Multi-Hazard Mitigation Plan

Williamson County, Illinois

Adoption Date: -- ______________________ --

Primary Point of Contact

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Section 1 - Public Planning Process

1.1 Narrative Description

Hazard Mitigation is defined as any sustained action to reduce or eliminate long-term risk to human life and property from hazards. The Federal Emergency Management Agency (FEMA) has made reducing hazards one of its primary goals. Hazard Mitigation Planning and the subsequent implementation of the projects, measures, and policies developed as part of these plans, is a primary mechanism in achieving FEMA's goal.

The Multi-Hazard Mitigation Plan (MHMP) is a requirement of the Federal Disaster Mitigation Act of 2000 (DMA 2000). The development of a local government plan is a requirement in order to maintain eligibility for certain federal disaster assistance and hazard mitigation funding programs. In order for the National Flood Insurance Program (NFIP) communities to be eligible for future mitigation funds, they must adopt the MHMP.

The Greater Egypt Regional Planning Commission was established in 1961 to "provide a plan for the general purpose of guiding and accomplishing a coordinated, adjusted, and harmonious development of the Franklin, Jackson, Perry, and Williamson County region, and of public improvement and utilities therein for the purpose of best promoting health, safety, morals, order, convenience, prosperity, efficiency and economy in the process of development and the general welfare of said region." In 1967, Jefferson County was added to the Greater Egypt Region. The Commission was re-established as Greater Egypt Regional Planning & Development Commission (GERPDC). The Commission, Williamson County Emergency Management Agency, SIUC Geology Department, The Polis Center of IUPUI, and Williamson County have joined efforts in the creation of this mitigation plan, realizing that the recognition of and the protection from hazards impacting the county and its residents contribute to future community and economic development.

In recognition of the importance of planning in mitigation activities, the Federal Emergency Management Agency (FEMA) has created HAZUS-MH (**Haz**ards **US**A **M**ulti-**H**azard), a powerful geographic information system (GIS)-based disaster risk assessment tool. This tool enables communities of all sizes to predict the estimated losses from floods, hurricanes, earthquakes, and other related phenomena and to measure the impact of various mitigation practices that might help reduce those losses. The Illinois Emergency Management Agency (IEMA) determined that HAZUS-MH should play a critical role in the risk assessments in Illinois. SIUC and The Polis Center are assisting Williamson County planning staff with performing the hazard risk assessment.

1.2 Planning Team Information

The Williamson County Multi-Hazard Mitigation Planning Team is headed by Alan Gower, who is the primary point of contact. Members of the planning team include county—including jurisdictions within the county—and federal representatives. Table 1-1 below identifies the planning team individuals and the organizations they represent.

Table 1-1: Multi Hazard Mitigation Planning Team Members

Name	Title	Organization	Jurisdiction
Dan Frisk	Refuge Manager	Crab Orchard Refuge/US Fish and Wildlife Service	Federal
Alan Gower	Director	Williamson County EMA	Williamson County
Steve Land	Deputy Director	Williamson County EMA	Williamson County
Gabe Wiemken	Communications Operator	Williamson County EMA	Williamson County
Brent Gentry	Williamson County Chairman	Williamson County Board	Williamson County
Jeffery Robinson	Supervisor of Assessments	Williamson County Supervisor of Assessments	Williamson County
Donald Florer	Fireman	Williamson County Fire Protection District	Williamson County
Dan Swiatowski	Chief	Williamson County Fire Protection District	Williamson County
Jim Webb	Engineer	Williamson County Engineer/Williamson County Highway Department	Williamson County
Kendra Washburn	Assistant Coordinator	Williamson County 911	Williamson County
Les Higgins	Captain	Williamson County Sheriff's Office	Williamson County
Celeste Sollers	Director	Williamson County Economic Development	Williamson County
Bob Campbell	Director	Regional Economic Development Corporation	Williamson County
Ken Smith	Director	Williamson County 911	Williamson County
Les Higgins		Williamson County Sheriff's Office	Williamson County
Peggy Russell	Director	Williamson County Family Crisis Center	Williamson County
Doug Kimmel	Airport Manager	Williamson County Regional Airport	Williamson County
Ronda Koch	Emergency Preparedness Director	Bi-County Health Dept.	Franklin-Williamson County
Rachel Deffenbaugh		Bi-County Health Dept.	Franklin-Williamson County
Keith Liddell	Principal	Carterville High School	City of Carterville
Bruce Talley	Chief	Fire Chief of Carterville	City of Carterville
Don Smith	Principal	Carterville High School	City of Carterville
Tim Bleyer	Superintendent	Superintendent of Carterville C.U.S.D. #5	City of Carterville
Evelyn Fuqua	President	Village of Crainville	Village of Crainville
Evelyn Fuqua	Village President	City of Crainville	Village of Crainville
Joe Fisher	Maintenance	City Maintenance	Village of Creal Springs
Micah Morrow	City Clerk	Creal Springs City Clerk's Office	Village of Creal Springs

Name	Title	Organization	Jurisdiction
Joe Lapinski	Public Works Director	City of Herrin	City of Herrin
Vic Ritter	Mayor	City of Herrin	City of Herrin
Gail West	City Manager	City of Marion	City of Marion
Lisa Smith	Assistant Superintendent	Superintendent Marion C.U.S.D. #2	City of Marion

The Disaster Mitigation Act (DMA) planning regulations and guidance stress that planning team members must be active participants. The Williamson County MHMP committee members were actively involved on the following components:

- Attending the MHMP meetings
- Providing available Geographic Information System (GIS) data and historical hazard information
- Reviewing and providing comments on the draft plans
- Coordinating and participating in the public input process
- Coordinating the county's formal adoption of the plan

An MHMP introductory meeting was held at SIUC on March 19, 2008. Representatives of Franklin, Jackson, Jefferson, Perry, and Williamson counties attended the meeting. John Buechler, MHMP Project Manager from Polis, and Nicholas Pinter, SIUC Geology Department, explained the motive behind the MHMP program and answered questions from the participants. Nicholas Pinter, Andy Flor, and Harvey Hanson from SIUC provided an introduction to hazards, and John Buechler and Dave Coats from The Polis Center provided an overview of HAZUS-MH. John Buechler described the timeline and the procedures to take place throughout the planning project. Shortly after the meeting, in response to many concerns regarding security and limited use of the counties' GIS data, a Memorandum of Understanding was created and signed by each county chairman.

The county board chairman met with representatives from the GERPDC, SIUC, and The Polis Center on March 19, 2008, to discuss the planning process and prospective planning team members. The county Multi-Hazard Mitigation Planning Team met on May 19, 2008, June 11, 2008, July 23, 2008, August 20, 2008, October 28, 2008, and November 6, 2008. These meetings were held at the SIUC campus, Williamson County Courthouse, and Williamson County EMA Facility. Each meeting was approximately two to four hours in length. The meeting agendas, minutes, and attendance sheets are included in Appendix A. During these meetings, the planning team successfully identified critical facilities, reviewed hazard data and maps, identified and assessed the effectiveness of existing mitigation measures, established mitigation projects, and assisted with preparation of the public participation information.

1.3 Public Involvement in Planning Process

An effort was made to solicit public input during the planning process. The Williamson County planning team invited participation from various representatives of county, local, city, and town governments. Alan Gower and/or Steve Land from the Williamson County EMA attended at least one public meeting in each of the incorporated areas within Williamson County to describe the multi-hazard mitigation planning process to local leaders and solicit their input on the project.

The planning process commenced on January 29, 2008, when Southern Illinois University-Carbondale held a news conference to advise the general public that FEMA had approved funding of proposed planning activities for natural disaster preparedness. It was explained that the university would collaborate with members of The Polis Center as well as the five regional planning commissions. The news conference was attended by representatives of the local papers, radio, and television.

Williamson County conducted presentations for the public to give an overview of the planning process, inform them of the benefits of completing the plan, and discuss natural hazards affecting Williamson County. Public meetings were held on March 19, 2008, June 11, 2008, July 23, 2008, August 20, 2008, and on October 28, 2008. Appendix A contains the agendas and minutes from each of the public meetings. Appendix B contains articles published by the local newspaper throughout the public input process.

1.4 Neighboring Community Involvement

The Williamson County planning team invited participation from various representatives of neighboring county, local, city, and town governments. The initial planning meeting at SIUC on March 19, 2008 included representatives from the adjacent GERPDC counties of Franklin, Jackson, Jefferson, and Perry. In the meeting, the county board chairmen and their EMA directors discussed creating county planning teams, scheduling meetings throughout the planning process, and ways to ensure public involvement in the plan. The county board chairmen also agreed to allow university research staff to have access to county GIS programs and data from the supervisors of the assessment.

Williamson County is bounded by Franklin, Jackson, Union, Johnson, Pope, and Saline Counties. Jefferson County, located north of Franklin County, has working relationships and cooperation with Williamson County through regional partnerships. The regional planning commission staff provides monthly status of each county's mitigation planning program to its commission, which is comprised of county and municipal representatives. Details of how neighboring stakeholders were involved are summarized in Table 1-2.

Table 1-2: Neighboring Community Participation

Person Participating	Neighboring Jurisdiction	Organization	Participation Description
John Evans	Jackson	County	Plan Development
Derek Misener	Jackson	County	Plan Development
Randall Crocker	Franklin	County	Plan Development
James Epplin	Perry	County	Plan Development
Michael Richmond	Perry	County	Plan Development
Ted Buck	Jefferson	County	Plan Development
Dennis Litton	Jefferson	County	Plan Development

1.5 Review of Technical and Fiscal Resources

The MHMP planning team identified representatives from key agencies to assist in the planning process. Technical data, reports, and studies were obtained from these agencies. The organizations and their contributions are summarized in Table 1-3.

Table 1-3: Key Agency Resources Provided

Agency Name	Resources Provided
Williamson County Supervisor of Assessments	Tax System Data Base, Parcel Map, and Ortho Map
U.S. Census	County Profile Information such as Population and Physical Characteristics
Department of Commerce and Economic Opportunity	Community Profiles
Illinois Department of Employment Security	Industrial Employment by Sector
National Climatic Data Center	Climate Data
USDA/US Forest Service	Physical Characteristics
Illinois Emergency Management Agency	2007 Illinois Natural Hazard Mitigation Plan
Greater Egypt Regional Planning & Development Commission	The Comprehensive Plan for the Greater Egypt Region, A Comprehensive Community Plan Herrin, Illinois, The Comprehensive Plan for Marion, Illinois, The Comprehensive Plan for Carterville, Illinois, The Comprehensive Plan for Johnston City, Illinois, The Comprehensive Plan for Colp, Illinois, The Comprehensive Plan for Creal Spring, Illinois, The Comprehensive Plan for Crainville, Illinois, The Comprehensive Plan for Hurst, Illinois, Big Muddy River Basin Interim Water Quality Management Plan and Illinois County Estimates: Corn, Soybeans, and Wheat
Illinois Environmental Protection Agency	Illinois 2008 Section 303(d) Listed Waters and watershed maps
United States Geological Survey	Hill Shade, National Atlas Federal Lands, NLCD 2001 Forest Canopy, and NLCD 2001 Land Cover
Illinois State Geological Survey	Coal Mining Maps

1.6 Review of Existing Plans

Williamson County and its associated local communities utilize a variety of planning documents to direct community development. These documents include land use plans, master plans, emergency response plans, municipal ordinances, and building codes. The MHMP planning process incorporated the existing natural hazard mitigation elements from these previous planning efforts. Table 1-4 lists the plans, studies, reports, and ordinances used in the development of the plan.

Table 1-4: Planning Documents Used for MHMP Planning Process

Author(s)	Year	Title	Description	Where Used
National Agricultural Statistics Service	2006–2007	Illinois County Estimates: Corn, Soybeans, and Wheat	This release contains official estimates of acreage, yield and production of corn, soybeans and wheat for counties in Illinois.	Land Use and Development Trends

Author(s)	Year	Title	Description	Where Used
Greater Egypt Regional Planning & Development Commission	1964	The Comprehensive Plan for the Greater Egypt Region	It offers guidelines for counties, cities and villages in their quest for improved social and economical opportunities for their citizens.	Topography and Land Use and Development Trends
Illinois Emergency Management Agency	2007	Illinois Natural Hazard Mitigation Plan	The Illinois Natural Hazard Mitigation Plan (INHMP) establishes a process for identifying and mitigating the effects of natural hazards in the State of Illinois as required under the Disaster Mitigation Act of 2000.	Topography
Metropolitan Planners, Inc. and General Planning and Resource Consultants	1963	A Comprehensive Community Plan Herrin, Illinois	This report presents in detail existing conditions in Herrin. From a careful analysis of these conditions, specific, detailed recommendations are made.	Zoning Ordinance and Land Use Plan
Greater Egypt Regional Planning & Development Commission	1965–1985	The Comprehensive Plan for Marion, Illinois	This study provides information on the population, economic base, land use and housing, public facilities, central business district and transportation and circulation aspects of the city.	Zoning Ordinance and Land Use Plan
Greater Egypt Regional Planning & Development Commission	1966	The Comprehensive Plan for Carterville, Illinois	This study provides information on the population, economic base, land use and housing, public facilities, central business district and transportation and circulation aspects of the city.	Zoning Ordinance and Land Use Plan
Greater Egypt Regional Planning & Development Commission	1964	The Comprehensive Plan for Johnston City, Illinois	This study provides information on the population, economic base, land use and housing, public facilities, central business district and transportation and circulation aspects of the city.	Zoning Ordinance and Land Use Plan
Greater Egypt Regional Planning & Development Commission	1965–1985	The Comprehensive Plan for Colp, Illinois	This study provides information on the population, economic base, land use and housing, public facilities, central business district and transportation and circulation aspects of the city.	Zoning Ordinance and Land Use Plan
Greater Egypt Regional Planning & Development Commission	1965–1985	The Comprehensive Plan for Creal Spring, Illinois	This study provides information on the population, economic base, land use and housing, public facilities, central business district and transportation and circulation aspects of the city.	Zoning Ordinance and Land Use Plan
Greater Egypt Regional Planning & Development Commission	1965–1985	The Comprehensive Plan for Crainville, Illinois	This study provides information on the population, economic base, land use and housing, public facilities, central business district and transportation and circulation aspects of the city.	Zoning Ordinance and Land Use Plan
Greater Egypt Regional Planning & Development Commission	1965–1985	The Comprehensive Plan for Hurst, Illinois	This study provides information on the population, economic base, land use and housing, public facilities, central business district and transportation and circulation aspects of the city.	Zoning Ordinance and Land Use Plan
State of Illinois Environmental Protection Agency	1973	Big Muddy River Basin Interim Water Quality Management Plan (Draft)	This study examines the Big Muddy River Basin. The analysis covers a description of the basin, demographics, economics, water supplies, water use, water quality, pollution sources, sewerage facilities, permits, surveillance, enforcement, operator certification, and environmental impact.	Jurisdiction Information and Topography

Section 2 - Jurisdiction Participation Information

The jurisdictions included in this multi-jurisdictional plan are listed in Table 2-1.

Table 2-1: Participating Jurisdictions

Jurisdiction Name
Williamson County
Village of Bush
Village of Cambria
City of Carterville
Village of Colp
Village of Crainville
City of Creal Springs
Village of Energy
Village of Freeman Spur
City of Herrin
City of Hurst
City of Johnston City
Village of Pittsburg
City of Marion
Village of Spillertown
Village of Stonefort
Village of Whiteash

2.1 Adoption by local governing body

The draft plan was made available to the planning team and other agencies on October 28, 2008, for review and comments. The Williamson County Hazard Mitigation Planning Team presented and recommended the plan to *<the officials responsible for adopting>*, who adopted the Williamson County Hazard Mitigation Plan on *<date adopted>.* Resolution adoptions are included in Appendix C of this plan.

2.2 Jurisdiction Participation

Each of the incorporated communities within Williamson County was invited to participate on the planning team. When a community was not able to provide representation, it was contacted individually and afforded the opportunity to provide input about its specific jurisdiction. Table 2-2 lists the jurisdictions and how each participated in the construction of this plan.

Table 2-2: Jurisdiction Participation

Jurisdiction Name	Participating Member	Participation Description
United States	Dan Frisk, Crab Orchard Refuge/US Fish and Wildlife Service	Member, MHMP planning committee
Illinois	Chris Brown, Director of Illinois Department of Public Health	Attended Planning Meeting(s)
Illinois	Rick Shryock, Illinois Emergency Management Agency	Attended Planning Meeting(s)
Southern Illinois Region	April Bennett, Withers Radio	Attended Planning Meeting(s)
Southern Illinois Region	Codell Rodriguez, Southern Illinoisan	Attended Planning Meeting(s)
Williamson County	Alan Gower, EMA	Member, MHMP planning committee
Williamson County	Steve Land, EMA	Member, MHMP planning committee
Williamson County	Gabe Wiemken, EMA	Member, MHMP planning committee
Williamson County	Brent Gentry, Williamson County Chairman	Member, MHMP planning committee
Williamson County	Jeffery Robinson, Supervisor of Assessment	Member, MHMP planning committee
Williamson County	Donald Florer, Williamson Co. Fire Protection District	Member, MHMP planning committee
Williamson County	Dan Swiatowski, Williamson Co. Fire Protection District	Member, MHMP planning committee
Williamson County	Jim Webb, Williamson Co. Engineer/Williamson Co. Highway Dept.	Member, MHMP planning committee
Williamson County	Kendra Washburn, Williamson Co. 911	Member, MHMP planning committee
Williamson County	Les Higgins, Williamson Co. Sheriff's Office	Member, MHMP planning committee
Williamson County	Celeste Sollers, Williamson Co. Economic Development	Member, MHMP planning committee
Williamson County	Bob Campbell, Regional Economic Development Corporation	Member, MHMP planning committee
Williamson County	Doug Kimmel, Williamson Co. Regional Airport	Member, MHMP planning committee
Williamson County	Ken Smith, Director of Williamson County 911	Member, MHMP planning committee
Williamson County	Peggy Russell, Executive Director of Williamson County Family Crisis Center	Member, MHMP planning committee
Williamson County	Jerry Norris, Williamson County Fire Protection District	Attended Planning Meeting(s)
Franklin-Williamson Counties	Ronda Koch, Franklin-Williamson Bi-County Health Director of Emergency Preparedness	Member, MHMP planning committee
Village of Bush	Albert Stephenson, President	Participated in Village Meeting
Village of Cambria	Bill Herron, President	Participated in Village Meeting
City of Carterville	Keith Liddell, Former Carterville High School Principal	Attended Planning Meeting(s)
City of Carterville	Bruce Talley, Fire Chief of Carterville	Member, MHMP planning committee
City of Carterville	Don Smith, Carterville High School Principal	Member, MHMP planning committee
City of Carterville	Tim Bleyer, Superintendent of Carterville C.U.S.D. #5	Member, MHMP planning committee
Village of Colp	Ronald Jackson, President	Participated in Village Meeting
Village of Crainville	Curtis Rogers	Attended Planning Meeting(s)
Village of Crainville	Evelyn Fuqua, Village President	Member, MHMP planning committee

Jurisdiction Name	Participating Member	Participation Description
Village of Creal Springs	Micah Morrow, Creal Springs City Clerk's Office	Member, MHMP planning committee
Village of Creal Springs	Phil Jeralds	Attended Planning Meeting(s)
Village of Energy	Frank Jeters, President	Participated in Village Meeting
Village of Freeman Spur	Curtis Spaven, President	Participated in Village Meeting
City of Herrin	Sam Shemwell, Alderman and President Pro-Tem	Participated in Village Meeting
City of Herrin	Vic Ritter, Mayor of Herrin	Member, MHMP planning committee
City of Herrin	Joe Lapinski, Public Works Director, City of Herrin	Member, MHMP planning committee
City of Hurst	James Rich, Mayor	Participated in Village Meeting
City of Johnston City	Richard Carter, President	Participated in Village Meeting
City of Marion	Jerry Hjerpe	Attended Planning Meeting(s)
City of Marion	Lisa Smith, Assistant Superintendent of Marion C.U.S.D. #2	Member, MHMP planning committee
City of Marion	Gail West, City Administrator, City of Marion	Member, MHMP planning committee
Village of Pittsburg	Keith Violett, President	Participated in Village Meeting
Village of Spillertown	Dale Whitehead, President	Participated in Village Meeting
Village of Stonefort	George Jackson, President	Participated in Village Meeting
Village of Whiteash	Rick LaBotte, President	Participated in Village Meeting

At each planning meeting, Alan Gower and Steve Land of the Williamson County EMA explained the importance of the multi-hazard mitigation for the county and the need for participation from all communities.

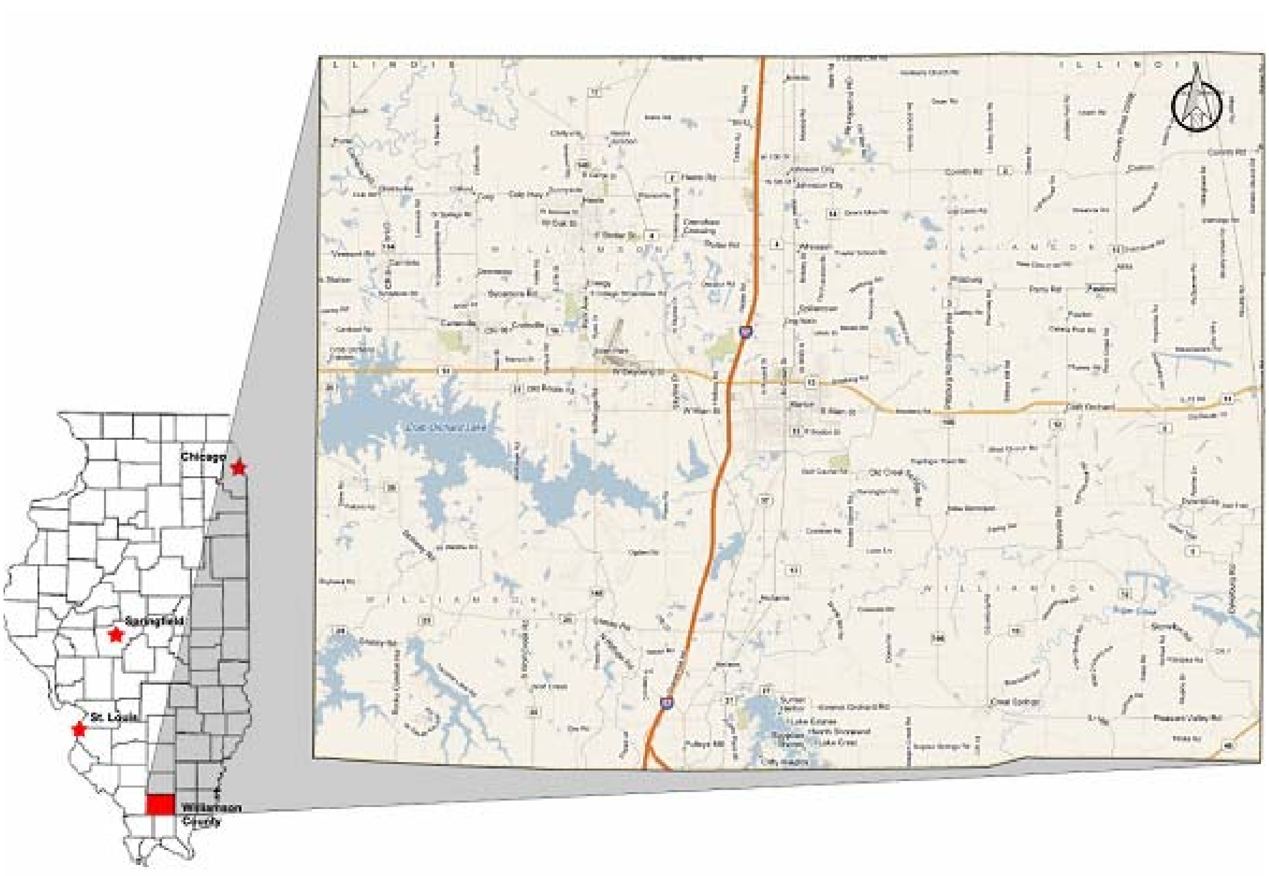
All members of the MHMP planning committee were actively involved in attending the MHMP meetings, providing available Geographic Information System (GIS) data and historical hazard information, reviewing and providing comments on the draft plans, coordinating and participating in the public input process, and coordinating the county's formal adoption of the plan. Each meeting culminated with an open forum to invite questions and input from the council members. Appendix A provides further description of the meetings, including dates.

Section 3 - Jurisdiction Information

Williamson County originated when Franklin County was divided to create a second county during the late 1830s. The division of Williamson and Franklin Counties became official on February 28, 1839. Williamson County was named after Hugh Williamson, an internationally renowned scholar best known for representing North Carolina at the Constitutional Convention. Marion, named for Revolutionary War hero General Francis Marion, was chosen to be the county seat.

Williamson County is located in the center of the southern tip of Illinois. It is bounded on the north by Franklin County; on the south by Johnson and Union Counties; on the east by Saline County; and on the west by Jackson County. Its relation to major urban areas is as follows: 120 miles southeast of St. Louis, MO; 180 miles south-southeast of Springfield, IL; 310 miles south-southwest of Chicago, IL. Figure 3-1 shows the location of Williamson County.

Figure 3-1: Map of Williamson County



Williamson County is one the most rapidly growing counties in southern Illinois. The major sources of economic activity include public administration, manufacturing, distribution centers, health services, retail trade, and tourism. A few of the top private employers in the county include Circuit City, Aisin, and Pepsi.

Nearly a quarter of Williamson County consists of public land, which draws a large number of tourists who contribute significantly to the local economy. The largest area of public land within the county is Crab Orchard National Wildlife Refuge, managed by the U.S. Fish and Wildlife Service. In addition to the refuge, the extreme southern portion of Williamson County is located within the Shawnee National Forest, which is managed by the National Park Service.

Sources: Adams, James N. (compiler), Keller, William E., ed., Illinois Place Names, Springfield: Illinois State Historical Society, 1989, pp. 609;

Milo Erwin, History of Williamson Co, IL, 1876;

Goodspeed Publishing Co, History of Gallatin, Saline, Hamilton, Franklin and Williamson Counties, Illinois, 1967;

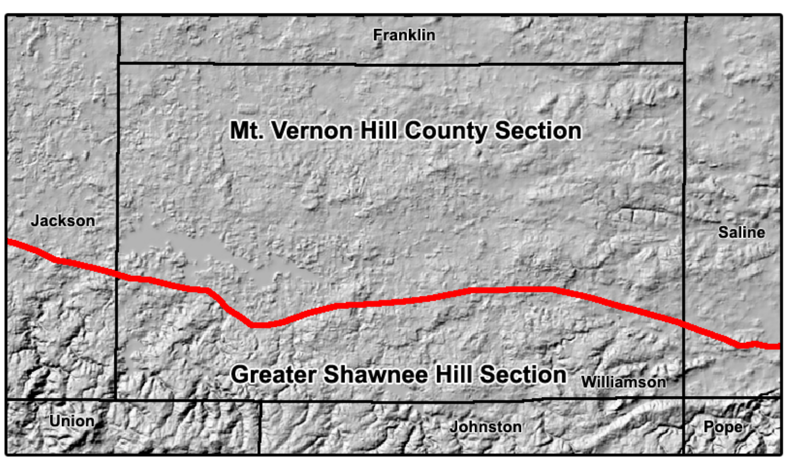
State of Illinois, Origin and Evolution of Illinois Counties, 1982;

3.1 Physical Setting (Topography)

Williamson County is located within the Till Plains and Shawnee Hills physiographic divisions of Illinois. The northern three-quarters of Williamson County are located in the Mt. Vernon Hill Country sub-division of the Till Plains. The topography of the Mt. Vernon Hill Country is characterized by low rolling hills and broad alluvial valleys along major streams. The southern quarter of the county lies within the Shawnee Hill Division, which is characterized by broad, rolling uplands that are dissected by relatively narrow and deep streams valleys containing steep-sided ridges and bluffs.

The highest elevation(s) (~ 650 feet above mean sea level) in Williamson County are found in the southwestern corner of the county in the Shawnee Hills. The lowest elevation(s) (~370 feet above sea level) are found in the northwest corner of the county along the Big Muddy River Valley near the village of Bush. Figure 3-2 depicts the physiographic divisions within Williamson County.

Figure 3-2: Physiographic Divisions of Williamson County



Physiographic/Hill Shade Map
Source: USGS

3.2 Climate

Williamson County climate is generally characterized by hot dry summers and cool wet winters. The variables of temperature, precipitation, and snowfall can vary greatly from one year to the next. In summer, the average low is 63.1°F and the average high is 86.8°F. However, daily maximum temperatures often exceed 90°F for the period of time (several weeks) between June and September. Also during these months, it is not uncommon for daily maximum temperatures to exceed 100°F for a few to several days.

During the fall and into the spring, freezing temperatures can occur any time between October and April. The average low and high temperatures in January are 24.2°F and 45.3°F, respectively. Average annual precipitation is 45.85 inches (NCDC data from 1971 to 2000). While the winters are generally cool, i.e. temperatures are above freezing most days, extended periods (days to a couple of weeks) of sub-freezing high temperatures often occur and are sometimes accompanied by significant amounts of ice and snow.

3.3 Demographics

According to US Census of 2007, Williamson County has a population of 64,541. From 2000–2007, the county experienced a population increase of 5.3%. The largest incorporated area within the county is the city of Marion, which has a population of 17,275. Table 3-1 shows the population distribution within the incorporated areas of Williamson County.

Table 3-1: Population by Community

Community	2007 Population	% of County
Village of Bush	263	0.4%
Village of Cambria	1,343	2.1%
City of Carterville	5,374	8.3%
Village of Colp	229	0.4%
Village of Crainville	1,316	2.0%
City of Creal Springs	718	1.1%
Village of Energy	1,207	1.9%
Village of Freeman Spur	153	0.2%
City of Herrin	12,165	18.8%
City of Hurst	794	1.2%
City of Johnston City	3,503	5.4%
Village of Pittsburg	585	0.9%
City of Marion	17,275	26.8%
Village of Spillertown	222	0.3%
Village of Stonefort	175	0.3%
Village of Whiteash	275	0.4%
Rural Population	18,944	29.4%

Source: American FactFinder, 2008 and U.S. Bureau of the Census: July 1, 2007 Estimates

3.4 Economy

Illinois MapStats, Illinois Department of Employment Security, and Illinois at Work Quarterly Reports for 2006 state that 61% of the workforce in Williamson County was employed in the private sector. Public administration represents the largest sector of employment in the county, employing approximately 18.0% of the workforce and generating approximately 11.4% of the earnings. The 2005 annual per capita income in the county is $27,169 compared to an Illinois average of $36,264. Table 3-2 presents the employment of the county's workforce by sector.

Table 3-2: Industrial Employment by Sector

Industrial Sector	% of County Workforce (2006)
Agriculture, Forestry, Fishing, Hunting, and Mining	0.6%
Construction	5.0%
Manufacturing	12.1%
Wholesale Trade	2.0%
Retail Trade	13.4%
Transportation, Warehousing and Utilities	3.7%
Information	2.0%
Finance, Insurance, Real Estate, and Rental/Leasing	6.4%
Professional and Business Services	7.8%
Educational, Health, and Social Services	15.4%
Arts, Entertainment, Recreation, Accommodation and Food Services	11.2%
Other Services (except Public Administration)	2.4%
Public Administration	18.0%

Source: Illinois Department of Employment Security 2007 and Illinois MapStats, 2008

3.5 Industry

Williamson County's major employers and number of employees are listed in Table 3-3. The largest employer is Aisin, which was established in 2001 and has nearly 1,000 employees. John A. Logan Community College is the second largest, with 800 full-time employees.

Table 3-3: Major Employers

Company Name	Location	Established	Employees	Type of Business
Manufacturing				
General Dynamics Corporation	Carterville	1958	420	Explosives and Ammunition
Minova USA Inc.	Marion	1974	100	Mining Equipment
Aisin MFG IL,LLC	Marion	2001	660	Auto Part Fabricator
Aisin Light Metals, Inc.	Marion	2004	140	Auto Parts
Aisin Electronics, IL, LLC	Marion	2005	130	Auto Parts
Pepsi Mid American	Marion	1935	600	Soda Bottler
Crisp Container	Marion	N/A	100	Soda Bottler
Retail Trade				
Walmart	Marion	2006	350	Food, Clothing, and Goods
Walmart	Herrin	1984	100	Food, Clothing, and Goods
Home Depot	Marion	2002	100	Home Improvement
Menards	Marion	2006	150	Home Improvement
Transportation, Warehousing and Utilities				
Ameren/CIPS	Herrin	1912	200	Electric/Gas
Southern IL Power Co-op	Marion	1963	500	Electric
United Parcel Service	Herrin	1975	150	Distribution Center
Circuit City	Marion	2001	350	Electronics Distribution Center
Verizon	Marion	N/A	200	Telecommunications
Finance, Insurance, Real Estate, and Rental/Leasing				
Blue Cross/Blue Shield	Marion	1983	350	Insurance Provider
Wisconsin Physicians Services	Marion	1998	300	Insurance Provider
Educational, Health, and Social Services				
John A. Logan	Carterville	1967	800	Higher Education
Carterville Unit School District #5	Carterville	1965	152	School District
Herrin Unit School District #4	Herrin	1964	250	School District
Johnston City Unit School District #1	Johnston City	1955	110	School District
Cardinal Healthcare	Energy	N/A	140	Healthcare
Herrin Hospital	Herrin	1913	450	Healthcare
Heartland Regional Medical Hospital	Marion	2002	600	Healthcare
Veterans Administration	Marion	1942	600	Healthcare
Marion Unit School District #2	Marion	N/A	450	Education
Crab Orchard Unit School District #3	N/A	N/A	50	Education
Arts, Entertainment, Recreation, Accommodation and Food Services				
Rent One Park	Marion	2007	250	Baseball Stadium
Public Administration				
US Dept. of Justice	Marion	1963	350	Federal Prison

Source: Department of Commerce and Economic Opportunity, Community Profiles 2007; Direct Contact

3.6 Land Uses and Development Trends

Pre-European settlement, Williamson County was densely forested with few areas of prairie. Since settlement, agriculture, strip mining, and urbanization have dramatically altered the county's land cover. Today, agriculture comprises the county's predominate land use. This is not due to great agricultural capabilities of the land as a major agricultural producer or because of maximum economic development potential resting in agricultural pursuits; rather it is a result of the existence of large volumes of land that cannot rationally be occupied by major urban uses within the foreseeable future. As a result many agricultural uses have only limited agricultural potential. Therefore, these areas are classed in the category of their highest and best use—agricultural use. The eastern portions of the county are the primary areas of agriculture use. Additional scattered areas are located within the urban core in segments that need not be utilized for urban expansion. These agricultural areas become the overflow areas of future growth. Corn is the primary crop, followed by soybeans, winter wheat, hay, and oats.

