek basins. The requirements include:

- For sites less than 10 acres, no fill or detention facilities in the floodplain;
- Stormwater management is required for all developments; and
- Release of stormwater associated with the 50-year frequency storm shall be limited to 90% of the pre-developed rates.

Design Rainfall Events

For the Augusta/Richmond County area, the 24-hour design rainfalls (not adjusted annually):

- *100-year rainfall = 8.0”*
- *10-year rainfall = 5.6”*
- *2-year rainfall = 3.75”*

Street and Road Design Technical Manual. The Technical Manual (adopted by reference at §7-3-60) establishes minimum requirements for the design and construction of streets, roads, and appurtenant structures, including drainage, culverts and bridges. It provides engineers, developers, land planners, and others with the technical information necessary to design and construct streets and roads within subdivisions and in some cases within individual commercial or industrial sites. For major works, the Georgia Department of Transportation Standards & Specifications are referenced.

Soil Erosion/Sediment Control Ordinance. The Soil Erosion and Sedimentation Control Ordinance (adopted by reference at §7-3-31) provides minimum guidelines for measures and practices as applied to development, including street and utility installations, drainage facilities and other temporary and permanent improvements. “Land disturbing activities” include clearing, dredging, grading, excavating, transporting, and filling (certain other activities and types of projects are exempt). Appropriate measures per Best Management Practices are to be installed to prevent or control erosion and sedimentation pollution during all stages of any land-disturbing activity.

Individual sediment and erosion control plans are to be prepared in accordance with the *Manual for Erosion and Sediment Control in Georgia*, prepared by the Georgia Department of Natural Resources. Plan content includes delineation of waterways, drainage, wetlands, and 100-year floodplains. The City is designated as the Issuing Authority, and Soil Conservation provides the technical review of plans.

Grading Ordinance. Adopted by reference at §7-3-40, the Grading Ordinance regulates excavation, filling, and grading activities to address erosion and sediment deposition that causes pollution and damage to domestic, agricultural, recreational, fish and wildlife, and other resource uses. Grading plans and permits are required, except for specifically exempted activities. For

site activities involving land disturbances greater than 1.1 acres, the developer must show grading provisions and a separate Grading Permit is required. Plan requirements are specified; designers must show the outline of the 100-year floodplain boundary and notes or a note that the property is not affected by the floodplain.

Utilities Department Design Standards. Sections specify design and construction standards for potable water distribution systems (including fire hydrants and fire lines) and for sanitary sewer system construction. Plan submittals must show, among other requirements, creek crossing details and backflow prevention devices. The requirement for backflow prevention devices is coordinated with the Site Plan Regulations and Subdivision Regulations.

6.2.3 Building Permits and Inspections

The License and Inspections Department administers and enforces codes related to building construction, property maintenance, business licenses and alcohol licenses. The current building code is the 2003 International Building Code and the 2003 International Residential Code, both adopted by the State under the cover of the Standard Building Code. Although the code contains building-specific provisions for flood resistance that are consistent with the NFIP, the City relies on the Floodplain Management Ordinance.

In 1998, the City received a Building Code Effectiveness Grading System evaluation by the Insurance Services Organization, Inc. The evaluation examines codes, staffing, training, and inspections, and the results affects property insurance rates. The City received a Class 6 for commercial/industrial construction and a Class 6 for 1- and 2-family residential construction.

The department includes 13 professional staff who perform plans reviews and inspections. All staff meet or exceed State requirements for certification in their trade/specialty, either through the model code organization or the Georgia State Construction Licensing Board and most staff hold multiple certifications. To maintain qualifications, staff attend training offered by the International Code Council (includes SBCCI), Georgia Power, Georgia Natural Gas, the Soil Conservation Service, and commercial providers.

The number of permits issued and inspections conducted in 2001 through 2004 are summarized in Table 6-1. In recent years, very few permits have been issued for buildings located in the mapped flood hazard areas. Processing of such permits includes these steps:

- Standard intake procedures includes a GIS check to identify several factors that are maintained in the related databases, including whether any portion of the property is located in the floodplain, which prompts a requirement that applicants first obtain approval from the Planning Commission.

- The standard intake procedures apply to applications for work in existing buildings; if determined to be in a floodplain, Planning Commission approval is required before a building permit is processed.
- For all building permits issued in floodplains, the Department reiterates the floodplain elevation requirement and the requirement to submit Elevation Certificates. Builders typically shoot elevations when foundations are finished and the Elevation Certificate must be submitted prior to release of the Certificate of Occupancy.
- If field inspectors see any work for which they do not have a permit file (whether in or out of the floodplain), they investigate the activity using office and computer resources; citations are issued for working without permits

Augusta addresses wind and snow load hazards through the building code and land use regulations:

- The building code requires all new construction to be designed and constructed for 80 mile per hour wind loads. This level of protection has been part of the building code since 1994; thus buildings constructed after that date are expected to be resistant to wind damage.
- The building code requires all new construction to be designed and constructed for 5 pounds per square foot snow load. This level of protection has been part of the building code since 1994; thus buildings constructed after that date are expected to be resistant to roof damage from winter storms.
- Section 3402.1, #1 of the Georgia Amendments to the 2000 Standard Building Code specifies that the right to a nonconforming use terminates if a structure becomes substandard under any applicable ordinance and the cost of placing it in lawful conformance exceeds fifty (50) percent of the replacement cost of the structure on the date that it was determined to be substandard.

Table 6-1. Augusta: Permit & Inspection Activity (2001-2004).

	Calendar Year 2001	Calendar Year 2002	Calendar Year 2003	Calendar Year 2004
New single-family, detached	356	460	584	716
New single-family, attached	161	100	68	80
Multi-family (2 or more)	22	30	7	7
Non-residential (all types)	75	68	105	75
Residential (additions, alterations, repairs)	1,930	2,261	2,493	2,679
Non-residential (addn's, alt's, repairs)	415	425	423	314
Demolition	200	222	196	277
Relocation	1	1	1	0
Other (mechanical, plumbing, electrical)	6,005	5,891	6,941	7,346
Mobile home (permanent/temporary)	298	267	223	230
All inspections (charged fee)	6,119	6,597	7,453	8,034

6.2.4 Regulating Flood Hazard Areas

The City of Augusta administers a coordinated set of regulations and ordinances that combine to comprehensively regulate flood hazard areas to minimize exposure of people and property.

If the License & Inspections Department determines that the parcels are affected by the mapped floodplain, applications are transferred to the Planning Commission for issuance of a floodplain approval. It is notable that the City processes as “floodplain” all applications for parcels that are touched by mapped floodplain areas, even if the proposed development is not “in” the flood hazard area. Regulated work includes buildings, additions to existing buildings, pipelines, utility work, grading, placement of signs, etc.

The purpose of the Flood Damage Prevention Ordinance (adopted by reference at §8-1-1) is to provide regulations for land development and construction in flood prone areas. The Ordinance is accompanied by the Flood Insurance Study and Flood Insurance Rate Maps that delineate areas susceptible to flooding during the 100-year and 500-year design floods. For the most part, the maps are based studies conducted by the U.S. Army Corps of Engineers on behalf of the Federal Emergency Management Agency (FEMA). The maps are the basis for determining which areas are regulated, what development can occur on a specific lot or tract, and what protective or remedial measure should be taken to support development. The Planning Commission administers the Ordinance and the maps are available to the public in its office.

Anyone who proposes to construct a structure, or to grade, fill or develop in a flood-prone area is required to obtain a Flood Development Permit before initiating any work. Applicants are required to disclose existing topography site and proposed structures, grading, drainage facilities, and contours. Depending on the nature of the project, the permit may be obtained as part of a Site Plan, subdivision Development Plan, or as a separate permit. An Elevation Certificate must be filed for each building to document that the lowest floor is no lower then required by the Ordinance before a Certificate of Occupancy is approved by the License and Inspections Department.

The Ordinance is amended periodically to conform to new Federal regulations, to correct deficiencies, and to address new issues. The maps may be revised by FEMA if substantial modification to a drainage basin or a waterway occurs, and site-specific map amendments may be approved by FEMA on the basis of engineering data supplied by a property owner. Variances may be considered by the Board of Zoning Appeals, but are rarely granted due to the criteria outlined in Federal regulations.

A statement of findings of fact that, along with the statement of purpose, sets the framework for the City's regulation of flood hazard areas:

- The flood hazard areas of Augusta, Georgia are subject to periodic inundation which results in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood relief and protection, and impairment of the tax base, all of which adversely affect the public health, safety and general welfare.
- These flood losses are caused by the occupancy of flood hazard areas of uses vulnerable to floods, which are inadequately elevated, flood-proofed, or otherwise unprotected from flood damages, and by the cumulative effect of obstructions in floodplains causing increases in flood heights and velocities.

The Flood Damage Prevention Ordinance is largely consistent with the regulations of the National Flood Insurance Program, with several notable exceptions that exceed the minimum federal requirements. Those exceptions, listed below, facilitate the City's objective of guiding development away from flood hazard areas:

- **Floodway Fringe.** Dividing the area that is landward of the floodway, yet within the floodplain, into the "lower floodway fringe" and the "upper floodway fringe" is a unique and effective provision. It allows the City to regulate the areas adjacent to mapped floodways as floodways, recognizing that such areas are artificially delineated on a map without full recognition of the likelihood that floodwaters will be fast flowing and relatively deeper.
- **Cumulative Substantial Improvement.** The Ordinance specifies that any combination of repairs, reconstruction, alteration, or improvements to a building that take place during a five-year period count towards the 50% of market value trigger for substantial improvement.
- **Unmapped Flood Hazard Areas.** Areas known to have flooded historically or that are defined by engineering practices but not yet incorporated into the Flood Insurance Study are included in the area regulated.
- **Freeboard above Base Flood Elevation.** The lowest floors (including basement) of new construction (including manufactured homes) and substantial improvements are required to be elevated no lower than three feet above the base flood elevation shown on the FIRM.
- **Elevation Certificates.** Procedurally, the City applies the requirement to submit surveyed evidence that the lowest floor is at or above the required elevation on all buildings if any portion of the lot is touched by the mapped flood hazard area.
- **Large Tracts.** Tracts of land that have more 1 acre that is within the mapped floodplain are regulated as if the floodplain is floodway, effectively providing a land use tool to guide development activities away from low areas.

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- **Equivalent Floodways in A Zones.** For flood hazard areas for which base flood elevations have not been determined (A Zones), the Ordinance, in effect, defines a floodway. As measured from the top of the stream bank, the area that is “equal to five (5) times the width of the stream or twenty (20) feet, whichever is greater” is treated as a floodway.

Flood Hazard Area Development Permit Application Form & Information. The Augusta-Richmond County Planning Commission has developed a form to summarize the information that is required to be shown on plans. It specifically requires elevations in relation to mean sea level and advises the following information is required:

- Elevation of lowest floor (including basement) of all structures;
- Elevation of the floodproofing measures used for non-residential structures;
- A certificate that floodproofing designs meet the Ordinance requirements; and
- Description of watercourse alterations.

A 5-page information handout (dated July 2000) is provided to applicants for floodplain development. It includes a brief background on flooding in Augusta, flood warning and flood safety, flood insurance, property protection measures, permit requirements, substantial improvement requirements, drainage system maintenance advice, a brief statement regarding the natural and beneficial functions of floodplains, and references for more information on flooding.

Substantial Damage/Improvement Packet (undated). The packet was prepared in 2000 after a flood that caused considerable damage and prompted an awareness of the importance of having materials to provide property owners. It is used by the Flood Assessment Team (see Section 6.4) and includes:

- Notice to property owners to provide the information about the “50% rule” (pertaining to substantial improvement and repair of substantial damage);
- Application for review (so that a determination can be made as to whether a Development Permit and/or a building permit are required);
- Affidavits for the Owner and the Contractor; and
- List of items required and worksheet for estimating the cost of reconstruction/improvements.

6.3 Augusta’s Departments & Programs

Augusta Emergency Management Agency. The City’s Emergency Management Agency is responsible for preparing and coordinating all emergency support functions to prevent, minimize and repair injury and damage resulting from emergencies and disasters, whether natural or man-made. Hazards that are addressed include: structural fire; police/public safety services; medical

and health services; rescue; warning services; communications; defense from radiological, chemical and special weapons; and other functions related to civilian protection.

Due to the types and quantities used by local industries and the presence of major transportation routes and railroads, the most significant threat to the citizens of Augusta is exposure to hazardous materials. The Emergency Management Agency coordinates the Local Emergency Planning Committee, which is very active and primarily focused on “community right to know” regarding hazardous materials and chemical accidents. The committee consists of 24 representatives from the City, community groups, and local industries. It sponsors community meetings, open houses, industry tours, shelter-in-place training, and risk management seminars. Augusta enjoys significant industry-to-industry cooperation, with hazardous materials handlers cooperating on a notification system and citizen education and outreach.

The EMA also coordinates the Community Awareness Emergency Response (CAER) which started in 1984 when Richmond County’s hazardous materials program began. The quarterly meetings focus on communications between citizens and industry and are well-attended.

EMA’s current initiatives include:

- Improving public education and information on all hazards, including flood, hurricanes, tornadoes, heat and hazardous materials. This accomplished through numerous presentations to citizens groups, neighborhood associations, church groups, and tours of the 911 Communications Center. A pending proposal will create a short-term grant-funded position to establish the outreach initiative.
- Developing the “911 Message” system through Calling Post, Inc., a computerized, auto-alert system that can be set up with groups of numbers for specific purposes or specific geographic areas. EMA can tailor messages for each incident or area alerted. The system has the capability to examine call logs to determine if the message was received live, by recording, or not answered.

Public Works and Engineering Functions. The Augusta Public Works & Engineering Department was reorganized into three departments in March 2005: the Engineering and Environmental Services Department, the Public Services Department, and the Solid Waste Department. Funding for major projects undertaken by either Public Services or Engineering and Environmental Services is largely derived from a 1% sales tax that provides for citywide capital projects, including roads, drainage, parks, fire stations, and other public buildings. The Capital Improvement Program is revised every 5 years based on pre-determined priorities and documented needs. At present, the Engineering and Environmental Services Department represents the City on the Corps of Engineers’ Flood Reduction Study (see Section 4.1.4).

Engineering and Environmental Services Department includes four sections:

- County Engineering reviews proposals for privately developed roads, drainage and stormwater management designs, and is responsible for subdivision plan reviews, subdivision inspection, utility permits and inspection, and erosion control.
- Preconstruction Engineering manages certain capital projects.
- Environmental Engineering is responsible for National Pollution Discharge Elimination permits, underground storage tanks, environmental permitting, and Brownfields.
- Traffic Engineering manages the City's traffic infrastructure.

Public Services Department is made up of three divisions:

- Maintenance Division is responsible for right-of-way maintenance, paving, vacant lot cleanings, community cleanups, drainage maintenance (storm drains, ditches, detention/retention ponds).
- Trees and Landscape Division develops programs to enhance sound management and stewardship, provides in-house fire control training, supports fire prevention programs (schools, civic clubs and private organizations), and advises residents on shade trees.
- Facilities Management Division is responsible for maintenance of City buildings and construction new of City buildings.

Solid Waste Department is an enterprise fund and is responsible for composting, landfill operations, and recycling.

The three departments are coordinating establishment of a database-driven system to maintain a wide variety of records and work orders. Referred to as the "GBA system," installation began in 2003. A component of the system will be designed to centralize recording of citizen complaints regardless of the office that fields a call. The system will facilitate documentation of repetitive complaints, repetitive repairs and document costs. One benefit will be to help prioritize the benefits and costs of drainage improvements or other modifications.

Maintenance of Lake Olmstead and Lake Aumond is among the Maintenance Division's responsibilities. As funding allows, work includes vegetation maintenance and dredging, although the latter is a very expensive endeavor. Both lakes are "flow through" and do not have operable inlet and outlet structures. Many years ago, flooding washed out Walton Way at Lake Aumond; the reconstruction was accomplished to function as a dam and emergency spillway.

As identified in agreements with the U.S. Army Corps of Engineers, among the City Engineer's responsibilities is inspection of certain flood control works, including the Augusta Levee and Oates Creek Flood Control Projects. These inspections are conducted with the U.S. Army Corps

of Engineers. Modifications to the Oates Creek project will be managed by the Preconstruction Engineering Section.

Inspection and maintenance of the stormwater system, especially drainage ditches and the 250+ detention basins that are in City ownership, are major Public Services responsibilities. The basins are those associated with subdivisions (basins on single lot developments generally stay in private ownership) and those constructed by the City. Maintenance is necessary to ensure proper functioning to provide the appropriate management of runoff. The City's Wrightsboro facility on Rae's Creek was developed to help reduce existing drainage problems.

Flooding has damaged several privately-owned ponds:

- A pond on Horsepen Branch (tributary to Spirit Creek) that was located above Sand Ridge Subdivision failed in May 2003, most likely due to deterioration of the spillway pipe.
- Harrison Sears pond, on Horsepen Branch (tributary to Spirit Creek) has been damaged by high water more than once.
- Located on Spirit Creek above Peach Orchard Road, Richmond Factory Pond failed in 1990 and was rebuilt.
- A stormwater pond at Arbor Place on a tributary to Rock Creek, was damaged by torrential rainfall and contributed to downstream damage.

Housing and Neighborhood Development. The Department's mission is to provide decent housing, suitable living environment and expand economic opportunities, principally for low and moderate-income persons and neighborhoods. Among its current goals are the following:

- Develop and implement comprehensive neighborhood revitalization strategies for distressed areas;
- Collaborate with community housing development organizations; and
- Provide technical and financial assistance and information to entrepreneurs and small business owners.

The City of Augusta is a HUD entitlement jurisdiction that receives and administers federal funds from the U.S. Department of Housing and Urban Development. Annual allocations are \$2.9 million in Community Development Block Grants, \$1.4 million in HOME Investment Partnerships Programs, and \$100,000 in Emergency Shelter grants. These programs support:

- Housing rehabilitation and home repairs required to bring clearly substandard homes into compliance with building codes;
- Private non-profit organizations and other developers that build new housing and renovate existing housing for low- and moderate-income persons

-
- Demolition and rebuild for households occupying severely deteriorated units.
 - Demolition and clearance of deteriorated structures, with vacated lots made available for construction of affordable housing.

Improving Housing in Augusta

Recently, Augusta Housing & Economic Development worked with a client to demolish and rebuild a dilapidated, flood-prone home. All code requirements were satisfied.

The Augusta-Richmond County Extension Service. The Extension Service is a unit of the University of Georgia's College of Agricultural & Environmental Sciences that offers a number of programs in order to:

- Respond to citizen needs and interests in agriculture, the environment, families, and 4-H;
- Promote conservation of natural resources; and
- Promote increased agricultural profitability and pest management practices.

On the Cooperative Extension Service's homepage (<http://www.ces.uga.edu>) a number of publications related to disasters are available, primarily dealing with emotional reactions and adjustments.

6.4 Augusta's Post-Flood Actions

In response to flooding in 2000, the City created the Flood Damage Assessment Team. The Team is composed of staff from the Planning Commission, License & Inspections, Emergency Management, and a representative of the Construction Advisory Board. It is responsible for assessing flood damage and making substantial damage determinations.

The Public Services Department inspects reported drainage problems, stormwater management facilities, and road culverts affected by flooding.

The Augusta Utilities Department manages increased wastewater inflows associated with increased infiltration and inflows due to rainfall and high water events. Reports of outages or damage to water lines or sewer lines are investigated and repairs are made, as appropriate.

The Emergency Management Agency coordinates with the Georgia Emergency Management Agency after major events; GEMA coordinates state personnel if required to assist with preliminary damage assessments.

6.5 Augusta's Continued Compliance with the NFIP

The City of Augusta is firmly committed to continued compliance with the NFIP as evidenced by the commitment to regulating development and redevelopment, by adoption of provisions that exceed the minimum NFIP requirements, and by active pursuit of mitigation opportunities.

The City of Augusta satisfied requirements for initial participation and joined the NFIP in 1978; Richmond County joined in 1980. The effective Flood Insurance Rate Maps are the basis for delineation of the minimum flood hazard area for the purposes of regulating development. The maps have been revised a number of times to reflect more detailed information and changes to the floodplain,

Regulations Review. A review of the City's floodplain regulations and subdivision standards was prepared and City staff were interviewed. The review, on file with the Planning Commission, was performed to ensure continued compliance with the NFIP and to identify opportunities to clarify regulatory language. The regulations are consistent with the NFIP. A number of opportunities for improved consistency and clarification were identified.

Community Assistance Visit – 1990. The NFIP State Coordinating Office (Georgia DNR) met with staff of the Augusta-Richmond County Planning Commission. Staff were described as having “a fair understanding” of the NFIP and federal regulations. The resulting report identified some concerns and the City undertook follow-up immediately:

- No problems with the Floodplain Management Ordinance;
- Minor concerns with administrative and enforcement procedures;
- Minor concerns with flood maps;
- Serious concerns with NFIP Biennial Report data; and
- Potential violations were identified: field reconnaissance identified a number of structures that were built in the floodplain and copies of Development Permits and Elevation Certificates for nine buildings were requested.

Community Assistance Visit – 2000. The NFIP State Coordinating Office (Georgia DNR) and a FEMA Region IV representative met with staff of the Augusta-Richmond County Planning Commission. Due, in part, to mid-year flooding, the Floodplain Management Ordinance and certain procedures were modified. The report acknowledged the merits of adopting more

restrictive ordinance provisions, establishing a Flood Damage Assessment Team to assess damage and make substantial damage determinations, and providing Flood Information Packets to residents (see also Section 6.4). The report outlined additional results:

- Recommendation that, in addition to requiring floodplain boundaries be delineated on Site Plans, that the preparer note the map panel number and date.
- Possible encroachment of fill into a floodway (subsequent investigation indicated it is not in the floodway).
- Height of foundation openings/flood vents higher than 12” above grade (subsequent investigation indicated the non-conforming openings are on the same side as the crawlspace door which has sufficient open area).
- Elevation Certificates required for buildings in the floodplain and errors in flood zone designations on some certificates (corrected elevation certificates were provided).

In response to the report, the City conveyed to all engineers and land surveyors a requirement that all Plot Plans, Site Plans, Development Plans, Final Plats, and all other plats submitted for approval must have a note regarding flood hazard areas, including identification of the map panel number and date. This requirement requires the note is to be placed on all documents, even if there is no floodplain affecting the site or if the building footprint is out of the floodplain. The requirement was subsequently incorporated into the appropriate ordinances.

The Community Rating System. The City has identified a number of its actions that may qualify for credit under the NFIP’s Community Rating System (CRS). The CRS is intended to recognize and encourage management of flood hazard areas above the minimum requirements of the NFIP. Discounts on the cost of federal flood insurance are provided to those citizens who reside within recognized communities. The City of Augusta anticipates considering applying for the CRS.

Nationwide, the average NFIP premium for \$100,000 in coverage property in A Zones and AE Zones is on the order of \$500. Thus, in communities with a 5% CRS discount, policyholders see, on average, annual savings of \$25. The cost of the average B, C, and X Zone policy is \$150; thus policyholder savings in these zones outside of the 100-year floodplain would be only \$7.50 per year. Regardless of the CRS discount available in A and AE Zones, which goes up in 5-percent increments, the discount on B, C, and X Zones is capped at 5%.

For Augusta residents, cost savings due to the CRS discount can be estimated. Because nearly half of policies appear to be on buildings that are “out” of the mapped floodplain, for the purpose of this estimate a CRS discount of only 5% is assumed to apply to all policies. The total premium paid is approximately \$397,000; thus a 5% discount would yield a total savings for property owners of about \$19,800 each year.

An independent report identifying possible points based on the City’s current program, as well as a number of reasonable and feasible additional activities that may qualify for CRS points, is on file with the Planning Commission. The following are the key opportunities:

- Floodplain Management Ordinance requires the lowest floor, including basement, to be elevated at least 3-feet above the Base Flood Elevation.
- The requirement that lowest floors be at least 3-feet above the BFE is imposed on buildings located on lots that touch the floodplain even if the building is “out”
- The City regulates a portion of the flood fringe as floodway.
- Stormwater management for most new development in Rae’s Creek, Rocky Creek, and Rock Creek watersheds is required to meet higher standards to provide over-management.
- Significant efforts related to drainage maintenance and improvements are underway.
- 22 homes have been acquired and demolished (or are in the process of being acquired and demolished) to provide open space.
- Significant public information efforts provide opportunities to continue to reach out to residents about flood hazards, mitigating damage, and flood insurance.
- The City prepared a Flood Hazard Mitigation Plan in 2004 (precursor to and incorporated into this Hazard Mitigation Plan, which addresses other flood hazards and other significant natural hazards).
- Efforts are made to expand the Greenspace program through fee simple acquisition of streamside areas and easement donations.

6.6 Comprehensive Plan: Short Term Work Program (2003-2007)

The Augusta-Richmond County Comprehensive Plan, updated in 2004, establishes a Short Term Work Program for 2003-2007. Table 6-2 shows selected projects, some dependent on inclusion in future phases of SPLOST, that have bearing on hazards (the table is annotated to indicate the pertinent hazard).

Table 6-2. Selected Projects from Comprehensive Plan: Short Term Work Program (2003-2007).

[Hazards addressed noted on left: **M** = Multi-Hazard (especially code compliance with wind, flood, snow load requirements), **F** = Flood/Drainage, **WF** = Wildland Fire, **HM** = HazMat]

Project	2003	2004	2005	2006	2007	Responsibility	Estimated Cost	Funding Source
LAND USE / GROWTH MANAGEMENT								
F Address growth management issues through use of the Georgia Quality Growth Partnership's Smart Growth Toolkit	■	■	■	■	■	City Commission, Planning Commission	Staff Time	City
HOUSING								
M Continue to implement modernization projects at Housing Authority sites	■	■	■	■	■	Augusta Housing Authority (AHA)	\$24,470,785	HUD
M Rehabilitate 275 housing units for low income homeowners	■	■	■	■	■	Housing & Economic Development (HED)	\$6,475,000	HUD, Program Income
M Rehabilitate 150 housing units for low income renters	■	■	■	■	■	HED	\$2,250,000	HUD, Program Income
M Complete emergency repairs on 75 housing units occupied by low income households	■	■	■	■	■	HED	\$375,000	HUD, Program Income
M Demolish 50 dilapidated housing units and rebuild new units on site for low income homeowners	■	■	■	■	■	HED	\$2,283,000	HUD
M Implement new and renovated housing projects in inner-city target area per the Target Area Master Plan (2003)	■	■	■	■	■	City, CHDOs, Private Developers	N/A	Various, including local housing trust fund
F Use the Augusta Land Bank to acquire tax delinquent and abandoned properties per Target Area Master Plan (2003)	■	■	■	■	■	Land Bank Authority, Law Department	N/A	Bond funds, CDBG, City
GREENSPACE AND NATURAL RESOURCES								
F Continue to participate in the Georgia Greenspace Program and protection of environmentally sensitive lands as open space	■	■	■	■	■	Central Savannah River Land Trust, City	N/A	State, City, Private Sector
F Develop a greenway along the river levee linking downtown to Phinizy Swamp Nature Park. Link to Augusta Canal and North Augusta trails.	■	■	■	■	■	Central Savannah River Land Trust, City	\$1,560,259	State, City, Private Sector
F Develop Butler Creek Greenway*			■	■		City	\$5,000,000	SPLOST Phase V

Table 6-2. Selected Projects from Comprehensive Plan: Short Term Work Program (2003-2007).

[Hazards addressed noted on left: **M** = Multi-Hazard (especially code compliance with wind, flood, snow load requirements), **F** = Flood/Drainage, **WF** = Wildland Fire, **HM** = HazMat]

F Implement recommendations for community outreach, long-term stream monitoring, & sewer system maintenance & procedural improvements contained in the Augusta Watershed Assessment Report (Jan. 2003)	■	■	■	■	■	APW&E, AUD, Augusta Watershed Roundtable, Consultant, Planning Commission	\$500,000	State, City, Private Sector, Non-profits
COMMUNITY FACILITIES AND SERVICES								
M Select site, design and construct a new Judicial Center	■	■	■	■	■	City, Court Officials	\$74 M	SPLOST Phases II, IV, & V
M Select site, design & construct new municipal administrative building *		■	■	■	■	City	\$20 M	SPLOST Phase V
M Select site, design & construct new main branch of Augusta Regional Library		■	■	■	■	City	\$15 M	SPLOST Phases IV & V, Private
M Design & construct new facility for Public Works and Utilities Departments	■	■	■			APW&E, AUD	\$19.5 M	SPLOST Phase V, Bonds
M Complete construction of new animal control center	■					APW&E	\$2.080 M	SPLOST
M Design & construct new building for federal agencies, U.S. Bankruptcy Court, U.S. Attorney, etc.	■	■	■			GSA, City	\$20 M	Federal
M Design & construct new regional coliseum*		■	■	■	■	City, Private, Other Local Governments	\$89.7 M	SPLOST Phase V, State, Private
M Select site, design and construct new exhibit hall and trade center *	■	■	■	■	■	City, CVB	\$20 M	SPLOST Phase V
M Select site, design & construct new performing arts center *	■	■	■	■	■	City, Arts Council	\$55.0 M	Public, Private
M Design & construct new pod at the Phinizy Road Jail *		■	■			City, Sheriff's Department	\$4.5 M	SPLOST Phase V
M, WF Complete construction of 5 new fire stations at various locations	■	■				Fire Department	\$6.6 M	SPLOST Phase IV
M Complete construction of Brookfield Park	■					Recreation and Parks Department	\$1.2 M	SPLOST Phase IV
M Complete construction of Sand Hills Park	■	■				Recreation and Parks Department	\$1.08 M	SPLOST Phase IV
M Complete design and construction of library and community center at Diamond Lakes Park	■	■				Recreation and Parks Department	\$5.8 M	SPLOST Phase IV

Table 6-2. Selected Projects from Comprehensive Plan: Short Term Work Program (2003-2007).

[Hazards addressed noted on left: **M** = Multi-Hazard (especially code compliance with wind, flood, snow load requirements), **F** = Flood/Drainage, **WF** = Wildland Fire, **HM** = HazMat]

M Upgrade existing parks as detailed in the Recreation and Parks Capital Improvements Plan. *	■	■	■	■	■	Recreation and Parks Department	N/A	SPLOST Phase V
F ARC drainage improvements, Phase I	■	■				APW&E	\$1,458,750	SPLOST Phase III
F ARC drainage improvements, Phase II	■	■				APW&E	\$84,100	SPLOST Phase III
F Bungalow Rd. drainage improvements	■	■				APW&E	\$2,131,780	SPLOST Phase III
F Engineer and complete East Boundary St. drainage improvements	■	■				APW&E	\$1,167,000	SPLOST Phase IV
F Green Meadows drainage improvements	■	■				APW&E	\$200,000	Local
M Phinzy Rd. Jail - install lightning protection equipment	■					APW&E	\$250,000	SPLOST Phase IV
F Raes Creek, Sec. III drainage improvements – Lake Olmstead to Berckmans Rd.	■	■				APW&E	\$880,000	SPLOST Phases I & II
F Complete Regional Flood Control Feasibility Study	■					APW&E, US Army Corps of Engineers	\$1,637,649	SPLOST Phases I & III
F Skinner Mill Rd. culvert extension	■					APW&E	\$156,100	SPLOST Phase II
F Travis Rd./Plantation Rd. drainage improvements		■	■			APW&E	\$2,361,000	SPLOST Phase III
F Woodlake drainage improvements	■	■				APW&E	\$939,000	SPLOST Phase III
M Complete Phase II public school construction, renovation and expansion projects.	■	■	■	■	■	RCBOE	\$162 million	Sales Tax
TRANSPORTATION								
HM Activities (engineering, land acquisition, etc.) related to relocating NS Railroad mainline off of 6th Street right-of-way. *	■	■	■	■	■	City, North Augusta, Railroads	70,000,000	Federal, SPLOST Phase V, South Carolina
F Acquire right-of-way and complete drainage improvements on I-20 @ Crane Creek			■	■	■	GDOT	\$9,047,000	FHWA, GDOT

* contingent upon being included on the SPLOST Phase V project list

6.7 Augusta's Natural Resources

The importance of protecting natural resources is recognized in several of the City's Development Documents, including the Comprehensive Plan and Comprehensive Zoning Ordinance that set the framework for long-term development. Regulations pertaining to specific proposals for land development require that wetlands, waterways and sensitive areas be delineated. This serves dual purposes: to encourage avoidance of those areas, and to more readily allow City staff to review potential impacts. Activity proposed within wetland areas must be approved by the U.S. Army Corps of Engineers under the authority of Section 404 of the Clean Water Act. Sediment and erosion control plans are required for most developments.

Natural resources are recognized and certain protections are provided in other regulations:

- Land Subdivision Regulations:
 - Individual sewerage disposal systems (if applicable) are to be designed per current Health Department regulations.
 - Delineation of wetlands per the National Inventory of Wetlands and, if subject to federal permit requirements, certain other submittals.
- Site Plan Regulations:
 - Delineation of wetlands per the National Wetlands Inventory.
 - Descriptive note describing permanent or temporary best management practices used to impact or target water quality.

Greenspace Program. The purpose of Augusta's Greenspace Program Plan is the permanent protection of undeveloped greenspace. It sets forth policies and specific proposals for long-term and short-term greenspace preservation and recognizes that funds for that purpose may come from several sources. The ultimate goal is the preservation of 20% of the City's land area (including approximately 20,000 acres of flood-prone lands). The most environmentally sensitive lands are targeted: floodplains of the Savannah River, major tributaries, and Phinizy Swamp; and land along the Augusta Canal. The plan received broad public support as evidenced by input received at public meetings. The Central Savannah River Land Trust monitors the City's Greenspace Program and lands.

Since November 2000, nearly 800 acres have been permanently protected. These acquisitions, supported in part by a state grant of \$1.2 million, move the City towards a continuous greenbelt around the developed areas, beginning at the Columbia County line (and connecting to that county's trail system), and extending along the Levee to Phinizy Swamp and linking along Butler Creek to Fort Gordon. Table 6-3 identifies all Greenspace parcels, including those owned by the City and those owned by others that may not yet fully qualify under the State's definition.