In recent years, residential land use has experienced significant expansion in Herrin, Marion, and around Lake of Egypt. New subdivisions in Herrin have recently been constructed along Stotlar and Hurricane Roads; Lake of Egypt area is experiencing rising land values from lakeside subdivision growth; and Marion, along with nearby communities Carterville and Crainville, has been the focal point of residential development in Williamson County with the construction of several new residential developments.

Commercial land use has historically been, and continues to be, concentrated within the business districts of the incorporated municipalities of the county. However, most of the recent commercial growth has occurred in the northwest portion of Marion near the I-57 and Illinois Route 13 interchange. In this area a minor league ball park, several new hotels, retail stores, car dealerships, restaurants, and shopping mall have all been constructed within the last 10 years. Construction of a new interchange in the county is expected to contribute to further commercial development.

Industrial land use has been concentrated within the REDCO and Robert L. Butler industrial parks located in Marion. Companies found within these industrial areas include General Dynamic Corporation, Minova, USA, Inc., Aisin facilities, Pepsi Mid America, and Circuit City Distribution Center.

Coal mining was an important industry in the Southern Illinois Region between the 1930s and 1980s. From 1990 through today, the importance of coal mining to the region and Williamson County has significantly lessened due to more stringent air quality. Regardless, Southern Illinois' coal mining history, particularly strip mines, left an indelible mark on Williamson County. In areas that were strip mined, particularly prior to the Surface Mine Reclamation Action of 1977, the land has been left unsuitable for agriculture or significant commercial or residential devolvement. These areas often contain large piles of mine spoil—large, deep pits filled with water that alter surface water drainage. In Williamson County abandoned strip mines are generally found in a narrow band (10 miles wide) along Illinois Route 13 and across the entire county.

Public land use in Williamson County includes schools, parks, playgrounds, public utilities, and transportation facilities. The major areas of public land use include the Shawnee National Forest and Crab Orchard National Wildlife Refuge. Other important areas of public land use include the Lake of Egypt and Marion Fairgrounds.

Source: National Agricultural Statistics Service, Illinois County Estimates: Corn, Soybeans, and Wheat, 2006-2007

Greater Egypt Regional Planning & Development Commission, The Comprehensive Plan for the Greater Egypt Region, 1964

Bauer, R.A. 2008. Planned Coal Mine Subsidence in Illinois: A Public Information Booklet, Circular 569, Illinois Department of Natural Resources and Illinois Geologic Survey, Springfield, Illinois. http://www.isgs.uiuc.edu/education/pdf-files/c569.pdf, last accessed, July 16, 2008.

3.7 Major Lakes, Rivers, and Watersheds

Williamson County lies on the divide between the Ohio and Mississippi River Basins. Two major watersheds that drain the county are the Saline River/Bay Creek and Big Muddy River. The Saline River/Bay Creek Watershed drains the eastern third of the county and empties into the Ohio River near Shawneetown, IL. Major streams within the Saline River/Bay Creek watershed in Williamson County include Prairie Creek, Brushy Creek, South Fork Saline River, and Maple Branch. The major lake within this watershed is the Lake of Egypt. The Big Muddy Watershed drains the western two-thirds of the county and empties into the Mississippi River near Grand Tower, IL. Major streams within the Big Muddy Watersheds include the Big Muddy River, Crab Orchard, Grassy, Hurricane, and Pond Creek. There are eight significant lakes within the Big Muddy Watershed in Williamson County. These lakes are Arrowhead, Johnston City, Herrin Old, Herrin New, Crab Orchard, Little Grassy, Devil’s Kitchen, and Marion reservoir.

Section 4 - Risk Assessment

The goal of mitigation is to reduce the future impacts of a hazard including loss of life, property damage, disruption to local and regional economies, and the expenditure of public and private funds for recovery. Sound mitigation must be based on sound risk assessment. Risk assessment involves quantifying the potential loss resulting from a disaster by assessing the vulnerability of buildings, infrastructure, and people. This assessment identifies the characteristics and potential consequences of a disaster, how much of the community could be affected by a disaster, and the impact on community assets. A risk assessment consists of three components: hazard identification, vulnerability analysis, and risk analysis.

4.1 Overall Hazard Ranking

4.1.1 Existing Plans

The previous Williamson County Comprehensive Emergency Management Plan (CEMP) did not contain a risk analysis. Additional local planning documents were reviewed to identify historical hazards and help identify risk. To facilitate the planning process, DFIRM maps were used for the flood analysis.

4.1.2 Planning Team

During Meeting #2 of the Williamson County Pre-Disaster Mitigation Planning initiative, which occurred on June 11, 2008, the planning team developed a list of hazards that affect the jurisdiction and ranked them. The team identified earthquakes, tornadoes, severe thunderstorms, and flooding as the four most significant hazards.

4.1.3 National Hazard Records

In addition to these identified hazards, the MHMP planning committee reviewed the list of natural hazards prepared by FEMA. To assist the planning team, historical storm event data was compiled from the National Climatic Data Center (NCDC; http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll). This NCDC data included 257 reported events in Williamson County between December 2, 1950 and April 2, 2008. A summary table of events related to each hazard type is included in the hazard profile sections that follow. A full table listing all events, including additional details, is included in this report as Appendix D. In addition to NCDC data, Storm Prediction Center (SPC) data associated with tornadoes, strong winds, and hail were plotted using SPC recorded latitude and longitude. These events are included as Appendix E. The list of NCDC hazards is included in Table 4-1.

Table 4-1: Climatic Data Center Historical Hazards

Hazard
Tornadoes
Severe Thunderstorms
Drought/Extreme Heat
Winter Storms
Flood/Flash flood

4.1.4 Hazard Ranking Methodology

Based on planning team input, national datasets, and existing plans, Table 4-2 lists the hazards Williamson County will address in this multi-hazard mitigation plan. In addition, these hazards ranked the highest based on the Priority Risk Index discussed in section 4.1.5.

Table 4-2: Planning Team Hazard List

Hazard
Earthquake
Tornado
Thunderstorms/ High Winds/ Hail/ Lightning
Transportation Hazardous Material Release
Winter Storms
Flooding
Droughts/ Extreme Heat
Landslide/Subsidence

4.1.5 Priority Risk Index

The next step involved a vulnerability analysis in which each hazard was assigned a likelihood rating based on the criteria and methods described below. Table 4-3 displays the probability of the future occurrence ranking. This ranking was based upon previous history and the definition of hazard. Using the definitions given, the likelihood of future events is "Quantified," which results in the classification within one of the four "Ranges" of likelihood.

Table 4-3: Future Occurrence Ranking

Probability	Characteristics
4 - *Highly Likely*	Event is probable within the calendar year. Event has up to 1 in 1 year chance of occurring. (1/1=100%) History of events is greater than 33% likely per year.
3 - *Likely*	Event is probable within the next three years. Event has up to 1 in 3 years chance of occurring. (1/3=33%) History of events is greater than 20% but less than or equal to 33% likely per year.
2 - *Possible*	Event is probable within the next five years. Event has up to 1 in 5 years chance of occurring. (1/5=20%) History of events is greater than 10% but less than or equal to 20% likely per year.
1 - *Unlikely*	Event is possible within the next ten years. Event has up to 1 in 10 years chance of occurring. (1/10=10%) History of events is less than or equal to 10% likely per year.

Next, the magnitude of the hazard's effect is considered according to the severity associated with past events of the hazard. Table 4-4 gives four classifications of Magnitude/Severity.

Table 4-4: Hazard Magnitude

Magnitude/Severity	Characteristics
4 - *Catastrophic*	Multiple deaths. Complete shutdown of facilities for 30 or more days. More than 50% of property is severely damaged.
3 - *Critical*	Injuries and/or illnesses result in permanent disability. Complete shutdown of critical facilities for at least 14 days. More than 25% of property is severely damaged.
2 - *Limited*	Injuries and/or illnesses do not result in permanent disability. Complete shutdown of critical facilities for more than seven days. More than 10% of property is severely damaged.
1 - *Negligible*	Injuries and/or illnesses are treatable with first aid. Minor quality of life lost. Shutdown of critical facilities and services for 24 hours or less. Less than 10% of property is severely damaged.

Warning Time and Duration are allotted four ranges each, as shown in the Table 4-5. Also indicated is the weighting factor for each of the four parts of the Calculated Priority Risk Index. The Probability factor is weighted at .45, Magnitude/Severity at .30, Warning Time at .15, and Duration at .10. These weights of significance are used to assign relative importance to each of these factors when combined to generate the Calculated Priority Risk Index value.

Table 4-5: Calculated Priority Risk Index

.45 Probability	.30 Magnitude/Severity	.15 Warning Time	.10 Duration
4 - Highly Likely	4 - Catastrophic	4 - Less Than 6 Hours	4 - More Than 1 Week
3 - Likely	3 - Critical	3 - 6-12 Hours	3 - Less Than 1 Week
2 - Possible	2 - Limited	2 - 12-24 Hours	2 - Less Than 1 Day
1 - Unlikely	1 - Negligible	1 - 24+ Hours	1 - Less Than 6 Hours

Table 4-6 identifies the Calculated Priority Risk Index for each hazard facing Williamson County.

Table 4-6: Williamson County Hazards (Calculated Priority Risk Index)

Hazard	Probability	Magnitude/Severity	Warning Time	Duration	Priority Risk Index
Earthquake	3.5 – Likely	4 – Catastrophic	4 – Less than 6 Hours	3 – Less than 1 Week	3.68
Tornado	4 – Highly Likely	3 – Critical	4 – Less than 6 Hours	2 – Less than 1 Day	3.50
Thunderstorms/ High Winds/Hail/ Lightning	4 – Highly Likely	2 – Limited	4 – Less than 6 Hours	2 – Less than 1 Day	3.20
Transportation of Hazardous Material Release	3 – Likely	2 – Limited	4 – Less than 6 Hours	2 – Less than 1 Day	2.75
Flooding	3 – Likely	3 – Critical	3 – 6–12 Hours	3 – Less than 6 Hours	3.00
Winter Storms	3 – Likely	2 – Limited	3 – 6–12 Hours	3 – Less than 6 Hours	2.70
Dam/Levee Failure	2 – Possible	2 – Limited	4 – Less than 6 Hours	2 – Less than 1 Day	2.30
Droughts/Extreme Heat	2 – Possible	2 – Limited	2 – 12–24 Hours	3 – Less than 6 Hours	2.10

4.1.6 GIS and HAZUS-MH

The third step in this assessment is the risk analysis, which quantifies the risk to the population, infrastructure, and economy of the community. Where possible, the hazards were quantified using Geographic Information System (GIS) analyses and HAZUS-MH, a GIS-based risk mitigation tool developed by the Federal Emergency Management Agency (FEMA). This process reflects a Level Two approach to analyzing hazards as defined for HAZUS-MH. The approach includes substitution of selected default data with local data. Level Two analysis significantly improves the accuracy of the model predictions.

HAZUS-MH generates a combination of site-specific and aggregated loss estimates depending on the analysis options that are selected and the input that is provided by the user. Aggregate inventory loss estimates, which include building stock analysis, are based on the assumption that building stock is evenly distributed across census blocks/tracts. Therefore, it is possible that overestimates of damage will occur in some areas while underestimates will occur in other areas. With this in mind, total losses tend to be more reliable over larger geographic areas than for individual census blocks/tracts. It is important to note that HAZUS-MH is not intended to be a substitute for detailed engineering studies. Rather, it is intended to serve as a planning aid for communities interested in assessing their risks to hazards relating to floods, earthquakes, and hurricanes. The documentation does not provide full details on the processes and procedures completed in the development of this project; it is only intended to highlight the major steps that were followed during the project.

Site-specific analysis is based upon loss estimations for individual structures. For flooding, analysis of site-specific structures takes into account the depth of water in relation to the structure. HAZUS-MH also takes into account the actual dollar exposure to the structure for the costs of building reconstruction, content, and inventory. However, damages are based upon the assumption that each structure falls into a structural class—for example, small versus large hospitals—and that structures in each class will respond in similar fashion to a specific depth of flooding. Site-specific analysis is also based upon a point location rather than a polygon; therefore, the model does not account for the percentage of a building that is inundated. These assumptions suggest that the loss estimates for site-specific structures, as well as for aggregate structural losses, need to be viewed as approximations of losses that are subject to considerable variability rather than as exact engineering estimates of losses to individual structures.

The following events were analyzed. The parameters for these scenarios were created using GIS, HAZUS-MH, and historical information to predict which communities would be at risk. Appendix I contains HAZUS-MH analysis reports.

Using HAZUS-MH

1. 100-year overbank flooding
2. Earthquake

Using GIS

1. Tornado
2. Hazardous Material Release

4.2 Vulnerability Assessment

4.2.1 Asset Inventory

4.2.1.1 Processes and Sources for Identifying Assets

Default data provided with the HAZUS-MH package is based on best available nationwide data sources. The initial step involved updating the default HAZUS-MH data using more specific state of Illinois data sources when available. At Meeting #1, the planning team members were provided with a plot and report of all HAZUS-MH critical facilities. The planning team took GIS data provided by SIU-Polis, verified the datasets using local knowledge, and allowed SIU-Polis to use their local GIS data for additional verification. SIU-Polis GIS analysts made these updates and corrections to the HAZUS-MH data tables prior to performing the risk assessment. The changes to the HAZUS-MH inventory allow a Level Two analysis. This update process improved the accuracy of the model predictions. The default HAZUS data has been updated as follows:

- The HAZUS defaults, critical facilities, and essential facilities have been updated based on most recent available data sources. Critical and essential point facilities have been reviewed, revised, and approved by local subject matter experts at each county.
- The essential facility updates (schools, medical care facilities, fire stations, police stations, and EOCs) have been applied to the HAZUS model data. HAZUS reports of essential facility losses reflect updated data.
- Parcels with assessment improvements (buildings) values were used to estimate the number of buildings in the flood-prone areas.
- The analysis is restricted to the county boundaries. Events that occur near the county boundary do not contain damage assessments from the adjacent county.

Critical Facilities List

Table 4-7 identifies the critical facilities that were added or updated for the analysis. A complete list of the critical facilities is included as Appendix F. A map of all the critical facilities is included as Appendix G.

Table 4-7: Critical Facilities List

Facility	Number of Facilities
Care Facilities	10
Emergency Centers	1
Fire Stations	21
Police Stations	15
Schools	31

Facility Replacement Costs

Default HAZUS-MH building stock data were used for the HAZUS-MH analyses. Facility replacement costs and total building exposure are identified in Table 4-8. Table 4-8 also includes the estimated numbers of buildings within each occupancy class.

Table 4-8: Building Exposure (default HAZUS-MH) for Williamson County

General Occupancy	Estimated Total Buildings	Total Building Exposure (X 1000)
Agricultural	144	$22,265
Commercial	1,538	$796,137
Education	49	$75,785
Government	51	$34,756
Industrial	411	$157,974
Religious/Non-Profit	200	$146,812
Residential	31,510	$3,025,848
Total	**33,903**	**$4,259,577**

Williamson County provided parcel boundaries with assessed values. The assessors data did not contain building replacement cost information and other building characteristics, and thus could not be used for the census block aggregated HAZUS-MH analysis. The parcel data was used to estimate the actual number of buildings within the flood-prone areas. The parcel data identified parcels with building improvements, which were then converted into centroid point locations. The parcels with improvements are summarized by occupancy class in Table 4-9.

Table 4-9: Parcels with Improvements by Occupancy Class for Williamson County

Occupancy Class	Count
Residential	22,769
Commercial	1,966
Industrial	52
Agriculture	2,100
Exempt	303
Total	**27,190**

4.3 Future Development

Williamson County is expected to see a modest increase in population due to the expansion of existing distribution centers, light industry, and the creation of new opportunities in the service industry such as retail stores, restaurants, and hotels. Most of this expansion is expected to take place within the city of Marion near the I-57 – Route 13 Interchange and along the Route 13 west of I-57, which includes the incorporated areas of Herrin, Carterville, and Crainville. More outdoor warning sirens will be needed to reach new residential developments and increase emergency facilities and services.

Due in part to the population growth in Williamson County, the communities of Marion and Carterville are in the process of constructing new schools. To ensure student safety, these new structures will likely be hardened for disasters such as tornadoes and earthquakes.

4.4 Hazard Profile

4.4.1 Tornado Hazard

Hazard Definition for Tornado Hazard

Tornadoes pose a great risk to the state of Illinois and its citizens. Tornadoes historically have occurred during any month of the year. The unpredictability of tornadoes makes them one of Illinois's most dangerous hazards. Their extreme winds are violently destructive when they touch down in the region's developed and populated areas. Current estimates place the maximum velocity at approximately 300 mph, but higher and lower values can occur. A wind velocity of 200 mph will result in a wind pressure of 102.4 pounds per square foot of surface area, a load that exceeds the tolerance limits of most buildings. Considering these factors, it is easy to understand why tornadoes can be so devastating for the communities they hit.

Tornadoes are defined as violently-rotating columns of air extending from thunderstorms to the ground. Funnel clouds are rotating columns of air not in contact with the ground. However, the violently-rotating column of air can reach the ground very quickly and become a tornado. If the funnel cloud picks up and blows around debris, it has reached the ground and is a tornado.

Tornadoes are classified according to the Fujita tornado intensity scale. The tornado scale ranges from low intensity F0, with effective wind speeds of 40 to 70 mph, to F5 tornadoes with effective wind speeds of over 260 mph. The Fujita intensity scale is included in Table 4-10.

Table 4-10: Fujita Tornado Rating

Fujita Number	Estimated Wind Speed	Path Width	Path Length	Description of Destruction
0 (Gale)	40–72 mph	6–17 yards	0.3–0.9 miles	Light damage, some damage to chimneys, branches broken, sign boards damaged, shallow-rooted trees blown over.
1 (Moderate)	73–112 mph	18–55 yards	1.0–3.1 miles	Moderate damage, roof surfaces peeled off, mobile homes pushed off foundations, attached garages damaged.
2 (Significant)	113–157 mph	56–175 yards	3.2–9.9 miles	Considerable damage, entire roofs torn from frame houses, mobile homes demolished, boxcars pushed over, large trees snapped or uprooted.
3 (Severe)	158–206 mph	176–566 yards	10–31 miles	Severe damage, walls torn from well-constructed houses, trains overturned, most trees in forests uprooted, heavy cars thrown about.
4 (Devastating)	207–260 mph	0.3–0.9 miles	32–99 miles	Complete damage, well-constructed houses leveled, structures with weak foundations blown off for some distance, large missiles generated.
5 (Incredible)	261–318 mph	1.0–3.1 miles	100–315 miles	Foundations swept clean, automobiles become missiles and thrown for 100 yards or more, steel-reinforced concrete structures badly damaged.

Previous Occurrences for Tornado Hazard

There have been several occurrences of tornadoes within Williamson County during recent decades. The National Climatic Data Center (NCDC) database reported nine tornadoes/funnel clouds in Williamson County since 1950.

For example, in October 2004, a tornado entered Williamson County from Johnson County where Interstate 57 crosses the county line. The tornado passed less than one-half mile south of the junction of Interstates 24 and 57 and was only on the ground for approximately one mile in Williamson County before turning back southeast into Johnson County near Route 37. In the community of Pulleys Mill, dozens of large trees were topped or uprooted, one home received partial roof damage, and a garage roof was peeled off. Utility poles and lines were downed. Peak winds along this segment of the tornado were estimated near 80 MPH.
Source: NCDC

Williamson County tornadoes recorded in the NCDC database are identified in Table 4-11. Additional details for NCDC events are included in Appendix D.

Table 4-11: Williamson County Tornadoes

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Williamson	12/18/1957	Tornado	F4	0	10	2.5M	0
Williamson	04/03/1968	Tornado	F1	0	0	25K	0
Williamson	06/02/1973	Tornado	F2	0	0	250K	0
Williamson	05/29/1982	Tornado	F4	10	181	250.0M	0
Williamson	11/19/1991	Tornado	F3	0	16	25.0M	0
Marion	06/12/1998	Tornado	F1	0	0	100K	0
Pulleys Mill	10/18/2004	Tornado	F1	0	0	25K	0
Crab Orchard	11/15/2005	Funnel Cloud	N/A	0	0	0	0
Carterville	11/15/2005	Funnel Cloud	N/A	0	0	0	0

Geographic Location for Tornado Hazard

The entire county has the same risk for occurrence of tornadoes, which can occur at any location within the county.

Hazard Extent for Tornado Hazard

The historical tornadoes listed above generally move from west to east across the county, although many other tracks are possible, from more southerly to northerly directions. The extent of the hazard varies both in terms of the extent of the path and the wind speed.

Calculated Priority Risk Index for Tornado Hazard

Based on historical information, the probability of future tornadoes in Williamson County is high. Tornadoes with varying magnitudes are expected to happen. According to the CPRI, tornadoes ranked as the number two hazard.

CPRI = Probability X .45 + Magnitude/Severity X .30 + Warning Time X .15 + Duration of event X .10.

Probability	+	Magnitude /Severity	+	Warning Time	+	Duration	=	CPRI
4 x .45	+	**3** x .30	+	**4** x .15	+	**2** x .10	=	**3.50**

Vulnerability Analysis for Tornado Hazard

Tornado hazards could impact the entire jurisdiction equally; therefore, the entire county population and all buildings are vulnerable to tornadoes. To accommodate the risk, this plan will consider all buildings located within the county as vulnerable. The existing buildings and infrastructure in Williamson County are discussed in types and numbers below. In addition, a discussion of the potential impacts for buildings and infrastructure during a tornado are included.

Critical Facilities

All critical facilities are vulnerable to tornadoes. A critical facility, if vulnerable, will encounter many of the same impacts as any other building within the jurisdiction. These impacts will vary based on the magnitude of the tornado, but can include structural failure, debris (trees or limbs) causing damage, roofs blown off or windows broken by hail or high winds, and loss of facility functionality (e.g. a damaged police station will no longer be able to serve the community). More information related to specific impacts for each Fujita number is included in Table 4-10. Table 4-7 lists the types and numbers of all of the critical facilities in the area. Critical facility information, including replacement costs, is included in Appendix F. A map of the critical facilities is included in Appendix G.

General Building Stock

A table of the building exposure in terms of types and numbers of buildings for the entire county is listed in Table 4-8. The buildings within the county can all expect the same impacts, similar to those discussed for critical facilities. These impacts include structural failure, debris (trees or limbs) causing damage, roofs blown off or windows broken by hail or high winds, and loss of building function (i.e. a damaged home will no longer be habitable causing residents to seek shelter). More information related to specific impacts for each Fujita number is included in Table 4-10.

Infrastructure

During a tornado the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. Since the county's entire infrastructure is equally vulnerable, it is important to emphasize that any number of these items could become damaged during a tornado. The impacts to these items include broken, failed, or impassable roadways, broken or failed utility lines (i.e. loss of power or gas to community), and railway failure from broken or impassable railways. Bridges could fail or become impassable causing risk to traffic.

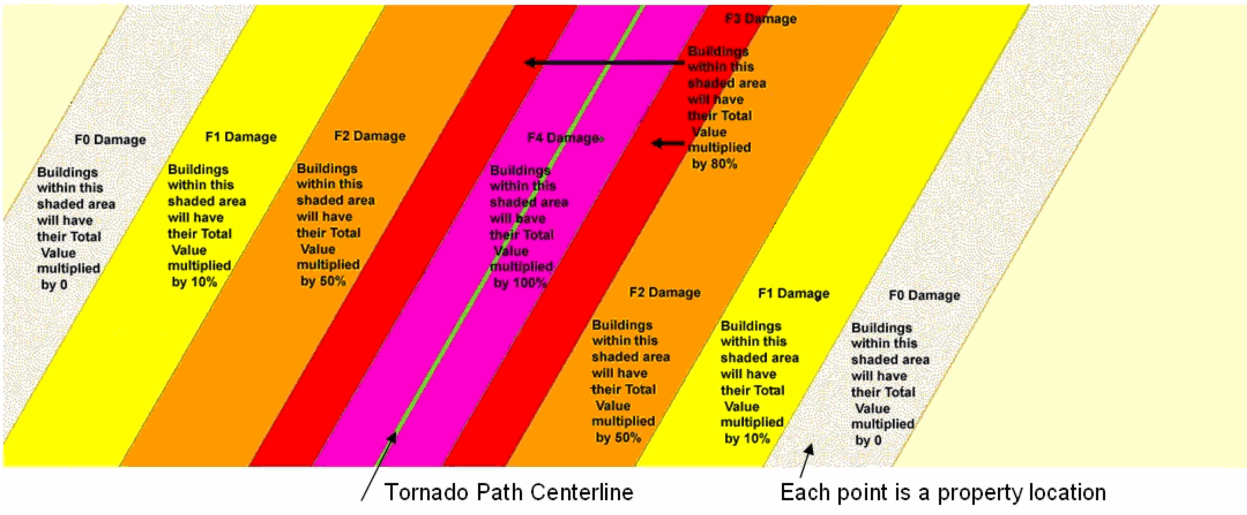
An example scenario is described below to illustrate the anticipated impacts of tornadoes in the county in terms of numbers and types of buildings and infrastructure. GIS overlay modeling was used to determine the potential impacts of an F4 tornado. The analysis used a historical path based upon the F4 tornado event that ran for 12.5 miles through the towns of Carterville and Marion in 1982, simulating the effects if the 1982 tornado were to be repeated today. The selected widths were modeled after a re-creation of the Fujita-Scale guidelines based on conceptual wind speeds, path widths, and path lengths. There is no guarantee that every tornado will fit exactly into one of these six categories. Table 4-12 depicts tornado damage curves as well as path widths.

Table 4-12: Tornado Path Widths and Damage Curves

Fujita Scale	Path Width (feet)	Maximum Expected Damage
F-5	3000	100%
F-4	2400	100%
F-3	1800	80%
F-2	1200	50%
F-1	600	10%
F-0	300	0%

Within any given tornado path there are degrees of damage. The most intense damage occurs within the center of the damage path with a decreasing amount of damage away from the center of the path. This natural process was modeled in GIS by adding damage zones around the tornado path. Figure 4-1 and Table 4-13 describe the zone analysis.

Figure 4-1: GIS Analysis Using Tornado Buffers



Once the historical route is digitized on the map, several buffers are created to model the damage functions within each zone.

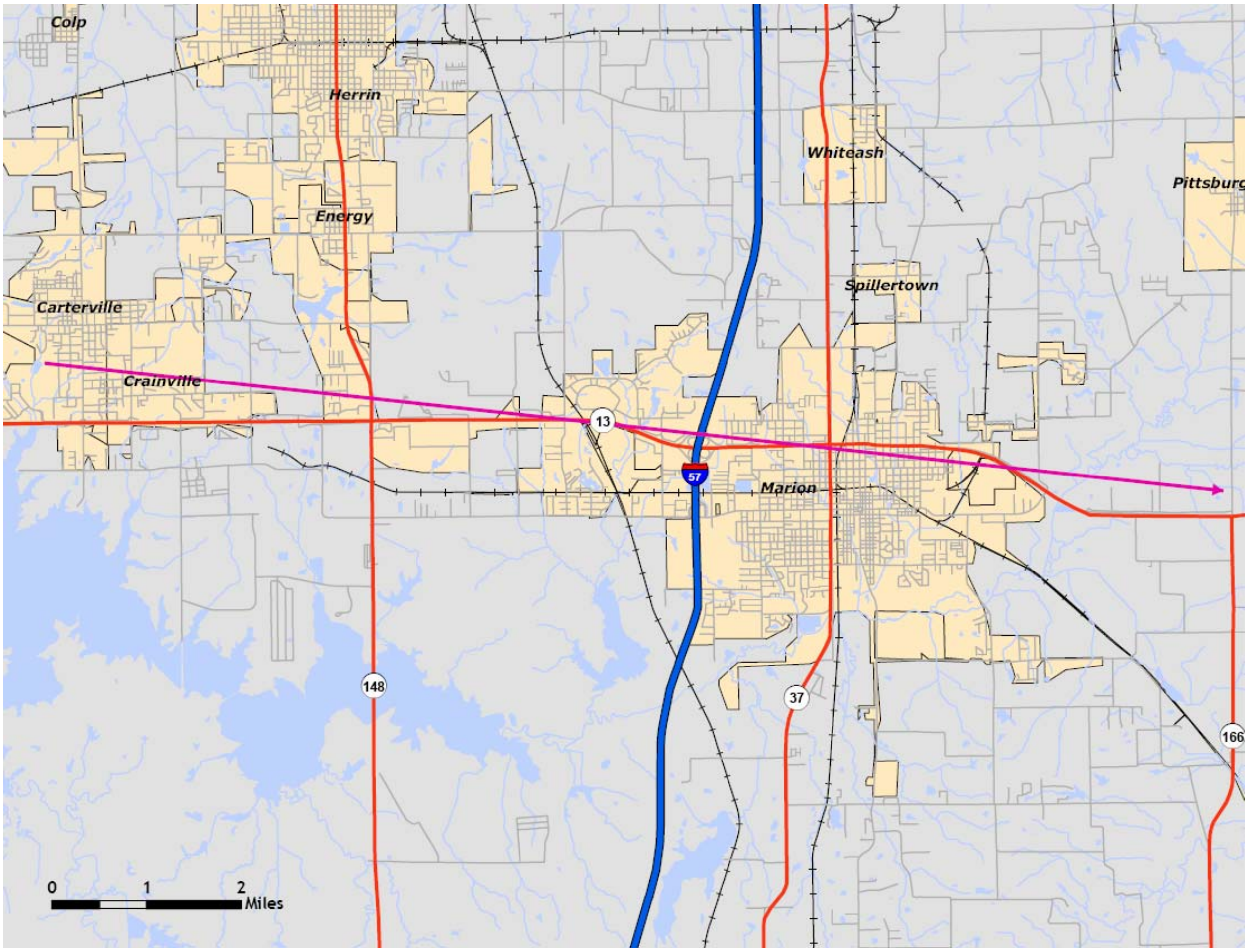
An F4 tornado has four damage zones. Total devastation is estimated within 150 feet of the tornado path (the darker-colored zone 1). The outer buffer is 900 feet from the tornado path (the lightest-colored zone 4), within which 10% of the buildings will be damaged.

Table 4-13: Tornado Zones and Damage Curves

Fujita Scale	Zone	Buffer (feet)	Damage Curve
F-4	4	600–900	10%
F-4	3	300–600	50%
F-4	2	150–300	80%
F-4	1	0–150	100%

The selected historical tornado path is depicted in Figure 4-2.

Figure 4-2: Historical F4 Tornado Path in Williamson County



Analysis

The GIS analysis of the simulated tornado (the 1982 event affecting present-day infrastructure) estimates that 1,409 buildings would be damaged. The estimated building losses were $106 million. The building losses are an estimate of building replacement costs multiplied by the percentages of damage. The overlay was performed against parcels with building improvement valuations provided by Williamson County. The results of the analysis are depicted in Tables 4-14 and 4-15 and Figure 4-3.