The City proposes several mechanisms to expand greenspace, including: revisions to the Comprehensive Zoning Ordinance to promote greenspace in developments; a greenspace element in the Comprehensive Plan; pursuit of donations of land; fee simple purchase or placement of conservation easements on compatible land; and placement of conservation easements over certain City-owned properties. Barriers to achieving the goal are identified: lack of funding; insufficient tax incentives to encourage donations; and long-term maintenance concerns with taking title to a myriad of scattered tracts.

**Table 6-3
Status of Augusta’s Greenspace (2003).**

City Ownership (permanently protected)		Other Ownership (not yet permanently protected)	
Greenspace Site	Size (acres)	Greenspace Site	Size (acres)
Phinizy Swamp Nature Park	234.0	Phinizy Swamp wetlands mitigation site (owned by GDOT and leased to GADNR via a 50-year management agreement).	1,540
Butler Creek – Boy Scout Tract	75.0		
Butler Creek – Parham Tract	3.5		
Butler Creek – Sibley Tract	50.0	Several City-owned parcels between downtown and New Savannah Lock and Dam (some parcels may be needed for future development; surveys are required for further delineation).	479±
Butler Creek – Spence Tract	25.5		
Butler Creek – Woodlake Subdivision	120	Spirit Creek Educational Forest (owned by the Georgia Forestry Commission).	570
Rae’s Creek – above golf course	4	Phinizy Swamp near New Savannah Lock and Dam (within 1,500 acres owned by the City, including sewerage treatment facilities and the Phinizy Swamp Nature Park).	616±
Spirit Creek – S Specialties Tract	36.0		
Savannah River Islands	10.0		
Savannah River/Augusta Canal	215.0		

The Greenspace Plan describes the City’s physical characteristics, rapid growth areas, population, and future land use. Areas that are significant natural areas that are protected and additional proposed areas for greenspace protection are described:

- Properties located on or adjacent to the Savannah River and the Augusta Canal are a mixture of floodplains and other buffer lands.
- Phinizy Swamp was created by ancient shifts in the Savannah River; some of it is farmed, some has been or is being mined, most has been timbered. It includes natural areas that are unique and most of it is within the floodplain.
- Butler Creek has seen aggressive pursuit of easements and fee simple acquisition of floodplain and buffer areas; this area will continue to be the City’s first priority.

-
- Rae’s Creek flows through a heavily urbanized area. The cost of land and easements has proven an obstacle to acquiring greenspace, even floodplain areas. The upper reach, in the Bel-Air area, where there is less existing development is a high priority.
 - Rock Creek, Rocky Creek, Spirit Creek and McBean Creek are lower priority, but the City will encourage donations of easements and property, especially where there are significant environmental resources or opportunity to achieve connectivity with other public areas.

The Augusta Greenspace Plan details provisions of the City’s Flood Damage Prevention Ordinance that “make it very difficult to develop property lying within the 100-year floodplains.” In part, it is anticipated that these restrictions will help to encourage owners to grant easements or to make donations to the City or the Savannah River Land Trust (thereby qualifying for tax benefits). These provisions serve to temporarily protect the floodplain as Greenspace:

- Limitations on grading; no fill to be brought into the floodplain;
- Lower floodway fringe to be treated as floodway;
- Stringent “no rise” certification requirements; and
- Three-foot freeboard above the Base Flood Elevation.

Tree Ordinance. The Tree Ordinance (adopted by reference at §8-4-1) provides standards for the protection of public trees, designates landmark trees, and provides landscaping standards for the development of private property (except single-family residential development). Where a Site Plan is required, a Landscape Plan must include a landscape element, a tree protection element, and a tree establishment element. The Tree Ordinance Illustrated Guide gives technical specifications for developing landscape plans and other purposes. The Landscape Plan is reviewed by the staff of the Planning Commission along with the rest of the Site Plan and it is subject to administrative approval by the staff or approval by the Augusta Tree Commission.

Groundwater Recharge Area Protection. The purpose of the Groundwater Recharge Area Protection Ordinance (codified as §8-6-1) is to manage land use within certain defined areas to ensure that the threat of groundwater pollution is minimized. The Ordinance sets standards that apply to waste disposal facilities, agricultural impoundments, hazardous material handling facilities, waste water basins, stormwater basins, wastewater spray and sludge operations, and homes or other land uses served by septic tank/drain systems. Minimum lot sizes are specified if septic tanks are used, based on pollution susceptibility, soil group, and slope, and are considerably larger than if public sewerage is available.

6.8 City of Blythe

Overview. The history of Blythe is an important factor to the city's residents. Beginning as a farming community in the early 1800s, it grew when the railroad was built in 1881. The current city, incorporated in 1920, includes about 116 households (730 residents) within its 2.84 square miles of area (2005 estimate). Located in the southwest corner of Augusta, GA, Blythe is essentially a residential community for nearby employment centers, including Fort Gordon. The city is partially in Burke County.

Blythe is governed by a Mayor/Council form of government; the mayor and four council members are elected. The City Council appoints the Planning Commission and the Building Inspector; there are two departments: Police and Waterworks.

The City's Comprehensive Plan outlines goals related to economic development, community facilities, housing, natural and historic resources, and land use. Some of those goals are related indirectly to reducing the impacts of natural hazards:

- Sound housing: related to building new residential areas to meet accepted standards; requiring new manufactured homes to meet 1976 HUD codes; removing buildings that present a public safety hazard.
- Natural resources: related to discouraging development of land that is mapped as having severe environmental limitations for intensive development.
- Land use: related to siting development in areas that can be economically served by existing public facilities and enacting a zoning ordinance.

Many older buildings are present in Blythe. The city views historic preservation as a positive influence and discourages destruction of buildings that are viable for occupancy. Public buildings that have some historical significance include:

- Blythe Community Center
- Blythe City Hall
- Clark Memorial Library
- Hayes Grocery
- Palmer Reese Building
- Farmers Bank
- Blythe Baptist Church
- Blythe United Methodist Church
- Railroad Fertilizer Shed
- Old Store

Development & Services. Blythe is primarily a residential farming community that desires to maintain this character. It does not experience significant development activity, largely due to its rural location. Soils and drainage limitations influence development which may be subject to regulatory requirements associated with wetlands. Areas shown on the generalized wetlands map are subject to approval by the U.S. Army Corps of Engineers.

The City lies completely within a significant aquifer recharge area and development must follow guidelines established by the Georgia Department of Natural Resources to limit exposure of subsurface waters to excessive pollution and/or contamination. Protection standards apply to certain activities such storage of agricultural chemicals, hazardous waste handling and disposal, chemical and petroleum storage tanks, on-site septic fields, and manufactured home parks.

Activities that require a building permit must conform to the State Building Code and permits are issued after approval by the City's Building Inspector and the Planning Commission. In 2003, 28 building permits were issued; 37 permits were issued in 2004. The Subdivision Ordinance requires conformance with the Augusta-Richmond County technical manual for streets and road design. Manufactured houses must be affixed to a permanent foundation and anchored to the ground to withstand wind loads per the State Building Code.

Under the Service Delivery Agreement, Augusta provides fire protection, emergency medical and 911 services; Augusta Public Works maintains roads and drainage ditches. The State, through a separate fund, handles resurfacing of City streets and roads.

The City provides water to its residents, tapping two wells and a 150,000 gallon storage tank. All buildings have on-site septic systems.

The Blythe Elementary School serves grades Pre-K through 5 and is the only school in the area. Located at Church Street, the school has 21 classrooms, a media center, a music room, gym, and a cafeteria.

Hazards in Blythe. Natural hazards that are described in Chapter 2 that are uniform throughout the planning area, including Blythe, are wind hazards, severe winter storms, drought and urban wildland fire.

There are no FEMA-mapped floodplains in Blythe, but some low areas are subject to standing water after prolonged rainfalls which may affect septic fields. Two ditches provide drainage; one was enlarged to relieve some standing water problems.

The severe ice storms in the 2003/2004 winter caused tree and limb damage and some areas were without power for two days. Emergency generators are available for the City Hall and Fire Department.

High winds overturned a manufactured home nearby, outside the City limits.

After power outages in the January 2004 ice storm the City worked with Augusta Utilities and now can connect to the regional water supply in emergencies.

Notices regarding water conservation were sent to water users during the last drought.

Debris generated by storms is handled cooperatively with the City of Augusta. In recent storms there were no additional charges if woody debris was cut to size and stacked in the City road right-of-way.

The only known hazardous materials within the City's boundaries are those used by the Waterworks Department.

6.9 City of Hephzibah

Overview. The Hephzibah area was originally inhabited by the Uchees Indian tribe, one of the minor tribes of the Creeks. The first land grants were made in the mid-1700s. The first community, organized around the Hephzibah Baptist Association, initially was named Brothersville for three brothers of the Anderson family who built homes in the early 1800s.

The City, chartered by the General Assembly in 1870, is located in the southern part of Richmond County. Hephzibah is essentially a residential community for nearby employment centers, including Fort Gordon. The City's 2005 estimated population of 4,200 includes about 1,700 households.

Hephzibah is governed by a City Commission form of government; its five commissioners are elected. The City's work is performed by eight departments: Fire, Police, Finance, Planning & Zoning, Cemetery, Water & Sewer, Building & Grounds, and Streets.

The Hephzibah Planning Commission is charged with the duties and responsibilities set forth in State statute, including the responsibility to develop comprehensive planning and zoning ordinances to promote health, safety, morals and the general welfare of the people of the city.

The Commission is responsible for regulating development, subdivisions and land uses, and issuing building permits for construction.

The City's Comprehensive Plan (March 7, 1994) outlines goals related to economic development, community facilities, housing, natural and historic resources, and land use. Some of those goals are related indirectly to reducing the impacts of natural hazards:

- Sound housing: related to enforcement of subdivision regulations and the zoning ordinance to ensure that new residential areas will be built within accepted standards for streets, sewers, water lines, and lot size for septic systems; requiring new manufactured homes to meet 1976 HUD codes; consider requiring backflow-preventer check valves on water supply lines for new mobile homes and new housing; enforcement of regulations governing setup, underpinning, and skirting of newly located mobile homes, including those in existing nonconforming parks.
- Natural resources: related to discouraging development of land that is mapped having severe environmental limitations for intensive development.
- Land use: related to siting development in areas that can be economically served by existing public facilities and enforcing the zoning ordinance.

Many older buildings are present in Hephzibah. The city views historic preservation as a positive influence and discourages destruction of buildings that are viable for occupancy. Approximately 50 properties have been identified as historic, most located in the center of the City. Eight original buildings exist from the City's early period:

- Absalom Rhodes' home
- Edmund Murphey's home
- The Henderson home
- The Ashley home
- The Clark home (Friendship Hall)
- Rev. Delph's home
- The Walker home
- Carriage Factory Building

Hephzibah has grown significantly since 1980 when it retained its original boundaries defined by a circle with a radius of 1 mile. In 1990 the City encompassed 13.0 square miles; by 2000, annexations had increased the area to 19.51 square miles. The area is characterized by broad ridge tops and hillsides; most of the City is drained by Little Spirit Creek, McBean Creek, and New Hope Branch. The dominant land use is agriculture (approximately 50% in 1990), followed

by undeveloped (27%) and residential (16%). The Comprehensive Plan anticipated slight future increases in residential and commercial land uses.

Development & Services. Development in Hephzibah is not constrained by soil types, with the dominant type being well-drained with a sandy surface. Along waterways, floodplain soils do not drain well. Areas shown on the generalized wetlands map, primarily along tributaries to Little Spirit and McBean Creeks, are subject to approval by the U.S. Army Corps of Engineers.

Activities that require a building permit must conform to the State Building code and permits are issued after approval by the City's Building Inspector and the Planning commission. In 2003, 27 building permits were issued and 25 permits were issued in 2004. The Subdivision Ordinance requires conformance with the Augusta-Richmond County technical manual for streets and road design. Manufactured houses must be affixed to a permanent foundation and anchored to the ground to withstand wind loads per the State Building Code.

Under the Service Delivery Agreement, Augusta provides emergency medical and 911 services; Augusta Public Works maintains county roads and drainage ditches in Hephzibah. The State, through a separate fund, handles resurfacing of City streets and roads.

The City operates its own water pumping, treatment and distribution system, obtaining all of its water supply from groundwater sources. Three elevated tanks have a combined capacity of 285,000 gallons. As of mid-2005, there are 1315 water meters installed throughout the City. The City also operates a small sewage treatment and disposal system, serving only one residential subdivision and two public schools. The remainder of the City is served by individual on-site septic systems. Several private waste management companies provide solid waste collection and disposal services.

The Hephzibah Fire Department includes both full-time paid personnel and volunteers. In addition to fire trucks, on smaller rescue vehicle is used for access to rural areas. The Comprehensive Plan acknowledges that the City's ability to respond to fires in the future may become more difficult as the population and areas served increase.

Hazards in Hephzibah. Natural hazards that are described in Chapter 2 that are uniform throughout the planning area, including Hephzibah, are wind hazards, severe winter storms, drought and urban wild land fire.

Hephzibah's Flood Insurance Rate Map, dated June 25, 1976, shows that the city is "minimally flood prone" and flood hazard areas do not have flood elevations determined using engineering

methods (refer to Figure 2-2). However, the GIS analysis indicates that no buildings are located in the mapped floodplain; 120 parcels of land are wholly or partially affected by mapped floodplain (Table 2-5).

The severe ice storms in the 2003/2004 winter caused tree and limb damage and some areas were without power for two days. Emergency generators are available for public safety use.

The City follows the State guidelines for water conservation. The City worked with Augusta Utilities and can connect to the regional water supply in emergencies because, during the last drought, Augusta needed additional resources and the City supplied South Richmond County with approximately 1 millions gallons per day.

The only known hazardous materials within the City's boundaries are those used by the Waterworks Department (chlorine is housed at wells and the treatment plant).

7.1 Implementation

Distribution. Upon adoption, the *Hazard Mitigation Plan* will be posted on the Planning Commission's web site and notices of its availability will be distributed to the following:

- The federal and state agencies that were notified and invited to participate in Plan development;
- Adjacent counties and cities;
- Citizens who attended public meetings (if contact information provided); and
- The organizations, agencies, and elected officials who received notices of public meetings.

Authority and Responsibility. Each action is assigned a lead agency (and support agency in some instances); each lead agency has the authority and is responsible for factoring the action into its work plan and schedule over the indicated time period. The lead agencies will report on progress or obstacles to pursuing actions (see Section 7.2).

Prioritizing Actions (not for grant funding). Most of the mitigation actions identified in this Plan are administrative or programmatic in nature, including addressing how hazards are incorporated into local processes, public awareness and warning, flood map revisions, sediment control on construction sites, staffing, water conservation, debris management, and refining what is known about flood risks at locations where hazardous materials are handled. The priorities designated are recommended by the Committee and are largely based on whether actions are on-going or can be incorporated into current workloads, budgets and staffing. In effect, this assessment is similar to balancing the benefits of an action with its costs of implementation (although a formal analysis of that comparison was not performed). Each lead agency is responsible for determining priorities within the framework of their overall responsibilities.

Methodologies for Prioritization (for grant funding). This Plan does not pre-identify projects that involve mitigation of hazards on private property because many factors must be considered when defining such projects, notably, recent damage experience, the interests of owners, and the availability of the non-federal cost share which cannot be projected due to the local budget process. Augusta Action G, Policies and Procedures for Flood Mitigation Projects, calls for establishment of a systematic method for using and prioritizing use of funds. For projects that may qualify for grant funds administered by State and Federal agencies, the following factors will be considered when developing site-specific projects and prioritizing them for submission:

- Exposure to hazard and frequency, probability and magnitude of future damage;
- Past damage;

-
- Eligibility as defined by potential funding source;
 - Interest of affected citizens and property owners;
 - Estimate of project costs and benefits using FEMA’s flood insurance claims histories and/or Benefit: Cost Modules where applicable; and
 - Availability of non-federal cost share.

Incorporating Mitigation in Other Plans. Chapter 6 describes how Augusta, Blythe and Hephzibah address hazards as part of their current planning mechanisms and processes, including land development, Greenspace, infrastructure design, and public outreach. The development of the *Hazard Mitigation Plan* did not reveal any significant gaps in how hazards are addressed in existing land planning mechanisms and processes.

Certain types of site-specific projects (such as flood mitigation projects that have been undertaken by Augusta) must be identified in the Special Purpose Local Option Sales Tax (SPLOST) plan. When projects and potential funding sources are identified, amendments to SPLOST will be recommended.

The Short Term Work Plan (2003-2007) that is included in the Augusta-Richmond County Comprehensive Plan (2004) identifies a number of capital projects that have bearing on natural hazards, including drainage projects. During the next revision of the Comprehensive Plan, the Planning Commission will review the *Hazard Mitigation Plan* to determine if any mitigation action is appropriately included in the Short Term Work Plan.