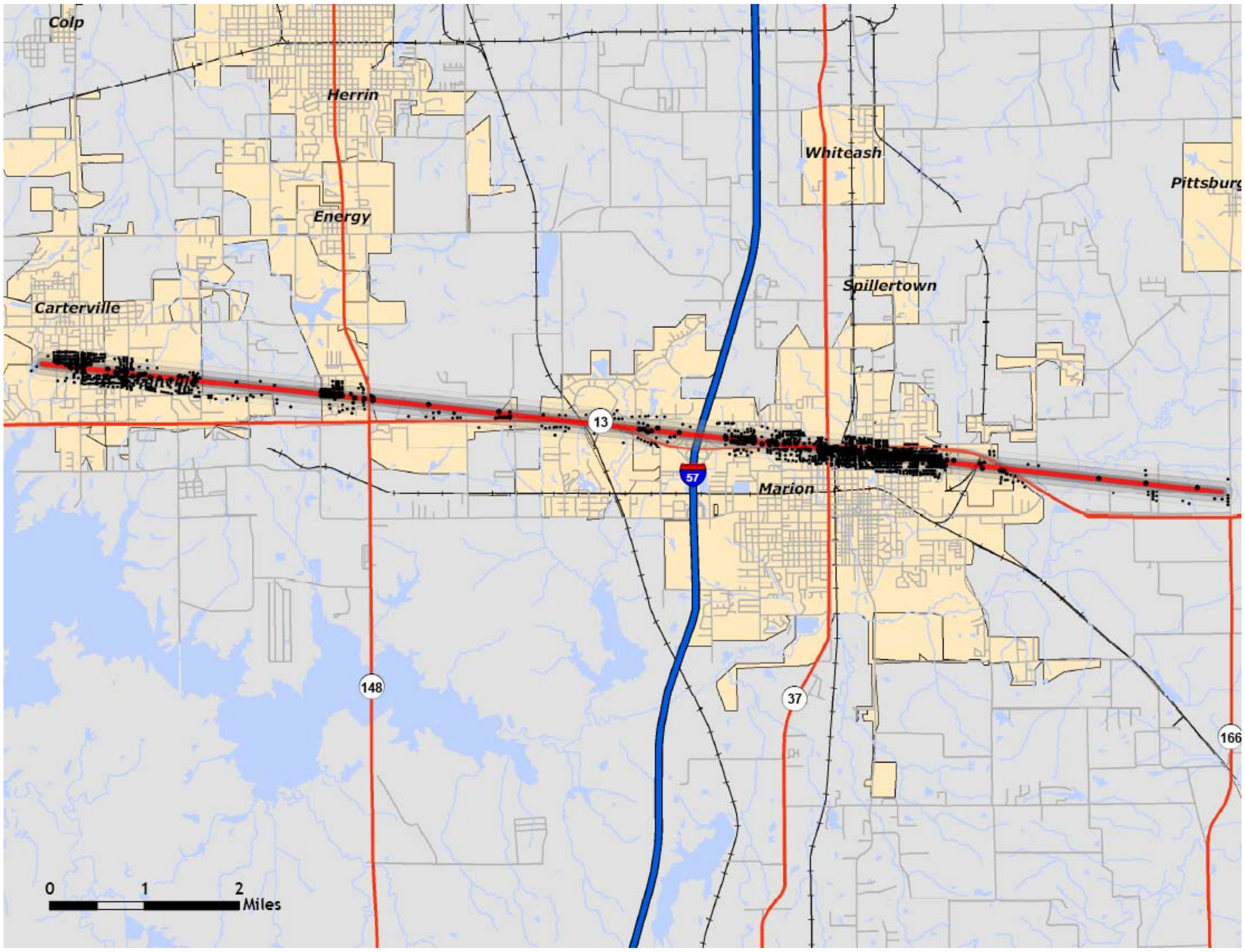
Table 4-14: Estimated Numbers of Buildings Damaged by Occupancy Type

Occupancy	Zone 1	Zone 2	Zone 3	Zone 4
Residential	161	152	352	390
Commercial	54	57	140	75
Industrial	0	0	0	0
Agriculture	6	1	3	4
Exempt	2	4	3	5
Total	**223**	**214**	**498**	**474**

Table 4-15: Estimated Building Losses by Occupancy Type

Occupancy	Zone 1	Zone 2	Zone 3	Zone 4
Residential	$10,780,170	$7,572,936	$10,735,470	$2,529,273
Commercial	$25,220,190	$19,096,944	$24,881,220	$4,156,794
Industrial	$0	$0	$0	$0
Agriculture	$358,950	$720	$82,815	$41,718
Exempt	$37,920	$425,400	$135,975	$28,785
Total	**$36,397,230**	**$27,096,000**	**$35,835,480**	**$6,756,570**

Figure 4-3: Modeled F4 Tornado Damage Buffers In Williamson County



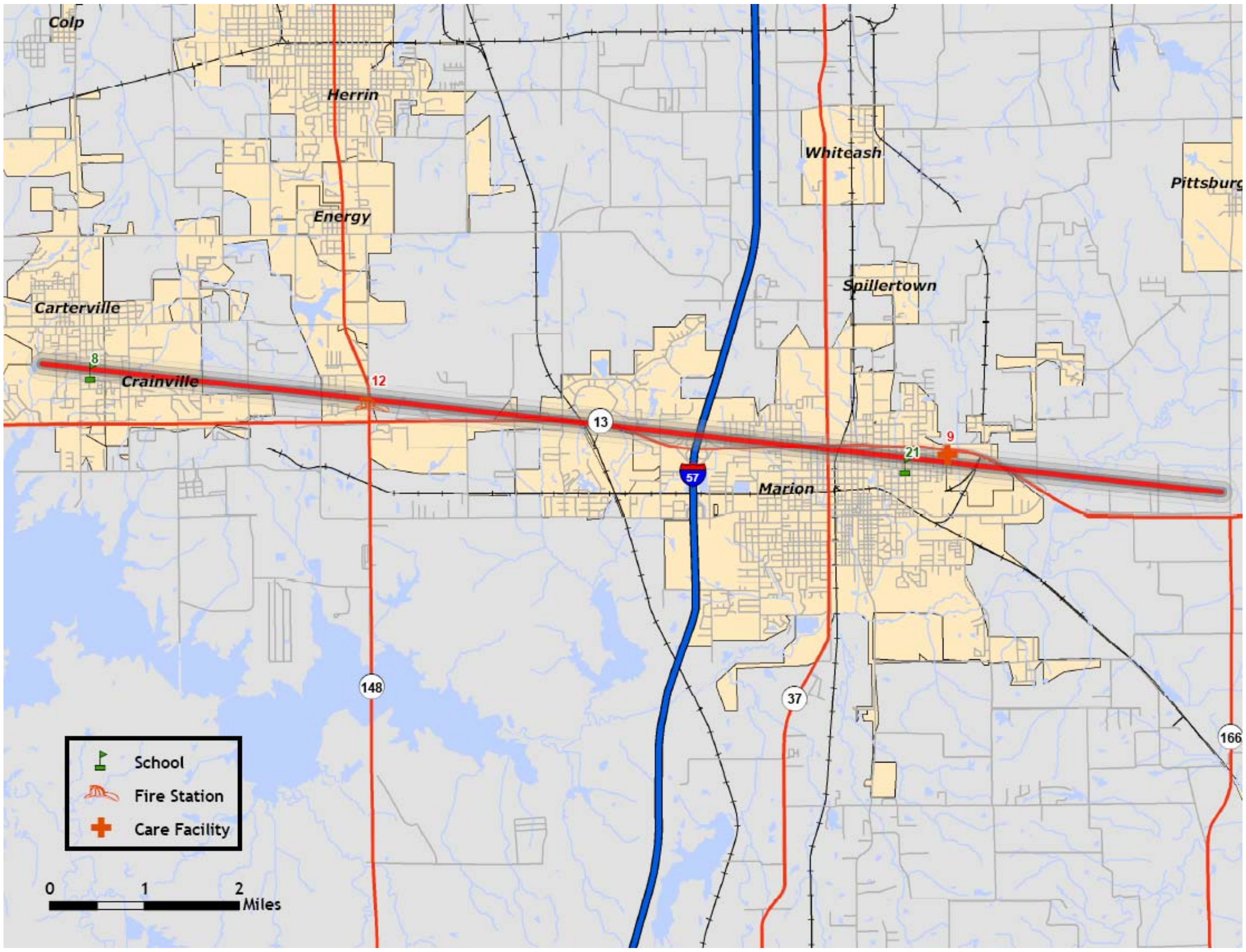
Essential Facilities Damage

There are four essential facilities located within 900 feet of the historical tornado path. The model predicts that one care facility, one fire station, and two schools would experience damage. The affected facilities are identified in Table 4-16, and their geographic locations are shown in Figure 4-4.

Table 4-16: Estimated Essential Facilities Affected

Name
Fountains Care Facility
Williamson County Fire Dept - Station #6
Carterville High School
Jefferson School

Figure 4-4: Essential Facilities within Tornado Path



Vulnerability to Future Assets/Infrastructure for Tornado Hazard

The entire population and buildings of Williamson County have been identified as at risk because tornadoes can occur anywhere within the state of Illinois. Furthermore, any future development in terms of new construction within the county will be at risk. The building exposure for Williamson County is included in Table 4-8.

All critical facilities in the county and its communities are at risk. Critical facility information, including replacement costs, is included in Appendix F. A map of the critical facilities is included in Appendix G.

Analysis of Community Development Trends

Preparing for severe storms will be enhanced if officials sponsor a wide range of programs and initiatives to address the overall safety of county residents. New structures should be built with sturdier construction, and existing structures should be hardened to lessen the potential impacts of severe weather. Community sirens to warn of approaching storms are also vital to ensuring the safety of Williamson County residents and minimizing property damage.

4.4.2 Flood Hazard

Hazard Definition for Flooding

Flooding is a significant natural hazard throughout the United States. The type, magnitude, and severity of flooding are functions of the amount and distribution of precipitation over a given area, the rate at which precipitation infiltrates the ground, the geometry and hydrology of the catchment, and flow dynamics and conditions in and along the river channel. Floods can be classified as one of two types: upstream floods or downstream floods. Both types of floods are common in Illinois. Upstream floods, also called flash floods, occur in the upper parts of drainage basins and are generally characterized by periods of intense rainfall over a short duration. These floods arise with very little warning and often result in locally intense damage, and sometimes loss of life, due to the high energy of the flowing water. Flood waters can snap trees, topple buildings, and easily move large boulders or other structures. Six inches of rushing water can upend a person; another eighteen inches might carry off a car. Generally, upstream floods cause damage over relatively localized areas, but they can be quite severe in the local areas where they occur. Urban flooding is a type of upstream flood. Urban flooding involves the overflow of storm drain systems and can be the result of inadequate drainage combined with heavy rainfall or rapid snowmelt. Upstream or flash floods can occur at any time of the year in Illinois, but they are most common in the spring and summer months.

Downstream floods, sometimes called riverine floods, refer to floods on large rivers at locations with large upstream catchments. Downstream floods are typically associated with precipitation events that are of relatively long duration and occur over large areas. Flooding on small tributary streams may be limited, but the contribution of increased runoff may result in a large flood downstream. The lag time between precipitation and time of the flood peak is much longer for downstream floods than for upstream floods, generally providing ample warning for people to move to safe locations and, to some extent, secure some property against damage. Riverine flooding on the large rivers of Illinois generally occurs during either the spring or summer.

Hazard Definition for Dam and Levee Failure

Dams are structures that retain or detain water behind a large barrier. When full or partially full, the difference in elevation between the water above the dam and below creates large amounts of potential energy, creating the potential for failure. The same potential exists for levees when they serve their purpose, which is to confine flood waters within the channel area of a river and exclude that water from land or communities land-ward of the levee. Dams and levees can fail due to either: (1) water heights or flows above the capacity for which the structure was designed; or (2) deficiencies in the structure such that it can not hold back the potential energy of the water. If a dam or levee fails, issues of primary concern include loss of human life/injury, downstream property damage, lifeline disruption (of concern would be transportation routes and utility lines required to maintain or protect life), and environmental damage.

Many communities view both dams and levees as permanent and infinitely safe structures. This sense of security may well be false, leading to significantly increased risks. Both downstream of dams and on floodplains protected by levees, security leads to new construction, added infrastructure, and increased population over time. Levees in particular are built to hold back flood waters only up to some maximum level, often the 100-year (1% annual probability) flood event. When that maximum is exceeded by more than the design safety margin, then the levee will be overtopped or otherwise fail, inundating communities in the land previously protected by that levee. It has been suggested that climate change, land-use shifts, and some forms of river engineering may be increasing the magnitude of large floods and the frequency of levee-failure situations.

In addition to failure that results from extreme floods above the design capacity, levees and dams can fail due to structural deficiencies. Both dams and levees require constant monitoring and regular maintenance to assure their integrity. Many structures across the U.S. have been under-funded or otherwise neglected, leading to an eventual day of reckoning in the form either of realization that the structure is unsafe, or sometimes an actual failure. The threat of dam or levee failure may require substantial commitment of time, personnel, and resources. Since dams and levees deteriorate with age, minor issues become larger compounding problems, and the risk of failure increases.

Previous Occurrences for Riverine and Flash Flooding

The National Climatic Data Center (NCDC) database reported 23 flash flood (including urban/small stream flooding) and seven riverine flood events in Williamson County between 1993 and 2006. Flash flooding accounts for the overwhelming majority of flood damage in the county. The NCDC reported approximately $2.7 million in property damage and another $50,000 dollars in crop damage related to flash flooding through this period. Riverine and small stream flooding accounted for $243,000 in property damage and an additional $30,000 in crop damages in Williamson and its surrounding counties. One death was attributed to flash flooding (NCDC 2008).

Significant flooding occurred in Williamson County as recently as March 18, 2008, requiring the opening of a Red Cross Shelter in Marion to help people displaced by the flooding. Within the city of Marion the fire department rescued 21 people by boat from their flooded homes. In Herrin 10 basements were severely flooded. Several low lying areas in the county were also flooded resulting in the closure of several roads in and around Johnston City and along Illinois Route 148 in the area of Crab Orchard Creek.

Significant Williamson County floods recorded by the NCDC are shown in Table 4-17. A complete list of flood events and additional information regarding significant flood events are included in Appendix D. Historical flood crests and discharges at hydrologic monitoring stations are summarized in Appendix H.

Table 4-17: Williamson County Previous Occurrences of Flooding

Location or County	Date	Type	Deaths	Injuries	Property Damage in $1000s	Crop Damage in $1000s
Williamson	11/14/1993	Flash Flood	0	0	500K	0
Williamson	04/22/1996	Flood	0	1	0	0
Marion	04/28/1996	Flash Flood	0	0	0	0

Location or County	Date	Type	Deaths	Injuries	Property Damage in $1000s	Crop Damage in $1000s
Williamson	05/01/1996	Flood	0	0	0	0
Marion	05/10/1996	Flash Flood	0	0	35K	30K
Williamson	04/15/1998	Flash Flood	0	0	500K	50K
Crab Orchard	06/29/1998	Flash Flood	0	0	100K	0
Williamson	01/21/1999	Flash Flood	0	0	0	0
Williamson	06/17/2000	Flood	0	0	1.0M	0
Marion	08/03/2000	Urban/small Stream Flood	0	0	0	0
Williamson	12/17/2001	Flash Flood	0	0	0	0
Williamson	12/17/2001	Flood	0	0	0	0
Williamson	11/15/2005	Flash Flood	0	0	40K	0
Williamson	11/15/2005	Flash Flood	0	0	50K	0
Herrin	07/04/2006	Flash Flood	0	0	70K	0
Williamson	3/18/2008 to 3/19/2008	Flood	0	0	375K	0

Source: NCDC

Previous Occurrences for Dam and Levee Dam Failure

According to the Williamson County EMA Director Alan Gower, there are no records or local knowledge of any dam or certified levee failure in the county.

Repetitive Loss Properties

FEMA defines a repetitive loss structure as a structure covered by a contract of flood insurance issued under the National Flood Insurance Program (NFIP) that has suffered flood loss damage on two or more occasions during a 10-year period that ends on the date of the second loss, in which the cost to repair the flood damage is 25% of the market value of the structure at the time of each flood loss.

Illinois Emergency Management was contacted to determine the location of repetitive loss structures. Williamson County has 19 repetitive loss structures within the county. The total amount paid for building replacement and building contents for damages to these repetitive loss structures is $949,133.69.

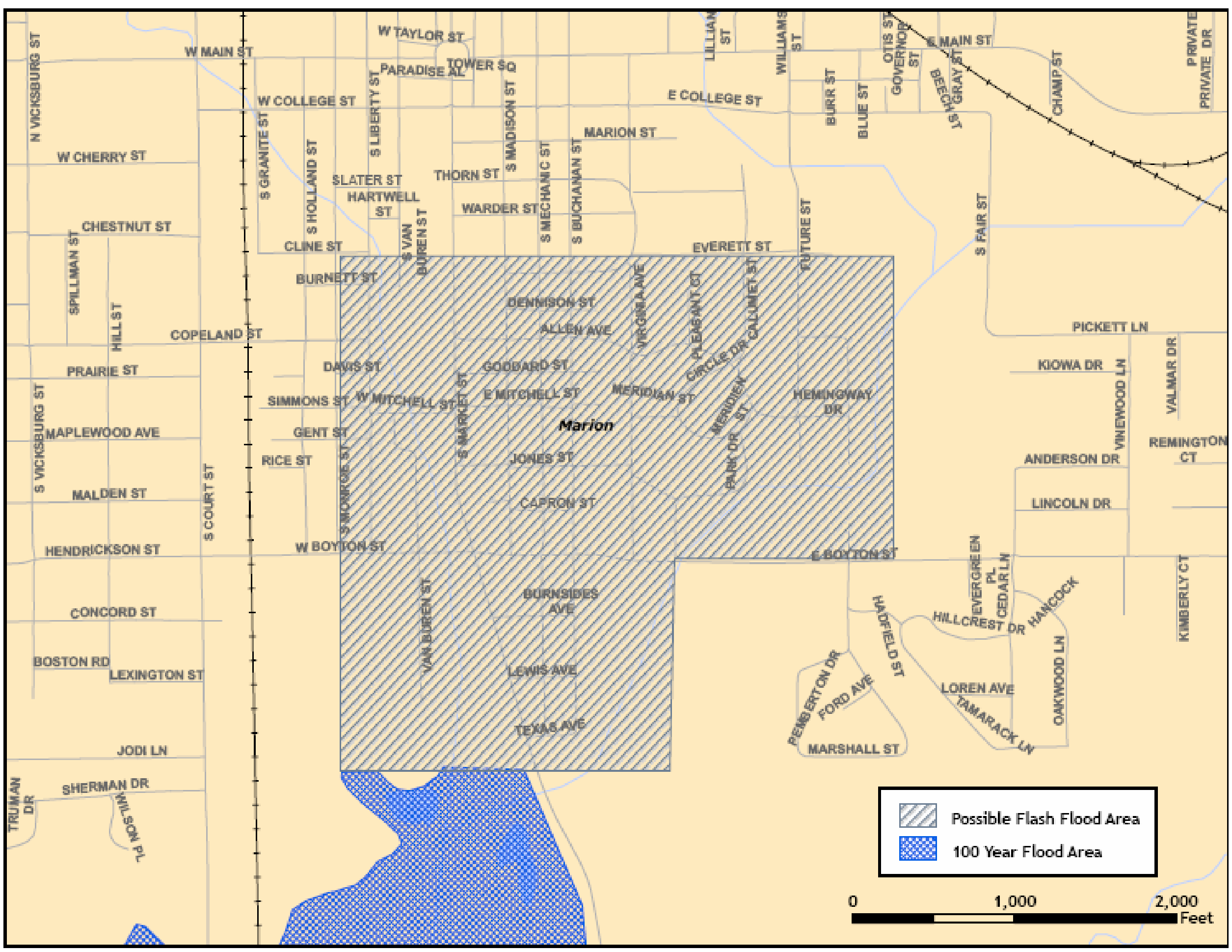
Geographic Location for Flooding

Most riverine flooding in Illinois occurs during either the spring or summer and is the result of excessive rainfall and/or the combination of rainfall and snowmelt. Flash flooding of low-lying areas in Illinois can occur during any time of the year, but tends to be less frequent and more localized between mid-summer and early winter.

The primary sources of riverine flooding in Williamson County are Crab Orchard Creek, the Big Muddy River, South Fork of the Saline River, and Little Grassy Creek. However, only riverine flooding along the Crab Orchard Creek and the Big Muddy River affect incorporated areas within Williamson County. Flooding along the Crab Orchard Creek can impact limited portions of Marion. Riverine flooding along the Big Muddy River and a few of its tributaries can affect limited areas of Johnston City, Freeman Spur, Herrin, Bush, and Hurst. Outside the incorporated areas of Williamson County, riverine floods can cause secondary road closures and flooding of agricultural lands. However, unless the flooding is a large event, most residential/urban areas and major roads and highways are not affected. During these large events, Crab Orchard Creek can cause the closure of Route 148 south of Marion and Old Route 13. Lake Creek, a small tributary to the Big Muddy River, can cause the closure of Route 37 between White Ash and Johnston City.

Flash flooding in Williamson County typically occurs or is best documented in urban/developed areas. For example, in the city of Marion, members of the planning team identified a recurring area of flash flooding on the south side of town. This area is bounded on the north by Everet Street, on the south by Boyton and Market Streets, on the east by Illinois Route 37, and on the west by Future Street (Figure 4-5). Flash flooding has also been documented in Carterville and Herrin (NCDC).

Figure 4-5: Historical Flash Flood Area in Marion, IL



The state of Illinois has recently completed the modernization of the Flood Insurance Rate Maps (FIRMs) for Williamson County. These digital files (DFIRMs) were used to identify specific stream reaches for analysis. The areas of riverine flooding are depicted on the map in Appendix E.

The U.S. Geologic Survey (USGS) provides information from hydrologic monitoring stations in the United States through its National Water Information System. Historically, there have been four hydrologic monitoring stations operated by the USGS in Williamson County, but at present none of those are operating. There are two hydrologic stations currently operating along the Big Muddy River in adjacent Franklin and Jackson Counties. Historical flood stages and discharge (where available) were compiled from these stations and a historic gauging location along the Crab Orchard Creek in Marion. These data are presented in Appendix H.

Geographic Location for Dam and Levee Failure

The National Inventory of Dams identified 30 dams in Williamson County. The map in Appendix E illustrates the location of Williamson County dams. Table 4-18 summarizes the National Inventory of Dams information.

Table 4-18: National Inventory of Dams

Name	River	Hazard	EAP
Johnston City Sewerage Lagoon	Lake Creek	S	
Pleasant Valley Lake	Wolf Creek	L	
Knights of Pythais Lake	Trib. S. Fork of Saline River	L	
Durst Lake	Trib. Crab Orchard Creek	L	
Madison Lake	Trib Hurricane Creek	L	
Marion Country Club Lake	Trib. S. Fork of Saline River	L	
Freeman United Fresh Water Lake	Trib. Lake Creek	S	
Lake of Egypt	S. Fork Saline River	H	
Marion Reservoir	Limb Branch	S	
Belford Lake	Trib. Little Cana Creek	L	
Zeigler Coal Lake 5	Trib. Lake Creek	S	
Sweet Lake	Trib. Lake Creek	S	
Teal Lake	Trin Limb Branch	L	
Johnston City Lake	Trib. Lake Creek	S	
Herrin Lake 1	Trib. Hurricane Creek	N/A	
Herrin Lake 2	Wolf Creek	N/A	
Sipco South Fly Ash Pond	Trib Lake of Egypt	L	
Freeman United Orient 4 East Slurry	Lake Creek	H	
Bleyer Lake	Caney Branch	L	
Martel	Trib. Lake Creek	L	
Freeman United, Orient 4, Auxiliary	Trib. Lake Creek	L	
Marion New Lake	Sugar Creek	H	
Southern IL Power Fly Ash Disposal Pond	Little Saline Creek	L	
Little Grassy	Little Grassy	H	Yes
Devil's Kitchen	Grassy Creek	H	Yes

Name	River	Hazard	EAP
Crab Orchard	Crab Orchard Creek	H	Yes
Visitor Center Dam	Unknown	H	Yes
Orient NO.4	Unknown	S	
Orient NO.4	Unknown	S	
Orient NO.4	Unknown	S	
Orient NO.4	Unknown	S	
Orient NO.4	Unknown	S	

A review of the Williamson County DRIM and county files identified no FEMA-certified levees in Williamson County.

Hazard Extent for Flooding

The HAZUS-MH flood model is designed to use a flood depth grid and flood boundary polygon from the DFIRM data. HAZUS-MH was used to model the Base Flood Elevation (BFE). The BFE is defined as the area that has a 1% chance of flooding in any given year. Planning team input and a review of historical information provided additional information on specific flood events.

Hazard Extent for Dam and Levee Failure

Dams assigned the low (L) hazard potential classification are those where failure or mis-operation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property. Dams assigned the significant (S) hazard classification are those dams where failure or mis-operation results in no probable loss of human life but can cause economic loss, environment damage, disruption of lifeline facilities, or impact other concerns. Dams classified as significant hazard potential dams are often located in predominantly rural or agricultural areas, but could be located in populated areas with a significant amount of infrastructure. Dams assigned the high (H) hazard potential classification are those dams where failure or mis-operation has the highest risk to cause loss of human life and significant damage to buildings and infrastructure.

According to the DNR and the National Inventory of Dams, six dams are classified as high hazard dams. Four dams have an Emergency Action Plan (EAP). An EAP is not required by the state of Illinois but is recommended in the 2003 Illinois Dam Safety & Inspection Manual.

Accurate mapping of the risks of flooding behind levees depends on knowing the condition and level of protection the levees actually provide. FEMA and the U.S. Army Corps of Engineers are working together to make sure that flood hazard maps better reflect the flood protection capabilities of levees and that the maps accurately represent the flood risks posed to areas situated behind them. Levee owners—usually states, communities, or private individuals or organizations such as local levee districts—are responsible for ensuring that the levees they own are maintained to their original design level and condition. In order to be considered creditable flood protection structures on FEMA's flood maps, levee owners must provide documentation to prove that the levee meets design, operation, and maintenance standards for protection against the 1% annual probability (100-year) flood. There are no federal levees within Williamson County. A detailed inventory of agriculture and/or local levees was not available.

Calculated Priority Risk Index for Flooding

Based on historical information and the HAZUS-MH flooding analysis results, the probability of flooding in Williamson is high. According to the Calculated Priority Risk Index (CPRI), flooding ranked as the number four hazard in Williamson County.

CPRI = Probability X .45 + Magnitude/Severity X .30 + Warning Time X .15 + Duration of event X .10.

Probability	+	Magnitude /Severity	+	Warning Time	+	Duration	=	CPRI
3 x .45	+	**3** x .30	+	**3** x .15	+	**3** x .10	=	**3.00**

Calculated Priority Risk Index for Dam and Levee Failure

Based on operation and maintenance requirements and local knowledge of the dams in Williamson County, the probability of failure is low. However, if a high hazard dam were to fail, the magnitude and severity of the damage could be great. The warning time and duration of the dam failure event would be very short. According to the Calculated Priority Risk Index (CPRI), flooding ranked as the number seven hazard in Williamson County.

CPRI = Probability X .45 + Magnitude/Severity X .30 + Warning Time X .15 + Duration of event X .10.

Probability	+	Magnitude /Severity	+	Warning Time	+	Duration	=	CPRI
2 x .45	+	**2** x .30	+	**4** x .15	+	**2** x .10	=	**2.30**

Vulnerability Analysis for Flooding (HAZUS-MH Analysis Using 100-Year DFIRM Boundary and Default General Building Stock)

HAZUS-MH generated the flood depth grid for a 100-year return period and made calculations by clipping the USGS 30-m DEM to the DFIRM boundary. Next, HAZUS-MH estimated the damages for Williamson County by utilizing default aggregate general building stock census data.

General Building Stock

Table 4-19 and Figure 4-6 depicts the HAZUS-MH analysis. HAZUS-MH estimates the 100-year flood would damage 152 buildings, totaling $42.6 million in building losses and $112.8 million in economic losses. The reported building counts should be interpreted as degrees of loss rather than exact numbers of buildings exposed to flooding. These numbers were derived from aggregate building inventories, which were assumed to be dispersed evenly across census blocks. HAZUS-MH requires that a predetermined amount of square footage of a typical building sustains damage in order to produce a damaged building count. If only a minimal amount of building damage is predicted, it is possible to see zero damaged building counts while also seeing economic losses.

These buildings can expect impacts similar to those discussed for the critical facilities. These include structural failure, extensive water damage to the facility, and loss of facility functionality (i.e. residential buildings may no longer be able to provide shelter to their inhabitants).

Table 4-19: Williamson County HAZUS-MH Analysis Total Economic Loss (100-Year Flood)

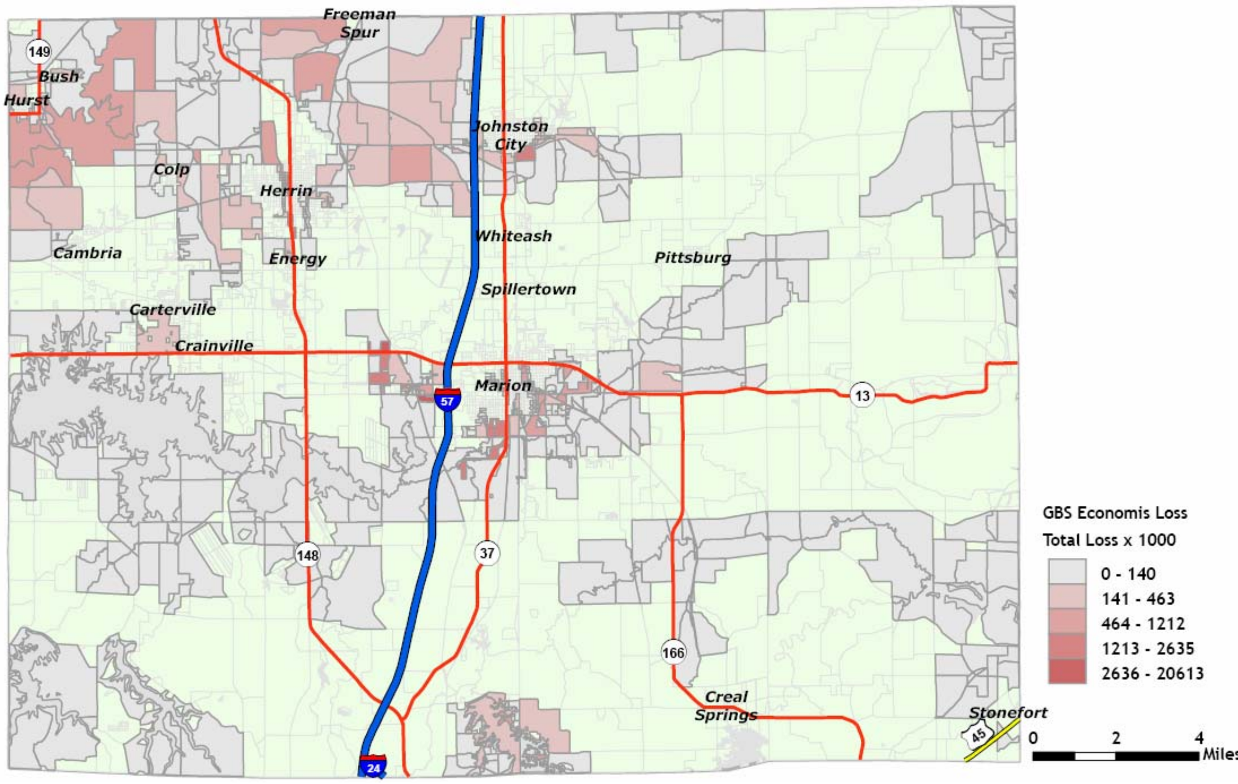
General Occupancy	Total Damaged Buildings	Building Loss (X 1000)	Total Economic Loss (X 1000)
Agricultural	0	$274	$1,089
Commercial	2	$11,245	$38,065
Education	0	$242	$1,714
Government	0	$128	$1,149
Industrial	1	$5,418	$25,505
Religious/Non-Profit	0	$823	$6,334
Residential	149	$24,432	$38,902
Total	**152**	**$42,562**	**$112,758**

Figure 4-6: Williamson County HAZUS-MH Analysis (100-Year Flood)

HAZUS-MH estimates 15 census blocks affected by the modeled flood event with losses exceeding $1 million. The distribution of losses is shown in Figure 4-7.

HAZUS-MH aggregate loss analysis is evenly distributed across a census block. Census blocks of concern should be reviewed in more detail to determine the actual percentage of facilities that fall within the flood hazard areas. The aggregate losses reported in this study may be overstated.

Figure 4-7: Williamson County Total Economic Loss (100-Year Flood)



Essential Facilities

An essential facility will encounter many of the same impacts as other buildings within the flood boundary. These impacts can include structural failure, extensive water damage to the facility, and loss of facility functionality (i.e. a damaged police station will no longer be able to serve the community). A complete list of all the essential facilities, including replacement costs, is included in Appendix C. A map of the critical facilities is included in Appendix D.

The HAZUS-MH analysis identified one fire station and two schools that may be subject to flooding. A list of the essential facilities within Williamson County is given in Table 4-20. A map of essential facilities potentially at risk to flooding is shown in Figures 4-8 and 4-9.

Table 4-20: Williamson County Damaged Essential Facilities

Facility Name
Williamson County Fire Department – Station 5
Our Lady Mount Carmel School
Marion Seventh Day Adventist School

Figure 4-8: Boundary of 100-Year Flood Overlaid with Essential Facilities

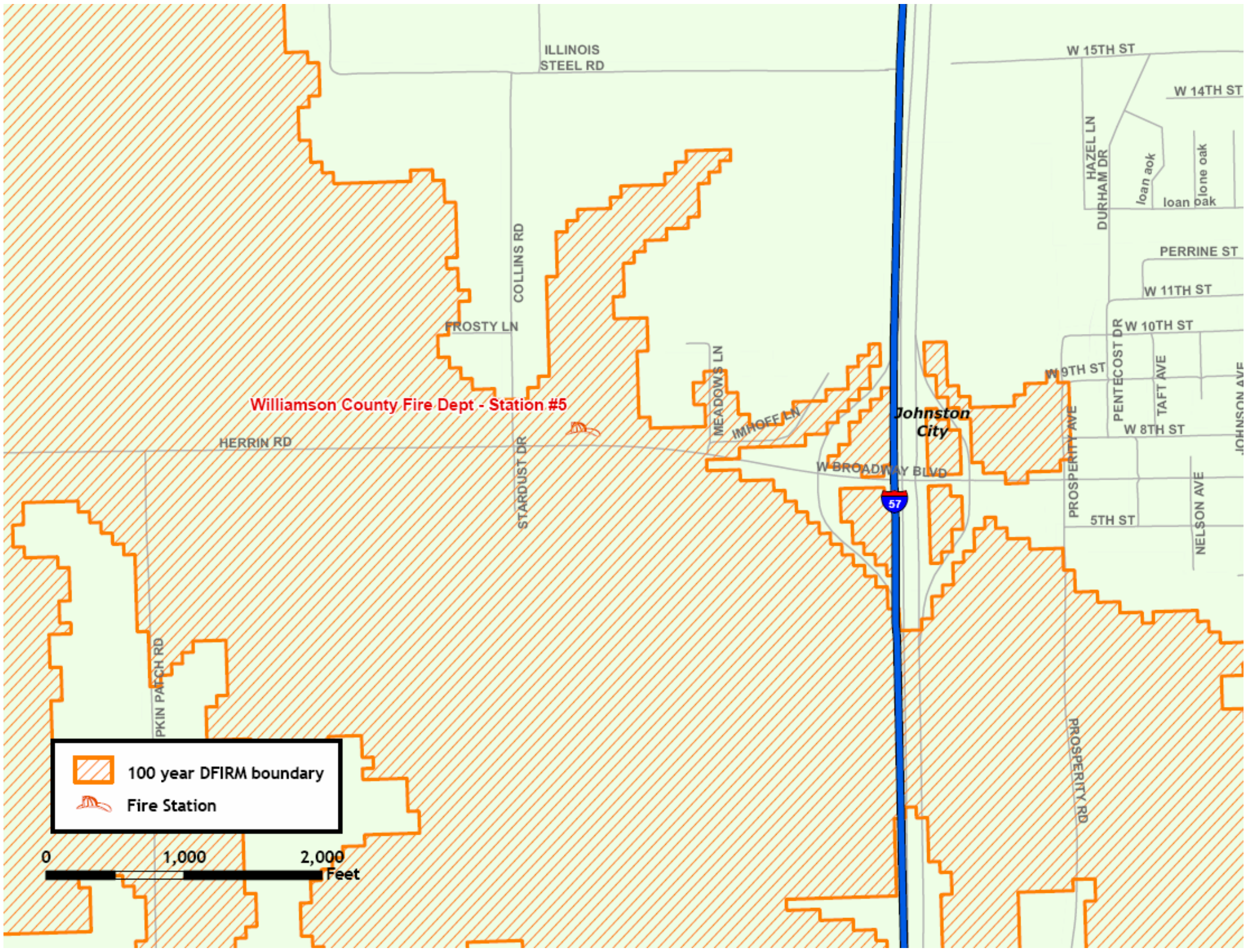
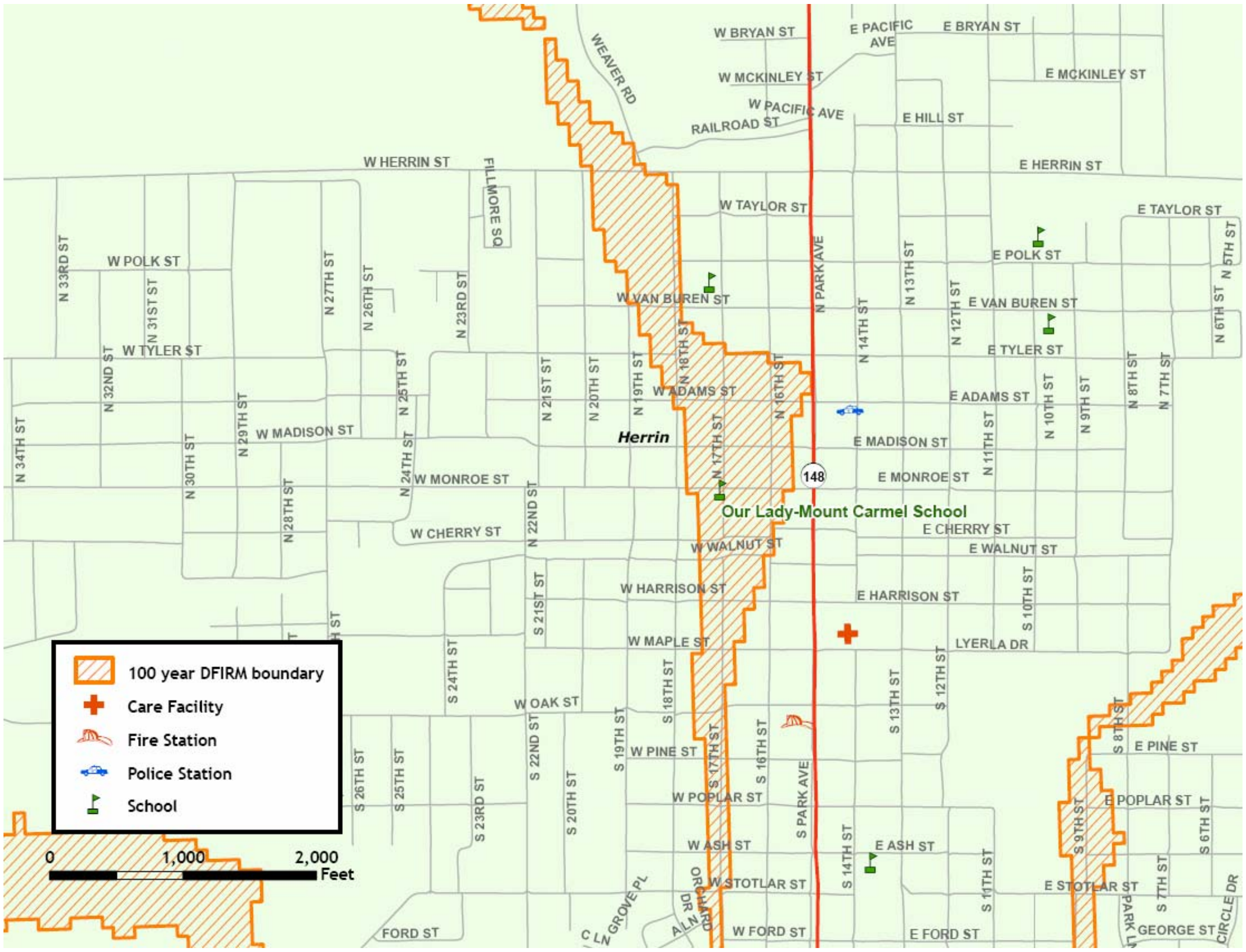


Figure 4-9: Boundary of 100-Year Flood Overlaid with Essential Facilities



HAZUS-MH Analysis Using 100-Year DFIRM Boundary and County Parcels

HAZUS-MH generated the flood depth grid for a 100-year return period and made calculations by clipping the USGS 30-m DEM to the DFIRM boundary. Next, HAZUS-MH utilized a user-defined analysis of Williamson County with site-specific parcel data provided by the county.