7.2 Evaluation & Progress Reports

The Augusta Planning Commission and the Augusta Emergency Management Agency are charged with monitoring this Plan and mitigation activities and preparing annual progress reports. A meeting may be held, or the mayors of Blythe and Hephzibah and the agencies that are assigned lead functions may be contacted and asked to report on the status of implementation, including obstacles to progress and recommended solutions. The reports will be compiled into a single document and submitted to the Georgia Emergency Management Agency.

In addition to the annual report, a meeting will be convened after damage-causing natural hazard events to review the effects of such events. Based on evaluation of those effects, adjustments to the mitigation actions and priorities may be made or additional event-specific actions may be identified (especially if funds to support projects become available).

7.3 Multi-Jurisdictional Considerations

Blythe and Hephzibah will be included in all communications related to executing the Plan. They will be responsible for reporting on any damage due to the occurrence of a hazard event and for reporting any actions taken to reduce future damage and risk.

7.4 Plan Maintenance & Revision

Revisions that warrant changing the text or incorporating new information may be prompted by a number of other circumstances, including identification of specific new mitigation projects, completion of several mitigation actions, or to satisfy requirements to qualify for specific funding. Minor revisions may be handled by addenda.

Major comprehensive review of and revisions to this Plan will be considered on a five-year cycle. Because the Plan is adopted in 2005, it will enter the next evaluation and review cycle sometime in 2009, with adoption of revisions anticipated in 2010. The Mitigation Planning Committee will be convened to conduct the comprehensive evaluation and revision. At that time, natural hazard events that have occurred will be incorporated and the risk assessment will be updated if such events indicate new or altered exposures.

Particular attention will be given to progress made on the mitigation actions. Actions that have not been completed and additional actions will be re-prioritized and examined in terms of feasibility given authorities, staff resources, goals, and budget limitations that will need to be taken into account at the time.

The public will be involved during the major comprehensive review to the Plan in the same ways used during the original Plan development (see Appendix A-1). The public will be notified when the revision process is started and provided the opportunity to review and comment on changes to the Plan and the priority action items. It is expected that a combination of informational public meetings, surveys and questionnaires, draft documents posted on the web site, and/or public meetings may be undertaken.

8.1 Summary

It is inevitable that hazard events will affect the Augusta area – but it is not inevitable that severe damage and threats to life and safety will always result. By understanding the potential for future damage, by identifying actions that can reduce the effects of hazards, and by taking action, the area’s citizens, economy, and infrastructure will be better protected.

Augusta, Georgia, undertook development of this *Hazard Mitigation Plan* because of increasing awareness that flood hazards and other hazards may affect many people and properties in the area. The Plan is a requirement associated with receipt of certain federal mitigation grant program funds administered by the Georgia Emergency Management Agency or the Federal Emergency Management Agency.

The Plan was prepared by City staff representing the Augusta-Richmond County Planning Commission, License & Inspections, Engineering & Environmental Services, Public Services, Emergency Management, the Fire Department, Augusta Utilities, Housing & Economic Development, Recreation & Parks, Information Technology, and the Finance Department. The cities of Blythe and Hephzibah were informed of the planning process, participated in a session on the background and planning process, and contributed text pertinent to their jurisdictions. State and federal agencies were notified and invited to attend.

The most significant natural hazard to affect the planning area was determined to be flooding. Flood events have occurred with increased frequency and severity in recent years. Although not generally resulting in damage to buildings, drainage problems often result in water on major roads and present risks to the traveling public. Flood hazard areas are found along all waterways, including the Savannah River and urban streams. The U.S. Army Corps of Engineers operates flood controls on the Savannah River, but there remains a low probability of significant flooding. Downtown Augusta is protected by the Augusta Levee which provides protection along the Savannah River from the boundary with Columbia County downstream to the New Savannah Lock and Dam. The urban streams where flooding has caused the most damage include Rae’s Creek, Crane Creek, Rock Creek, Augusta Canal, Rocky Creek, and Oates Creek. In the rural parts of the City, less development has encroached into floodplains. The City has some expansive flood-prone areas on the City’s eastern side, notably the Phinizy Swamp and below the Savannah Lock and Dam where the Savannah River floodplain is no longer modified by the Levee.

Hazards other than flooding that affect the area to some degree include high winds (hurricanes, tornadoes), drought, winter storms, and wildland fires. Although some of these hazards may affect the entire area (hurricane winds, drought, winter storms), their potential to cause property damage is not significant. Tornadoes and wildland fires may have locally severe impacts, but their potential overall impact to the planning area are not significant.

This Plan sets the stage for long-term disaster resistance through identification of actions that will, over time, reduce the exposure of people and property to natural hazards. Sections of the Plan:

- Provide overviews of the hazards that threaten the planning area,
- Characterize the people and property that are exposed to some risk,
- Outline the planning process,
- Describe how hazards are recognized in the normal processes and functions of the cities, and
- Identify priority mitigation action items.

To address the identified hazards and impacts on citizens, public safety, costs, and the area's infrastructure, 19 actions are identified. The area will benefit as progress is made toward the mitigation goal over the next 5–10 years. The priority actions are related to:

- Drainage and stormwater management
- Flood warning
- Public awareness initiative
- Flood hazard map revisions and updates
- Flood mitigation projects
- Soil erosion and sediment control
- Flood mitigation staffing
- NFIP Community Rating System
- Sewer line infiltration & inflow
- Savannah River flood protection & awareness
- Dam safety
- Access to development in rural areas for wildfire control
- Reduction in wildfire risks on City-owned lands
- Public tree maintenance
- Water conservation awareness

-
- Coordinated plan to manage debris
 - Environmental (HazMat) safety
 - Downtown railroad safety (HazMat)

8.2 References

44 CFR Part 201. Robert T. Stafford Disaster Relief and Emergency Assistance Act (as amended by the Disaster Mitigation Act of 2000), Hazard Mitigation Grant Program.

44 CFR Part 206. Robert T. Stafford Disaster Relief and Emergency Assistance Act (as amended by the Disaster Mitigation Act of 2000). Pre-Disaster Mitigation Program.

44 CFR 78.6. National Flood Insurance Act of 1968 (as amended). Flood Mitigation Assistance Program.

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National Oceanographic and Atmospheric Administration, National Climatic Data Center (U.S. Local Storm Reports). Accessed January 2005, online at <http://lwf.ncdc.noaa.gov/oa/climate/severeweather/extremes.html>.

National Oceanographic and Atmospheric Administration, Coastal Services Center (Hurricane & Tropical Storms). Accessed January 2005, online at <http://hurricane.csc.noaa.gov/hurricanes/viewer.htm>.

U.S. Army Corps of Engineers. *Savannah River Flood Emergency Plan (DP 1130-2-16)*. Revised July 1994. Copy on file with the Augusta Emergency Management Agency.

Appendix A – Documentation of Planning Process

- A-1. Notifications
- A-2. Planning Committee Meeting Agendas
- A-3. Resolutions of Adoption

Appendix B – Hazard Identification & Risk Assessment

- B-1. Background on HAZUS-MH[®]
- B-2. GEMA's Online Critical Facility Inventory

Appendix C – Key Terms & Acronyms

Appendix D – Savannah River Public Facility Summary

Appendix A: Documentation of Planning Process

A-1 Notifications

The following were mailed a notification that Augusta was initiating the planning process to develop a Hazard Mitigation Plan to include the cities of Blythe and Hephzibah and advised about the Planning Committee’s meetings and two public meetings (see mailings, newspaper notices, and posted notices below):

- Georgia State Agencies: Georgia Emergency Management Agency; Department of Natural Resources, Department of Transportation
- Augusta Regional Airport & Daniel Field Airport
- University Hospital, Medical College of Georgia, St. Joseph Hospital, VA Medical Center
- Augusta State University, Augusta Technical College, Paine College
- Savannah District Corps of Engineers
- Brier Creek Soil & Water District
- Local Emergency Planning Committee (DSM Chemicals, Ft Gordon, Proctor and Gamble, Impact Safety, General Chemical, Ruetgers, Solvay Polymers, PCS Nitrogen, Olin Chemical, Rural Metro, Public Health, Augusta Canal Authority)
- Forty-five neighborhood associations:

Aragon Park	Bethlehem Area Comm.	Bethlehem Neigh. Assoc
Bell Terrace Assoc.	Berckman Hills Assoc.	Barton Chapel Neigh. Assoc.
Barton Village Assoc.	Barton Chapel-Sharon Rd	Bell Terrace Assoc.
Bellaire Hills Assoc.	Neigh. Assoc.	Brookfield Assoc.
East Augusta Neigh Assoc.	Breeze Hill Neigh. Assoc.	Forest Hills Neigh. Assoc.
Glendale Neigh. Assoc	Fairington Neigh. Assoc	Goshen Neigh. Assoc.
Glenn Hills Neigh. Assoc.	Glendale Neigh. Assoc.	Harrisburt Neigh. Assoc
Hyde Park & Aragon Park	Green Meadows Neigh. Assoc.	Kissingbower Neigh Assoc.
Laney-Walker Neigh. Assoc.	Hillwood Neigh. Assoc.	National Hills Neigh. Assoc.
Olde Town Neigh. Assoc.	Ga Extension Service	Ravenwood Neigh. Assoc.
Ridge Forest Neigh. Assoc.	Montclair Neigh. Assoc.	Sand Hills Neigh. Assoc.
Sandhills Neigh. Assoc.	Pepperridge Neigh. Assoc.	South Nellieville Neigh. Assoc.
Turpin Hills Neighborhood	Sand Ridge Comm. Neigh. Assoc.	Woodlake Neigh. Assoc.
Walton Acres Neigh. Assoc.	Summerville Neigh. Assoc.	Virginia Subdivision Assoc.
Pinnacle Place Neigh. Assoc.	Turpin Hills Neighborhood	Sand Hills Neighborhood
Old Town Neigh. Assoc.	Walton Acres Neigh. Assoc.	
	Fairington Neigh. Assoc.	

Notice of Public Meeting

Hazard Mitigation Plan for Augusta, Blythe, and Hephzibah

A public meeting will be held February 2, 2005, at 6 p.m., in Room 803, of the Municipal Building (530 Greene Street), to present an overview of a planning process recently started by the City of Augusta and the cities of Blythe and Hephzibah. The process will lead to a plan of action to reduce the long-term impacts of natural hazards. **Members of the public are encouraged to attend.**

Review copies of the City's Flood Hazard Mitigation Plan and a draft report of hazards and their impacts are available at the following locations: Augusta-Richmond County Planning Commission (525 Telfair Street), Blythe City Hall (294 Church Street), and Hephzibah City Hall (2538 Highway 88).

*For web
posting
1/18/2005*

The Augusta Chronicle

Nation & World/7A

Thursday, January 20, 2005

Notice of Public Meeting
Hazard Mitigation Plan for Augusta, Blythe,
and Hephzibah
A public meeting will be held February 2,
2005, at 6 p.m., in Room 802 of the Municipal
Building (530 Greene Street), to present an
overview of a planning process recently
started by the City of Augusta and the cities
of Blythe and Hephzibah. The process will
lead to a plan of action to reduce the
long-term impacts of natural hazards.
Members of the public are encouraged to
attend.
Review copies of the City's Flood Hazard
Mitigation Plan and a draft report of haz-
ards and their impacts are available at the
following locations: Augusta-Richmond
County Planning Commission (525 Telfair
Street), Blythe City Hall (294 Church St), and
Hephzibah City Hall (2530 Hwy 88).
Jan. 20, 2005 Adv # 6099480

The Augusta Chronicle

Nation & World/7A

Thursday, January 27, 2005

Notice of Public Meeting
Hazard Mitigation Plan for Augusta, Blythe, and
Hephzibah
A public meeting will be held February 2,
2005, at 6 p.m., in Room 802 of the Municipal
Building (530 Greene Street), to present an
overview of a planning process recently started
by the City of Augusta and the cities of Blythe
and Hephzibah. The process will lead to a plan
of action to reduce the long-term impacts of
natural hazards. Members of the public are
encouraged to attend.
*Review copies of the City's Flood Hazard
Mitigation Plan and a draft report of hazards
and their impacts are available at the following
locations: Augusta-Richmond County Plan-
ning Commission (525 Telfair Street), Blythe
City Hall (294 Church St), and Hephzibah City
Hall (2530 Hwy 88).
Jan. 27, Feb. 2, 2005 Adv # 6099830

The Augusta Chronicle

6B/Metro ★

Wednesday, February 2, 2005

Notice of Public Meeting
Hazard Mitigation Plan for Augusta, Blythe, and
Hephzibah
A public meeting will be held February 2,
2005, at 6 p.m., in Room 802 of the Municipal
Building (530 Greene Street), to present an
overview of a planning process recently started
by the City of Augusta and the cities of Blythe
and Hephzibah. The process will lead to a plan
of action to reduce the long-term impacts of
natural hazards. Members of the public are
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Review copies of the City's Flood Hazard
Mitigation Plan and a draft report of hazards
and their impacts are available at the following
locations: Augusta-Richmond County Plan-
ning Commission (525 Telfair Street), Blythe
City Hall (294 Church St), and Hephzibah City
Hall (2530 Hwy 88).
Jan. 27, Feb. 2, 2005 Adv # 6099830

**IMPORTANT INFORMATION
REGARDING
AUGUSTA'S HAZARD MITIGATION PLAN**

The Augusta-Richmond County Emergency Management Agency and the Augusta-Richmond County Planning Commission have started the planning process to develop a Hazard Mitigation Plan in accordance with guidelines of the Federal Emergency Management Agency (FEMA) and the Georgia Emergency Management Agency (GEMA). The Hazard Mitigation Plan will include the cities of Blythe and Hephzibah. Last year FEMA approved the *Augusta Flood Hazard Mitigation Plan*; the Hazard Mitigation Plan will build on that effort and look at other natural hazards.

During the mitigation planning process we will learn more about natural hazards in our area and what we can do now to minimize future damage and threats to our citizens. To prepare the plan, we have organized a working committee of staff, including representatives from Blythe and Hephzibah. The Hazard Mitigation Plan Committee will be coordinated through the Emergency Management Agency and the Augusta-Richmond County Planning Commission.

The Hazard Mitigation Plan Committee will meet at 9 a.m. on Tuesday, February 1, 2005 in Room 802 of the Municipal Building.

On Wednesday, February 2, 2005, we are holding a public meeting to introduce the hazard mitigation concept, overview hazards and event history, and to request information to help identify issues and public concerns. The meeting will be in Room 803 of the Municipal Building, 530 Greene Street, from 6:00 p.m. to 8:00 p.m.

We invite you to review the *Augusta Flood Hazard Mitigation Plan* and the draft report that looks at other hazards (drought, hurricane/tropical storm, high winds/severe storms, tornadoes, winter storms, wildfire/urban interface fire, hazardous materials, and shoreline erosion). You can access these documents online at <http://www.augustaga.gov> by going to the Planning & Zoning pull-down. Copies can be reviewed in the following offices:

- Augusta-Richmond County Planning Commission,
- (M-F, 9am to 4pm, Monday through Friday).
- Blythe City Hall, 294 Church Street, Blythe.
- Hephzibah City Hall, 2530 Hwy 88, Hephzibah.

The draft plan will be made available to you and the public for is forwarded to the Augusta Commission and the City Council

Please send an e-mail to Lois Schmidt (lschmidt@augustaga.gov) of future meetings. If you have additional questions, please contact the Planning & Zoning Development Administrator, Augusta-Richmond County Planning Commission, 1796 between the hours of 8:30 a.m. and 5:00 p.m., Monday through Friday.

Sent
1/18/2005

Notice of Public Meeting

Hazard Mitigation Plan for Augusta, Blythe, and Hephzibah

A public meeting will be held September 15, 2005, at 6 p.m., in the Municipal Building, Room 803, 530 Greene Street, to review the City's draft Hazard Mitigation Plan. The Plan may be reviewed by downloading from http://www.augustaga.gov/departments/planning_zoning/home.asp. Review copies are available at the following locations: Augusta-Richmond County Planning Commission (525 Telfair Street), Blythe City Hall (294 Church Street), and Hephzibah City Hall (2538 Highway 88). **Members of the public are encouraged to attend.**

Citizens have the opportunity to comment on the Plan and the proposed actions that are intended to reduce exposure to natural hazards. Comments will be accepted until September 22, 2005, and may be faxed to 410/267-5977 or mailed to RCQuinn Consulting, 153 Prince George St #2, Annapolis, MD, 21401.

For web
posting

Posted in ARCCP
lobby, Municipal
Bldg lobby, Muni
Bldg elevator &
8th floor of Muni
Bldg (Commission
Chambers doors)
9/9/2005

...
The Augusta Chronicle

...
8B/Metro

Thursday, September 1, 2005

NOTICE OF PUBLIC MEETING

Hazard Mitigation Plan for Augusta, Blythe, and Hephzibah

A public meeting will be held September 15, 2005, at 6 p.m., in the Municipal Building, Room 803, 530 Greene Street, to review the City's draft Hazard Mitigation Plan. The Plan may be reviewed by downloading from http://www.augustaga.gov/departments/planning_zoning/home.asp. Review copies are available at the following locations: Augusta-Richmond County Planning Commission (525 Telfair Street), Blythe City Hall (294 Church Street), and Hephzibah City Hall (2538 Highway 88). Members of the public are encouraged to attend.