HAZUS-MH estimates the 100-year flood would damage 884 buildings. The total estimated numbers of damaged buildings are given in Table 4-21. Figure 4-10 depicts the Williamson County parcel points that fall within the 100-year DFIRM floodplain. Figures 4-11 and 4-12 highlight damaged buildings within the DFIRM floodplain areas in Marion and Herrin.

Table 4-21: Williamson County Potential Flood-Prone Buildings

General Occupancy	Total Damaged Buildings
Residential	668
Commercial	97
Industrial	0
Agricultural	81
Exempt	38
Total	**884**

Figure 4-10: Williamson County Buildings in Floodplain (100-Year Flood)

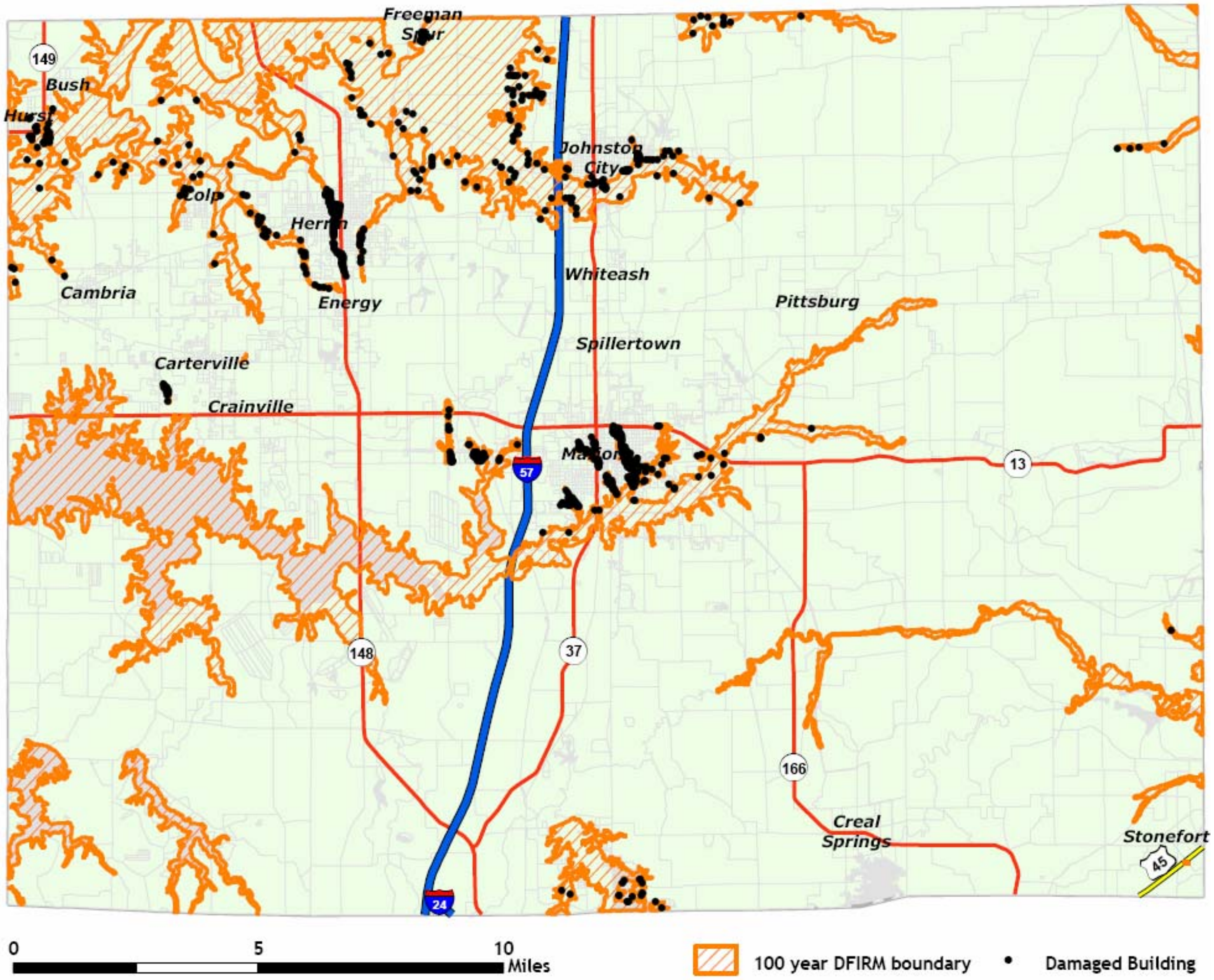


Figure 4-11: Williamson County Urban Areas (Marion) Flood-Prone Areas (100-Year Flood)

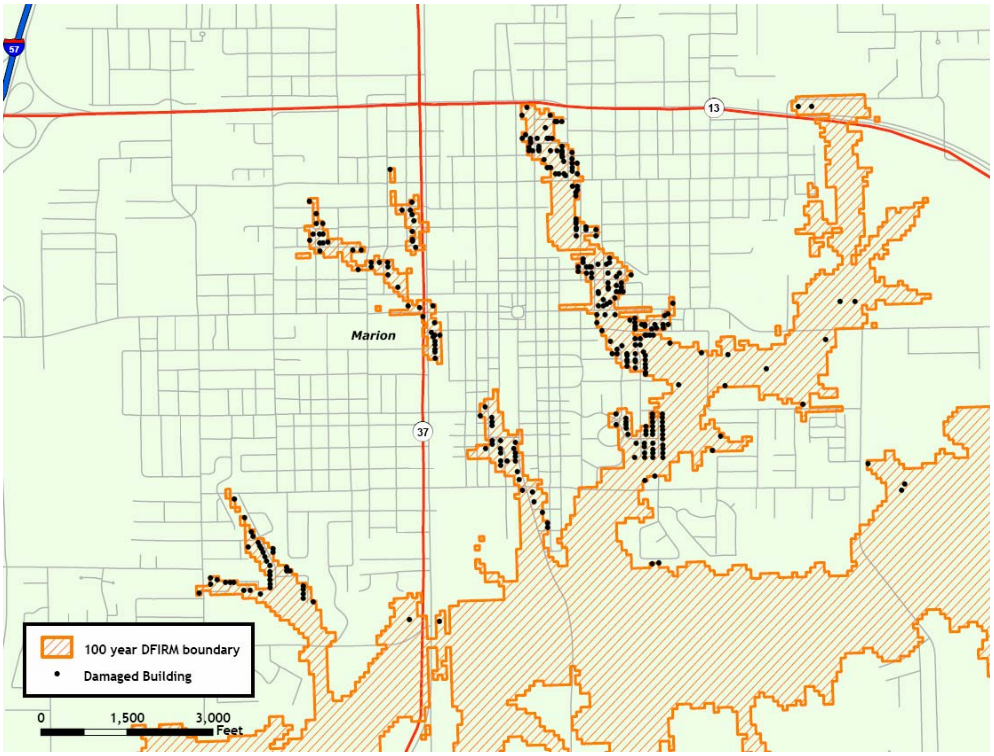
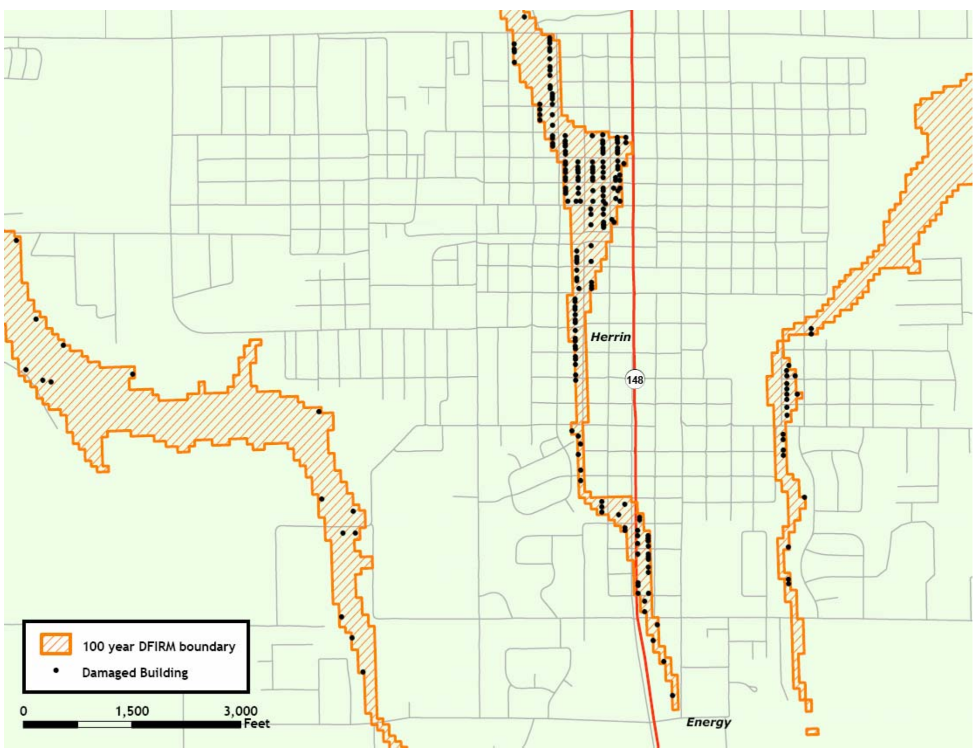


Figure 4-12: Williamson County Urban Areas (Herrin) Flood-Prone Areas (100-Year Flood)



Infrastructure

The types of infrastructure that could be impacted by a flood include roadways, utility lines/pipes, railroads, and bridges. Since an extensive inventory of the infrastructure is not available for this plan, it is important to emphasize that any number of these items could become damaged in the event of a flood. The impacts to these items include broken, failed, or impassable roadways; broken or failed utility lines (i.e. loss of power or gas to community); or railway failure from broken or impassable railways. Bridges could fail or become impassable, causing a traffic risk.

Vulnerability Analysis for Flash Flooding

Flash flooding could affect any location within this jurisdiction; therefore, the entire county's population and buildings are vulnerable to a flash flood. These structures can expect the same impacts as discussed in a riverine flood.

Critical facility information, including replacement costs, is included in Appendix F. A map of the critical facilities is included in Appendix G. Table 4-8 lists the economic exposure and building counts from the General Building Stock by general occupancy for the county.

Vulnerability Analysis for Dam and Levee Failure

An Emergency Action Plan (EAP) is required to assess the effect of dam failure on these communities. In order to be considered creditable flood protection structures on FEMA's flood maps, levee owners must provide documentation to prove the levee meets design, operation, and maintenance standards for protection against the 1% annual probability flood.

Vulnerability to Future Assets/Infrastructure for Flooding

Flash flooding may affect nearly any location within the county; therefore all buildings and infrastructure are vulnerable to flash flooding. Currently, the municipal planning commissions review new developments for compliance with the local zoning ordinance. At this time no construction is planned within the area of the 100-year floodplain. Therefore, there is no new construction, which will be vulnerable to a 100-year flood.

Vulnerability to Future Assets/Infrastructure for Dam Failure

Municipal Planning Commissions reviews new development for compliance with local zoning ordinances.

Analysis of Community Development Trends

Areas with recent development within the county may be more vulnerable to drainage issues. Storm drains and sewer systems are usually most susceptible, which can cause the back-up of water, sewage, and debris into homes and basements, causing structural and mechanical damage as well as creating public health hazards and unsanitary conditions. Controlling floodplain development is the key to reducing flood-related damages.

4.4.3 Earthquake Hazard

Hazard Definition for Earthquake Hazard

An earthquake is a sudden, rapid shaking of the Earth caused by the breaking and shifting of rock beneath the Earth's surface. For hundreds of millions of years, plate tectonics has shaped the Earth as the huge plates that form the Earth's surface move slowly over, under, and past each other. At their boundaries, the plates typically are locked together and unable to release the accumulating energy. When this energy grows strong enough, the plate boundary breaks free and causes the ground to shake. Most earthquakes occur at the boundaries where the plates meet; however, some earthquakes occur in the middle of plates, as is the case for seismic zones in the Midwestern United States. The most seismically active area in the Midwest U.S. is the New Madrid Seismic Zone. Scientists have learned that the New Madrid fault system may not be the only fault system in the Central U.S. capable of producing damaging earthquakes. The Wabash Valley fault system in Illinois and Indiana manifests evidence of large earthquakes in its geologic history, and there may be other, as yet unidentified, faults that could produce strong earthquakes.

Ground shaking from strong earthquakes can collapse buildings and bridges, disrupt gas, electric, and phone service, and sometimes trigger landslides, avalanches, flash floods, fires, and destructive ocean waves (tsunamis). Buildings with foundations resting on unconsolidated materials and other unstable soil, and trailers and homes not tied to their foundations are at risk because they can be shaken off their mountings during an earthquake. When an earthquake occurs in a populated area, it may cause deaths, injuries, and extensive property damage. Magnitude measures the energy released at the source of the earthquake. Magnitude is determined from measurements on seismographs, and a single earthquake will have a single magnitude to quantify its strength. Earthquake intensity measures the strength of shaking produced by the earthquake at a certain location. Intensity is determined from effects on people, human structures, and the natural environment, and a single earthquake will have a wide range of intensity values at different locations around the epicenter.
(Source: *http://earthquake.usgs.gov/learning/topics/mag_vs_int.php*)

Historical Earthquakes that have Affected Williamson County

Numerous instrumentally measured earthquakes have occurred in Illinois (Figure 4-13). In the past few decades, with many precise seismographs positioned across Illinois, measured earthquakes have varied in magnitude from very low microseismic events of M=1-3 to larger events up to M=5.4. Microseismic events are usually only detectable by seismographs and rarely felt by anyone. The most recent earthquake in Illinois—as of the date of this report—occurred on June 1, 2008 at 8:56:12 local time about 35 km (25 miles) southeast of Olney, IL and measured 1.6 in magnitude.

The consensus of opinion among seismologists working in the Midwest is that a magnitude 5.0 to 5.5 event could occur virtually anywhere at any time throughout the region. Earthquakes occur in Illinois all the time, although damaging quakes are very infrequent. Illinois earthquakes causing minor damage occur on average every 20 years, although the actual timing is extremely variable. Most recently, a magnitude 5.2 earthquake shook southeastern Illinois on April 18, 2008, causing minor damage in the Mt Carmel, IL area. Earthquakes resulting in more serious damage have occurred approximately every 70 to 90 years.

Table 4-22 is a description of earthquake intensity using an abbreviated Modified Mercalli Intensity scale, and Table 4-23 lists earthquake magnitudes and their corresponding intensities.

Table 4-22: Abbreviated Modified Mercalli Intensity Scale

Mercalli Intensity	Description
I	Not felt except by a very few under especially favorable conditions.
II	Felt only by a few persons at rest, especially on upper floors of buildings.
III	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
VIII	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.
XI	Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.
XII	Damage total. Lines of sight and level are distorted. Objects thrown into the air.

Table 4-23: Earthquake Magnitude vs. Modified Mercalli Intensity Scale

Earthquake Magnitude	Typical Maximum Modified Mercalli Intensity
1.0 - 3.0	I
3.0 - 3.9	II - III
4.0 - 4.9	IV - V
5.0 - 5.9	VI - VII
6.0 - 6.9	VII - IX
7.0 and higher	VIII or higher

First on the list of historical earthquakes that have affected Illinois, and first on the list on continuing earthquake threats at present and into the future, is seismic activity on the New Madrid Seismic Zone of southeastern Missouri. On December 16, 1811 and January 23 and February 7, 1812, three earthquakes struck the central U.S. with magnitudes estimated to be 7.5–8.0. These earthquakes caused violent ground-cracking and volcano-like eruptions of sediment *(sand blows)* over an area of >10,500 km^2, and uplift of a 50 km by 23 km zone (the Lake County uplift). The shaking rang church bells in Boston, collapsed scaffolding on the Capitol in

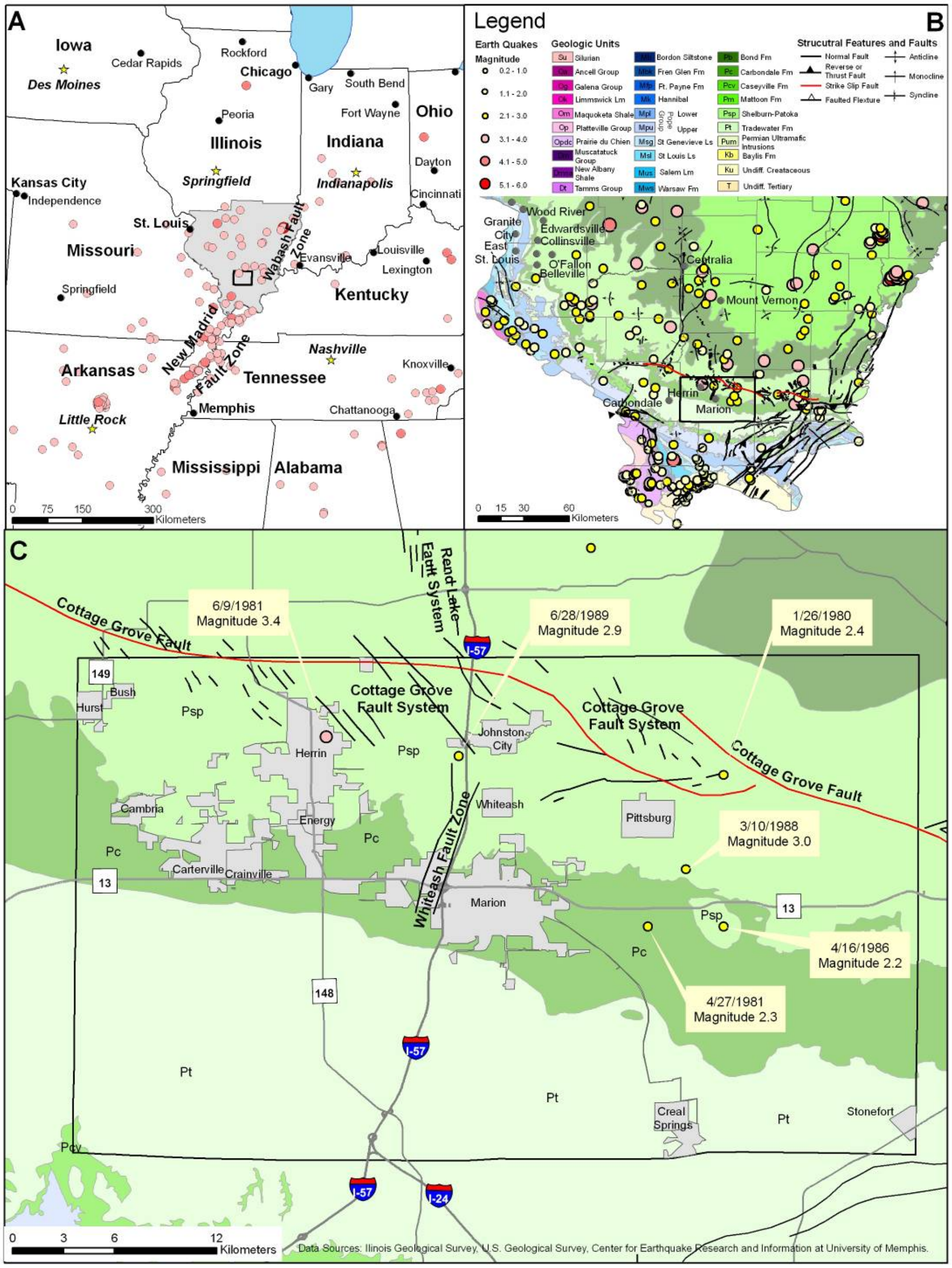
Washington, D.C., and was felt over a total area of over 10 million km^2 (the largest felt area of any historical earthquake). Of *all* the historical earthquakes that have struck the U.S., an 1811-style event would do the *most* damage if it recurred today.

The New Madrid earthquakes are especially noteworthy because the seismic zone is in the center of the North American Plate. Such *intraplate earthquakes* are felt, and do damage, over much broader areas than comparable earthquakes at plate boundaries. The precise driving force responsible for activity on the New Madrid seismic zone is not known, but most scientists infer that it is compression transmitted across the North American Plate. That compression is focused on New Madrid because it is the site of a Paleozoic structure—the Reelfoot Rift—which is a zone of weakness in the crust.

The U.S. Geological Survey (USGS) and the Center for Earthquake Research and Information (CERI) at the University of Memphis estimate the **probability of a repeat of the 1811–1812 type earthquakes (magnitude 7.5–8.0) is 7%–10% over the next 50 years** (*USGS Fact Sheet 2006-3125*.) Frequent large earthquakes on the New Madrid seismic zone are geologically puzzling because the region shows relatively little deformation. Three explanations have been proposed: 1) recent seismological and geodetic activity is still a short-term response to the 1811–12 earthquakes; 2) activity is irregular or cyclic; or 3) activity began only in the recent geologic past. There is some dispute over how often earthquakes like the 1811–12 sequence occur. Many researchers estimate a recurrence interval of between 550 and 1100 years; other researchers suggest that either the magnitude of the 1811–12 earthquakes have been over-stated, or else the actual frequency of these events is less. It is fair to say, however, that even if the 1811–12 shocks were just magnitude ~7 events, they nonetheless caused widespread damage and would do the same if another such earthquake or earthquake sequence were to strike today.

[Above: New Madrid earthquakes and seismic zone modified from N. Pinter, 1993, Exercises in Active Tectonic history adapted from *Earthquake Information Bulletin*, 4(3), May-June 1972. http://earthquake.usgs.gov/regional/states/illinois/history.php]

Figure 4-13: A) Location of notable earthquakes in Illinois region with inset of Williamson County; B) Generalized geologic bedrock map with earthquake epicenters, geologic structures, and inset of Williamson County; C) Geologic and earthquake epicenter map of Williamson County



The earliest reported earthquake in Illinois was in **1795**. This event was felt at Kaskaskia, IL for a minute and a half and was also felt in Kentucky. At Kaskaskia, subterranean noises were heard. Due to the sparse frontier population, an accurate location is not possible, and the shock may have actually originated outside the state.

An intensity VI-VII earthquake occurred on **April 12, 1883**, awakening several people in Cairo, IL. One old frame house was significantly damaged, resulting in slight injury to the inhabitants.

On **October 31 1895** a large M6.8 occurred at Charleston, Missouri, just south of Cairo. Strong shaking caused eruptions of sand and water at many places along a line roughly 30 km (20 mi) long. Damage occurred in six states, but most severely at Charleston, with cracked walls, windows shattered, broken plaster, and chimneys fallen. Shaking was felt in 23 states from Washington, D.C. to Kansas and from southernmost Canada to New Orleans, LA.

A Missouri earthquake on **November 4, 1905**, cracked walls in Cairo. Aftershocks were felt over an area of 100,000 square miles in nine states. In Illinois, it cracked the wall of the new education building in Cairo and a wall at Carbondale, IL.

Among the largest earthquakes occurring in Illinois was the **May 26, 1909** shock, which knocked over many chimneys at Aurora. It was felt over 500,000 square miles and strongly felt in Iowa and Wisconsin. Buildings swayed in Chicago where there was fear that the walls would collapse. Just under two months later, a second Intensity VII earthquake occurred on **July 18, 1909**, damaged chimneys in Petersburg, IL, Hannibal, MO, and Davenport, IA. Over twenty windows were broken, bricks loosened and plaster cracked in the Petersburg area. This event was felt over 40,000 square miles.

On **November 7, 1958**, a shock along the Indiana border resulted in damage at Bartelso, Dale and Maunie, IL. Plaster cracked and fell, and a basement wall and floor were cracked.

On **August 14, 1965**, a sharp but local shock occurred at Tamms, IL—a town of about 600 people. The magnitude 5.0 quake damaged chimneys, cracked walls, knocked groceries from shelves, and muddied the water supply. Thunderous earth noises were heard. This earthquake was only felt within a 10 mile radius of Tamms, in communities such as Elco, Unity, Olive Branch, and Olmstead, IL. Six aftershocks were felt.

An earthquake of Intensity VII occurred on **November 9, 1968**. This magnitude 5.3 shock was felt over an area of 580,000 square miles in 23 states. There were reports of people in tall buildings in Ontario and Boston feeling the shock. Damage consisted of bricks being knocked from chimneys, broken windows, toppled television antennae, and cracked plaster. There were scattered reports of cracked foundations, fallen parapets, and overturned tombstones. Chimney damage was limited to buildings 30 to 50 years old. Many people were frightened. Church bells rang at Broughton and several other towns. Loud rumbling earthquake noise was reported in many communities.

Dozens of other shocks originating in Missouri, Arkansas, Kansas, Nebraska, Tennessee, Indiana, Ohio, Michigan, Kentucky, and Canada have been felt in Illinois without causing damage. There have been three earthquakes slightly greater than magnitude 5.0 and Intensity level VII which occurred in 1968, 1987, and 2008 and that were widely felt throughout southern Illinois and the midcontinent.

Above text adapted from *http://earthquake.usgs.gov/regional/states/illinois/history.php* and from *Seismicity of the United States, 1568-1989 (Revised), C.W. Stover and J.L. Coffman, U.S. Geological Survey Professional Paper 1527, United States Government Printing Office, Washington: 1993.*

Geographic Location for Earthquake Hazard

Williamson County occupies a region susceptible to earthquakes (see above). Regionally, the two most significant zones of seismic activity are the New Madrid Seismic Zone and the Wabash Valley Fault System. The epicenters of five small earthquakes (M2.2–3.4) have been recorded in Williamson County. This local seismic activity has been focused along and near the Cottage Grove Fault System and other smaller adjacent fault zones such as the White Ash Fault Zone and Rend Lake Fault System. The Cottage Grove Fault System is a right-lateral, strike-slip fault that extends 113 km across southern Illinois. The seismogenic potential of these structures is unknown, and the geologic mechanism related to the minor earthquakes is poorly understood. Return periods for large earthquakes within the New Madrid System are estimated to be ~500–1000 years; moderate quakes between magnitude 5.5 and 6.0 can recur within approximately 150 years or less. The Wabash Valley Fault System extends nearly the entire length of southern Illinois and has the potential to generate an earthquake of sufficient strength to cause damage between St. Louis, MO and Indianapolis, IN. The USGS and the Center for Earthquake Research and Information estimate the **probability of a repeat of the 1811–1812 type earthquakes (magnitude 7.5–8.0) at 7%–10% and the probability of a magnitude 6.0 or larger at 25%–40% within the next 50 years.**

Hazard Extent for Earthquake Hazard

The extent of the earthquake is countywide.

Calculated Priority Risk Index for Earthquake Hazard

Based on historical information, as well as current USGS and SIU research and studies, future earthquakes in Williamson County are likely. According to the CPRI, earthquake is ranked as the number one hazard.

CPRI = Probability X .45 + Magnitude/Severity X .30 + Warning Time X .15 + Duration of event X .10.

Probability	+	Magnitude /Severity	+	Warning Time	+	Duration	=	CPRI
3.5 x .45	+	**4** x .30	+	**4** x .15	+	**3** x .10	=	**3.68**

Vulnerability Analysis for Earthquake Hazard

This hazard could impact the entire jurisdiction equally; therefore, the entire county's population and all buildings are vulnerable to an earthquake and can expect the same impacts within the affected area. To accommodate the risk, this plan will consider all buildings located within the county as vulnerable. The existing buildings and infrastructure in Williamson County are discussed in types and numbers below. In addition, a discussion of the potential impacts for buildings and infrastructure during an earthquake are also included.

Critical Facilities

All critical facilities are vulnerable to earthquakes. A critical facility would encounter many of the same impacts as any other building within the county. These impacts include structural failure and loss of facility functionality (i.e. a damaged police station will no longer be able to serve the community). A complete list of all of the critical facilities, including replacement costs, is included in Appendix F. A map of the critical facilities is included in Appendix G.

General Building Stock

Table 4-8 shows building exposure in terms of types and numbers of buildings for the entire county. The buildings within the county can all expect the same impacts, similar to those discussed for critical facilities. These impacts include structural failure and loss of building function, which could result in indirect impacts (i.e. damaged homes will no longer be habitable, causing residence to seek shelter).

Infrastructure

During an earthquake, the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. Since a full inventory of infrastructure is not available for this plan, it is important to emphasize that any number of these items could become damaged in the event of an earthquake. The impacts to these items include broken, failed, or impassable roadways, broken or failed utility lines (i.e. loss of power or gas to community), and railway failure from broken or impassable railways. Bridges could fail or become impassable causing risk to traffic. Typical scenarios are described below to gauge the anticipated impacts of earthquakes in the county in terms of number and types of buildings and infrastructure.

The SIU-Polis team reviewed existing geological information and recommendations for earthquake scenarios. Three earthquake scenarios, two based on USGS modeled scenarios and one based on deterministic scenarios, were developed to provide a reasonable basis for earthquake planning in Williamson County. The two USGS analyses were an M7.7 event on the New Madrid fault zone and an M7.1 earthquake on the Wabash Valley Seismic Zone. Shake maps provided by FEMA were used in HAZUS-MH to estimate losses for Williamson County based on these events. The final scenario was a Moment Magnitude of 5.5 with the epicenter located in Williamson County. Note that a deterministic scenario, in this context, refers to hazard or risk models based on specific scenarios without explicit consideration of the probability of their occurrences. This scenario was selected based upon a rupture on the Cottage Grove Fault System, a local fault that presents a realistic earthquake scenario for planning purposes.

Modeling a deterministic scenario requires user input for a variety of parameters. One of the most critical sources of information that is required for accurate assessment of earthquake risk is soils data. FEMA provided a NEHRP (National Earthquake Hazards Reduction Program) soil classification map for Illinois. NEHRP soil classifications portray the degree of shear-wave amplification that can occur during ground shaking.

FEMA also provided a map for liquefaction potential that could be used by HAZUS-MH. Low-lying areas in floodplains with a water table within five feet of the surface are particularly susceptible to liquefaction. These areas contain Class F soil types. For this analysis, a depth to water table of five meters was used.

An earthquake depth of 10.0 kilometers was selected based on input from Geophysicist Harvey Henson (SIU). HAZUS-MH also requires the user to define an attenuation function unless ground motion maps are supplied. Because Williamson County has experienced smaller earthquakes, the decision was made to use the Toro et al. (1997) attenuation function.

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

Earthquake Analysis

Results for 7.7 Magnitude Earthquake, New Madrid Scenario

The results of the 7.7 New Madrid earthquake are depicted in Tables 4-24, 4-25, and Figure 4-14. HAZUS-MH estimates that approximately 1,478 buildings will be at least moderately damaged. This is more than 6% of the total number of buildings in the region. It is estimated that 54 buildings that will be damaged beyond repair.

The total building related losses were $146.67 million; 8% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 53% of the total loss.