Citizens have the opportunity to comment on the Plan and the proposed actions that are intended to reduce exposure to natural hazards.

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...
The Augusta Chronicle

RICHMOND COUNTY NEIGHBORS

...
14/Thursday, September 15, 2005

Notice of Public Meeting
Hazard Mitigation Plan for Augusta, Blythe, and
Heplerah

A public meeting will be held September 15, 2005, at 6 p.m., in the Municipal Building, Room 803, 530 Greene Street, to review the City's draft Hazard Mitigation Plan. The Plan may be reviewed by downloading from
http://www.augustaga.gov/departments/planning_zoning/ncnhs.asp. Review copies are available at the following locations: Augusta-Richmond County Planning Commission (524 Telfair Street), Blythe City Hall (294 Church Street), and Heplerah City Hall (2538 Highway 88). Members of the public are encouraged to attend.

Citizens have the opportunity to comment on the Plan and the proposed actions that are intended to reduce exposure to natural hazards. Comments will be accepted until September 22, 2005, and may be faxed to 410/267-5977 or mailed to RCQuinn Consulting, 153 Prince George St #3, Annapolis, MD, 21401.

September 8, 15, 2005 Adv#9543854

**IMPORTANT INFORMATION
REGARDING
AUGUSTA'S HAZARD MITIGATION PLAN**

The Augusta-Richmond County Emergency Management Agency and the Augusta-Richmond County Planning Commission are continuing the planning process to develop a Hazard Mitigation Plan in accordance with guidelines of the Federal Emergency Management Agency (FEMA) and the Georgia Emergency Management Agency (GEMA). The Hazard Mitigation Plan will include the cities of Blythe and Hephzibah. Last year FEMA approved the *Augusta Flood Hazard Mitigation Plan*; the Hazard Mitigation Plan is building on that effort and look at other natural hazards.

During the mitigation planning process we are learning more about natural hazards in our area and what we can do now to minimize future damage and threats to our citizens. To prepare the plan, we have organized a working committee of staff, including representatives from Blythe and Hephzibah. The Hazard Mitigation Plan Committee is being coordinated through the Emergency Management Agency and the Augusta-Richmond County Planning Commission.

The Hazard Mitigation Plan Committee will meet at 10 a.m. on Friday, September 16, 2005 in Room 802 of the Municipal Building to continue this planning process.

On Thursday, September 15, 2005, we are holding a public meeting to present the draft Hazard Mitigation Plan to the public. The meeting will be in Room 803 of the Municipal Building, 530 Greene Street, from 6:00 p.m. to 8:00 p.m.

We invite you to review the draft *Augusta Hazard Mitigation Plan*. You can access this document online at <http://www.augustaga.gov> by going to the Planning & Zoning pull-down. Copies can be reviewed in the following offices:

- Augusta-Richmond County Planning Commission, 520 Telfair Street
- (M-F, 9am to 4pm, Monday through Friday).
- Blythe City Hall, 294 Church Street, Blythe.
- Hephzibah City Hall, 2530 Hwy 88, Hephzibah.

The draft Hazard Mitigation Plan is being made available to you and the public for comment before the final document is forwarded to the Augusta Commission and the City Councils of Blythe and Hephzibah.

If you have additional questions, please call Terri Turner, Assistant Zoning & Development Administrator, Augusta-Richmond County Planning Commission, at (706) 821-1796 between the hours of 8:30.a.m. and 5:00 p.m., Monday through Friday.

Sent 9/1/2005

A-2 Planning Committee Meeting Agendas

HAZARD MITIGATION PLANNING COMMITTEE MEETING #1

AUGUSTA, BLYTHE & HEPHZIBAH

February 1, 2005, 9am to 11:30am
Room 802 Municipal Building

1. Introduce committee members
2. Overview of mitigation planning [Note that this committee was reconvened from the planning committee that prepared the Flood Hazard Mitigation Plan]
3. Hazard events that occurred in 2004
4. Review hazard identification & risk assessment (see below)
5. Review of mitigation goal (from Flood Hazard Mitigation Plan)
6. Review capability assessment and process to update
7. Preview public meeting (Wednesday, February 2)
8. What's next?
 - a. Follow up interviews to expand the capability assessment
 - b. 2nd Meeting, Friday February 4: Report on mitigation actions from Flood Hazard Mitigation Plan; review at-risk assessments, review capability for mitigation, consider acceptability of goal statement, initiate discussion of mitigation actions.

Please Read in Advance:

Draft Mitigation HIRA Chpts 1 and 4
Flood Mitigation Plan

ATTENDEES (February 1, 2005)	
Terri Turner, Planning Commission	Ed Howerton, Recreation
Lori Videtto, Public Works/Engineering	Christopher James, Fire Dept
Rick Acree, Public Services/Fac	Howard Willis, Emergency Management
Michele Pearman, IT/GIS	P.A. Williams, Sheriff's Office
Joe Holley, Augusta Utilities	Hephzibah Councilman Don Adkins (separate meeting)
Fred Russell, City Administrator	Blythe Mayor Tom Cobb (separate meeting)
Teresa Smith, Public Works	Scott Sherman, Georgia Emergency Mgmt

HAZARD MITIGATION PLANNING COMMITTEE
MEETING #2

AUGUSTA, BLYTHE & HEPHZIBAH

February 4, 2005, 9am to 11:30am
Room 802 Municipal Building

1. Report on public meeting
2. Status of capability assessments
3. Initiate discussion of actions for hazards other than flood
4. What's next?
 - a. Finalize hazard id & risk assessment
 - b. Finalize capability assessments

ATTENDEES (February 4, 2005)	
Terri Turner, Planning Commission	Ed Howerton, Recreation
Christopher James, Fire Dept	John Pearson, Sr, GA Forestry
Rick Acree, Public Services/Facilities	Howard Willis, Emergency Management
Michele Pearman, IT/GIS	P.A. Williams, Sheriff's Office
George Patty, Planning Commission	Marshall Masters, Construction & Inspection
Fred Russell, City Administrator	Tommy Boyles, Commissioner District 7
Robert Oliver, Public Works	Doug Cheek, Augusta Utilities

HAZARD MITIGATION PLANNING COMMITTEE
MEETING #3

AUGUSTA, BLYTHE & HEPHZIBAH

April 28, 2005, 9am to 11:30am
Room 802 Municipal Building

1. Questions on the Draft Plan
2. Review Concept of Actions (programmatic vs projects)
3. Discussion of actions for hazards other than flood
4. What's next?
 - a. Complete pending text in Draft Plan
 - b. Circulate notes on actions and finalize text
 - c. Public meeting
 - d. Finalize plan, recommend adoption

ATTENDEES (April 28, 2005)	
Terri Turner, Planning Commission	
Teresa Smith, Public Works	
P.A. Williams, Sheriff's Office	
Christopher James, Fire Dept	
John Pearson, Sr, GA Forestry	
Rick Acree, Public Services/Facilities	

HAZARD MITIGATION PLANNING COMMITTEE
MEETING #4

AUGUSTA, BLYTHE & HEPHZIBAH

September 16, 2005
Room 802 Municipal Building

1. Review status of preliminary review by GEMA
2. Report on public meeting & comments
3. Review proposed actions (non-flood_, designate lead agencies, identify barriers
4. Discussed need for pertinent agencies to report on status of flood actions per Flood Hazard Mitigation Plan
5. Agree to circulate actions for each department to indicate priorities to determine overall recommended ranking
6. Discuss approval of Plan and forwarding it with a recommendation for adoption by the Augusta Commission and the cities of Blythe and Hephzibah
7. What's next?
 - Address GEMA comments
 - Complete GEMA's online critical facilities data
 - Finalize the plan & submit to GEMA/FEMA
 - Adoption

ATTENDEES (September 16, 2005)	
Terri Turner, Planning Commission	Fred Russell, City Administrator
George Patty, Planning Commission	Mike Greene, Public Services
Pam Costabile, License & Inspections	Butch Wilhelm, Sheriff's Office
Robert Anderson, Public Services, Fac Mgmt	Jerry Delaughter, Augusta Utilities
Robert Oliver, Jr., Engineering Services	Chief Howard Willis, Fire/EMA
Dennis Stroud, Public Services, Maintenance	Billy Yates, IT-GIS
Ed Howerton, Recreation & Parks	
John Pearson, Sr, Georgia Forestry Comm	Guest: Scott Sherman, GEMA
D.B. Atkins, City of Hephzibah	Guest: David Brown, Veterans Admin MC

A-3. Resolutions of Adoption

RESOLUTION

WHEREAS the City of Augusta, Georgia, has experienced flooding that resulted in public safety hazards, damage to private and public property, and public and private expenditures for clean up and recovery; and

WHEREAS, the cities of Augusta, Blythe and Hephzibah each may experience losses due to other natural hazards such as wind, severe winter storm, drought, urban wildland interface fire and exposure to hazardous materials related to natural hazards; and

WHEREAS, the Robert T. Stafford Disaster Relief and Emergency Assistance Act as amended by the Disaster Mitigation Act of 2000 require local jurisdictions to adopt a mitigation plan in order to be eligible for post-disaster and pre-disaster grants to implement certain mitigation projects; and

WHEREAS the National Flood Insurance Reform Act of 1994 and the Flood Insurance Reform Act of 2004 require local jurisdictions to adopt a mitigation plan in order to be eligible for grants to implement certain flood mitigation projects; and

WHEREAS the planning process supported by the Georgia Emergency Management Agency and required by the Federal Emergency Management Agency offers the opportunity to consider natural hazards and risks, and to identify mitigation actions to reduce future impacts of such hazards; and

WHEREAS the State of Georgia has provided federal mitigation funds to support the development of a Hazard Mitigation Plan; and

WHEREAS the City of Augusta adopted a *Flood Hazard Mitigation Plan* on February 17, 2004; and

WHEREAS the *Hazard Mitigation Plan* for Augusta, Blythe and Hephzibah has been developed by the Mitigation Planning Committee and supersedes Augusta's *Flood Hazard Mitigation Plan*; and

WHEREAS the *Hazard Mitigation Plan* identifies mitigation actions that, over time, will help minimize and reduce safety threats, reduce the costs of natural hazard events, and reduce damage to private and public property; and

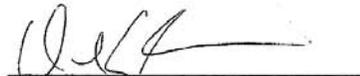
WHEREAS a public meeting was held on February 2, 2005, to introduce the planning concept and to solicit questions and comments; and a public meeting was held on September 15, 2005, to present the Draft Plan and request comment; and

WHEREAS the *Hazard Mitigation Plan* has been submitted to the Georgia Emergency Management Agency and the Federal Emergency Management Agency for final review; final approval will be withheld until the Plan is adopted.

NOW, THEREFORE, BE IT RESOLVED by the Augusta Commission that:

1. The *Hazard Mitigation Plan* is hereby adopted as an official document of the City of Augusta, Georgia.
2. The City departments identified in the Plan are hereby directed to pursue implementation of the recommended priority activities that are assigned to their agencies.
3. Any action identified in the Plan that cannot be pursued within existing budgets shall be subject to and contingent upon budget approval, if required, which shall be at the discretion of the Augusta Commission, and this resolution shall not be interpreted so as to mandate any such appropriations.
4. The Augusta Emergency Management Agency, with support by the Augusta-Richmond County Planning Commission, is designated to coordinate with other offices and the cities of Blythe and Hephzibah and shall periodically report on the activities, accomplishments, and progress, and shall prepare and submit reports to the Georgia Emergency Management Agency, as required.

PASSED AND ADOPTED by the Commission of Augusta, Georgia, this 8th day of February, 2006.


Deke Copenhaver, Mayor

2/15/06
Date


Lena Bofner, Clerk of Commission

Date

**HAZARDOUS MITIGATION PLAN RESOLUTION
AUGUSTA, BLYTHE AND HEPHZIBAH**

WHEREAS, the cities of Augusta, Blythe and Hephzibah each may experience losses due to natural hazards that result in public safety hazards, damage to private and public property, and public and private expenditures for clean up and recovery; and

WHEREAS, the Robert T. Stafford Disaster Relief and Emergency Assistance Act as amended by the Disaster Mitigation Act of 2000 require local jurisdictions to adopt a mitigation plan in order to be eligible for post-disaster and pre-disaster grants to implement certain mitigation projects; and

WHEREAS, the planning process supported by the Georgia Emergency Management Agency and required by the Federal Emergency Management Agency offers the opportunity to consider natural hazards and risks, and to identify mitigation actions to reduce future impacts of such hazards; and

WHEREAS, the State of Georgia has provided federal mitigation funds to support the development of a hazard mitigation plan; and

WHEREAS, the *Hazard Mitigation Plan* identifies multi-jurisdictional mitigation actions that, over time, will help minimize and reduce safety threats, reduce the costs of natural hazard events, and reduce damage to private and public property; and

WHEREAS, a public meeting was held on February 2, 2005, to introduce the planning concept and to solicit questions and comments; and a public meeting was held on September 15, 2005, to present the Draft Plan and request comment; and

WHEREAS, the *Hazard Mitigation Plan* has been submitted to the Georgia Emergency Management Agency and the Federal Emergency Management Agency for final review; final approval will be withheld until the Plan is adopted.

NOW, THEREFORE BE IT RESOLVED BY THE GOVERNING AUTHORITY OF THE CITY OF BLYTHE, GEORGIA THAT:

1. The *Hazard Mitigation Plan* is hereby adopted as an official document of the City of Blythe, Georgia.
2. The City will cooperate with the City of Augusta to pursue implementation of the recommended multi-jurisdictional activities and to periodically report on progress.
3. Any action identified in the plan that cannot be pursued within existing budgets shall be subject to and contingent upon budget approval and this resolution shall not be interpreted to mandate any such approval

PASSED AND ADOPTED BY THE MAYOR AND CITY COUNCIL OF BLYTHE, GEORGIA
THIS 13TH DAY OF FEBRUARY 2006.

*See signatures on page 2

Tom Cobb
MAYOR, Thomas C. Cobb

Daisy M. Price
MAYOR PRO TEM, Daisy M. Price

Not in Attendance
COUNCILWOMAN, Jerry W. Reeves

James M. Gray
COUNCILMAN, James M. Gray

Loriann H. Chancey
CITY CLERK, Loriann H. Chancey



AS TO FORM:
B. Michael Arrington
CITY ATTORNEY, B. Michael Arrington

RESOLUTION

WHEREAS, the cities of Augusta, Blythe and Hephzibah each may experience losses due to natural hazards that result in public safety hazards, damage to private and public property, and public and private expenditures for clean up and recovery; and

WHEREAS, the Robert T. Stafford Disaster Relief and Emergency Assistance Act as amended by the Disaster Mitigation Act of 2000 require local jurisdictions to adopt a mitigation plan in order to be eligible for post-disaster and pre-disaster grants to implement certain mitigation projects; and

WHEREAS the planning process supported by the Georgia Emergency Management Agency and required by the Federal Emergency Management Agency offers the opportunity to consider natural hazards and risks, and to identify mitigation actions to reduce future impacts of such hazards; and

WHEREAS the State of Georgia has provided federal mitigation funds to support the development of a hazard mitigation plan; and

WHEREAS the *Hazard Mitigation Plan* for Augusta, Blythe and Hephzibah has been developed by the Mitigation Planning Committee; and

WHEREAS the *Hazard Mitigation Plan* identifies multi-jurisdictional mitigation actions that, over time, will help minimize and reduce safety threats, reduce the costs of natural hazard events, and reduce damage to private and public property; and

WHEREAS a public meeting was held on February 2, 2005, to introduce the planning concept and to solicit questions and comments; and a public meeting was held on September 15, 2005, to present the Draft Plan and request comment; and

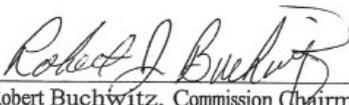
WHEREAS the *Hazard Mitigation Plan* has been submitted to the Georgia Emergency Management Agency and the Federal Emergency Management Agency for final review; final approval will be withheld until the Plan is adopted.

NOW, THEREFORE, BE IT RESOLVED by the Chairman of the Commission that:

1. The *Hazard Mitigation Plan* is hereby adopted as an official document of the City of Hephzibah, Georgia.
2. The City will cooperate with the City of Augusta to pursue implementation of the recommended multi-jurisdictional activities and to periodically report on progress.

3. Any action identified in the Plan that cannot be pursued within existing budgets shall be subject to and contingent upon budget approval and this resolution shall not be interpreted so as to mandate any such approval.

PASSED AND ADOPTED by the Commission of Hephzibah, Georgia, this 3rd day of April, 2006.


Robert Buchwitz, Commission Chairman

ATTEST:


City Clerk

Appendix B: Hazard Identification & Risk Assessment

B-1 Background on HAZUS-MH[®]

Hazards U.S., known as HAZUS-MH[®], is a nationally-applicable, standardized methodology and software program that contains models for estimating potential losses from earthquakes, floods, and hurricane winds. HAZUS-MH[®] was developed by the Federal Emergency Management Agency (FEMA) under contract with the National Institute of Building Sciences (NIBS, www.nibs.org). NIBS maintains committees of wind, flood, earthquake and software experts to provide technical oversight and guidance to HAZUS-MH[®] development. Additional background on the program is at <http://www.nibs.org/hazusweb/>.