Table 4-24: New Madrid Scenario-Damages Counts by Building Occupancy

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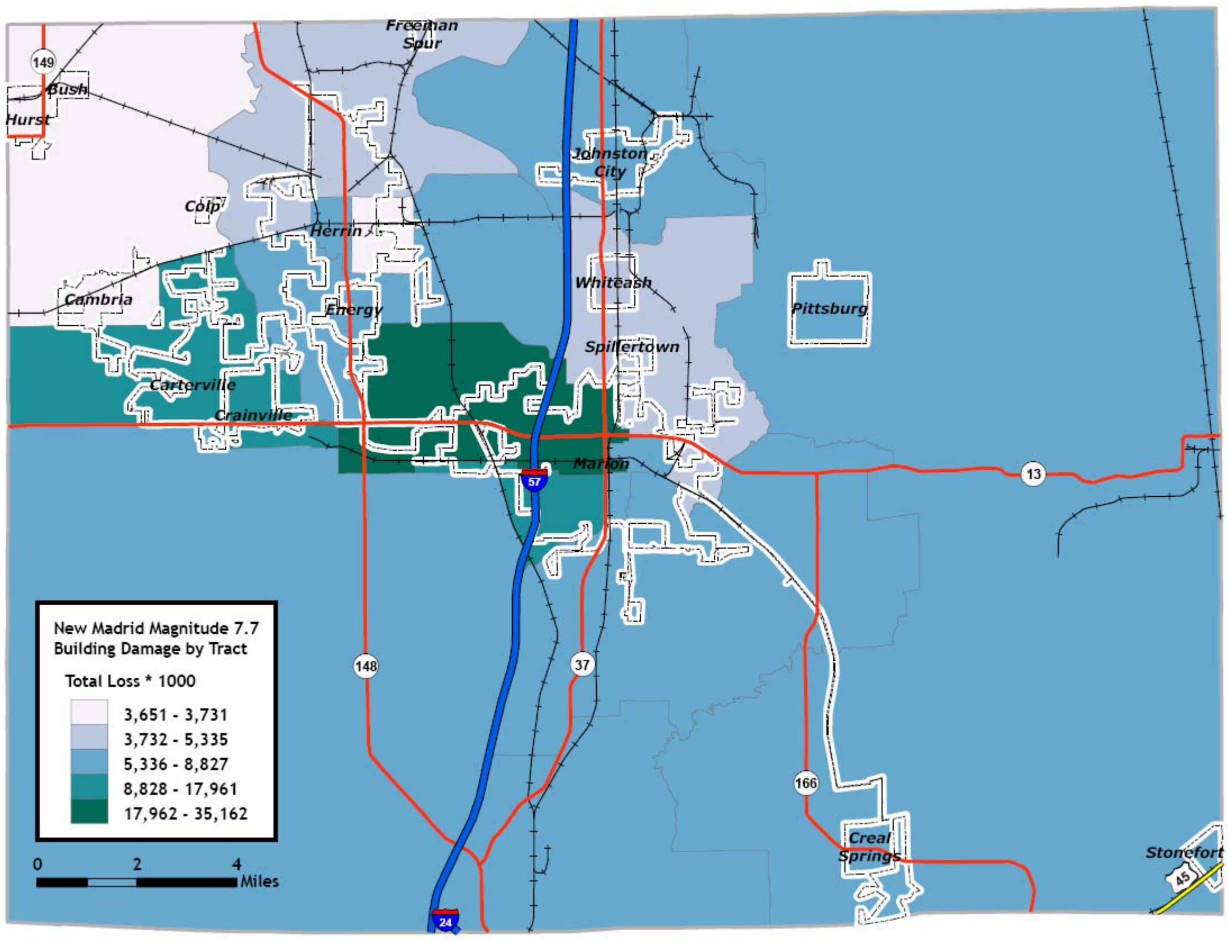
	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	9	0.04	4	0.09	2	0.15	0	0.26	0	0.08
Commercial	260	1.32	110	2.48	44	3.24	3	5.64	1	1.22
Education	12	0.06	5	0.11	2	0.13	0	0.15	0	0.07
Government	20	0.10	8	0.17	3	0.20	0	0.21	0	0.10
Industrial	44	0.22	20	0.44	10	0.70	1	1.27	0	0.22
Other Residential	2,262	11.51	1,399	31.56	768	56.22	21	35.67	8	15.11
Religion	44	0.23	15	0.34	6	0.44	0	0.68	0	0.24
Single Family	17,001	86.51	2,872	64.80	532	38.93	32	56.12	45	82.95
Total	19,653		4,433		1,367		58		54	

Table 4-25: New Madrid Scenario-Building Economic Losses in Millions of Dollars

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Loses							
	Wage	0.00	0.15	3.93	0.11	0.37	4.56
	Capital-Related	0.00	0.06	3.37	0.07	0.09	3.59
	Rental	0.79	0.76	2.25	0.04	0.13	3.96
	Relocation	0.09	0.03	0.12	0.00	0.04	0.27
	Subtotal	0.87	1.00	9.66	0.23	0.62	12.38
Capital Stock Loses							
	Structural	4.58	1.98	3.31	0.64	1.11	11.62
	Non_Structural	31.92	13.30	18.30	4.68	5.71	73.91
	Content	19.41	5.19	14.56	3.55	4.86	47.56
	Inventory	0.00	0.00	0.37	0.77	0.07	1.21
	Subtotal	55.91	20.47	36.54	9.63	11.75	134.29
	Total	56.78	21.47	46.20	9.86	12.37	146.67

Figure 4-14: New Madrid Scenario-Building Economic Losses in Thousands of Dollars



New Madrid Scenario-Essential Facility Losses

Before the earthquake, the region had 766 care beds available for use. On the day of the earthquake, the model estimates that only 44 care beds (6%) are available for use by patients already in medical care facilities and those injured by the earthquake. After one week, 64% of the beds will be back in service. By day 30, 88% will be operational. The HAZUS-MH classification for hospitals includes all care facilities.

Results for 7.1 Magnitude Earthquake, Wabash Valley Scenario

The results of the 7.1 Wabash Valley earthquake are depicted in Table 4-26, Table 4-27, and Figure 4-15. HAZUS-MH estimates that approximately 13 buildings will be at least moderately damaged. This is 0% of the total number of buildings in the region. There are no estimated buildings that will be damaged beyond repair.

The total building related losses were $19.3 million; 1% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up more than 61% of the total loss.

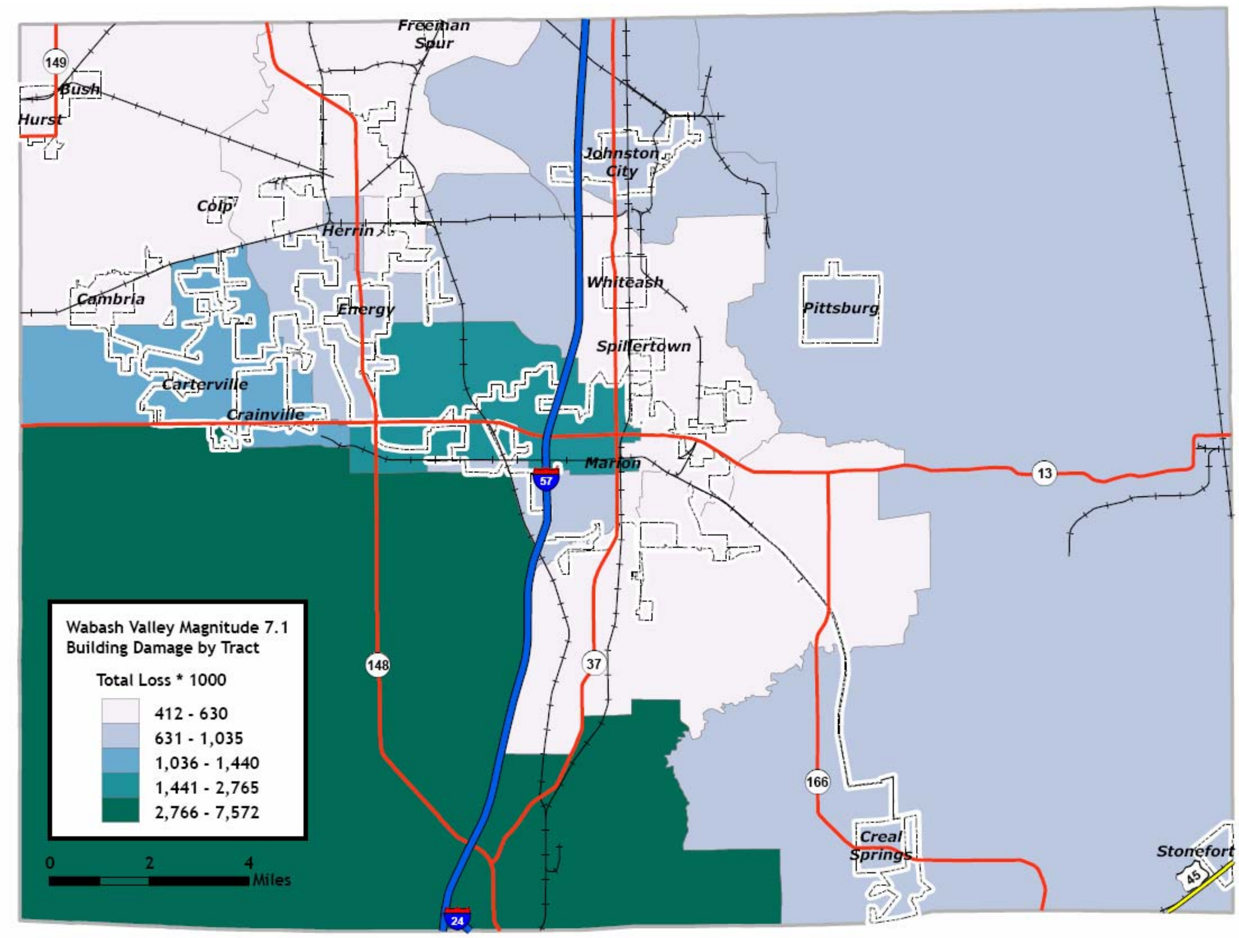
Table 4-26: Wabash Valley Scenario-Damage Counts by Building Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	15	0.06	0	0.07	0	0.10	0	0.00	0	0.00
Commercial	414	1.63	4	1.77	0	2.06	0	0.00	0	0.00
Education	19	0.07	0	0.11	0	0.13	0	0.00	0	0.00
Government	31	0.12	0	0.15	0	0.18	0	0.00	0	0.00
Industrial	73	0.29	1	0.29	0	0.37	0	0.00	0	0.00
Other Residential	4,352	17.18	100	45.85	6	42.98	0	0.00	0	0.00
Religion	65	0.26	1	0.35	0	0.42	0	0.00	0	0.00
Single Family	20,363	80.39	113	51.40	7	53.76	0	0.00	0	0.00
Total	25,331		219		14		0		0	

Table 4-27: Wabash Valley Scenario-Building Economic Losses in Millions of Dollars

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Loses							
	Wage	0.00	0.00	0.03	0.00	0.01	0.04
	Capital-Related	0.00	0.00	0.03	0.00	0.00	0.03
	Rental	0.01	0.01	0.03	0.00	0.00	0.05
	Relocation	0.00	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.01**	**0.01**	**0.08**	**0.00**	**0.01**	**0.12**
Capital Stock Loses							
	Structural	0.08	0.04	0.04	0.01	0.02	0.19
	Non_Structural	5.08	1.72	2.19	0.89	0.81	10.69
	Content	3.92	0.82	1.89	0.68	0.78	8.10
	Inventory	0.00	0.00	0.05	0.14	0.01	0.21
	Subtotal	**9.08**	**2.58**	**4.17**	**1.72**	**1.63**	**19.19**
	Total	**9.10**	**2.60**	**4.26**	**1.72**	**1.64**	**19.30**

Figure 4-15: Wabash Valley Scenario-Building Economic Losses in Thousands of Dollars



Wabash Valley Scenario-Essential Facility Losses

Before the earthquake, the region had 766 care beds available for use. On the day of the earthquake, the model estimates that only 383 care beds (50%) are available for use by patients already in medical care facilities and those injured by the earthquake. After one week, 97% of the beds will be back in service. By day 30, 100% will be operational. The HAZUS-MH classification for hospitals includes all care facilities.

Results for 5.5 Magnitude Earthquake in Williamson County

The results of the initial analysis, the 5.5 magnitude earthquake with an epicenter in the center of Williamson County, are depicted in Tables 4-28 and 4-29 and Figure 4-16. HAZUS-MH estimates that approximately 3,453 buildings will be at least moderately damaged. This is more than 14% of the total number of buildings in the region. There are an estimated 172 buildings that will be damaged beyond repair.

The total building related losses were $308.6 million; 11% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies, which made up more than 56% of the total loss.

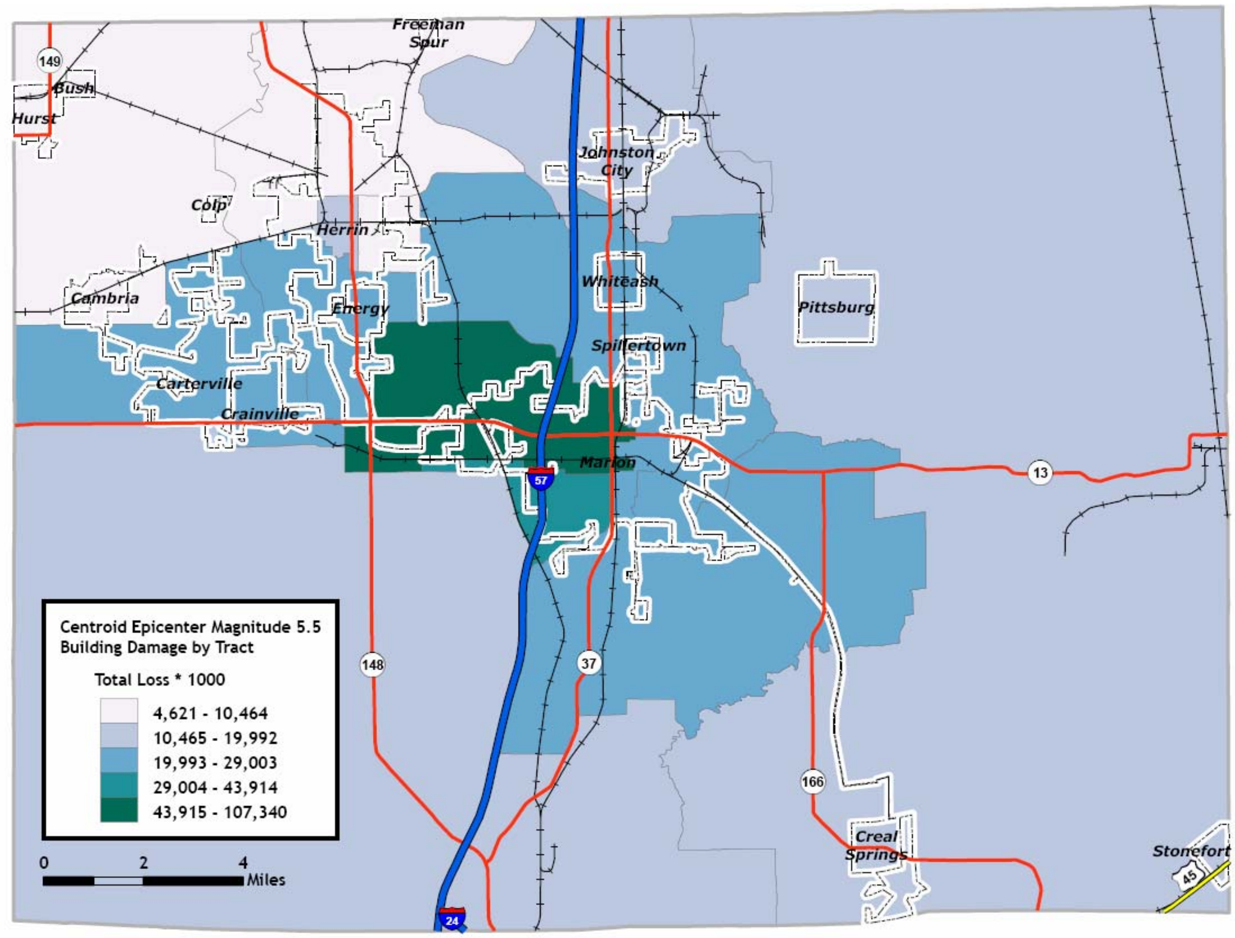
Table 4-28: Williamson County M5.5 Scenario-Damage Counts by Building Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	9	0.05	3	0.05	2	0.09	1	0.15	0	0.10
Commercial	241	1.44	87	1.59	65	2.40	21	3.60	5	2.62
Education	12	0.07	3	0.06	3	0.10	1	0.14	0	0.14
Government	20	0.12	6	0.10	4	0.16	1	0.20	0	0.19
Industrial	43	0.26	14	0.26	12	0.44	4	0.69	1	0.41
Other Residential	2,641	15.83	975	17.94	718	26.65	107	18.37	17	9.91
Religion	39	0.23	13	0.25	10	0.36	3	0.55	1	0.47
Single Family	13,676	81.99	4,330	79.73	1,882	69.80	446	76.30	149	86.17
Total	**16,679**		**5,431**		**2,696**		**585**		**173**	

Table 4-29: Williamson County M5.5 Scenario-Building Economic Losses in Millions of Dollars

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Loses							
	Wage	0.00	0.94	9.90	0.24	0.82	11.90
	Capital-Related	0.00	0.40	8.50	0.14	0.21	9.24
	Rental	3.35	3.00	5.15	0.09	0.35	11.94
	Relocation	0.39	0.08	0.32	0.01	0.12	0.91
	Subtotal	**3.73**	**4.42**	**23.85**	**0.48**	**1.49**	**33.99**
Capital Stock Loses							
	Structural	17.35	4.60	9.13	1.52	3.06	35.66
	Non_Structural	74.41	27.16	35.36	7.93	10.88	155.73
	Content	32.54	9.18	25.66	6.10	7.68	81.17
	Inventory	0.00	0.00	0.64	1.31	0.10	2.05
	Subtotal	**124.30**	**40.94**	**70.79**	**16.86**	**21.72**	**274.62**
	Total	**128.03**	**45.36**	**94.65**	**17.35**	**23.21**	**308.60**

Figure 4-16: Williamson County M5.5 Scenario-Building Economic Losses in Thousands of Dollars



Williamson County M5.5 Scenario—Essential Facility Losses

Before the earthquake, the region had 766 care beds available for use. On the day of the earthquake, the model estimates that only 17 care beds (2%) are available for use by patients already in medical care facilities and those injured by the earthquake. After one week, 47% of the beds will be back in service. By day 30, 77% will be operational. The HAZUS-MH classification for hospitals includes all care facilities.

Vulnerability to Future Assets/Infrastructure for Earthquake Hazard

New construction, especially critical facilities, will accommodate earthquake mitigation design standards.

Analysis of Community Development Trends

Community development will occur outside of the low lying areas in floodplains with a water table within five feet of grade which are susceptible to liquefaction.

4.4.4 Thunderstorm Hazard

Hazard Definition for Thunderstorm Hazard

Severe thunderstorms are defined as thunderstorms including one or more of the following characteristics: strong winds, large damaging hail, and frequent lightning. Severe thunderstorms most frequently occur in Illinois in the spring and summer months and in the late afternoon or evening, but can occur any month of the year at any time of day. A severe thunderstorm's impacts can be localized or can be widespread in nature. A thunderstorm is classified as severe when it meets one of more of the following criteria:

- Hail of diameter 0.75 inches or higher,
- Frequent and dangerous lightning,
- Wind speeds equal to or greater than 58 mph.

Hail

Hail can be a product of a strong thunderstorm. Hail usually falls near the center of a storm, however strong winds occurring at high altitudes in the thunderstorm can blow the hailstones away from the storm center, resulting in a broader distribution. Hail stones generally range from pea-sized to baseball-sized, but hail stones larger than softballs have been reported on rare occasions.

Lightning

Lightning is a discharge of electricity from a thunderstorm. Lightning is often perceived as a minor hazard, but in reality lightning causes damage to many structures and kills or severely injures numerous people in the United States each year.

Severe Winds (Straight-Line Winds)

Straight-line winds from thunderstorms are a fairly common occurrence across Illinois. Straight-line winds can cause damage to homes, businesses, power lines, and agricultural areas and may require temporary sheltering of individuals who are without power for extended periods of time.

Previous Occurrences for Thunderstorm Hazard

The National Climatic Data Center (NCDC) database reported 35 hailstorms in Williamson County since 1950. Hail in some form occurs nearly every year in the late spring and early summer months.

The most recent damaging occurrence was in May 2005, when thunderstorms produced large hail at several locations in southern Illinois. The most intense hail occurred at Marion where hail stones reached the size of golf balls. The hail dented numerous vehicles and broke mirrors and tail lights. Leaves were stripped off trees, and some limbs were downed. The hail damaged vinyl siding, broke house windows, and caused some roof damage. Other hail reports in southern

Illinois in the May 2005 storm were quarter-sized or smaller. The hail lasted long enough to cover the ground at Alto Pass. The only report of strong winds was near Mount Vernon where large limbs were blown down on Route 148 south of town. Williamson County hailstorms are listed in Table 4-30; additional details for NCDC events are included in Appendix D.
Source: NCDC

Table 4-30: Williamson County Hailstorms

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Williamson	5/7/1971	Hail	1.75 in.	0	0	0	0
Williamson	5/14/1986	Hail	0.75 in.	0	0	0	0
Williamson	6/24/1992	Hail	1.75 in.	0	0	0	0
Williamson	6/24/1992	Hail	1.00 in.	0	0	0	0
Williamson	6/24/1992	Hail	0.75 in.	0	0	0	0
Crab Orchard	6/9/1995	Hail	0.75 in.	0	0	0	0
Herrin	6/23/1995	Hail	1.75 in.	0	0	0	0
Marion	2/27/1996	Hail	0.75 in.	0	0	0	0
Cambria	4/19/1996	Hail	0.75 in.	0	0	0	0
Marion	4/21/1996	Hail	1.75 in.	0	0	0	0
Hurst	6/6/1997	Hail	1.00 in.	0	0	0	0
Marion	6/13/1997	Hail	0.75 in.	0	0	0	0
Marion	1/21/1999	Hail	1.00 in.	0	0	0	0
Herrin	1/21/1999	Hail	1.00 in.	0	0	0	0
Johnston City	1/21/1999	Hail	0.88 in.	0	0	0	0
Cambria	2/27/1999	Hail	0.75 in.	0	0	0	0
Hudgens	5/5/1999	Hail	2.75 in.	0	0	50K	0
Marion	5/17/1999	Hail	0.75 in.	0	0	0	0
Marion	3/26/2000	Hail	0.88 in.	0	0	0	0
Marion	4/7/2000	Hail	1.00 in.	0	0	0	0
Marion	4/7/2000	Hail	1.00 in.	0	0	0	0
Johnston City	7/3/2001	Hail	0.75 in.	0	0	0	0
Marion	8/18/2001	Hail	0.75 in.	0	0	0	0
Herrin	4/28/2002	Hail	0.75 in.	0	0	0	0
Marion	5/2/2002	Hail	2.00 in.	0	0	2.0M	0
Hurst	5/12/2002	Hail	0.88 in.	0	0	0	0
Herrin	5/25/2002	Hail	1.75 in.	0	0	300K	0
Marion	3/20/2004	Hail	0.75 in.	0	0	0	0
Crab Orchard	5/26/2004	Hail	1.00 in.	0	0	0	0
Herrin	5/26/2004	Hail	1.75 in.	0	0	0	0
Marion	5/26/2004	Hail	1.00 in.	0	0	0	0
Herrin	6/1/2004	Hail	0.88 in.	0	0	0	0
Marion	6/1/2004	Hail	0.75 in.	0	0	0	0
Marion	7/6/2004	Hail	0.75 in.	0	0	0	0
Marion	10/18/2004	Hail	1.75 in.	0	0	0	0

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Bush	4/12/2005	Hail	1.00 in.	0	0	0	0
Creal Springs	4/22/2005	Hail	0.75 in.	0	0	0	0
Marion	3/11/2006	Hail	1.25 in.	0	0	0	0
Carterville	4/22/2006	Hail	0.88 in.	0	0	0	0
Creal Springs	8/10/2006	Hail	0.75 in.	0	0	0	0
Crainville	9/22/2006	Hail	0.88 in.	0	0	0	0
Pittsburg	9/22/2006	Hail	1.00 in.	0	0	0	0
Pittsburg	11/10/2006	Hail	0.75 in.	0	0	0	0
Marion	3/30/2007	Hail	0.88 in.	0	0	0	0
Cambria	4/3/2007	Hail	1.25 in.	0	0	0	0
Marion	4/3/2007	Hail	0.88 in.	0	0	0	0
Williamson	1/29/2008	Hail	0.88 in.	0	0	0	0

Source: NCDC

The National Climatic Data Center (NCDC) database reported one occurrence of a significant lightning event in Williamson County since 1950. On September 23, 2006, lightning was the likely cause of a house fire that killed two women.

Williamson County lightning strikes are listed in Table 4-31; additional details for NCDC events are included in Appendix D. Lightning occurs in Williamson County every year. The following table only represents those events that were recorded by the NCDC.
Source: NCDC

Table 4-31: Williamson County Lightning Strikes

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Spillertown	9/23/2006	Lightning	N/A	0	0	0	0

Source: NCDC

The National Climatic Data Center (NCDC) database identified 86 wind storms reported since 1950 in Williamson County. On multiple occasions in the past 50 years, trees have been uprooted by severe winds in Williamson County. Many of the displaced trees landed on homes and automobiles. In addition, several of these extreme wind events resulted in damage to multiple buildings unable to withstand the force produced by the wind speeds.

Wind storms have historically occurred year-round with the greatest frequency and damage in April through August. A recent high-intensity storm occurred in January 2000, when winds estimated near 90 mph severely damaged a wood-frame home and partially unroofed several others. This thunderstorm downburst originated just northeast of Carbondale in Jackson County, and caused extensive damage in the Cambria area before dissipating. Table 4-32 shows wind-storm events and available top wind speeds for Williamson County.
Source: NCDC

Table 4-32: Williamson County Wind Storms

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Williamson	6/13/1966	Tstorm Wind	52 kts.	0	0	0	0
Williamson	6/13/1966	Tstorm Wind	0 kts.	0	0	0	0
Williamson	1/28/1970	Tstorm Wind	0 kts.	0	0	0	0
Williamson	3/25/1970	Tstorm Wind	0 kts.	0	0	0	0
Williamson	8/2/1974	Tstorm Wind	52 kts.	0	0	0	0
Williamson	9/28/1974	Tstorm Wind	0 kts.	0	0	0	0
Williamson	8/29/1975	Tstorm Wind	50 kts.	0	0	0	0
Williamson	11/29/1975	Tstorm Wind	0 kts.	0	0	0	0
Williamson	11/30/1975	Tstorm Wind	0 kts.	0	0	0	0
Williamson	1/13/1976	Tstorm Wind	58 kts.	0	0	0	0
Williamson	5/30/1977	Tstorm Wind	55 kts.	0	0	0	0
Williamson	8/21/1977	Tstorm Wind	0 kts.	0	0	0	0
Williamson	7/2/1980	Tstorm Wind	70 kts.	0	0	0	0
Williamson	7/5/1980	Tstorm Wind	0 kts.	0	0	0	0
Williamson	4/2/1982	Tstorm Wind	52 kts.	0	0	0	0
Williamson	5/31/1982	Tstorm Wind	0 kts.	0	0	0	0
Williamson	6/29/1983	Tstorm Wind	0 kts.	0	0	0	0
Williamson	7/24/1983	Tstorm Wind	55 kts.	0	0	0	0
Williamson	7/24/1983	Tstorm Wind	55 kts.	0	0	0	0
Williamson	9/11/1983	Tstorm Wind	0 kts.	0	0	0	0
Williamson	4/29/1984	Tstorm Wind	60 kts.	0	0	0	0
Williamson	1/7/1989	Tstorm Wind	0 kts.	0	0	0	0
Williamson	5/9/1990	Tstorm Wind	0 kts.	0	0	0	0
Williamson	7/21/1990	Tstorm Wind	53 kts.	0	0	0	0
Williamson	6/24/1992	Tstorm Wind	55 kts.	0	0	0	0
Williamson	9/9/1992	Tstorm Wind	0 kts.	0	0	0	0
37 Marion	9/2/1993	Tstorm Wind	N/A	0	0	0	0
Herrin	4/15/1994	Tstorm Wind	N/A	0	0	1K	0
Williamson	6/7/1995	Tstorm Wind	N/A	0	0	0	0
Eastern	6/20/1995	Tstorm Wind	N/A	0	0	0	0
Johnston City	4/19/1996	Wind	0 kts.	0	0	0	0
Creal Springs	5/5/1996	Tstorm Wind	52 kts.	0	0	0	0
Marion	7/1/1996	Tstorm Wind	50 kts.	0	0	0	0
Carterville	9/23/1996	Tstorm Wind	0 kts.	0	0	2K	0
Marion	10/22/1996	Tstorm Wind	50 kts.	0	0	0	0
Marion	7/14/1997	Tstorm Wind	55 kts.	0	0	0	0
Marion	5/21/1998	Wind	0 kts.	0	0	28K	0
Corinth	6/9/1998	Wind	52 kts.	0	0	20K	0

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Marion	6/12/1998	Tstorm Wind	50 kts.	0	0	5K	0
Herrin	6/20/1998	Tstorm Wind	50 kts.	0	0	0	0
Blairsville	6/20/1998	Tstorm Wind	55 kts.	0	0	20K	0
Marion	4/3/1999	Tstorm Wind	61 kts.	0	0	25K	0
Hudgens	5/5/1999	Tstorm Wind	56 kts.	0	0	0	0
Marion	5/17/1999	Tstorm Wind	50 kts.	0	0	3K	0
Marion	6/4/1999	Tstorm Wind	57 kts.	0	0	0	0
Marion	1/3/2000	Tstorm Wind	57 kts.	0	0	0	0
Cambria	1/3/2000	Tstorm Wind	52 kts.	0	0	35K	0
Marion	5/18/2001	Tstorm Wind	0 kts.	0	0	7K	0
Marion	7/3/2001	Tstorm Wind	87 kts.	0	0	100K	0
Johnston City	7/18/2001	Tstorm Wind	75 kts.	0	0	100K	0
Corinth	9/7/2001	Wind	N/A	0	0	0	0
Marion	10/13/2001	Tstorm Wind	50 kts.	0	0	0	0
Johnston City	10/24/2001	Tstorm Wind	50 kts.	0	0	0	0
Colp	4/28/2002	Tstorm Wind	52 kts.	0	0	0	0
Crab Orchard	7/10/2002	Tstorm Wind	52 kts.	0	0	5K	0
Marion	3/20/2004	Tstorm Wind	52 kts.	0	0	3K	0
Cambria	5/26/2004	Tstorm Wind	50 kts.	0	0	0	0
Carterville	5/27/2004	Wind	N/A	0	0	3K	0
Herrin	7/5/2004	Tstorm Wind	52 kts.	0	0	0	0
Johnston City	4/22/2005	Tstorm Wind	50 kts.	0	0	10K	0
Carterville	8/14/2005	Rain	N/A	0	0	0	0
Williamson	11/6/2005	Tstorm Wind	50 kts.	0	0	1K	0
Crab Orchard	2/16/2006	Tstorm Wind	60 kts.	0	0	75K	0
Herrin	4/2/2006	Tstorm Wind	56 kts.	0	0	0	0
Marion	7/21/2006	Tstorm Wind	50 kts.	0	0	10K	0
Marion	10/18/2007	Rain	N/A	0	0	0	0
Williamson	11/11/1995	Tstorm Wind	50 kts.	0	0	15K	0
Williamson	10/22/1996	Tstorm Wind	50 kts.	0	0	0	0
Williamson	4/30/1997	Tstorm Wind	50 kts.	0	0	0	0
Williamson	4/20/2000	Wind	N/A	0	0	19K	0
Williamson	3/9/2002	Wind	N/A	0	0	19K	0
Williamson	1/8/2006	Tstorm Wind	55 kts.	0	0	2K	0
Williamson	1/19/2006	Wind	N/A	0	0	14K	0
Williamson	2/16/2006	Tstorm Wind	52 kts.	0	0	10K	0

Source: NCDC

Geographic Location for Thunderstorm Hazard

The entire county has the same risk for occurrence of thunderstorms. They can occur at any location within the county.

Hazard Extent for Thunderstorm Hazard

The extent of the historical thunderstorms listed above varies both in terms of the extent of the storm, the wind speed, and the size of hail stones. Thunderstorms can occur at any location within the county.

Calculated Priority Risk Index for Thunderstorm Hazard

Based on historical information, the probability of future high wind damage is highly likely. High winds with widely varying magnitudes are expected to happen. According to the CPRI, thunderstorms and high wind damage ranked as the number three hazard.

CPRI = Probability X .45 + Magnitude/Severity X .30 + Warning Time X .15 + Duration of event X .10.

Probability	+	Magnitude /Severity	+	Warning Time	+	Duration	=	CPRI
4 x .45	+	**2** x .30	+	**4** x .15	+	**2** x .10	=	**3.20**

Vulnerability Analysis for Thunderstorm Hazard

Severe thunderstorms are an evenly distributed threat across the entire jurisdiction; therefore, the entire county's population and all buildings are susceptible to severe thunderstorms and can expect the same impacts within the affected area. This plan will therefore consider all buildings located within the county as vulnerable. The existing buildings and infrastructure in Williamson County are discussed in types and numbers in Table 4-8. In addition, even though the exact areas affected are not known, a discussion of the potential impacts for buildings and infrastructure during a severe thunderstorm are also included.

Critical Facilities

All critical facilities are vulnerable to severe thunderstorms. A critical facility will encounter many of the same impacts as any other building within the jurisdiction. These impacts include structural failure, debris (trees or limbs) causing damage, roofs blown off or windows broken by hail or high winds, fires caused by lightning, and loss of function of the facility (i.e. damaged police station will no longer be able to serve the community). Table 4-7 lists the types and numbers of all of the critical facilities in the area. Critical facility information, including replacement costs, is included in Appendix F. A map of the critical facilities is included in Appendix G.

General Building Stock

A table of the building exposure in terms of types and numbers of buildings for the entire county is provided in Table 4-8. The buildings within the county can all expect the same impacts, similar to those discussed for critical facilities. These impacts include structural failure, debris (trees or limbs) causing damage, roofs blown off or windows broken by hail or high winds, fires caused by lightning, and loss of building functionality (i.e. damaged home will no longer be habitable causing residents to seek shelter).

Infrastructure

During a severe thunderstorm, the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. Since the county's entire infrastructure is equally vulnerable, it is important to emphasize that any number of these items could become damaged during a severe thunderstorm. The impacts to these items include broken, failed or impassable roadways; broken or failed utility lines (i.e. loss of power or gas to community); or railway failure from broken or impassable railways. Bridges could fail or become impassable causing risk to traffic.

Vulnerability to Future Assets/Infrastructure for Thunderstorm Hazard

All future development within the county and all communities will remain vulnerable to these events.

Analysis of Community Development Trends

Preparing for severe storms will be enhanced if officials sponsor a wide range of programs and initiatives to address the overall safety of county residents. New structures need to be built with more sturdy construction, and those structures already in place need to be hardened to lessen the potential impacts of severe weather. Community warning sirens to provide warning of approaching storms are also vital to preventing the loss of property and ensuring the safety of Williamson County residents.

4.4.5 Drought Hazard

Hazard Definition for Drought Hazard

Droughts are normal climatic phenomena that occur across the state of Illinois and within Williamson County. The meteorological condition that creates a drought is below-normal rainfall. However excessive heat can lead to increased evaporation, which will enhance drought conditions. Droughts can occur in any month. Droughts differ from normal arid conditions found in low-rainfall areas. Droughts refer to abnormally low amounts of precipitation over an extended period of time (usually a growing season or more). The severity of a drought depends on its location, duration, and geographical extent, as well as on the water supply, and usage demands made by human activities, and vegetation or agricultural operations.

Droughts bring several different problems that must be addressed. The quality and quantity of crops, livestock, and other agricultural activities will be affected during prolonged drought. Drought can adversely impact forested areas including the potential for destructive forest and woodland fires that could threaten residential, commercial, and recreational structures.

Previous Occurrences of Drought Hazard

The National Climatic Data Center (NCDC) database reported 28 drought/heat-wave events in Williamson County since 1950. For example, in July of 1999 four fatalities were blamed on the heat, including two in Williamson County. Elsewhere in southern Illinois, a 53-year-old migrant worker died while laboring in a field near Shawneetown in Gallatin County. The man died at an Evansville hospital after suffering a heat stroke. The fourth death occurred in Metropolis, IL where an 82-year-old woman was found dead in her bathroom. This was the first time that the Massac County coroner ruled cause of death as heat exhaustion. The woman did not use a fan in the house, and the indoor temperature was measured at 98°F. Daily highs were near 100°F on July 29 and 30, with afternoon heat indices from 110°F to 115°F. At Paducah, Kentucky, across the Ohio River from Metropolis, this was the fifth warmest July on record. *Source: NCDC*

NCDC records of droughts/heat waves are listed in Table 4-33. Additional details for NCDC events are included in Appendix D.

Table 4-33: Williamson County Drought/Heat Wave Events

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Williamson	9/1/1998	Drought	N/A	0	0	0	0
Williamson	8/1/1999	Drought	N/A	0	0	0	0
Williamson	9/1/1999	Drought	N/A	0	0	0	0
Williamson	10/1/1999	Drought	N/A	0	0	0	0
Williamson	11/1/1999	Drought	N/A	0	0	0	0
Williamson	12/1/1999	Drought	N/A	0	0	0	0
Williamson	8/1/2002	Drought	N/A	0	0	0	0
Williamson	9/1/2002	Drought	N/A	0	0	0	53.0M
Williamson	6/1/2005	Drought	N/A	0	0	0	0

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Williamson	7/1/2005	Drought	N/A	0	0	0	0
Williamson	8/1/2005	Drought	N/A	0	0	0	0
Williamson	7/7/1995	Excessive Heat	N/A	0	0	0	50K
Williamson	8/10/1995	Excessive Heat	N/A	0	1	0	0
Williamson	7/2/1997	Excessive Heat	N/A	1	0	0	0
Williamson	7/25/1997	Excessive Heat	N/A	0	12	0	0
Williamson	6/22/1998	Excessive Heat	N/A	1	0	0	0
Williamson	7/18/1999	Excessive Heat	N/A	4	0	0	0
Williamson	7/7/2001	Excessive Heat	N/A	0	0	0	0
Williamson	8/3/2002	Excessive Heat	N/A	0	8	0	0
Williamson	7/21/2005	Excessive Heat	N/A	0	62	0	0
Williamson	8/19/2005	Excessive Heat	N/A	0	0	0	0
Williamson	7/19/2006	Excessive Heat	N/A	0	0	0	0
Williamson	7/31/2006	Excessive Heat	N/A	0	0	0	0
Williamson	8/1/2006	Excessive Heat	N/A	0	0	0	0
Williamson	8/19/2006	Excessive Heat	N/A	0	0	0	0
Williamson	8/8/2007	Excessive Heat	N/A	0	0	0	0

Source: NCDC

Geographic Location for Drought Hazard

Droughts, as shown in the above table, are regional in nature. Most of the NCDC data is calculated regionally or in some cases statewide.

Hazard Extent for Drought Hazard

The extent of droughts varies in terms of geographical extent, temperature, duration, and the range of precipitation.

Calculated Priority Risk Index for Drought Hazard

Based on historical information, future droughts in Williamson County are possible. Droughts of varying magnitudes are expected. According to the CPRI, droughts ranked as the number eight hazard posed to Williamson County.

CPRI = Probability X .45 + Magnitude/Severity X .30 + Warning Time X .15 + Duration of event X .10.

Probability	+	Magnitude /Severity	+	Warning Time	+	Duration	=	CPRI
2 x .45	+	**2** x .30	+	**2** x .15	+	**3** x .10	=	**2.10**

Vulnerability Analysis for Drought Hazard

Drought impacts are an evenly distributed threat across the entire jurisdiction; therefore, the entire county is vulnerable to drought and can expect the same impacts within the affected area. The entire population and buildings have been identified as at risk. The building exposure for Williamson County, as determined from the updated inventory in HAZUS-MH is included in Table 4-8. In addition, even though the exact areas affected are not known, a discussion of the potential impacts during a drought is also included.

Critical Facilities

All critical facilities are vulnerable to drought. A critical facility will encounter many of the same impacts as any other building within the jurisdiction, which should involve little damage. These impacts include water shortages, fires as a result of drought conditions, and residents in need of medical care from the heat and dry weather. Table 4-7 lists the types and numbers of all of the critical facilities in the area. Critical facility information, including replacement costs, is included in Appendix F. A map of the critical facilities is included in Appendix G.

General Building Stock

A table of the building exposure in terms of types and numbers of buildings for the entire county is listed in Table 4-8. The buildings within the county can all expect the same impacts similar to those discussed for critical facilities. These impacts include water shortages, fires as a result of drought conditions, and residents in need of medical care from the heat and dry weather.

Infrastructure

During a drought, the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. The risk to these structures is primarily associated with fire that could result from the hot, dry conditions. Should such a fire event occur, any number of these items could become damaged. The impacts to these items may include broken, failed or impassable roadways; broken or failed utility lines (i.e. loss of power or gas to community); or railway failure from broken or impassable railways. Bridges could fail or become impassable.

Vulnerability to Future Assets/Infrastructure for Drought Hazard

Future development will remain vulnerable to these events. Some urban and rural areas are more susceptible than others. Excessive demands of the populated area place a limit on water resources. In rural areas, crops and livestock may suffer from extended periods of heat and drought, and dry conditions can lead to the ignition of wildfires that could threaten residential, commercial, and recreational areas.

Analysis of Community Development Trends

Because the droughts are regional in nature future development will be impacted across the county.

4.4.6 Winter Storm Hazard

Hazard Definition for Winter Storm Hazard

Severe winter weather consists of various forms of precipitation and strong weather conditions. This may include one or more of the following: freezing rain, sleet, heavy snow, blizzards, icy roadways, extreme low temperatures, and strong winds. These conditions can cause human health risks such as frostbite, hypothermia, and death.

Ice (glazing) and Sleet Storms

Ice or sleet, even in small quantities, can result in hazardous driving conditions and can cause property damage. Sleet involves frozen raindrops that bounce when they hit the ground or other objects. Sleet does not stick to trees and wires. Ice storms, on the other hand, involve liquid rain that falls through subfreezing air and/or onto sub-freezing surfaces, freezing on contact with those surfaces. The ice coats trees, buildings, overhead wires, and roadways, sometimes causing extensive damage.

The most damaging winter storms in southern Illinois have been ice storms. Ice storms occur when moisture-laden gulf air converges with the northern jet stream causing strong winds and heavy precipitation. This precipitation takes the form of freezing rain coating power and communication lines and trees with heavy ice. The winds will then cause the overburdened limbs and cables to snap, leaving large sectors of the population without power, heat, or communication. In the past few decades, including the winter of 2007–08, numerous ice storm events have occurred in southern Illinois.

Snow Storms

Significant snow storms are characterized by the rapid accumulation of snow, often accompanied by high winds, cold temperatures, and low visibility. A blizzard is categorized as a snow storm with winds of 35 miles per hour or greater and/or visibility of less than ¼ mile for three or more hours. Blizzards are the most dramatic and perilous of all winter storm events. Most snow within a blizzard is in the form of fine, powdery particles, which are wind-blown in such great quantities that visibility is reduced to only a few feet. Blizzards have the potential to result in property damage.

Illinois has repeatedly been struck by blizzards, although they are less common in the southern part of the state. Blizzard conditions can cause power outages, loss of communication, and make transportation impossible. The blowing of snow can reduce visibility to less than ¼ mile, resulting in disorientation that can make even travel by foot dangerous.

Severe Cold

Severe cold is characterized by the ambient air temperature that may drop to around 0°F or below. These extreme temperatures can increase the likelihood of frostbite and hyperthermia. High winds during severe cold events can enhance the air temperatures effects. Fast winds during cold weather events can lower the Wind Chill Factor (how cold the air feels on your skin), which can lower the time it takes for frostbite and hypothermia to affect a person's body.

Previous Occurrences for Winter Storm Hazard

The National Climatic Data Center (NCDC) database identified 28 winter storm and extreme cold events for Williamson County since 1950. The most recent event in the NCDC database was in December 2004 and resulted in one death. A major winter storm dumped from 10 to 20 inches of snow across most of southern Illinois, clogging interstates and shutting down most businesses. In Johnson County, the roof of a hardware store and a horse arena collapsed under the weight of the snow and ice. Portions of Interstates 57, 64, and 24 were extremely difficult to travel. Numerous abandoned vehicles and jack-knifed semis blocked portions of these highways. The near-blizzard conditions stranded many interstate travelers in hotels, and some hotels on Interstates 64 and 57 were totally filled. State police took some stranded motorists to an emergency shelter at the Marion Senior Citizens Center, where at least eight people spent the night. A state disaster declaration was issued for those counties generally from the Marion/Carbondale area east and south, including the Wabash Valley. Those areas received more snow than is normal for the entire winter. The NCDC winter storms are listed in Table 4-34. Additional details for NCDC events are included in Appendix D.
Source: NCDC

More recently still, and not yet added to the NCDC database, multiple ice storms struck Williamson County and other areas of southern Illinois in the winter of 2007–08. The storm of February 11–12, 2008 caused loss of electrical service to more than 27,000 homes in the area, closed traffic on Interstate 57 through Williamson County, and closed schools, the university, and business activity throughout the region.

Table 4-34: Winter Storm Events

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Southern Illinois	3/8/1994	Snow	N/A	0	0	500K	0
Williamson	9/24/1995	Frost	N/A	0	0	0	0
Williamson	12/8/1995	Snow	N/A	0	0	0	0
Williamson	12/9/1995	Extreme Cold	N/A	0	0	0	0
Williamson	1/2/1996	Winter Storm	N/A	0	0	0	0
Williamson	1/6/1996	Winter Storm	N/A	0	0	0	0
Williamson	2/2/1996	Extreme Cold	N/A	0	0	0	0
Williamson	12/16/1996	Winter Storm	N/A	0	0	0	0
Williamson	1/8/1997	Winter Storm	N/A	0	0	0	0
Williamson	1/10/1997	Extreme Windchill	N/A	1	0	0	0
Williamson	1/15/1997	Ice Storm	N/A	0	0	0	0
Williamson	4/10/1997	Snow	N/A	0	0	0	0
Williamson	4/18/1997	Frost	N/A	0	0	0	0
Williamson	1/17/1998	Freezing Rain	N/A	0	0	0	0
Williamson	12/21/1998	Freezing Rain	N/A	0	0	0	0

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Williamson	12/23/1998	Snow	N/A	0	0	0	0
Williamson	1/1/1999	Ice Storm	N/A	0	0	150K	0
Williamson	1/8/1999	Ice Storm	N/A	0	0	0	0
Williamson	3/14/1999	Snow	N/A	0	0	0	0
Williamson	1/22/2000	Snow	N/A	0	0	0	0
Williamson	4/9/2000	Frost	N/A	0	0	0	0
Williamson	10/9/2000	Frost	N/A	0	0	0	0
Williamson	12/12/2000	Extreme Cold	N/A	0	0	0	0
Williamson	12/13/2000	Winter Storm	N/A	0	0	0	0
Williamson	12/15/2000	Freezing Rain	N/A	0	0	0	0
Williamson	1/1/2001	Extreme Cold	N/A	0	0	0	0
Williamson	1/26/2001	Freezing Rain	N/A	0	0	0	0
Williamson	2/21/2001	Winter Storm	N/A	0	0	0	0
Williamson	4/18/2001	Frost	N/A	0	0	0	0
Williamson	1/19/2002	Snow	N/A	0	0	0	0
Williamson	12/4/2002	Winter Storm	N/A	0	0	0	0
Williamson	12/23/2002	Winter Storm	N/A	0	0	0	0
Williamson	1/22/2003	Winter Storm	N/A	0	0	0	0
Williamson	1/23/2003	Extreme Cold/wind Chill	N/A	0	0	0	0
Williamson	2/16/2003	Winter Storm	N/A	0	0	0	0
Williamson	2/23/2003	Snow	N/A	0	0	0	0
Williamson	10/3/2003	Frost/freeze	N/A	0	0	0	0
Williamson	1/25/2004	Ice Storm	N/A	0	0	0	0
Williamson	1/27/2004	Winter Storm	N/A	0	0	0	0
Williamson	1/29/2004	Winter Storm	N/A	0	0	0	0
Williamson	12/22/2004	Winter Storm	N/A	1	1	100K	0
Williamson	12/23/2004	Extreme Cold/wind Chill	N/A	1	0	0	0
Williamson	5/4/2005	Frost/freeze	N/A	0	0	0	0
Williamson	10/28/2005	Frost/freeze	N/A	0	0	0	0
Williamson	12/8/2005	Winter Storm	N/A	0	0	0	0
Williamson	2/18/2006	Winter Storm	N/A	0	0	0	0
Williamson	1/21/2007	Winter Storm	N/A	0	0	0	0
Williamson	2/1/2007	Winter Storm	N/A	0	0	0	0
Williamson	12/15/2007	Winter Storm	N/A	0	0	0	0
Williamson	2/11/2008	Winter Storm	N/A	0	3	0	0

Source: NCDC

Geographic Location for Winter Storm Hazard

Severe winter storms, as shown in the above table, are regional in nature. Most of the NCDC data is calculated regionally or in some cases statewide.

Hazard Extent for Winter Storm Hazard

The extent of the historical winter storms listed above varies in terms of storm extent, temperature, and ice or snowfall. Severe winter storms affect the entire jurisdiction equally.

Calculated Priority Risk Index for Winter Storm Hazard

Based on historical information, the probability of future winter storms is likely. Winter storms of varying magnitudes are expected to happen. According to the CPRI, winter storms ranked as the sixth highest hazard posed to Williamson County.

CPRI = Probability X .45 + Magnitude/Severity X .30 + Warning Time X .15 + Duration of event X .10.

Probability	+	Magnitude /Severity	+	Warning Time	+	Duration	=	CPRI
3 x .45	+	**2** x .30	+	**3** x .15	+	**3** x .10	=	**2.70**

Vulnerability Analysis for Winter Storm Hazard

Winter storm impacts are an evenly distributed threat across the entire jurisdiction; therefore the entire county is vulnerable to winter storms and can expect the same impacts within the affected area. The building exposure for Williamson County, as determined from the updated HAZUS-MH building inventory, is included in Table 4-8.

This plan will therefore consider all buildings located within the county as vulnerable. The existing buildings and infrastructure in Williamson County are discussed in types and numbers below. In addition, even though the exact areas affected are not known, a discussion of the potential impacts for buildings and infrastructure during a winter storm are also included.

Critical Facilities

All critical facilities are vulnerable to a winter storm. A critical facility will encounter many of the same impacts as any other buildings within the jurisdiction. These impacts include loss of gas or electricity from broken or damaged utility lines, roads and railways damaged or impassable, broken water pipes, and roof collapse from heavy snow. Table 4-7 lists the types and numbers of the critical facilities in the area. Critical facility information, including replacement costs, is included in Appendix F. A map of the critical facilities is included in Appendix G.

General Building Stock

Table 4-8 lists the building exposure in terms of types and numbers of buildings for the entire county. The impacts to the building stock within the county are similar to the damages expected to the critical facilities, including loss of gas of electricity from broken or damaged utility lines, roads and railways damaged or impassable, broken water pipes, and roof collapse from heavy snow.

Infrastructure

During a winter storm, the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads and bridges. Since the county's entire infrastructure is equally vulnerable it is important to emphasize that any number of these items could become damaged during a winter storm. Potential impacts include broken gas and/or electricity lines, or damaged utility lines, damaged or impassable roads and railways, and broken water pipes.

Vulnerability to Future Assets/Infrastructure for Winter Storm Hazard

Any new development within the county will remain vulnerable to these events.

Analysis of Community Development Trends

Because the winter storm events are regional in nature future development will be impacted across the county

4.4.7 Hazardous Materials Storage and Transport Hazard

Hazard Definition for Hazardous Materials Storage and Transport Hazard

Explosions result from the ignition of volatile materials such as petroleum products, natural gas and other flammable gases, hazardous materials/chemicals and dust, and explosive devices. An explosion can potentially cause death, injury, and property damage. In addition, a fire routinely follows an explosion, which may cause further damage and inhibit emergency response. Emergency response may require fire, safety/law enforcement, search and rescue, and hazardous materials units.

Previous Occurrences for Hazardous Materials Storage and Transport Hazard

Williamson County has not experienced a significant or large-scale hazardous material incident at a fixed site or transportation route that has resulted in multiple deaths or serious injuries.

Geographic Location for Hazardous Materials Storage and Transport Hazard

The hazardous material hazards are countywide and are primarily associated with the transport of materials via highway or rail.

Hazard Extent for Hazardous Materials Storage and Transport Hazard

The extent of the hazardous material hazard varies both in terms of the quantity of material being transported as well as the specific content of the container.

Calculated Priority Risk Index for Hazardous Materials Storage and Transport Hazard

The possibility of a hazardous materials accident is high, based on input from the planning team. According to the CPRI, Hazardous Materials Storage and Transport ranked as the number five hazard facing Williamson County.

CPRI = Probability X .45 + Magnitude/Severity X .30 + Warning Time X .15 + Duration of event X .10.

Probability	+	Magnitude /Severity	+	Warning Time	+	Duration	=	CPRI
3 x .45	+	**2** x .30	+	**4** x .15	+	**2** x .10	=	**2.75**

Vulnerability Analysis for Hazardous Materials Storage and Transport Hazard

Hazardous material impacts are an evenly distributed threat across the entire jurisdiction; therefore the entire county is vulnerable to a release associated with hazardous materials storage or transport and can expect the same impacts within the affected area. The building exposure for Williamson County, as determined from the HAZUS-MH building inventory, is included in Table 4-8. This plan will therefore consider all buildings located within the county as vulnerable.

The existing buildings and infrastructure in Williamson County are discussed below. In addition, even though the exact areas affected are not known, a discussion of the potential impacts for buildings and infrastructure is also included.

Critical Facilities

All critical facilities and communities within the county are at-risk. A critical facility, if vulnerable, will encounter many of the same impacts as any other buildings within the jurisdiction. These impacts include structural failure due to fire or explosion and loss of function of the facility (i.e. a damaged police station will no longer be able to serve the community). Table 4-7 lists the types and numbers of all critical facilities in the area. Critical facility information, including replacement costs, is included in Appendix F. A map of the critical facilities is included in Appendix G.

General Building Stock

Table 4-8 lists the building exposure in terms of type and number of buildings for the entire county. The buildings within the county can all expect the same impacts, similar to those discussed for critical facilities. These impacts include structural failure due to fire or explosion or debris and loss of function of the building (i.e. a damaged home will no longer be habitable causing residence to seek shelter).

Infrastructure

During a hazardous materials release, the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. Since a full inventory of infrastructure is not available for this plan, it is important to emphasize that any number of these items could become damaged in the event of a hazardous material release. The impacts to these items include broken, failed, or impassable roadways; broken or failed utility lines (i.e. loss of power or gas to community); and railway failure from broken or impassable railways. Bridges could fail or become impassable causing risk to traffic.

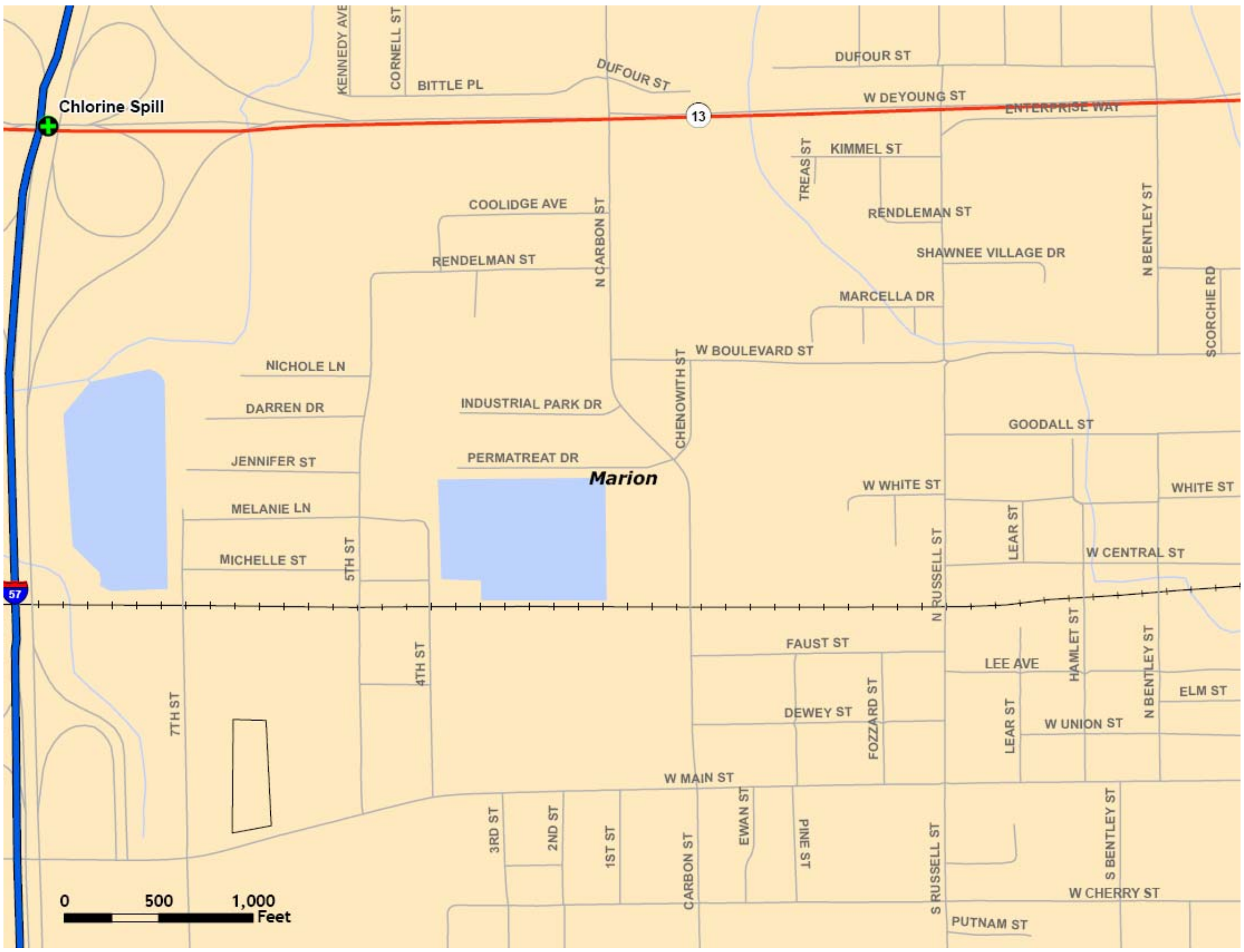
In terms of numbers and types of buildings and infrastructure, typical scenarios are described below to gauge the anticipated impacts of hazardous materials events in the county. The U.S. EPA's ALOHA (Areal Locations of Hazardous Atmospheres) model was utilized to assess the area of impact for a chlorine release at the intersection of Interstate 57 and New Route 13 in Marion.

Chlorine is a greenish-yellow gas with a pungent, suffocating odor. Chlorine is a common chemical used in industrial operations and can be found in either liquid or gas form. Rail and truck tankers commonly haul chlorine to and from facilities. The gas can be stored or transported in liquid form at temperatures below -35°C, or at higher temperatures when maintained at high pressure. Contact with unconfined liquid chlorine can cause frostbite from evaporative cooling. The most significant threat from chlorine is associated with release into the environment, where it will transform into its gaseous phase. Chlorine gas is toxic and potentially lethal. The gas has adverse health effects from either long-term inhalation of low concentrations of vapors or short-term inhalation of high concentrations. Chlorine vapors are much heavier than air and tend to settle in low areas. Chlorine is commonly used to purify water, bleach wood pulp, and make other chemicals.

Analysis

ALOHA is a computer program designed for first responders and for emergency planning and training. For this scenario, atmospheric modeling parameters were based upon westerly wind speeds of five mph. The temperature was 68°F with 75% humidity and partly cloudy skies. The target area was chosen due to its proximity to densely populated areas. The geographic area covered in this analysis is depicted in Figure 4-17.

Figure 4-17: Location of Chemical Release



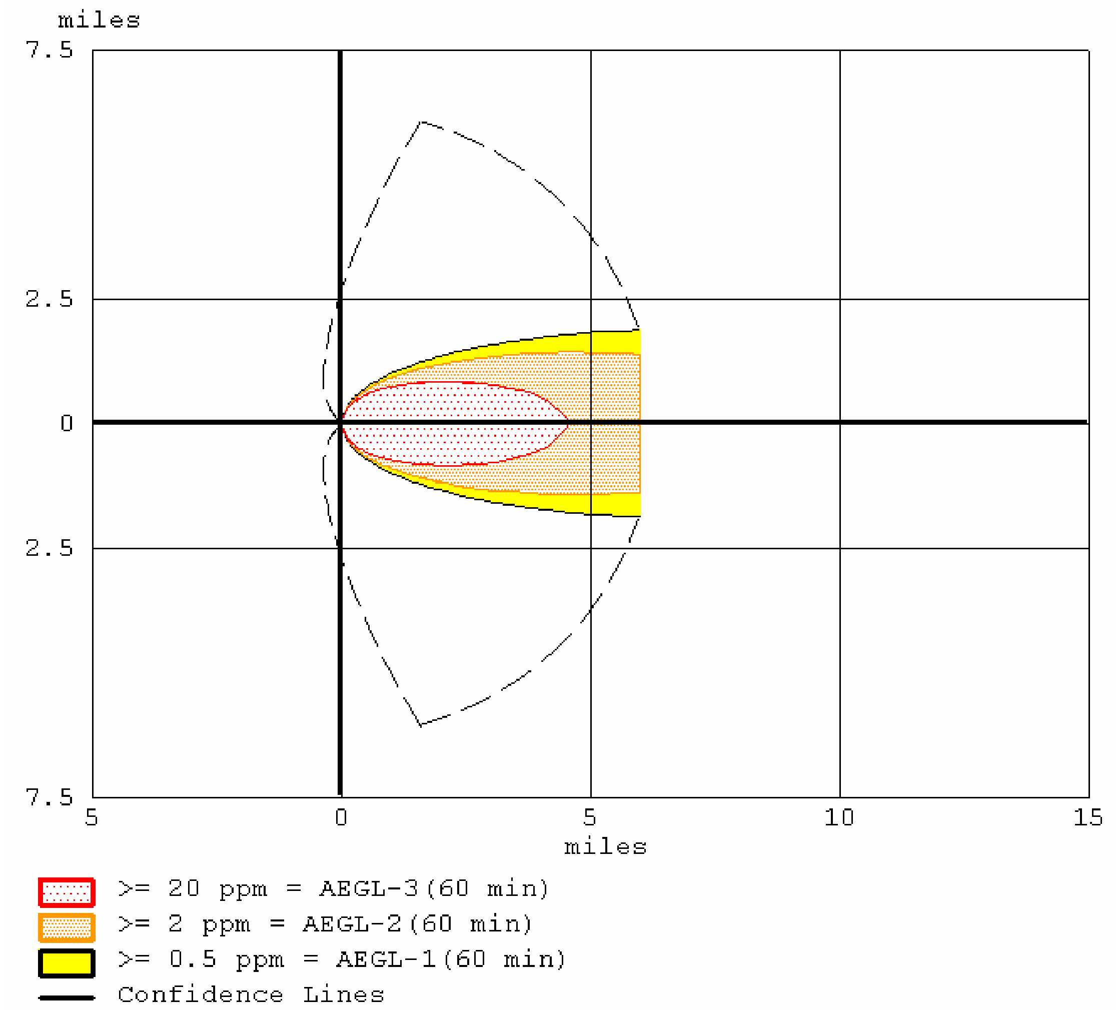
The source of the chemical spill is a horizontal, cylindrical-shaped tank. The diameter of the tank was set to eight feet and the length set to 33 feet (12,048 gallons). At the time of this release, the tank was estimated to be 100% full. The chlorine in this tank is in its liquid state. This release was based on a leak from a 2.5-inch diameter hole, 12 inches above the bottom of the tank. Figure 4-18 shows the plume modeling parameters in greater detail.

Figure 4-18: ALOHA Plume Modeling Parameters

```
SITE DATA:
  Location: MARION, ILLINOIS
  Building Air Exchanges Per Hour: 0.30 (sheltered single storied)
  Time: July 8, 2008  1131 hours CDT (user specified)

CHEMICAL DATA:
  Chemical Name: CHLORINE                Molecular Weight: 70.91 g/mol
  AEGL-1(60 min): 0.5 ppm   AEGL-2(60 min): 2 ppm   AEGL-3(60 min): 20 ppm
  IDLH: 10 ppm
  Ambient Boiling Point: -29.8° F
  Vapor Pressure at Ambient Temperature: greater than 1 atm
  Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)
  Wind: 5 miles/hour from W at 10 meters
  Ground Roughness: open country          Cloud Cover: 5 tenths
  Air Temperature: 68° F                  Stability Class: B
  No Inversion Height                     Relative Humidity: 75%

SOURCE STRENGTH:
  Leak from hole in horizontal cylindrical tank
  Non-flammable chemical is escaping from tank
  Tank Diameter: 8 feet                   Tank Length: 33 feet
  Tank Volume: 12,408 gallons
  Tank contains liquid                    Internal Temperature: 68° F
  Chemical Mass in Tank: 73.0 tons        Tank is 100% full
  Circular Opening Diameter: 2.5 inches
  Opening is 12 inches from tank bottom
  Release Duration: 23 minutes
  Max Average Sustained Release Rate: 10,400 pounds/min
     (averaged over a minute or more)
  Total Amount Released: 138,213 pounds
  Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).

THREAT ZONE:
  Model Run: Heavy Gas
  Red   : 4.5 miles --- (20 ppm = AEGL-3(60 min))
  Orange: greater than 6 miles --- (2 ppm = AEGL-2(60 min))
  Yellow: greater than 6 miles --- (0.5 ppm = AEGL-1(60 min))
```

Using the settings above, approximately 10,400 pounds of material would be released per minute. The image in Figures 4-19 and 4-20 depicts the plume footprint generated by ALOHA. As the substance moves away from the source, the level of substance concentration decreases. Each color-coded area depicts a level of concentration measured in parts per million.

Figure 4-19: Plume Footprint Generated by ALOHA



The red buffer (20 ppm) extends no more than 4.5 miles from the point of release after one hour. The orange buffer (2 ppm) extends more than six miles from the point of release after one hour. The yellow buffer (0.5 ppm) extends more than six miles from the point of release after one hour. The dashed lines depict the level of confidence within the confines of the entire plume footprint. The ALOHA model is 95% confident that the release will stay within this boundary.

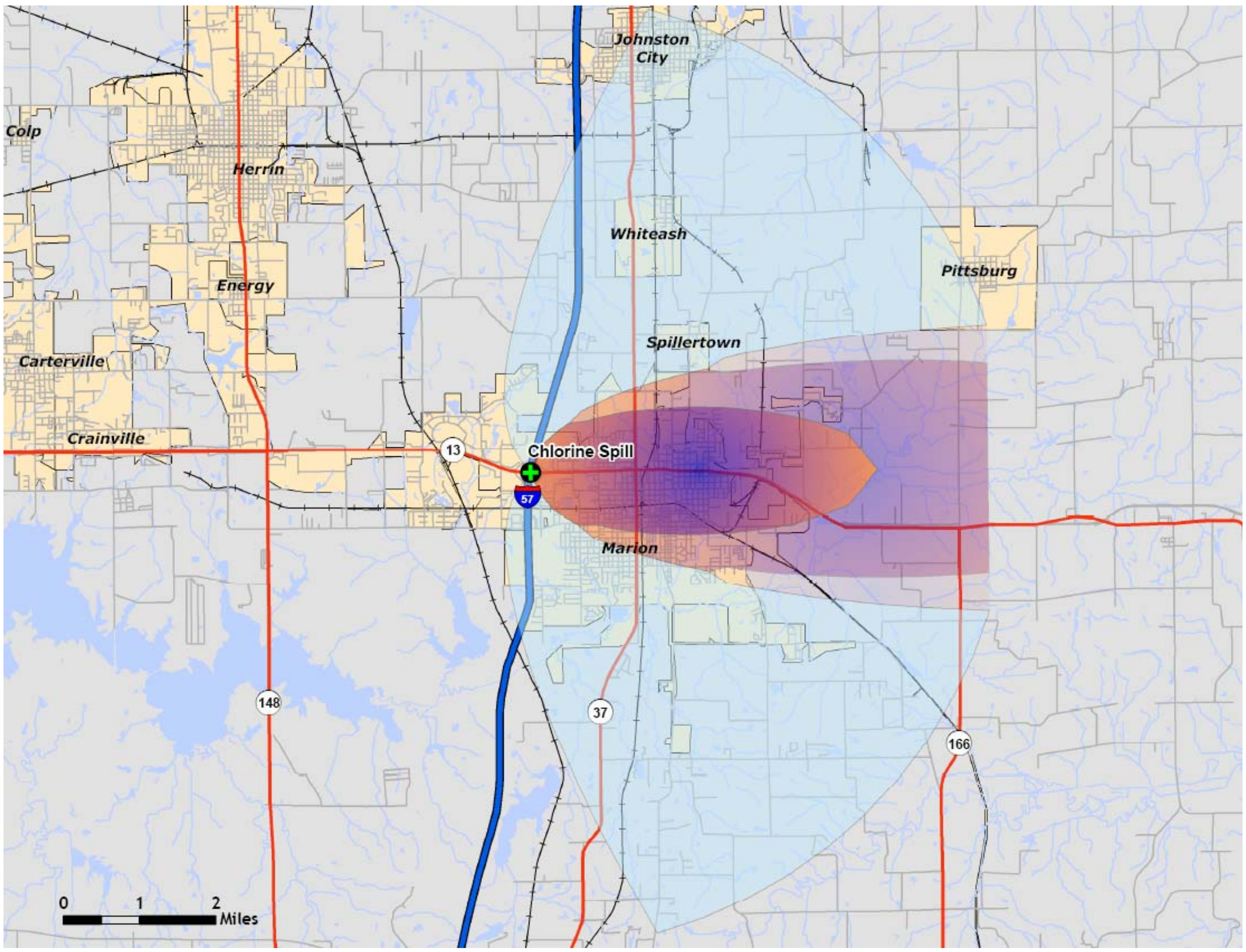
Acute Exposure Guideline Levels (AEGLs) are intended to describe the health effects on humans as a result of a rare exposure to airborne chemicals. The National Advisory Committee for AEGLs is developing these guidelines to help both national and local authorities, as well as private companies, deal with emergencies involving spills, or other catastrophic exposures.