Loss estimates produced by the software are based on current scientific and engineering knowledge of the effects of hurricane winds, floods, and earthquakes. Estimating losses is essential to decision-making at all levels of government, providing a basis for developing mitigation plans and policies, emergency preparedness, and response and recovery planning. HAZUS-MH[®] takes into account various impacts of a hazard event such as:

- Physical damage: damage to residential and commercial buildings, schools, critical facilities, and infrastructure;
- Economic loss: lost jobs, business interruptions, repair and reconstruction costs; and
- Social impacts: impacts to people, including requirements for shelters and medical aid.

HAZUS-MH[®] uses state-of-the-art geographic information system (GIS) software to map and display hazard data and the results of damage and economic loss estimates for buildings and infrastructure. It also allows users to estimate the impacts of hurricane winds, floods, and earthquakes on populations. Level 1 analyses use default data about people and building stock are taken from national databases, notably a combination of U.S. Census data from 1990 and information provided by the Dun and Bradstreet Corporation (Arlington, Virginia) in 1996.

The default data includes information about the percentages of different types of buildings within a planning area (wood, unreinforced masonry, reinforced masonry, manufactured housing, and others) and the level of engineering design (non-engineered, partially engineered, or fully engineered). Also included are replacement values for various classifications of buildings based on R.S. Means cost estimating values (in 1994 dollars) with and regional cost modifiers.

Data produced by Level 1 analyses should be used only for indicative/informative purposes and should not be viewed literally for analytical purposes. For analytical purposes, a Level 2 analysis should be undertaken with specific local information keyed in to replace the default data. It should be noted that HAZUS-MH[®] is considered one of many planning tools used by

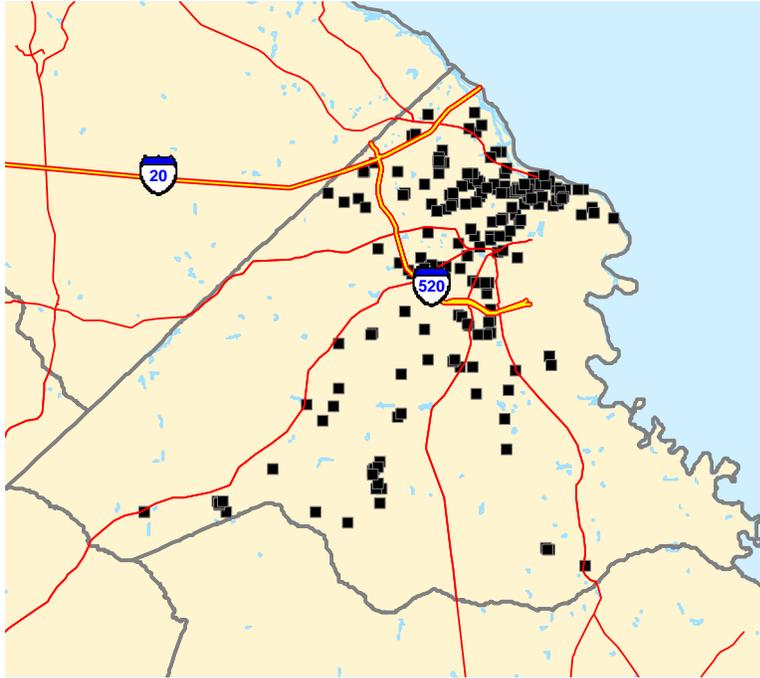
states and local governments. Other tools should be considered in developing the hazard analysis and risk assessment for local communities. In some cases, other tools and methodologies may be more useful.

B-2 GEMA's Online Critical Facility Inventory

Pre-Disaster Mitigation Critical Facilities Inventory is a password-protected interoperable web application developed by the University of Georgia at the request of GEMA. As described online at <https://www.itos.uga.edu/projects.html>, this secure application allows representatives from disparate locations to collect and review data relative to Critical Facilities. These data are seamlessly matched with other GIS data sets, including hazard data to allow for mapping and spatial analysis. GEMA Representatives, focused on providing quality data for facilities, need no knowledge of GIS in order to create maps or reports as a bi-product of the system. This application eliminates data redundancy and ensures that all users are working with the most current collection of information.

GEMA identified a number of public and private facilities that appear to be characteristic of “critical facilities.” The Augusta-Richmond County Planning Commission was charged with requesting certain data from the owners and operators of those facilities. During that process, a number of additional public facilities were identified and added to the database (listed below).

The online tool utilizes basic hazard identification information, as defined and shown below. For the two hazards that are mappable (flood and wildland interface fire), the Augusta Hazard Mitigation Plan is based on more detailed GIS layers used by the Augusta Information Technology-Geographic Information System. Specifically, the database of critical facilities was geocoded and used with the City's flood hazard map layer and land use layers to determine which facilities appear to be at-risk.

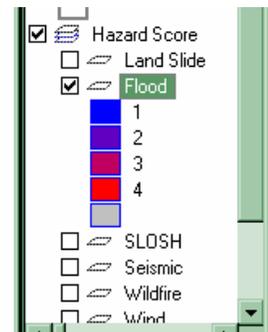


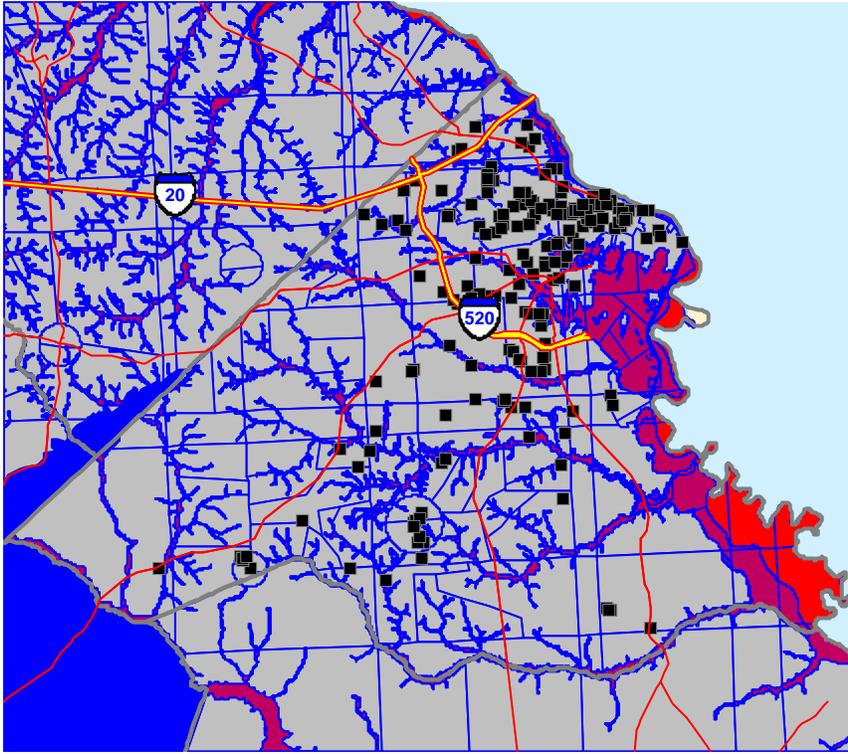
Locations of facilities included in GEMA's inventory

Hazard Scores (GEMA online description)

Flood Hazard Scores

The flood hazard scores are derived from the FEMA Q3 "Zone" values. The Q3 layer is derived from the FEMA paper flood insurance rate maps. Although the resolution is 1:24,000, which has an allowable error of 40 feet, FEMA recommends using 250 feet as the potential error. This layer cannot be used for a legal flood determination.

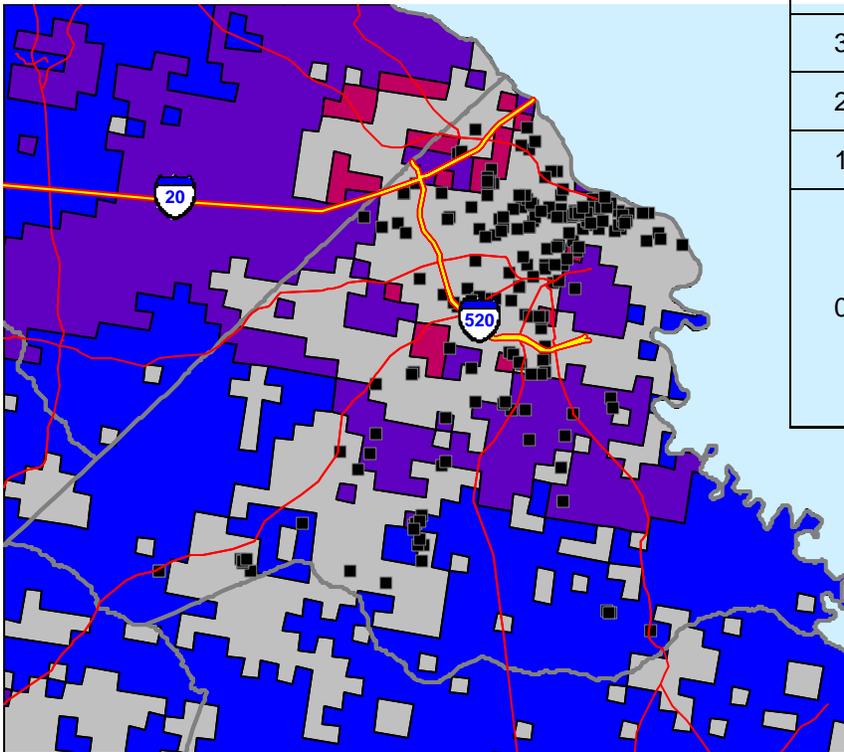
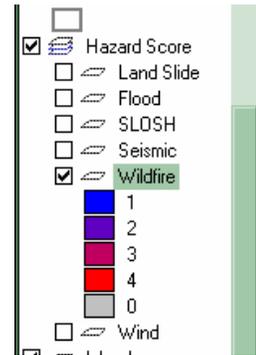




Hazard Scores (GEMA online description)

Wildfire Risk Scores

The Wildfire Risk Layer was based on the USDA Forest Service, RMRS Fire Sciences Laboratory “Wildland Fire Risk to Flammable Structures, V 1.0” map. Although this data was not intended for use at a detail greater than state-wide analysis, it has been included as the best available data on wildfire risk. The scores are based on the risk value from the original layer. The horizontal positional accuracy is unknown for this layer.

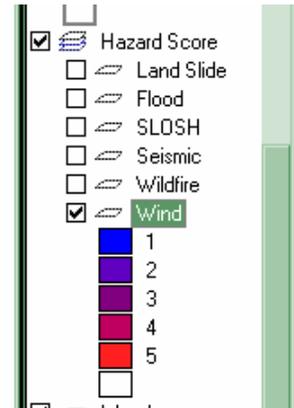


Score	Original Value	Description
4	5	High
3	4	Moderate
2	3	Low
1	2	Very Low
0	1	No Houses
	7	Agriculture
	8	Water
	9	City

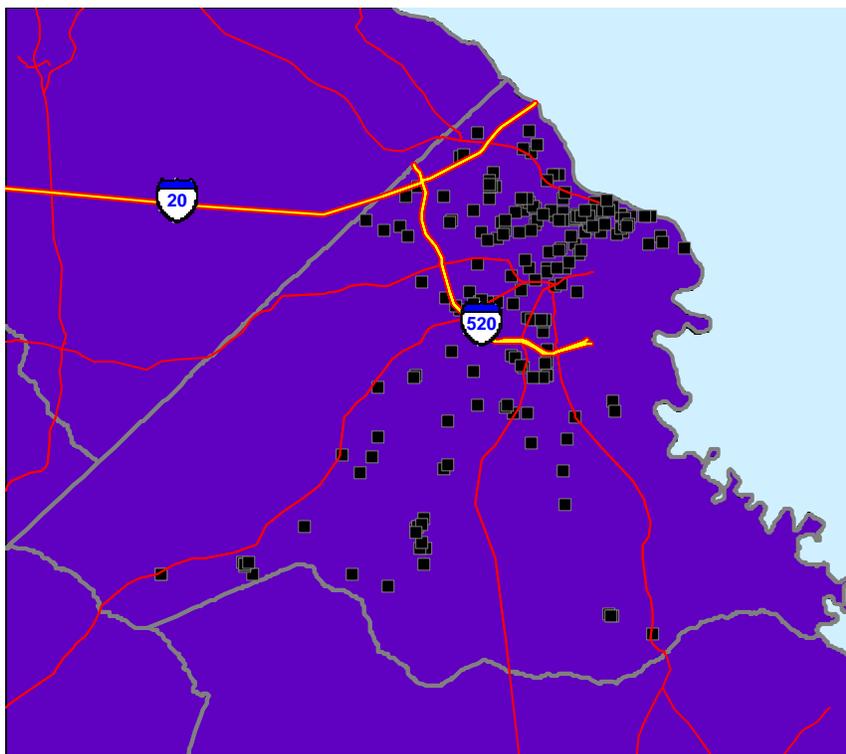
Hazard Scores (GEMA online description)

Wind Hazard Scores

The Wind Hazard Scores are based on the 2000 International Building Code, figure 1609 contours showing 3 second gust wind speeds with a 50 year return interval. The Northwest portion of the state scored an additional point for the 250 mph community tornado shelter design zone according to FEMA publications.



Score	Original Value	Description
5	> 120 mph	3 second gust greater than 120 mph
4	110 to 119 mph	
3	100 to 109 mph	
2	90 to 99 mph (or ZONE IV)	This score is also given to an area with Zone IV of the "Design Wind Speed Map for Community Shelters," representing an area exposed to 250 mph winds. This area is the Northwestern corner of the state.
1	< 90 mph	



From GEMA's Critical Facilities Online Tool (as of December 2005)

Government Jurisdiction	Type	Name or Structure Description	Essential Facility	Transportation Facility	Lifeline System	High Potential Loss	HazMat Facility	Important Facility	Vulnerable Population	Economic Assets	Special Considerations	Historic Considerations	Other	Size of Bldg. (sq. ft.)	Replace Value (\$)	Replace Value Year	Contents Value	Contents Value Year	Functional Value	Displace Cost (\$ per day)	Occupancy	FLOOD Hazard Score	WILDFIRE Hazard Score
Augusta-Richmond County	Other	Fleming Athletic Office							X					4,600	\$120,000	1999	\$75,000			45	3	3	
Augusta-Richmond County	Other	The Boathouse						X						7,800	\$1,250,000	2004	\$90,000	2004		250	3	0	
Augusta-Richmond County	Airport	Bush Field Airport		X	X									68,058	\$5,814,245	2004				300	0	2	
Augusta-Richmond County	Airport	Daniel Field		X	X									13,000	\$6,000	2004				25	0	0	
Augusta-Richmond County	C&D	RICHMOND CO DEANS BRIDGE RD PH 2C (SL)	X											2,895	\$1,215,435	2004						0	0
Augusta-Richmond County	City Hall	Augusta-Richmond Co Municipal Building						X						1,100,000	\$23,063,403	2004						0	0
Blythe town	City Hall	Blythe City Hall	X									X		3,900	\$210,000	2000	\$13,900	2000		4	0	0	
Hephzibah city	City Hall	Hephzibah City Hall			X			X						2,670	\$210,750	2000	\$48,150	2000	\$258,900	4	0	2	
Augusta-Richmond County	City Jail	CSRA Humane Society						X						15,250	\$345,930	2004						0	0
Augusta-Richmond County	County Correctional Institution	Richmond County Correctional Institute	X						X					12,000	\$3,423,634	2004						0	0
Augusta-Richmond County	County Jail	Charles B. Webster Detention Center	X						X					134,166	\$143,000	2004				550	0	0	
Augusta-Richmond County	County Jail	Richmond County Jail	X						X					150,000	\$22,576,000	2004						0	0
Augusta-Richmond County	Courthouse	Richmond County Courthouse						X						1,100,000	\$23,063,403	2004						0	0

From GEMA's Critical Facilities Online Tool (as of December 2005)

Government Jurisdiction	Type	Name or Structure Description	Essential Facility	Transportation Facility	Lifeline System	High Potential Loss	HazMat Facility	Important Facility	Vulnerable Population	Economic Assets	Special Considerations	Historic Considerations	Other	Size of Bldg. (sq. ft.)	Replace Value (\$)	Replace Value Year	Contents Value	Contents Value Year	Functional Value	Displace Cost (\$per day)	Occupancy	FLOOD Hazard Score	WILDFIRE Hazard Score
Augusta-Richmond County	Elementary School	Health Professions (Magnet) School	X											66,199	\$1,029,000	2004					469	0	0
Augusta-Richmond County	Elementary School	Barton Chapel Elementary School	X											62,726	\$2,169,739	2004					658	0	0
Augusta-Richmond County	Elementary School	Bayvale Elem School	X											42,297	\$600,000	2004					375	0	0
Blythe town	Elementary School	Elementary School	X											45,765	\$1,238,000	2004					419	0	0
Augusta-Richmond County	Elementary School	Elementary School	X											59,022	\$4,941,000	2004					538	0	0
Augusta-Richmond County	Elementary School	Elementary School	X											50,174	\$1,518,000	2004					507	0	0
Augusta-Richmond County	Elementary School	Elementary School	X											77,536	\$7,777,468	2004					540	0	0
Augusta-Richmond County	Elementary School	Freedom Park Elementary	X											79,604	\$186,043,000	2004					710	0	1
Augusta-Richmond County	Elementary School	Elementary School	X											45,342	\$1,836,000	2004					291	0	0
Augusta-Richmond County	Elementary School	Elementary School	X											65,123	\$2,552,999	2004					523	0	0
Augusta-Richmond County	Elementary School	Elementary School	X											68,792	\$3,411,000	2004					601	0	0
Augusta-Richmond County	Elementary School	Elementary School						X						47,408	\$1,338,018	2004					474	0	2
Hephzibah city	Elementary School	Elementary School	X											0	\$323,658	2004						0	2

From GEMA's Critical Facilities Online Tool (as of December 2005)

Government Jurisdiction	Type	Name or Structure Description	Essential Facility	Transportation Facility	Lifeline System	High Potential Loss	HazMat Facility	Important Facility	Vulnerable Population	Economic Assets	Special Considerations	Historic Considerations	Other	Size of Bldg. (sq. ft.)	Replace Value (\$)	Replace Value Year	Contents Value	Contents Value Year	Functional Value	Displace Cost (\$per day)	Occupancy	FLOOD Hazard Score	WILDFIRE Hazard Score
Augusta-Richmond County	Elementary School	Thomson Elementary School	X											38,042	\$963,000	2004					458	0	0
Hephzibah city	Elementary School	Hephzibah Elementary School	X											77,701	\$1,123,000	2004					543	0	2
Augusta-Richmond County	Elementary School	Thomson Elementary School (Former)	X											40,916	\$659,000	2004					343	0	0
Augusta-Richmond County	Elementary School	Houghton Elementary School (Former)						X						85,813	\$523,100	2004						0	0
Augusta-Richmond County	Elementary School	Jamestown Elementary School	X											59,022	\$6,913,000	2004					884	0	0
Augusta-Richmond County	Elementary School	Schmitt Elementary School (Former)	X											41,000	\$573,000	2004					170	0	2
Augusta-Richmond County	Elementary School	Jenkins-White Elementary	X											77,803	\$5,661,355	2004					453	0	0
Augusta-Richmond County	Elementary School	Lake Forest Hills Elementary School	X											72,971	\$4,672,637	2004					566	0	0
Augusta-Richmond County	Elementary School	Lamar Elementary School	X											57,833	\$2,136,510	2004					401	0	0
Augusta-Richmond County	Elementary School	McBearn Elementary School	X											68,867	\$4,640,000	2004					583	0	1
Augusta-Richmond County	Elementary School	Meadowbrook Elementary School	X											60,954	\$3,984,000	2004					754	0	2
Augusta-Richmond County	Elementary School	Merry Elementary School	X											60,193	\$2,318,449	2004					441	0	3
Augusta-Richmond County	Elementary School	Millidge Elementary School	X											43,941	\$1,048,000	2004					350	0	0

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Augusta-Richmond County	Elementary School	Monte Santo Elementary School	X											80,804	\$586,000	2004					585	0	0
Augusta-Richmond County	Elementary School	National Hills Elementary School	X											29,595	\$1,032,000	2004					247	0	3
Augusta-Richmond County	Elementary School	Old Sue Reynolds Elementary School	X											38,599	\$754,000	2004					0	0	0
Augusta-Richmond County	Elementary School	Romms Elementary School	X											54,093	\$2,672,000	2004					482	0	0
Augusta-Richmond County	Elementary School	Stas A. Floyd (Headstart Program)	X											35,810	\$507,000	2004					252	0	0
Augusta-Richmond County	Elementary School	Southside Elementary School	X											48,590	\$939,000	2004					435	0	0
Augusta-Richmond County	Elementary School	Sue Reynolds Elementary (new)	X											79,604	\$4,854,057	2004					635	0	0
Augusta-Richmond County	Elementary School	Terrace Manor Elementary School	X											55,526	\$1,174,000	2004					409	0	0
Augusta-Richmond County	Elementary School	Tobacco Road Elementary School	X											66,669	\$3,503,000	2004					818	0	2
Augusta-Richmond County	Elementary School	Traditional Elementary School	X											73,803	\$1,624,492	2004					719	0	0
Augusta-Richmond County	Elementary School	Warren Road Elementary School	X											69,594	\$1,508,259	2004					512	0	0
Augusta-Richmond County	Elementary School	Wheeless Road Elementary School	X											47,112	\$781,000	2004					513	0	0

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Augusta-Richmond County	Elementary School	Wilkinson Gardens Elementary School	X											76,484	\$540,000	2004					573	0	0
Augusta-Richmond County	Elementary School	Willis Foreman Elem	X											59,022	\$11,069,120	2004					894	0	0
Augusta-Richmond County	Elementary School	Windsor Spring Road Elementary School	X											66,799	\$830,743	2004					765	0	0
Augusta-Richmond County	Emergency Services	9-1-1 Center/Emergency Operation Center	X											8,740	\$1,250,000	1997						0	0
Augusta-Richmond County	Emergency Services	Record Retention Facility	X											9,000	\$550,000	1997	\$250,000	1997				0	0
Augusta-Richmond County	Fire Station	AFD- Engine Co #1	X											52,708	\$1,438,000	2004	\$750,000	2004				0	0
Augusta-Richmond County	Fire Station	AFD- Engine Co #10	X											3,000	\$81,000	2004	\$330,000	2004			4	0	0
Augusta-Richmond County	Fire Station	AFD- Engine Co #11	X											35,719	\$223,759	2004	\$330,000	2004			3	0	0
Augusta-Richmond County	Fire Station	AFD- Engine Co #12	X											2,800	\$1,065,000	2004	\$1,250,000	2004			4	0	1
Augusta-Richmond County	Fire Station	AFD- Engine Co #12 (Abandoned)											X	13,225	\$132,000	2004						0	1
Augusta-Richmond County	Fire Station	AFD- Engine Co #13	X											14,810	\$94,000	2004	\$330,000				4	0	0
Augusta-Richmond County	Fire Station	AFD- Engine Co #14	X											2,800	\$114,000	2002	\$330,000				3	0	0
Augusta-Richmond County	Fire Station	AFD- Engine Co #15	X											4,572	\$100,000	2004	\$300,000				3	0	0

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Augusta-Richmond County	Fire Station	AFD- Engine Co #16	X											3,742	\$251,000	2004	\$330,000	2004				0	0
Augusta-Richmond County	Fire Station	AFD- Engine Co #17	X											2,800	\$121,528	2004	\$330,000	2004			5	0	2
Augusta-Richmond County	Fire Station	AFD- Engine Co #18	X											4,589	\$57,000	2004	\$830,000	2004			4	0	2
Augusta-Richmond County	Fire Station	AFD- Engine Co #19	X											148,200	\$1,277,000	2004	\$750,000	2004			3	0	2
Augusta-Richmond County	Fire Station	AFD- Engine Co #19 (Abandoned)											X	1,600	\$73,000	2004						0	0
Augusta-Richmond County	Fire Station	AFD- Engine Co #2	X											5,000	\$65,000	2004	\$300,000	2004			4	0	0
Augusta-Richmond County	Fire Station	AFD- Engine Co #3	X											21,780	\$394,000	2004					22	0	0
Augusta-Richmond County	Fire Station	AFD- Engine Co #4	X											10,890	\$168,000	2004	\$600,000	2004			4	0	0
Augusta-Richmond County	Fire Station	AFD- Engine Co #5	X											23,958	\$442,000	2004	\$330,000	2004			4	0	3
Augusta-Richmond County	Fire Station	AFD- Engine Co #6	X											37,897	\$65,720	2002	\$1,105,000	2002			9	0	0
Augusta-Richmond County	Fire Station	AFD- Engine Co #7	X											4,800	\$1,206,000	2004	\$800,000	2004			4	0	2
Augusta-Richmond County	Fire Station	AFD- Engine Co #7 (Abandoned)											X	2,100	\$130,000	2002					0	0	0
Augusta-Richmond County	Fire Station	AFD- Engine Co #8	X											174,240	\$1,295,000	2004	\$1,200,000					0	0
Augusta-Richmond County	Fire Station	AFD- Engine Co #9	X											5,600	\$124,000	2002	\$330,000	2002			3	0	0

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Augusta-Richmond County	Fire Station	Bush Field Fire Department	X											4,420	\$5,814,245	2004					3	0	2
Augusta-Richmond County	Fire Station	Fort Gordon Fire Department	X											0	\$186,043,000	2004						0	1
Hephzibah city	Fire Station	Hephzibah Fire Department	X					X						3,949	\$228,300	2000	\$26,400	2000	\$254,700		2	0	2
Augusta-Richmond County	High School, Public	Academy of Richmond County High School	X											243,108	\$15,808,601	2004					1,343	0	0
Augusta-Richmond County	High School, Public	Cross Creek High	X											205,100	\$19,466,248	2004					1,314	0	2
Augusta-Richmond County	High School, Public	George P. Butler Comprehensive High School	X											179,820	\$1,474,000	2004					1,244	0	0
Augusta-Richmond County	High School, Public	Glenn Hills High	X											157,347	\$10,407,572	2004					1,308	0	0
Hephzibah city	High School, Public	Hephzibah Comprehensive High	X											145,429	\$5,940,000	2004					1,288	0	1
Augusta-Richmond County	High School, Public	Lucy C. Laney Comprehensive High School	X											146,681	\$1,267,000	2004					684	0	0
Augusta-Richmond County	High School, Public	Richmond County Alter. & Opportunity Magnet School	X											30,873	\$2,932,935	2004					0	0	3
Augusta-Richmond County	High School, Public	T.W. Josey Comprehensive High School	X											191,336	\$4,391,079	2004					1,037	0	0
Augusta-Richmond County	High School, Public	Westside High	X											137,018	\$6,104,612	2004					905	0	0

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Augusta-Richmond County	Hospital, Admissions Entrance	Augusta VA Medical Center (Uptown Division)	X											687,930	\$96,000,000	1997	\$30,000,000	1997				0	0
Augusta-Richmond County	Hospital, Admissions Entrance	Charter Augusta Behavioral Health System	X											12,500	\$1,715,322	2004						0	0
Augusta-Richmond County	Hospital, Admissions Entrance	Doctor's Hospital	X											280,000	\$36,000,000	1997	\$20,100,000	1997				0	0
Augusta-Richmond County	Hospital, Admissions Entrance	Georgia Regional Hospital at Augusta Campus	X											0	\$8,082,000	2004						0	0
Augusta-Richmond County	Hospital, Admissions Entrance	Regional Med-Surg Unit/Augusta	X											192	\$8,082,000	2004						0	0
Augusta-Richmond County	Hospital, Admissions Entrance	Gracewood Regional Hospital at Augusta	X						X					192	\$1,500,000	2004					450	0	0
Augusta-Richmond County	Hospital, Admissions Entrance	Gracewood State School & Hospital	X											4,500	\$10,040,079	2004						0	2
Augusta-Richmond County	Hospital, Admissions Entrance	Medical College of Georgia (Ambulatory Care Center)	X											365,822	\$43,898,640	2004	\$21,349,372	1997				0	0
Augusta-Richmond County	Hospital, Admissions Entrance	Medical College of Georgia (Children's Medical Center)	X											219,308	\$38,378,900	2004						0	0
Augusta-Richmond County	Hospital, Admissions Entrance	Medical College of Georgia (East Wing)	X											55,260	\$7,609,854	1997	\$4,571,107	1997				0	0

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Augusta-Richmond County	Hospital, Admissions Entrance	Medical College of Georgia (Special Care Center)	X											365,822	\$43,898,640	2004	\$21,349,372					0	0	
Augusta-Richmond County	Hospital, Admissions Entrance	Medical College of Georgia (Sydenstricker Bldg)	X											336,547	\$38,053,369	1997	\$40,989,247	1997				0	0	
Augusta-Richmond County	Hospital, Admissions Entrance	Medical College of Georgia (Talmadge Building)	X											428,912	\$59,065,472	1997	\$35,479,601	1997				0	0	
Augusta-Richmond County	Hospital, Admissions Entrance	Medical College of Georgia (Talmadge & Syden Buildings)	X											765,459	\$107,164,260	2004						0	0	
Augusta-Richmond County	Hospital, Admissions Entrance	St. Joseph's Hospital of Augusta	X											400,000	\$24,753,000	2004				700		0	0	
Augusta-Richmond County	Hospital, Admissions Entrance	Swanton Rehabilitation Hospital	X						X					70,000	\$2,255,000	2004					250		0	0
Augusta-Richmond County	Hospital, Emergency Entrance	Augusta VA Medical Center (Downtown Division)	X											628,225	\$105,000,000	1997	\$70,000,000	1997					0	0
Augusta-Richmond County	Hospital, Emergency Entrance	University Hospital	X						X					802,811	\$145,586,307	2004							0	0
Augusta-Richmond County	Library	Appleby Branch Library									X	X		4,600	\$783,462	2004	\$981,133	2004		\$125	10		0	0
Augusta-Richmond County	Library	Augusta Richmond County Public Library									X			38,500	\$4,279,130	2004	\$6,896,562	2004		\$1,051	75		0	0

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Augusta-Richmond County	Library	Friedman Branch Library											X	10,300	\$775,325	2004	\$1,179,410	2004		\$282	27	0	0
Augusta-Richmond County	Library	Jeff Maxwell Branch Library											X	7,158	\$587,883	2004	\$1,685,698	2004		\$196	28	0	3
Augusta-Richmond County	Library	Wallace Branch Library											X	5,147	\$372,978	2004	\$656,895	2004		\$141	10	0	0
Augusta-Richmond County	Marshals Office	Richmond County Marshal's Office						X						197,762	\$23,063,403	2004					0	0	
Augusta-Richmond County	Middle School	East Augusta Middle School	X											79,754	\$1,802,000	2004					508	0	0
Augusta-Richmond County	Middle School	Glenn Hills Middle School	X											138,219	\$1,278,956	2004					1,287	0	0
Hephzibah city	Middle School	Hephzibah Middle School	X											99,398	\$4,885,601	2004					1,156	0	0
Augusta-Richmond County	Middle School	Langford Middle School	X											82,352	\$1,366,119	2004					802	0	0
Augusta-Richmond County	Middle School	Morgan Road Middle School	X											99,141	\$6,913,000	2004					879	0	0
Augusta-Richmond County	Middle School	Murphey Middle School	X											94,838	\$5,275,000	2004					781	0	0
Augusta-Richmond County	Middle School	Sego Middle School	X											98,109	\$4,977,000	2004					1,014	0	0
Augusta-Richmond County	Middle School	Spirit Creek Middle School	X											99,141	\$11,069,120	2004					1,008	0	2
Augusta-Richmond County	Middle School	Tubman Middle School	X											116,074	\$1,800,443	2004					691	0	0
Augusta-Richmond County	Middle School	Tutt Middle School	X											94,466	\$912,000	2004					669	0	0

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Augusta-Richmond County	Middle/High School	Davidson High School (old location)	X											35,747	\$494,000	2004					0	0	0
Augusta-Richmond County	MSWL	Deans Bridge Road Municipal Landfill						X						2,895	\$79,000	2004				\$50,000	26	0	2
Augusta-Richmond County	Other	Administrative Office at Elliott Park						X						9,100	\$750,000	2004	\$100,000				30	0	0
Augusta-Richmond County	Other	AFD- (Old Engine Co #1) Child Advocacy Group						X						2,100	\$1,281,238	2004						0	0
Augusta-Richmond County	Other	Augusta Aquatic Center						X						29,200	\$5,000,000	2004	\$300,000				700	0	0
Augusta-Richmond County	Other	Augusta Municipal Golf Course						X						14,150	\$850,000	2004	\$145,000				105	0	0
Augusta-Richmond County	Other	Denise Mearns Community Center						X						17,000	\$2,900,000	2003	\$100,000				500	0	3
Augusta-Richmond County	Other	Dwyne Area Community Center						X						5,850	\$600,000	2002	\$30,000				125	0	1
Augusta-Richmond County	Other	Carrie Mays						X						15,960	\$850,000	2004	\$100,000	2004			425	0	3
Augusta-Richmond County	Other	Doughty Park						X						2,016	\$100,000	2004	\$15,000	2004			75	0	0
Augusta-Richmond County	Other	Dyess Park						X						3,125	\$130,000	2004	\$30,000	2004			125	0	0
Augusta-Richmond County	Other	Eastview Park						X						4,275	\$600,000	2004	\$50,000	2004			120	0	0
Augusta-Richmond County	Other	Garrett Gymnasium						X						11,100	\$1,250,000	2004	\$50,000	2004			250	0	0