- AEGL 1: Above this airborne concentration of a substance, it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

- AEGL 2: Above this airborne concentration of a substance, it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.

- AEGL 3: Above this airborne concentration of a substance, it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

Figure 4-20: ALOHA Plume Footprint Overlaid in ArcGIS

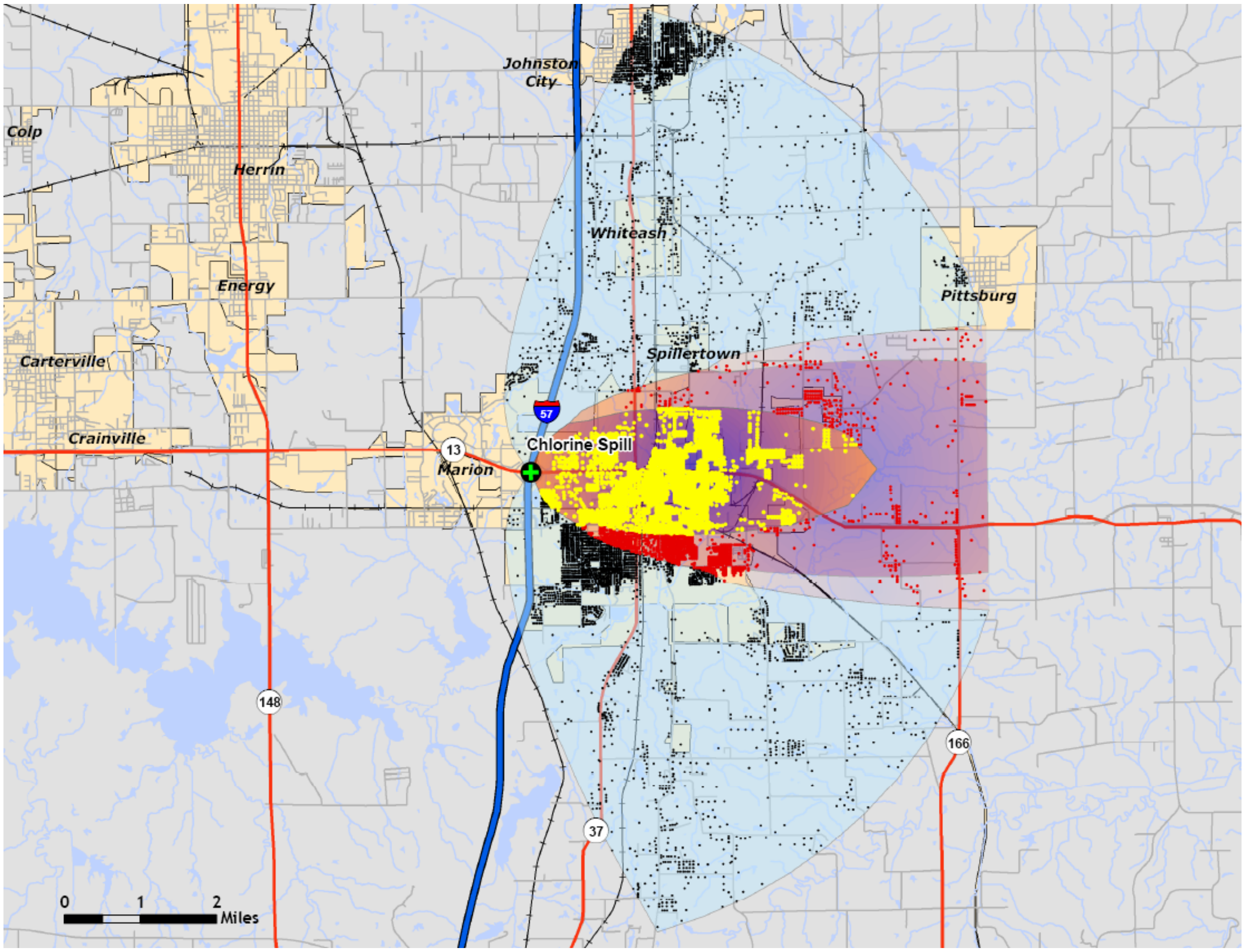


Results

By summing the GBS Points within all AEGL zones (20 ppm, 2 ppm, 0.5 ppm, and > 0.5 ppm), the GIS overlay analysis predicts that as many as 9,782 buildings could be exposed at a replacement cost of $878 million. If this event were to occur, approximately 20,930 people would be affected.

The Williamson County General Building Stock (GBS) point layer was added to ArcMap and overlaid with the plume footprint. The GBS point layer was then intersected with each of the four footprint areas to classify each GBS point based upon the plume footprint in which it is located. Figure 4-21 depicts the Williamson County GBS points after the intersect process.

Figure 4-21: Williamson County Global Building Stock Points Classified By Plume Footprint



General Building Stock Damage

The results of the chlorine-release simulation are given in Tables 4-35 through 4-39. Table 4-35 summarizes the results of the chemical spill within all AEGL zones (20 ppm, 2 ppm, 0.5 ppm, and > 0.5 ppm). Tables 4-36 through 4-38 provide analysis within each AEGL zone. Table 4-39 shows the potential impact to the surrounding area within the 95% confidence footprint.

Table 4-35: Estimated Exposure (all ppm)

Occupancy	Population	Building Counts	Exposure
Residential	20,930	8,372	$615,474,960
Commercial	0	905	$210,021,540
Industrial	0	10	$6,260,010
Agriculture	0	358	$39,419,610
Exempt	0	137	$7,167,660
Total	**20,930**	**9,782**	**$878,343,780**

Table 4-36: Estimated Exposure (20 ppm)

Occupancy	Population	Building Counts	Exposure
Residential	6,860	2,744	$191,989,350
Commercial	0	618	$130,975,950
Industrial	0	5	$5,761,230
Agriculture	0	11	$1,030,200
Exempt	0	92	$4,405,410
Total	**6,860**	**3,470**	**$334,162,140**

Table 4-37: Estimated Exposure (2 ppm)

Occupancy	Population	Building Counts	Exposure
Residential	2,813	1,125	$84,642,690
Commercial	0	76	$14,388,720
Industrial	0	2	$51,210
Agriculture	0	42	$3,338,850
Exempt	0	22	$1,336,290
Total	**2,813**	**1,267**	**$103,757,760**

Table 4-38: Estimated Exposure (0.5 ppm)

Occupancy	Population	Building Counts	Exposure
Residential	193	77	$6,217,110
Commercial	0	1	$364,830
Industrial	0	0	$0
Agriculture	0	21	$1,133,520
Exempt	0	0	$0
Total	**193**	**99**	**$7,715,460**

Table 4-39: Estimated Exposure (> 0.5 ppm)

Occupancy	Population	Building Counts	Exposure
Residential	11,065	4,426	$332,625,810
Commercial	0	210	$64,292,040
Industrial	0	3	$447,570
Agriculture	0	284	$33,917,040
Exempt	0	23	$1,425,960
Total	**11,065**	**4,946**	**$432,708,420**

Essential Facilities Damage

There are 23 essential facilities within the limits of the chemical spill plume. Most are located within the confines of the >0.5 ppm concentration level. The affected facilities are identified in Table 4-40. Their geographic locations are depicted in Figures 4-22 and 4-23.

Table 4-40: Essential Facilities within Plume Footprint

Name
Veteran's Administration Hospital
Fifth Season Residential
Fountains Care Facility
Veterans Administration Nursing Home
Johnston City Fire Department
Marion Fire Department
Williamson County Fire Department - Station #1
Marion City Police
Williamson County Sheriff's Dept
Spillertown Police Dept
Whiteash Police Dept
Johnston City Police Department
New Marion High School*
Project Echo
Jefferson Elementary School
Johnston City High School
Washington Elementary & Middle School
Jefferson School
Lincoln School
Longfellow School
Marion High School
Marion Jr. High School
Washington School

*Essential facility construction was not complete at the time of this analysis.

Figure 4-22: Essential Facilities within Plume Footprint

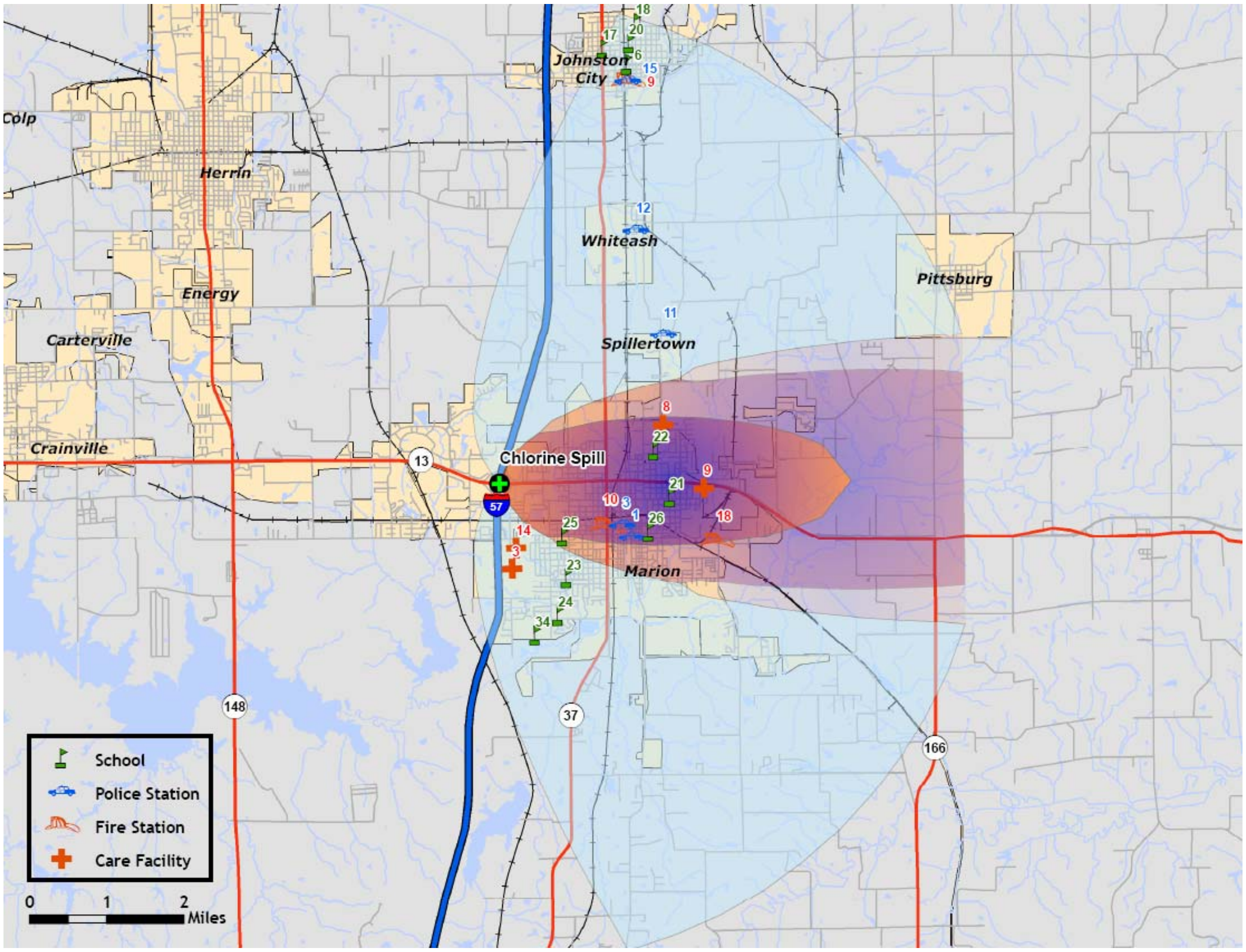
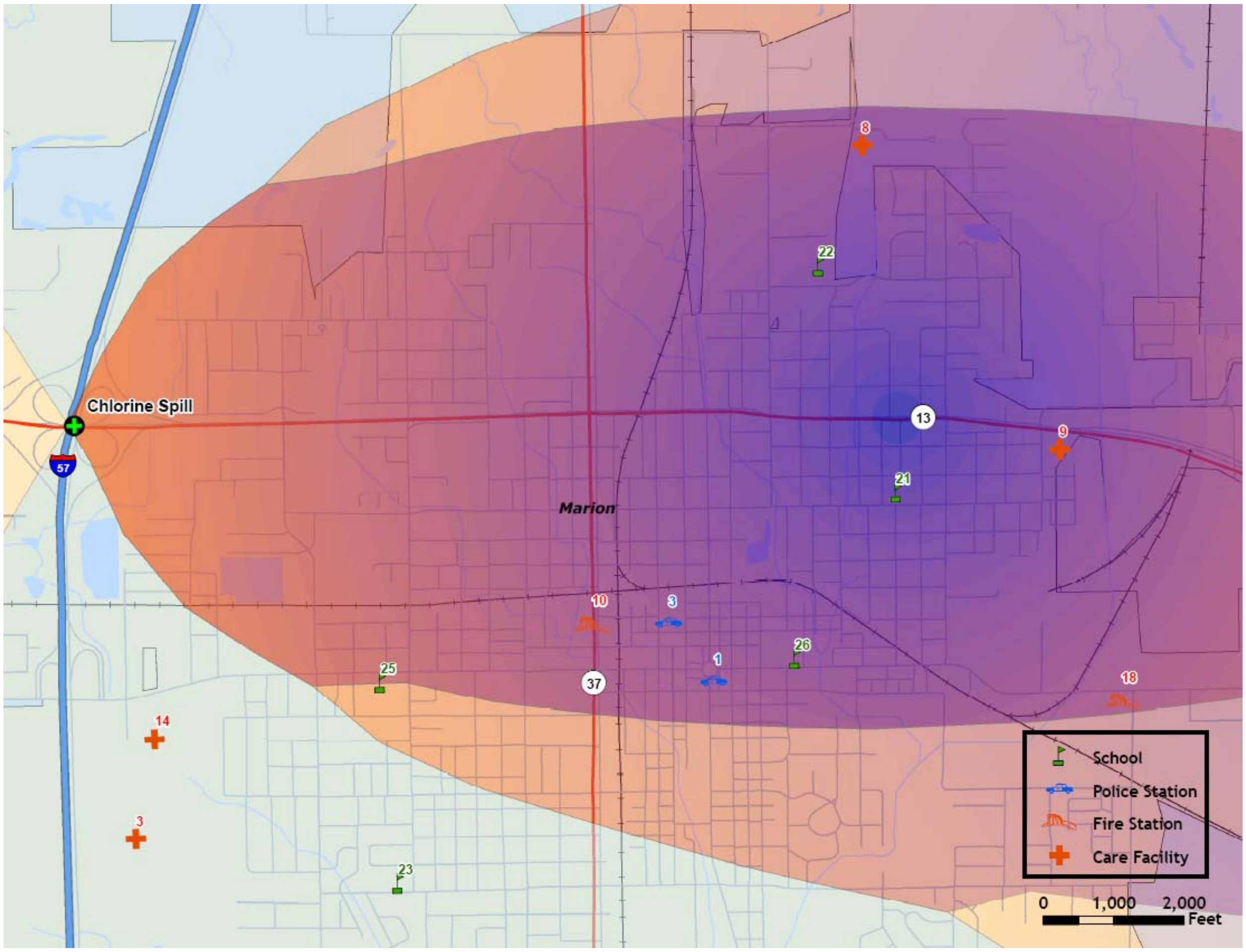


Figure 4-23: Essential Facilities at Greatest Risk



Vulnerability to Future Assets/Infrastructure for Hazardous Materials Storage and Transport Hazard

Much new development in Williamson County is in close proximity to transportation corridors, such as along Route 13. These areas are particularly vulnerable to chemical releases because of transportation of hazardous materials.

Analysis of Community Development Trends

Because of the concentration of new development in proximity to the transportation network, future development is likely to be vulnerable. The major transportation routes and the industries located in Williamson County pose a threat of dangerous chemicals and hazardous materials release.

4.4.8 Ground Failure Hazard

Subsidence

Subsidence, sinking of the land surface, in Illinois is usually associated with either underground mining or collapse of soil into crevice in underling soluble bedrock. Areas at risk for subsidence can be determined from detailed mapping of geologic conditions or detailed mine maps. Data sources were compiled from the Illinois Geologic Survey and Illinois Department of Natural Resources to assess the risk of subsidence in Williamson County. This section provides an overview of the subsidence hazards in Illinois in general and a discussion of the potential subsidence risk for Williamson County.

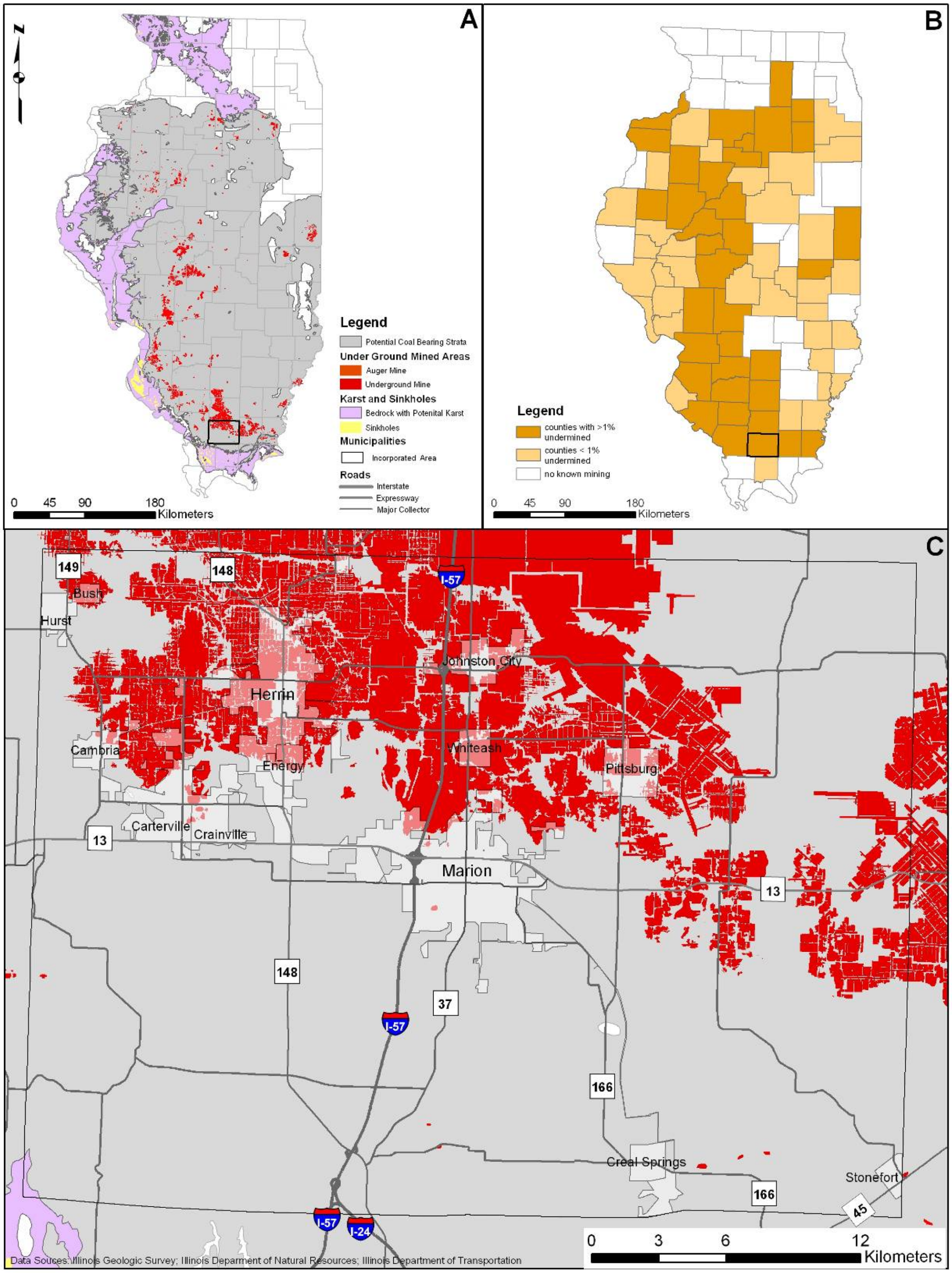
Underground Mining and Subsidence

Underground mines have been used extensively in Illinois to extract coal, lead, zinc, fluorites, shale, clay stones, limestone, and dolomite. When mining first began in Illinois, land over mined areas was sparsely populated. If the ground subsided, homes or other structures were seldom damaged. As towns and cities expanded over mined-out areas, subsidence damage to structures became increasingly more common. The most common underground mines in Illinois are coal mines. A recent study in Illinois has found that about 333,100 housing units were located over or adjacent to 839,000 acres mined for coal (Bauer, 2008).

Illinois has abundant coal resources. All or parts of 86 of 102 counties in the state have coal-bearing strata. As of 2007, about 1,050,400 acres (2.8% of the state) have been mined. Of that total, 836,655 acres are underground mines (Bauer, 2008). Illinois ranks first among all U.S. states for reserves of bituminous coal (Illinois Coal Association, 1992).

Figure 4-24a shows the statewide distribution of bedrock with karst potential, coal bearing strata, sink holes, and underground mines. Figure 4-24b shows the counties which are 0, < 1%, and >1% undermined; Fig 4-24c shows the countywide distribution of bedrock with karst potential, coal bearing strata, sink holes, and underground mines.

Figures 4-24a, 4-24b, and 4-24c: Maps of Statewide and Countywide Areas with Subsidence Hazard Potential



Mining Methods

There are two fundamental underground mining methods used in Illinois: high-extraction methods such as long-wall and low-extraction room-and pillar mining. High-extraction methods remove almost all of the coal in localized areas. For modern mining practices, subsidence associated with high-extraction methods is planned and regulated by state and federal authorities. The subsurface subsides above the mine within several days or weeks after the coal has been removed. Subsidence of the over-burden above the mined-out area can continue up to seven years after subsurface removal, depending on the local geologic conditions (Bauer, 2008). The initial ground movements associated with this mining, which tend to be the largest, diminish rapidly after a few months. After subsidence has decreased to a level that no longer causes damage to structures, the land may be suitable for development. The maximum amount of subsidence is proportional to the amount of material extract and the depth between the mining and the surface. In general, over the centerline of the mine panel, subsidence can be 60 to 70% of the extract material (e.g., 10 ft of material extracted would cause a maximum subsidence of six to seven feet; Bauer, 2006).

For low-extraction techniques such a room-and-pillar mining, miners create openings (rooms) as they work. Enough of the coal layer is left behind in the pillars to support the ground surface. In Illinois this system of mining extracts 40% to 55% of the coal resources in modern mines and up to 75% is some older mines. Based on current state regulations, room-and-pillar mines in operation after 1983 that do not include planned subsidence must show that they have a stable design. Although these permitting requirements have improved overall mine stability, there are no guarantees that subsidence will not occur above a room-and-pillar mine in the future. In general, if coal or other mined resources has been removed from an area, subsidence of the overlying material is always a possibility (Bauer, 2006).

Types of Mine Subsidence

In Illinois, subsidence of the land surface related to underground mining undertakes two forms: pit subsidence or trough (sag) subsidence. Pit subsidence structures are generally six to eight feet deep and range from two to 40 feet in diameter. Pit subsidence mostly occurs over shallow mines that are <100 feet deep and where the overlying bedrock is <50 feet thick and composed of weak rock materials such as shale. The pit is produced when the mine roof collapses and the roof fall void works its way to the surface. These structures form rapidly. If the bedrock is only a few feet thick and the surface material are unconsolidated (loose), these material may fall into adjacent mine voids, producing a surface hole deeper than the height of the collapse mine void. Pit subsidence can cause damage to a structure if it develops under the corner a building or support post of a foundation or other critical location. Subsidence pits should be filled to ensure that people or animals don't fall into these structures (Bauer, 2006).

Trough (or "sag") subsidence forms a gentle depression over a broad area. Some trough subsidence may be as large as a whole mine panel (i.e. several hundred feet long and a few hundred feet wide). Several acres of land may be affected by a single trough event or feature. As discussed above, the maximum vertical settlement is 60% to 70% of the height of material removed (e.g., two to six feet). Significant troughs may develop suddenly (in a few hours or days) or gradually over a period of years. Troughs originate over places in mines where pillar have collapsed, producing downward movement at the ground surface. These failures can develop over mines of any depth. Trough subsidence produce an orderly pattern of tensile features (tension cracks) surrounding a central area of possible compression features. The type and extent of damage to surface structures relate to their orientation and position within a trough. In the tension zone, the downward-bending movements that develop in the ground may damage buildings, roads, sewer and water pipes, and other utilities. The downward bending of the ground surface causes the soil to crack, forming the tension cracks that pull structures apart. In the relatively smaller compression zone, roads my buckle and foundation walls may be pushed inward. Buildings damaged by compressional forces typically need their foundations rebuilt. They also may need to be leveled due to differential settling (Bauer, 2006).

Mine Subsidence Insurance

The Mine Subsidence Insurance Act of 1979 created subsidence insurance as part of an Illinois homeowner's policy. Homeowners in any of the Illinois counties undermined by approximately 1% or more automatically have mine subsidence insurance as a part of their policy, unless coverage is waived in writing. Mine subsidence insurance is especially important for homes located near or over mines that operated before the 1977 Surface Mine Control and Reclamation Act. The companies that operated these mines may no longer be in business (Bauer, 2006).

Mine Subsidence in Williamson County

Nearly all of Williamson County is underlain by rock units which contain coal. Analysis of the GIS data layer of active and abandoned coal mines in Illinois obtained from the Illinois Department of Natural Resources (ILDNR) revealed that 513 km^2 out of Williamson County's total 1150 km^2 (44.6%) have been undermined. The undermined areas general are found north of Route 13 and underlie significant portions of incorporated communities of Bush, Cambria, Crainville, Energy, Herrin, Johnston City, Marion, Pittsburg, and Whiteash. Comparison of the GIS layer of buildings attained from Williamson County with ILDNR GIS layer of active and abandoned underground-coal mines was performed. This analysis revealed that 11,797 out of the 40,612 or 29% of the buildings in the county were above undermined areas.

Mine subsidence impacting the residents of southern Illinois, and specifically Williamson County, have been documented in the local and regional press for several decades. One example of subsidence impacting residents of Herrin was reported in the Chicago Tribune in December 14, 1990. This article reported that several homes were damaged by a rapid mine subsided which formed a depression of up to about 3.5 ft. This subsidence was also caused a water main break, which resulted in minor flooding of two homes (Tackett, 1990). In adjacent Jackson County, a sudden mine subsidence caused a portion of U.S. Route 51 to sink up eight feet, causing an injury accident on December 24, 2001. An Illinois Department of Transportation field maintenance technician reported that similar collapses have occurred along other state roads through out the region (Homan, 2001).

Subsidence Related to Karst Features

Subsidence can also occur on land located over soluble bedrock. The land over such bedrock often has topography characteristic of past subsidence events. This topography is termed “karst.” Karst terrain has unique landforms and hydrology found only in these areas. Bedrock in a karst areas are typically limestone, dolomite, or gypsum. In Illinois, limestone and dolomite (carbonate rocks) are the principle karst rock types. 9% of Illinois has carbonate rock types close enough to the ground surface to have a well developed karst terrain. The area in Illinois in which the karst terrain is most developed is the southern and southwestern part of the state (Panno, et al., 1997). The karst feature most associated with subsidence is the sinkhole.

Sinkhole Formation

A sinkhole is an area of ground that has no natural external surface drainage—when it rains, all of the water stays inside the sinkhole and typically drains into the subsurface. Sinkholes can vary from a few feet to hundreds of acres and from less than one to more than 100 feet deep. Typically, sinkholes form slowly, so that little change is seen during a lifetime, but they also can form suddenly when a collapse occurs. Such a collapse can have a dramatic effect if it occurs in a populated setting.

Sinkholes form where rainwater moves through the soil and encounters soluble bedrock. The bedrock begins to dissolve along horizontal and vertical cracks and joints in the rock. Eventually, these cracks become large enough to start transporting small soil particles. As these small particles of soil are carried off, the surface of the soil above the conduit slump down gradually, and a small depression forms on the ground surface. This depression acts like a funnel and gathers more water, which makes the conduit still larger and washes more soil into the conduit.

Sinkhole Collapse

Sudden collapse of a sinkhole occurs where the soil close to the ground surface does not initially slump down, but instead forms a bridge. Beneath that surface cover, a void forms where the soil keeps washing into the conduit. These voids are essentially shallow caves. Over time, the void enlarges enough that the weight of the overlying bridge can no longer be supported. The surface layer then suddenly collapses into the void, forming a sinkhole.

The process of forming a conduit and a soil bridge usually takes years to decades to form. However this natural process can be aggravated and expedited by human activates. Since the process of forming a sinkhole depends on water to carry soil particle down into the karst bedrock, anything that increases the amount of water flowing into the subsurface can accelerate sinkhole formation process. Parking lots, streets, altered drainage from construction, and roof drainage are a few of the things that can increase runoff.

Collapses are more frequent after intense rainstorms. However, drought and altering of the water table can also contribute to sinkhole collapse. Areas where the water table fluctuates or has suddenly been lowered are more susceptible to sinkhole collapse.

It is also possible for construction activity to induce the collapse of near-surface voids or caves. In areas of karst bedrock, it is imperative that a proper geotechnical assessment be completed prior to construction of any significant structures. Solutions to foundation problems in karst terrain generally are expensive (White, 1988).

Sinkhole Subsidence or Collapse Potential for Williamson County

Nearly all of Williamson County is underlain by insoluble bedrock, and therefore subsidence from this mechanism should not be a concern. However an extremely small area of the southwestern corner of the county is underlain by carbonate bedrock. No sinkholes have been mapped by the Illinois Geologic Survey in Williamson County.

Hazard Extent for Subsidence

The extent of subsidence hazard in Williamson County is a function of where current development is located relative to (1) areas of past and present underground mining, and (2) areas of soluble bedrock.

Vulnerability Analysis for Ground Failure

The existing buildings and infrastructure of Williamson County are discussed in types and numbers below. In addition, a discussion of the potential impacts for buildings and infrastructure as a result of ground failure is also included.

Critical Facilities

Any critical facility built above highly soluble bedrock could be vulnerable to land subsidence. A critical facility will encounter the same impacts as any other building within the affected area. These impacts include damages ranging from cosmetic to structural. Buildings may sustain minor cracks in walls due to a small amount of settling, while in more severe cases, the failure of building foundations can cause cracking of critical structural elements. Table 4-7 lists the types and numbers of all of the critical facilities in the area. Critical facility information, including replacement costs, is included in Appendix F. A map of the critical facilities is included in Appendix G.

General Building Stock

Table 4-8 lists the building exposure in terms of types and numbers of buildings for the entire county. The buildings within this area can anticipate impacts similar to those discussed above for critical facilities, ranging from cosmetic to structural. Buildings may sustain minor cracks in walls due to a small amount of settling, while in more severe cases, the failure of building foundations causes cracking of critical structural elements.

Infrastructure

In the area of Williamson County affected by land subsidence the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. The risk to these structures is primarily associated with land collapsing directly beneath them in a way that undermines their structural integrity. The impacts to these items include broken, failed, or impassable roadways; broken or failed utility lines (i.e. loss of power or gas to community); and railway failure from broken or impassable railways. In addition bridges could fail or become impassable causing risk to traffic.

Vulnerability to Future Assets/Infrastructure for Ground Failure

New buildings and infrastructure placed on undermined land or on highly soluble bedrock will be vulnerable to ground failure.

Analysis of Community Development Trends

The majority of new development in Williamson County is along and near Route 13 west of the I-57 interchange. This area has not been undermined and there are no current plans to mine the areas by utilizing subsurface mining techniques. Thus, development in this area should not be impacted by ground subsidence.

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Section 5 - Mitigation Strategy

The goal of mitigation is to reduce the future impacts of a hazard including property damage, disruption to local and regional economies, and the amount of public and private funds spent to assist with recovery. The goal of mitigation is to build disaster-resistant communities. Mitigation actions and projects should be based on a well constructed risk assessment; Williamson County's is provided in Section 4 of this plan. Mitigation should be an ongoing process adapting over time to accommodate a community's needs.

5.1 Community Capability

The capability assessment identifies current activities used to mitigate hazards. The capability assessment identifies the policies, regulations, procedures, programs, and projects that contribute to the lessening of disaster damages. The assessment also provides an evaluation of these capabilities to determine whether the activities can be improved in order to more effectively reduce the impact of future hazards. The following sections identify existing plans and mitigation capabilities within all of the communities listed in Section 2 of this plan.

5.1.1 National Flood Insurance Program (NFIP)

The county and all of the communities within the county are members of the National Flood Insurance Program (NFIP). In 2007, approximately 150 households were located in the Williamson County Special Flood Hazard Area; 246 households paid flood insurance, insuring $17,161,600 in property value. The total premiums collected amounted to $103,144, which on average was $420 annually. From 1978 to 2007, 177 claims were filed totaling $1,261,341. The average claim was $7,126.