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Augusta-Richmond County	Other	Gracewood Park						X						3,840	\$150,000	2004	\$60,000			125	0	0	
Augusta-Richmond County	Other	H.H. Brigham Community Center						X						14,000	\$950,000	2002	\$90,000			500	0	0	
Augusta-Richmond County	Other	H.H. Brigham Senior Center						X						7,700	\$600,000	2002	\$70,000			125	0	0	
Augusta-Richmond County	Other	H.H. Brigham Swim Center						X						13,600	\$950,000	2002	\$175,000			300	0	0	
Hephzibah city	Other	Hephzibah/Carr oll Community Center						X						5,320	\$120,000	2002	\$20,000			100	0	0	
Augusta-Richmond County	Other	Hickman Park						X						1,350	\$75,000	2002	\$25,000			40	0	0	
Augusta-Richmond County	Other	Jamestown Center						X						3,840	\$250,000	2004	\$65,000	2004		125	0	0	
Augusta-Richmond County	Other	Julian Smith Bar B Que Pit						X						5,400	\$175,000	2002	\$40,000			200	0	0	
Augusta-Richmond County	Other	Julian Smith Casino						X						10,500	\$250,000	2002	\$40,000			400	0	0	
Augusta-Richmond County	Other	May Park Community Center						X						17,000	\$2,500,000	2004	\$800,000	2004		500	0	0	
Augusta-Richmond County	Other	McBean Community Park						X						6,300	\$700,000	2004	\$75,000			110	0	1	
Augusta-Richmond County	Other	Meddams Woods Community Center						X						11,160	\$1,500,000	2002	\$80,000			400	0	0	
Augusta-Richmond County	Other	Merry Street Ceramic Shop						X						1,400	\$100,000	2002	\$30,000			35	0	0	

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Augusta-Richmond County	Other	Minnick Park						X						2,400	\$65,000	2002	\$7,500			45	0	0	
Augusta-Richmond County	Other	Government House						X						7,000	\$350,000	2004	\$160,000	2004			100	0	0
Augusta-Richmond County	Other	R.C.B.O.E. Headquarters	X											96,285	\$440,000	2004					425	0	0
Augusta-Richmond County	Other	R.C.B.O.E. Transportation Facility	X											17,846	\$1,873,830	2004					298	0	0
Augusta-Richmond County	Other	Sand Hills Community Center						X						7,300	\$600,000	2004	\$60,000				200	0	0
Augusta-Richmond County	Other	Sue Reynolds Park						X						2,375	\$85,000	2004	\$20,000				60	0	2
Augusta-Richmond County	Other	Warren Road Community Center						X						14,000	\$2,500,000	2004	\$100,000	2004			500	0	0
Augusta-Richmond County	Other	W.F. Johnson Community Center						X						27,000	\$1,400,000	2004	\$100,000	2004			500	0	0
Augusta-Richmond County	Other School	Davidson Magnet School	X											117,970	\$5,406,000	2004					759	0	0
Augusta-Richmond County	Other School	R.C.B.O.E. Maintenance	X											17,010	\$378,000	2004					117	0	0
Augusta-Richmond County	Other School	William Robinson Center	X											18,447	\$1,488,927	2004					3	0	0
Augusta-Richmond County	Police Station	FD-Engine Co #8 (Abandoned)	X											2,100	\$86,841	2004					0	0	0
Blythe town	Police Station	Blythe Police Department	X											3,900	\$210,000	2000	\$13,900	2000			4	0	0
Hephzibah city	Police Station	Hephzibah Police Department	X					X						2,670	\$210,750	2000	\$48,150	2000	\$258,900		4	0	2

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Augusta-Richmond County	Private Four-Year College	Paine College						X						52,896	\$6,240,916	2004						0	0
Augusta-Richmond County	Private Four-Year College	Paine College						X						0	\$1,330,000	2004						0	0
Augusta-Richmond County	Private School	Alicia Community School						X						26,434	\$2,643,400	2005	\$1,000,000	2005			250	0	0
Augusta-Richmond County	Private School	Aquinas High School						X						17,250	\$2,231,000	2004					375	0	0
Augusta-Richmond County	Private School	Augusta Christian Academy						X						52,708	\$240,000	2004						0	0
Augusta-Richmond County	Private School	Seventh Day Adventist (closed)						X						6,900	\$479,000	2004					0	0	0
Augusta-Richmond County	Private School	Curtis Baptist Elementary School	X											111,949	\$849,357	2004						0	0
Augusta-Richmond County	Private School	Curtis Baptist High School						X						35,719	\$271,000	2004					150	0	0
Augusta-Richmond County	Private School	Ebenezer Seventh Day Adventist Junior Academy						X						2,800	\$292,495	2002	\$247,380				10	0	0
Augusta-Richmond County	Private School	Episcopal Day School						X			X			79,816	\$6,500,000	2003	\$1,200,000	2003			537	0	0
Augusta-Richmond County	Private School	First Baptist Church of Gracewood Academy						X						5,200	\$860,450	2004						0	2
Augusta-Richmond County	Private School	Hillcrest Baptist School						X						176,418	\$1,577,394	2004					275	0	0
Augusta-Richmond County	Private School	Immaculate Conception School						X						66,647	\$495,000	2004					65	0	0

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Government Jurisdiction	Type	Name or Structure Description	Essential Facility	Transportation Facility	Lifeline System	High Potential Loss	HazMat Facility	Important Facility	Vulnerable Population	Economic Assets	Special Considerations	Historic Considerations	Other	Size of Bldg. (sq. ft.)	Replace Value (\$)	Replace Value Year	Contents Value	Contents Value Year	Functional Value	Displace Cost (\$ per day)	Occupancy	FLOOD Hazard Score	WILDFIRE Hazard Score
Augusta-Richmond County	Private School	Risen Savior Academy						X						4,800	\$17,680	2004						0	0
Augusta-Richmond County	Private School	Southgate Christian School (closed)						X						49,400	\$1,573,129	2004						0	0
Augusta-Richmond County	Private School	St. Joseph Academy						X						40,502	\$4,231,755	2005	\$800,000				536	0	0
Augusta-Richmond County	Private School	Wee Wisdom School						X						59,400	\$54,000	2004						0	0
Augusta-Richmond County	Private School	Westminster School of Augusta						X						6,124	\$403,204	2004	\$47,216		\$1,000	\$868	170	0	0
Augusta-Richmond County	Private School	Westminster Schools of Augusta												34,524	\$2,273,060	2004	\$266,180	2004	\$1,000	\$868	321	0	0
Augusta-Richmond County	Private School	Westminster Schools of Augusta, Administration						X						5,606	\$369,099	2004	\$43,222		\$1,000	\$868	40	0	0
Augusta-Richmond County	Private School	Westminster Schools, Maintenance Shop											X	2,400	\$158,016	2003	\$18,504		\$1,000	\$868	3	0	3
Augusta-Richmond County	Private School	Westminster Schools, Prep School Gym											X	16,265	\$1,070,887	2004	\$125,403		\$1,000	\$868	130	0	3
Augusta-Richmond County	Psychoeducational	Sand Hills	X											23,882	\$893,883	2004					81	0	0
Augusta-Richmond County	Public Four-Year College	Augusta State University						X						946,313	\$111,629,640	2004	\$34,096,992	2004			6,200	0	0
Augusta-Richmond County	Public University	Medical College of Georgia						X						845,500	\$0	2004						0	0

From GEMA's Critical Facilities Online Tool (as of December 2005)

Government Jurisdiction	Type	Name or Structure Description	Essential Facility	Transportation Facility	Lifeline System	High Potential Loss	HazMat Facility	Important Facility	Vulnerable Population	Economic Assets	Special Considerations	Historic Considerations	Other	Size of Bldg. (sq. ft.)	Replace Value (\$)	Replace Value Year	Contents Value	Contents Value Year	Functional Value	Displace Cost (\$ per day)	Occupancy	FLOOD Hazard Score	WILDFIRE Hazard Score
Augusta-Richmond County	Vocational Technical School	Augusta Technical College						X			X			22,301	\$9,761,000	2004	\$17,700,000	2004			2,500	0	0
Augusta-Richmond County	Recycling Center	Johnson Magnet											X	1,166	\$14,000	2004						0	0
Augusta-Richmond County	Sheriffs Office	Richmond County Sheriff's Office	X						X					160,736	\$22,576,000	2004					750	0	0
Augusta-Richmond County	Sheriffs Office	Sheriff's Office Training Center						X						3,600	\$79,000	2004					25	0	0
Augusta-Richmond County	Sheriffs Office	Sheriffs Office - Daniel Village Substation	X											699,754	\$6,309,288	2004					50	0	0
Augusta-Richmond County	Sheriffs Office	Sheriffs Office - Eisenhower Drive Substation	X											750	\$78,750	2004					2	0	0
Augusta-Richmond County	Sheriffs Office	Sheriffs Office - Southgate Plaza Substation	X											2,690	\$1,360,287	2004					50	0	0
Augusta-Richmond County	State Prison	Georgia Regional Youth Detention Center						X						0	\$0	2004						0	0
Augusta-Richmond County	State Prison	Georgia Regional Youth Development Center						X						0	\$0	2004						0	0
Hephzibah city	wastewater Treatment Plant	Hephzibah WPCP	X		X		X							90	\$6,200	2000	\$6,200	2000			0	0	0

From GEMA's Critical Facilities Online Tool (as of December 2005)

Government Jurisdiction	Type	Name or Structure Description	Essential Facility	Transportation Facility	Lifeline System	High Potential Loss	HazMat Facility	Important Facility	Vulnerable Population	Economic Assets	Special Considerations	Historic Considerations	Other	Size of Bldg. (sq. ft.)	Replace Value (\$)	Replace Value Year	Contents Value	Contents Value Year	Functional Value	Displace Cost (\$per day)	Occupancy	FLOOD Hazard Score	WILDFIRE Hazard Score
Blythe town	Water System	City of Blythe Treatment Plant #1 (New Well)												120	\$35,000	1997	\$25,000	1997				0	0
Blythe town	Water System	City of Blythe Treatment Plant #2 (Old Well)											X	144	\$35,000	1997	\$25,000	1997				0	0
Blythe town	Water System	City of Blythe Water System	X									X		3,900	\$210,000	2000	\$51,200	2000		3		0	0
Blythe town	Water System	City of Blythe Water Tower			X									0	\$0	2004						0	0
Hephzibah city	Water System	City of Hephzibah Water System	X		X		X							576	\$58,800	2000	\$89,300	2000	\$148,100			0	2
Hephzibah city	Water System	Hephzibah-Oakridge Water Tower	X		X		X							336	\$35,800	2000	\$52,100	2000	\$87,900			0	0

Appendix C: Key Terms & Acronyms

For the most part, terms used in the Plan have the meanings that are commonly associated with them:

- **Critical/Essential Facilities** are critical to the health and welfare of the population, especially during and following hazard events. Critical facilities include shelters, police and fire stations, schools, childcare/senior care centers, hospitals, emergency operations centers, and government buildings. The term includes building that, if damaged, would create secondary adverse effects, such as hazardous materials facilities, vulnerable facilities, housing for special needs populations.
- **Disaster** means the occurrence of widespread or severe damage, injury, loss of life or property, or such severe economic or social disruption that supplemental disaster relief assistance is necessary for the affected political jurisdiction(s) to recover and to alleviate the damage, loss, hardship, or suffering caused thereby.
- **Federal Emergency Management Agency (FEMA)** coordinates the federal government's efforts to plan for, respond to, recover from, and mitigate the effects of natural and man-made hazards.
- **Flood Insurance Rate Map (FIRM)** is prepared by the Federal Emergency Management Agency to show Special Flood Hazard Areas; this map is the basis for regulating development.
- **Floodplain.** See "Special Flood Hazard Area (SFHA)" below.
- **Hazard** is defined as the natural or technological phenomenon, event, or physical condition that has the potential to cause property damage, infrastructure damage, other physical losses, and injuries and fatalities.
- **Mitigation** is defined as actions taken to reduce or eliminate the long-term risk to life and property from hazards. Mitigation actions are intended to reduce the need for emergency response – as opposed to improving the ability to respond.
- **National Flood Insurance Program (NFIP)**, located within FEMA, is charged with preparing FIRMs, developing regulations to guide development, and providing insurance for flood damage.
- **Risk** is defined as the potential losses associated with a hazard. Ideally, risk is defined in terms of expected probability and frequency of the hazard occurring, people and property exposed, and potential consequences.
- **Special Flood Hazard Area (SFHA) or Floodplain** is the area adjoining a river, stream, shoreline, or other body of water that is subject to partial or complete inundation. The SFHA is the area predicted to flood during the 1% annual chance flood, commonly called the "100-year" flood.

The following acronyms are used:

- **CRS** – Community Rating System (NFIP)
- **DOT** – Georgia Department of Transportation

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- **FEMA** – U.S. Department of Homeland Security – Federal Emergency Management Agency
 - **FIRM** – Flood Insurance Rate Map
 - **FIS** – Flood Insurance Study
 - **FMA** – Flood Mitigation Assistance (FEMA)
 - **GEMA** – Georgia Emergency Management Agency
 - **GIS** – Geographic Information System
 - **HMGP** – Hazard Mitigation Grant Program (FEMA)
 - **NFIP** – National Flood Insurance Program (FEMA)
 - **PDM** – Pre-Disaster Mitigation Grant Program (FEMA)
 - **SFHA** – Special Flood Hazard Area

Appendix D:

Savannah River Public Facility Summary

	Photo #	TAX ID	Ground Elev*	BFE	BFE-Ground Elev	Description
Marina Store	1, 2	037-4-001-03-1	130	135	5'	Built in 1994; current brick building (low damage potential except for contents); building valued at \$107,160. No EC on file
Boathouse Community Center (main building, d open pavilion, small building)	3, 4, 5, 6, 7	048-3-071-00-0	130	134	4'	City-owned; old building elevated several feet above grade; lower level is boat storage and useable area overlooking water (windows)
Boat Storage	8, 9	048-0-001-03-0	130	133.5	3.5'	City-owned. Land (\$242k); building (\$98k), PreFab structural steel, built 1955
Welding (large bldg, brick office)	10, 11, 12	048-0-001-05-0	130	133.5	3.5'	Owned by Modern Welding. Land value \$284k; building values \$786k. Office building 1846 sf, built 1975; no specifics on large building.
Unknown	13					Storage tank (on separate parcel?)
Richmond (main building, small bldgs, vacant at rd)	14, 15, 16, 17, 18	048-0-001-01-0	125-130	133.5	8-3.5'	City-owned land (\$1.09 mill) and buildings. Richmond Bonded buildings (\$899k). Wood/steel combined; built 1963 GA Ports Authority building, 1000 sf, \$94k, PreFab Structural steel, built 1955
Traffic Engineering	19, 20	062-0-008-00-0	125-130	133.5	8-3.5'	City-owned. Masonry load bearing; footprint 7,500 sf; built in 1951. Land value \$777k; building value \$124k
Raw Water Pumping Station	21	--	153 (new elevation will be 143)	140.5	above	Up-river from Riverwalk

*Ground Elevation based on gross contour from GIS.



Photo 1. Front of Marina Building

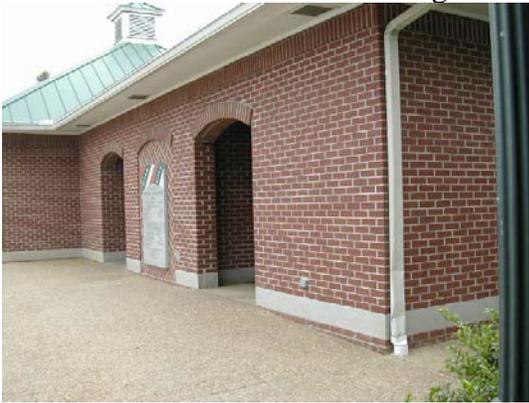


Photo 2. Restroom portion of Marina Building



Photo 3. Boathouse Community Center



Photo 4. Boathouse Community Center



Photo 5. Boathouse Community Center



Photo 6. Downstream of Community Center



Photo 7 Pavilion Downstream Community Center



Photo 10: Modern Welding



Photo 8: Boat Storage



Photo 11: Modern Welding



Photo 9: Boat Storage



Photo 12. Modern Welding Office building



Photo 13. Parcel between Modern & Vacant Bldg



Photo 16. Richmond Warehouse



Photo 14. Vacant Building



Photo 17. Richmond Warehouse

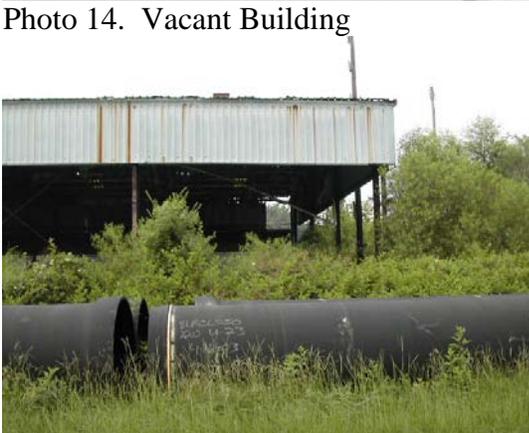


Photo 15. Downstream of Vacant Building



Photo 18. Richmond Warehouse (downstream)



Photo 19. Augusta Traffic Engineering



Photo 20. Augusta Traffic Engineering



Photo 21. Raw Water Pumping Station