The county and incorporated areas do not participate in the National Flood Insurance Program's (NFIP) Community Rating System (CRS). The CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community meeting the three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote the awareness of flood insurance. Table 5-1 identifies each community and the date each participant joined the NFIP.

Table 5-1: Additional Information on Communities Participating in the NFIP

Community	Participation Date	FIRM Date	CRS Date	CRS Rating	Flood Plain Zoning Ordinance Adopted Last
Williamson County	8/04/2008	8/04/2008	N/A	N/A	7/31/08
Village of Bush	9/18/1985	8/04/2008	N/A	N/A	7/31/08
Village of Cambria	8/4/2008	8/04/2008	N/A	N/A	3/17/2008
City of Carterville	8/19/1987	8/04/2008	N/A	N/A	5/15/1987
Village of Freeman Spur	8/07/2008	8/04/2008	N/A	N/A	7/15/08
City of Herrin	4/16/1990	8/04/2008	N/A	N/A	7/14/2008
City of Hurst	9/18/1985	8/04/2008	N/A	N/A	2/15/1983
City of Johnston City	4/01/1982	8/04/2008	N/A	N/A	6/01/1994
City of Marion	9/15/1983	8/04/2008	N/A	N/A	9/15/1983
Village of Crainville	8/04/2008	8/04/2008	N/A	N/A	4/1/2008
Village of Energy	8/04/2008	8/04/2008	N/A	N/A	N/A

5.1.2 Storm Water Management Stream Maintenance Program/Ordinance

Williamson County has a storm water management plan as an element of the Subdivision Ordinance, Section 7. This section requires the subdivider to provide either a ditch or storm sewer of adequate size for surface runoff of streets and install drainage structures wherever required. The village of Cambria subdivision development is an element of their zoning codes; 40-5-8 R-5 PLANNED UNIT DEVELOPMENT: (Amendment 7, dated November 2, 2005). This amendment requires the subdivider to make provisions for acceptable design and construction of storm water facilities.

The city of Carterville has a storm water management plan as an element of the Subdivision Ordinance, Section 34-7-6. This section requires the subdivider to provide adequate surface and subsurface drainage for the removal of storm water. The extent of the storm water facilities required shall be based upon an analysis prepared by a Registered Professional Engineer. The analysis shall be based upon the rational method of computing storm water run-off using the one-hour rainfall to be expected at a five year frequency. Any person proposing to locate a structure or a use within one hundred feet of any stream or main drainage channel in any zoning district is required to include with the application for building or use permit a statement by a competent engineer. The statement is to be based on a study of the watershed area and the probable run-off that proves the structure or use in the location proposed shall leave adequate space for the flow of flood waters. Lastly no building shall be permitted within 50 feet of the top of the bank of any stream or main drainage channel.

The city of Herrin has a storm water management plan as an element of the Subdivision Ordinance, Section 34-2-11. This section informs the subdivider that storm water drainage shall be discharged to marshlands, swamps, retention basins, or other treatment facilities. No existing ditch, stream, drain, or drainage canal shall be deepened, widened, routed, or filled without written permission from the city. Artificial channels must be constructed to augment the natural drainage system; as part of a recreational trail system. No plat shall be recorded for any subdivision situated within 500 feet of any surface drain or watercourse serving a tributary area of 640 acres or more, until such plan or map has been reviewed by the Department of Transportation. For the purpose of determining the flood hazards involved, for the protection of persons and property, a report must be filed by the Department of the County Recorder.

The village of Energy has a storm water management plan as an element of the Subdivision Ordinance, Section 34-6-1. This section requires the subdivider of residential developments of specified size to adhere to this code. The village requires the right to require detention storage in all cases in which the proposed development will generate excess run-off that adversely affects the carrying capacity of the receiving watercourse. Developments of two acres with less than 30% of the area paved and developments that generate less than one cubic foot per second per acre are not be required to provide detention storage.

The city of Marion has a Storm Water Detention Ordinance # 2212. This ordinance prohibits the placement of fill material or construction or placement of any other structure on a person’s property, or performance of any excavation or grading to alter the flow of surface water across the property in a manner that could damage adjacent property. The land owner or developer must propose development that will not result in damage to any adjacent or downstream property that is certified by a professional engineer's submission of sufficient data and calculation. This requirement can be accomplished by the owner or developer designing and constructing an on-site storm water detention facility that limits the peak flood flows from proposed development to the existing peak flows from the subject tract.

5.1.3 Zoning Management Ordinance

The cities of Carterville, Herrin, Johnston City, and Marion, as well as the villages of Cambria and Crainville have land use planning and zoning ordinances within the county. Table 5-2 identifies the date of adoption of the Comprehensive Plans, Zoning Ordinances, and Subdivision Control Ordinance. The cities of Carterville, Herrin, Johnston City, and Marion, as well as the villages of Cambria and Crainville each have a zoning administrator.

Table 5-2: Description of Zoning Plans/Ordinances

Community	Comp Plan	Zoning Ord	Subd Control Ord	Erosion Control	Storm Water Mgmt	Burning Ord.	Seismic Ord.	Bldg. Stndrds.
Williamson County	7/1/1964	N/A	11/1/1982	11/1/1982	11/1/1982	4/13/1981	N/A	N/A
Village of Bush	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Village of Cambria	N/A	10/20/2005	10/20/2005	N/A	10/20/2005	N/A	N/A	N/A
City of Carterville	5/6/1966	6/03/1969	2/3/1970	N/A	2/3/1970	2/3/1970	N/A	3/5/1963
Village of Colp	7/30/1967	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Village of Crainville	5/1/1968	6/5/2006	5/15/1980	5/15/1980	N/A	5/15/1980	N/A	N/A
City of Creal Springs	4/14/1967	N/A	N/A	N/A	N/A	N/A	N/A	1/11/1965
Village of Energy	N/A	N/A	8/10/1999	8/10/1999	8/10/1999	7/11/1989	N/A	N/A
Village of Freeman Spur	N/A	N/A	N/A	N/A	N/A	2005	N/A	2005
City of Herrin	9/1963	3/28/1966	4/13/1987	7/25/2005	7/25/2005	1/26/1998	N/A	10/28/2002
City of Hurst	6/26/1967	N/A	N/A	N/A	N/A	N/A	N/A	12/26/1958
City of Johnston City	7/1/1964	8/18/1964	7/13/1964	N/A	N/A	1/1/1996	N/A	4/16/1963
City of Marion	7/15/1968	11/24/1958	2/8/1965	7/14/2008	7/14/2008	9/20/1993	N/A	N/A
Village of Pittsburg	N/A	N/A	N/A	N/A	N/A	9/12/2005	N/A	N/A

Community	Comp Plan	Zoning Ord	Subd Control Ord	Erosion Control	Storm Water Mgmt	Burning Ord.	Seismic Ord.	Bldg. Stndrds.
Village of Spillertown	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Village of Stonefort	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Village of Whiteash	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

5.1.4 Erosion Management Program/ Policy

Williamson County has erosion and sediment controls as an element of the Subdivision Ordinance, Section 7. This section requires the subdivider to reseed turf or sod exposed areas to prevent erosion. The village of Crainville has erosion and sediment controls as an element of the Subdivision Ordinance, Section 3-16. This section requires the subdivider to conform to the natural limitations presented by topography and soil so as to create the least potential for soil erosion.

The city of Herrin has erosion and sediment controls as an element of the Subdivision Ordinance, Section 34-2-12. This section requires the subdivider to conform the development to natural limitations of topography and soil so as to create the least potential for soil erosion. The village of Energy has erosion and sediment controls as an element of the Subdivision Ordinance, Section 34-6-12 (D) and (E). This section informs the subdivider of the proper calculations to design a sediment storage facility. The erosion control element informs the subdivider of the principal spillway and outlet work that are designed to prevent erosion.

5.1.5 Fire Insurance Rating Programs/ Policy

Table 5-3 lists the fire departments in Williamson County, as well as the ISO rating and the number of members in each department.

Table 5-3: Listing of Fire Departments, Ratings, and Number of Firefighters

Fire Department	Fire Insurance Rating	Number of Firefighters
Bush Fire Dept.	ISO 7	10
Cambria Fire Dept.	ISO 5	16
Carterville Fire Dept.	ISO 6	21
Energy Fire Dept.	ISO 6	8
Herrin Fire Dept.	ISO 4	19
Hurst Fire Dept.	ISO 6	25
Johnston City Fire Dept.	ISO 4	14
Lake of Egypt Fire Protection District	ISO 7	38
Marion Fire Dept.	ISO 4	24
Pittsburg Fire Dept.	ISO 6	14
Stonefort Fire Dept.	ISO 6	11
Williamson County Fire Protection District	ISO 7	70

5.1.6 Land Use Plan

Table 5-2 identifies the area Comprehensive Plans within Williamson County.

5.1.7 Building Codes

Table 5-2 identifies the building standards adopted within the county. Carterville, Creal Springs, Herrin, Hurst, and Johnston City have all adopted the National Building Code. Many of the building codes for manufactured homes require tie-downs to minimize wind effects. There are no building codes specific to seismic control.

5.2 Mitigation Goals

The Williamson County Emergency Management Agency, Southern Illinois University-Carbondale Geology Department, the Polis Group of IUPUI, and the Greater Egypt Regional Planning & Development Commission assisted the Williamson County Multi-Hazard Mitigation Planning Team in the formulation of mitigation strategies and projects for Williamson County. The goals and objectives set forth were derived through participation and discussion of the views and concerns of the Williamson County Multi-Hazard Mitigation Team members and related public input. The MHMP will focus on these goals, with a great deal of public input, to ensure that the priorities of the communities are represented.

The goals represent long-term, broad visions of the overall vision the county would like to achieve for mitigation. The objectives are strategies and steps which will assist the communities to attain the listed goals. Table 5-5 lists mitigation actions, which are defined projects that will help to complete the defined goals and objectives.

Goal 1: Lessen the impacts of hazards to new and existing infrastructure

(a) Objective: Retrofit critical facilities with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.

(b) Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.

(c) Objective: Minimize the amount of infrastructure exposed to hazards.

(d) Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the county.

(e) Objective: Improve emergency sheltering in Williamson County.

Goal 2: Create new or revise existing plans/maps related to hazards affecting Williamson County

(a) Objective: Support compliance with the NFIP for each jurisdiction in Williamson County.

(b) Objective: Review and update existing community plans and ordinances to support hazard mitigation.

(c) Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.

Goal 3: Develop long-term strategies to educate the public on the hazards affecting Williamson County

(a) Objective: Raise public awareness on hazard mitigation.

(b) Objective: Improve education of emergency personnel and public officials.

5.3 Mitigation Actions/Projects

Upon completion of the risk assessment and development of the goals and objectives, the Planning Committee was provided with a list of the six mitigation measure categories from the *FEMA State and Local Mitigation Planning How to Guides*. The measures are listed below.

- **Prevention:** Government, administrative or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space preservation, and storm water management regulations.

- **Property Protection:** Actions that involve the modification of existing buildings or structures to protect them from a hazard or removal from the hazard area. Examples include acquisition, elevation, structural retrofits, storm shutters, and shatter-resistant glass.

- **Public Education and Awareness:** Actions to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.

- **Natural Resource Protection:** Actions that, in addition to minimizing hazard losses, preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.

- **Emergency Services:** Actions that protect people and property during and immediately after a disaster or hazard event. Services include warning systems, emergency response services, and protection of critical facilities.

- **Structural Projects:** Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, levees, floodwalls, seawalls, retaining walls, and safe rooms.

After Meeting #3, held July 23, 2008, MHMP members were presented with the task of individually listing potential mitigation activities using the FEMA evaluation criteria. The MHMP members brought their mitigation ideas to Meeting #4 which was held August 20, 2008. The evaluation criteria (STAPLE+E) involved the following categories and questions.

Social:
- Will the proposed action adversely affect one segment of the population?
- Will the action disrupt established neighborhoods, break up voting districts, or cause the relocation of lower income people?

Technical:
- How effective is the action in avoiding or reducing future losses?
- Will it create more problems than it solves?
- Does it solve the problem or only a symptom?
- Does the mitigation strategy address continued compliance with the NFIP?

Administrative:
- Does the jurisdiction have the capability (staff, technical experts, and/or funding) to implement the action, or can it be readily obtained?
- Can the community provide the necessary maintenance?
- Can it be accomplished in a timely manner?

Political:
- Is there political support to implement and maintain this action?
- Is there a local champion willing to help see the action to completion?
- Is there enough public support to ensure the success of the action?
- How can the mitigation objectives be accomplished at the lowest cost to the public?

Legal:
- Does the community have the authority to implement the proposed action?
- Are the proper laws, ordinances, and resolution in place to implement the action?
- Are there any potential legal consequences?
- Is there any potential community liability?
- Is the action likely to be challenged by those who may be negatively affected?
- Does the mitigation strategy address continued compliance with the NFIP?

Economic:
- Are there currently sources of funds that can be used to implement the action?
- What benefits will the action provide?
- Does the cost seem reasonable for the size of the problem and likely benefits?
- What burden will be placed on the tax base or local economy to implement this action?
- Does the action contribute to other community economic goals such as capital improvements or economic development?

- What proposed actions should be considered but be "tabled" for implementation until outside sources of funding are available?

Environmental:
- How will this action affect the environment (land, water, endangered species)?
- Will this action comply with local, state, and federal environmental laws and regulations?
- Is the action consistent with community environmental goals?

The development of the MHMP is the first step in a multi-step process to implement projects and policies to mitigate hazards in the county and the communities in the county.

Completed or Current Mitigation Actions/Projects

Since this is the first mitigation plan developed for Williamson County, there are no deleted or deferred mitigation items. The following tables will refer to completed, ongoing, or future mitigation actions.

Table 5-4 presents the completed and ongoing mitigation actions and projects in the county.

Table 5-4: Completed and Ongoing Mitigation Actions

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Comments
Establish Public Awareness Campaigns regarding hazards	**Goal:** Develop long-term strategies to educate the public on the hazards affecting Williamson County **Objective:** Raise public awareness on hazard mitigation	All	Williamson County, Bush, Cambria, Carterville, Colp, Crainville, Creal Springs, Energy, Freeman Spur, Herrin, Hurst, Johnston City, Pittsburg, Marion, Spillertown, Stonefort, Whiteash	The County EMA, schools, Red Cross, and other organizations have implemented various forms of this strategy. Local resources have been used to target and inform the resident population. Additional funding will be sought from the Pre-Disaster Mitigation program. The educational outreach program is an ongoing project subject to the acquisition of funds.
Provide a comprehensive alert system for the county	**Goal:** Lessen the impacts of hazards to new and existing infrastructure **Objective:** Evaluate and strengthen the communication and transportation abilities of emergency services throughout the county	Tornado, Thunderstorm/ Lightning event	Williamson County, Bush, Cambria, Carterville, Colp, Crainville, Creal Springs, Energy, Freeman Spur, Herrin, Hurst, Johnston City, Pittsburg, Marion, Spillertown, Stonefort, Whiteash	The County EMA oversees the implementation of the project. Local resources have been used to install and maintain the warning system. Additional funding will be sought from the E911 and other funding sources to expand the warning system coverage area. Implementation, if funding is available, is forecasted to be complete within two years.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Comments
Install weather radios in public assembly areas	**Goal:** Lessen the impacts of hazards to new and existing infrastructure **Objective:** Evaluate and strengthen the communication and transportation abilities of emergency services throughout the county	Tornado, Thunderstorms	Williamson County, Bush, Cambria, Carterville, Colp, Crainville, Creal Springs, Energy, Freeman Spur, Herrin, Hurst, Johnston City, Pittsburg, Marion, Spillertown, Stonefort, Whiteash	The County EMA, Red Cross, and other organizations oversee the implementation of this project. Local resources and donations will be used to distribute weather radios to individuals in need. Additional funding will be sought from private businesses and other sources to expand the distribution of these radios. The weather radio distribution project is ongoing and subject to the acquisition of funds.
Operate Williamson County shelters as cooling centers	**Goal:** Lessen the impacts of hazards to new and existing infrastructure **Objective:** Improve emergency sheltering in Williamson County	Extreme Heat	Marion	The county shelters and other organizations oversee the implementation of this project. Local resources have been used to operate and maintain these facilities. Additional funding will be sought from the pre-disaster mitigation program to expand and improve the accessibility and function of these facilities. The cooling centers are a seasonal project subject to the acquisition of funds.
Implement a new program in which businesses and contributors donate fans to be provided to individuals in need	**Goal:** Lessen the impacts of hazards to new and existing infrastructure **Objective:** Improve emergency sheltering in Williamson County	Extreme Heat	Williamson County, Bush, Cambria, Carterville, Colp, Crainville, Creal Springs, Energy, Freeman Spur, Herrin, Hurst, Johnston City, Pittsburg, Marion, Spillertown, Stonefort, Whiteash	The County EMA, Red Cross, and other organizations oversee the implementation of this project. Local resources have been used to procure and distribute fans to individuals in need. Additional funding will be sought from private businesses and other sources to continue the distribution of these fans. The fan distribution project is a seasonal project subject to the acquisition of funds and donations.
NOAA Storm-Ready Designation To be certified and nationally sponsored as a prepared and response capable County	**Goal:** Lessen the impacts of hazards to new and existing infrastructure **Objective:** Evaluate and strengthen the communication and transportation abilities of emergency services throughout the county	Tornado, Severe Weather, Winter Storms	Williamson County, Bush, Cambria, Carterville, Colp, Crainville, Creal Springs, Energy, Freeman Spur, Herrin, Hurst, Johnston City, Pittsburg, Marion, Spillertown, Stonefort, Whiteash	The County EMA has established a 24-hour warning operation center that monitors local weather conditions. They operate severe weather and forecast alert systems. They promote the improvement of public readiness through community seminars and have developed a formal hazardous weather plan. Additional funding will be sought to improve the coverage of the communication system and the educational outreach seminars.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Comments
Provide school presentations, videos, and drills that demonstrate proper emergency procedures and awareness;	**Goal:** Develop long-term strategies to educate the public on the hazards affecting Williamson County **Objective:** Raise public awareness on hazard mitigation	All	Carterville, Crab Orchard, Johnston City, Herrin, and Marion School Districts	The County EMA, schools, Red Cross, and other organizations have implemented various forms of this strategy. Organizations have allocated $10,000 county wide for educational outreach. Local resources have been used to target and inform the resident population. Additional funding will be sought from the Pre-Disaster Mitigation program and other sources. The educational outreach program is an ongoing project subject to the acquisition of funds.
Establish an incident management team	**Goal:** Lessen the impacts of hazards to new and existing infrastructure **Objective:** Evaluate and strengthen the communication and transportation abilities of emergency services throughout the county	All	Williamson County,	The county and County EMA oversees the implementation of this project. Local resources have been used to assemble an incident management team. Additional Department of Homeland Security funding will be sought to expand capabilities of the response team. Implementation, if funding is available, is forecasted to be complete within approximately five years.
Update DFIRMS for Williamson County	**Goal:** Create new or revise existing plans/maps related to hazards affecting Williamson County **Objective:** Support compliance with the NFIP	Flood	Williamson County, Bush, Cambria, Carterville, Colp, Crainville, Creal Springs, Energy, Freeman Spur, Herrin, Hurst, Johnston City, Pittsburg, Marion, Spillertown, Stonefort, Whiteash	The County will oversee the implementation of this project. Implementation will be ongoing as new information is obtained.
Geological study of the area around the Devil's Kitchen dam to possibly retro-fit dam to current standards.	**Goal:** Create new or revise existing plans/maps related to hazards affecting Williamson County **Objective:** Conduct new studies/research to profile hazards and follow up with mitigation strategies	Earthquakes	Williamson County	The US Fish and Wild Life Service is overseeing the implementation of this project. Federal resources are used to fund this project.
Create Emergency Action Plan to deal with hazard events	**Goal:** Create new or revise existing plans/maps related to hazards affecting Williamson County **Objective:** Review and update existing community plans and ordinances to support hazard mitigation	Earthquake, Flood	Williamson County	The County EMA and other Emergency Authorities oversees the implementation of this project. Local and state resources are used to fund this project.

5.4 Implementation Strategy and Analysis of Mitigation Projects

Implementation of the mitigation plan is critical to the overall success of the mitigation planning process. The first step is to decide, based upon many factors, which action will be undertaken first. In order to pursue the top priority first, an analysis and prioritization of the actions is important. Some actions may occur before the top priority due to financial, engineering, environmental, permission, and site control issues. Public awareness and input of these mitigation actions can increase knowledge to capitalize on funding opportunities and monitoring the progress of an action.

In Meeting #4, the planning team prioritized mitigation actions based on a number of factors. A rating of High, Medium, or Low was assessed for each mitigation item and is listed next to each item in Table 5-6. The factors were the STAPLE+E (Social, Technical, Administrative, Political, Legal, Economic, and Environmental) criteria listed in Table 5-5.

Table 5-5: STAPLE+E planning factors

S – Social	Mitigation actions are acceptable to the community if they do not adversely affect a particular segment of the population, do not cause relocation of lower income people, and if they are compatible with the community's social and cultural values.
T – Technical	Mitigation actions are technically most effective if they provide a long-term reduction of losses and have minimal secondary adverse impacts.
A – Administrative	Mitigation actions are easier to implement if the jurisdiction has the necessary staffing and funding.
P – Political	Mitigation actions can truly be successful if all stakeholders have been offered an opportunity to participate in the planning process and if there is public support for the action.
L – Legal	It is critical that the jurisdiction or implementing agency have the legal authority to implement and enforce a mitigation action.
E – Economic	Budget constraints can significantly deter the implementation of mitigation actions. Hence, it is important to evaluate whether an action is cost-effective, as determined by a cost benefit review, and possible to fund.
E – Environmental	Sustainable mitigation actions that do not have an adverse effect on the environment, comply with federal, state, and local environmental regulations, and are consistent with the community's environmental goals, have mitigation benefits while being environmentally sound.

For each mitigation action related to infrastructure, new and existing infrastructure was considered. Additionally, the mitigation strategies address continued compliance with the NFIP. While an official cost benefit review was not conducted for any of the mitigation actions, the estimated costs were discussed. The overall benefits were considered when prioritizing mitigation items from High to Low. Projects with a High priority rating are to be completed within two years, those with Medium priority ratings are to be completed in two to four years, and those with Low ratings are to be completed within four to six years. An official cost benefit review will be conducted prior to the implementations of any mitigation actions. Table 5-6 presents mitigation projects developed by the planning committee.

Table 5-6: Mitigation Strategies

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
Harden Critical Facilities	**Goal:** Lessen the impacts of hazards to new and existing infrastructure **Objection:** Retrofit critical facilities with structural design practices and equipment that will withstand natural disasters and offer weather-proofing	All	Williamson County, Bush, Cambria, Carterville, Colp, Crainville, Creal Springs, Energy, Freeman Spur, Herrin, Hurst, Johnston City, Pittsburg, Marion, Stonefort	High	The county, local government, and Williamson County EMA will oversee the implementation of this project. Local resources will be used to identify the required structures to be hardened. Funding has not been secured as of 2008, but the pre-disaster mitigation program and community development grants are a possible funding source. Implementation, if funding is available, is forecasted to be complete within approximately two years.
Establish a database network of 4WD/offroad vehicles to access stranded people and special needs people	**Goal:** Lessen the impacts of hazards to new and existing infrastructure **Objective:** Evaluate and strengthen the communication and transportation abilities of emergency services throughout the county	Winter Storm	Williamson County, Bush, Cambria, Carterville, Colp, Crainville, Creal Springs, Energy, Freeman spur, Herrin, Hurst, Johnston City, Pittsburg, Marion, Spillertown, Stonefort, Whiteash	High	The county, local government, and Williamson County EMA will oversee the implementation of this project. Local resources will be used to identify the resources and build the database. The project is forecasted to be complete within approximately two years.
Capital Improvement Plan will be used to construct saferooms, harden structures, and acquire generators for schools	**Goal:** Create new or revise existing plans/maps related to hazards affecting Williamson County **Objective:** Review and update existing community plans and ordinances to support hazard mitigation	Earthquake, Tornado, Thunderstorm	Marion, Carterville	High	The Marion and Carterville School Districts will oversee the implementation of this project. Local resources will be used to identify the required structures to be hardened. Partial funding has been secured, but additional funding will be sought from the pre-disaster mitigation program. Implementation is forecasted to be complete within approximately one year. When prioritizing this mitigation item, the overall estimated costs were weighed against the overall mitigation action estimated benefits.
Install lightning detection systems in all community parks	**Goal:** Lessen the impacts of hazards to new and existing infrastructure **Objective:** Evaluate and strengthen the communication and transportation abilities of emergency services throughout the county	Thunderstorm/ Lightning event	Williamson County	Medium	The County EMA will oversee the implementation of this project. Local resources and additional grants will be used to procure the systems. If funding is available, is forecasted to be complete within approximately 3 years.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
Bury all new construction power lines in the county and work with utilities to encourage underground power lines a requirement for new construction	**Goal:** Lessen the impacts of hazards to new and existing infrastructure **Objective:** Minimize the amount of infrastructure exposed to hazards.	Thunderstorm, Tornado, Winter Storm	Williamson County, Bush, Cambria, Carterville, Colp, Crainville, Creal Springs, Energy, Freeman Spur, Herrin, Hurst, Johnston City, Pittsburg, Marion, Spillertown, Stonefort, Whiteash	Medium	The County, municipalities, the county EMA and utility companies will oversee the implementation of this project. Local and corporate resources will be used to prioritize power lines and bury them. The project is forecasted to begin within approximately three years.
Implement the use of swing-gates and barricades for flooding, especially in Crab Orchard NWR	**Goal:** Lessen the impacts of hazards to new and existing infrastructure **Objective:** Equip public facilities and communities to guard against damage caused by secondary effects of hazards	Flood	Creal Springs, Marion, Crab Orchard, Carterville	Medium	The County Highway Department will oversee the implementation of this project. Local resources will be used to identify hazard prone roads. Funding has not been secured as of 2008, but the Pre-Disaster Mitigation program and Illinois Department Of Transportation are a possible funding source. Implementation, if funding is available, is forecasted to be complete within approximately three years.
Install backflow systems in homes that have sewer system flooding issues; check valves	**Goal:** Lessen the impacts of hazards to new and existing infrastructure **Objective:** Equip public facilities and communities to guard against damage caused by secondary effects of hazards	Flood	Herrin	Medium	The County and Municipalities will oversee the implementation of this project. Local resources will be used to evaluate the severity of the sanitary sewer backup during heavy rain fall events. Funding has not been secured as of 2008, but the Environmental Protection Agency program is a possible funding source. Implementation, if funding is available, is forecasted to be complete within approximately three years.
Improve radio towers by ensuring proper grounding has been installed and upgraded as needed	**Goal:** Lessen the impacts of hazards to new and existing infrastructure **Objective:** Evaluate and strengthen the communication and transportation abilities of emergency services throughout the county	Tornado, Severe Weather	Williamson County, Marion	Low	The County EMA and communication companies will oversee the implementation of this project. Local and corporate resources will be used to identify and install grounds on radio and communication towers. Funding has not been secured as of 2008, but the Pre-Disaster Mitigation program is a possible funding source. Implementation, if funding is available, is forecasted to be complete within approximately five years.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
Supply all critical facilities with an emergency preparedness kit of basic survival gear, food, and water	**Goal:** Lessen the impacts of hazards to new and existing infrastructure **Objective:** Improve emergency sheltering in Williamson County	All	Williamson County, Bush, Cambria, Carterville, Colp, Crainville, Creal Springs, Energy, Freeman Spur, Herrin, Hurst, Johnston City, Pittsburg, Marion, Spillertown, Stonefort, Whiteash	Low	The County EMA, Red Cross, and other organizations oversee the implementation of this project. Local resources have been used to distribute food and supplies to individuals in need. Additional funding will be sought from the pre-disaster mitigation program to expand and improve the distribution of these kits. The emergency preparedness kit is an ongoing project subject to the acquisition of funds.
Automatic shutoff valves that respond to movement in the earth and buildings	**Goal:** Lessen the impacts of hazards to new and existing infrastructure **Objective:** Retrofit critical facilities with structural design practices and equipment that will withstand natural disasters and offer weather-proofing	Earthquake	Bush, Cambria, Carterville, Colp, Crainville, Creal Springs, Energy, Freeman Spur, Herrin, Hurst, Johnston City, Pittsburg, Marion, Spillertown, Stonefort, Whiteash	Low	The County EMA, municipalities, and utility companies will oversee the implementation of this project. Local and corporate resources will be used to identify and install inertial valves. Funding has not been secured as of 2008, but the pre-disaster mitigation program is a possible funding source. Implementation, if funding is available, is forecasted to be complete within approximately five years.
Elevate Route 13 three feet above recent flooding levels across Crab Orchard Lake	**Goal:** Lessen the impacts of hazards to new and existing infrastructure **Objective:** Minimize the amount of infrastructure exposed to hazards	Flood	Williamson County	Low	The County Highway Department will oversee the implementation of this project. Local resources will be used to identify hazard prone roads. Funding has not been secured as of 2008, but the Illinois Department Of Transportation is a possible funding source. Implementation, if funding is available, is forecasted to be complete within approximately six years.
Improve backup power for shelters	**Goal:** Lessen the impacts of hazards to new and existing infrastructure **Objective:** Improve emergency sheltering in Williamson County	Winter Storm	Williamson County	Low	The county, local government, and Williamson County EMA will oversee the implementation of this project. Local resources and additional Department of Homeland Security sources will be used to purchase the backup generators The project is forecasted to be complete within approximately five years.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
Place sign boards on local roads adjacent to interstates to direct traffic toward shelters	**Goal:** Lessen the impacts of hazards to new and existing infrastructure **Objective:** Evaluate and strengthen the communication and transportation abilities of emergency services throughout the county	Winter Storm	Williamson County	Low	The county, local government, and Williamson County EMA will oversee the implementation of this project. Local resources and additional sources will be used to purchase the signs. The project is forecasted to be complete within approximately five years.
Purchase portable lighting for mass casualty preparation	**Goal:** Lessen the impacts of hazards to new and existing infrastructure **Objective:** Improve emergency sheltering in Williamson County	All	Williamson County	Low	The County EMA will oversee the implementation of this project. Local resources and additional grants will be used to procure the systems. If funding is available, is forecasted to be complete within approximately 5 years.
Purchase evacuation/supply kits for every classroom in Williamson County	**Goal:** Lessen the impacts of hazards to new and existing infrastructure **Objective:** Improve emergency sheltering in Williamson County	All	Carterville, Crab Orchard, Johnston City, Herrin, and Marion School Districts	Low	The County EMA will oversee the implementation of this project. Local resources and additional grants will be used to procure the systems. If funding is available, is forecasted to be complete within approximately 5 years.
Installation of centralized positive-pressure HVAC systems in schools	**Goal:** Lessen the impacts of hazards to new and existing infrastructure **Objective:** Improve emergency sheltering in Williamson County	HAZMAT	Carterville, Crab Orchard, Johnston City, Herrin, and Marion School Districts	Low	Each School Districts will oversee the implementation of this project. Local resources will be used to evaluate the cost benefit of a positive air pressure HVAC system. Partial funding has been secured, but additional funding will be sought. Implementation is forecasted to be complete within approximately six years.
Purchase and implement Reverse 911 or Alert Now	**Goal:** Lessen the impacts of hazards to new and existing infrastructure **Objective:** Evaluate and strengthen the communication and transportation abilities of emergency services throughout the county	All	Williamson County, Bush, Cambria, Carterville, Colp, Crainville, Creal Springs, Energy, Freeman Spur, Herrin, Hurst, Johnston City, Pittsburg, Marion, Spillertown, Stonefort, Whiteash	Low	The County EMA in partnership with the 911 agency will oversee the implementation of this project. Local resources will be used to evaluate the cost benefits of the system. Funding has not been secured as of 2008. If funding is available, is forecasted to be complete within approximately five years.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
Develop an NEHRP soils map, a liquefaction map, and a topographic map	**Goal:** Create new or revise existing plans/maps related to hazards affecting Williamson County **Objection:** Review and update existing community plans and ordinances to support hazard mitigation	Earthquake, flood	Williamson County, Bush, Cambria, Carterville, Colp, Crainville, Creal Springs, Energy, Freeman Spur, Herrin, Hurst, Johnston City, Pittsburg, Marion, Spillertown, Stonefort, Whiteash	Low	The County EMA and Supervisor of Assessments office will oversee the implementation of this project. Local resources have been used to produce and maintain the current mapping system. Additional funding will be sought from the pre-disaster mitigation program to acquire more comprehensive and informative maps. Implementation, if funding is available, is forecasted to be complete within approximately five years.
Improve the capacity of the emergency response teams in the event of hazards	**Goal:** Lessen the impacts of hazards to new and existing infrastructure **Objective:** Evaluate and strengthen the communication and transportation abilities of emergency services throughout the county	HAZMAT	Williamson County	Low	The County EMA will oversee the implementation of this project. Local resources will be used to evaluate the capabilities of the Hazmat Response Team. Community development grants are a possible funding source. Implementation, if funding is available, is forecasted to be complete within approximately 5 years.
Revise and adopt current building codes. Specifically, seismic and wind loads need to be addressed to improve the stability of critical structures and ensure a safe environment for the public.	**Goal:** Create new or revise existing plans/maps related to hazards affecting Williamson County **Objective:** Review and update existing community plans and ordinances to support hazard mitigation	Earthquake, Tornado, Severe Weather	Williamson County, Bush, Cambria, Carterville, Colp, Crainville, Creal Springs, Energy, Freeman Spur, Herrin, Hurst, Johnston City, Pittsburg, Marion, Spillertown, Stonefort, Whiteash	Low	The County and Municipalities will oversee the implementation of this strategy working with the State of Illinois. Local resources will be used to update and adopt current building codes.
Sponsor Seismic Code Training for area architects, engineers, and contractors	**Goal:** Create new or revise existing plans/maps related to hazards affecting Williamson County **Objective:** Conduct new studies/research to profile hazards and follow up with mitigation strategies	Earthquake	Williamson County	Low	The County and Municipalities will oversee the implementation of this strategy working with the State of Illinois. Funding has not been secured, but additional funding will be sought from the Pre-Disaster Mitigation program. Implementation is forecasted to be complete within approximately five years.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
Conduct flow studies and re-routing of water in flood-prone area (Route 13 between Carbondale and Carterville)	**Goal:** Create new or revise existing plans/maps related to hazards affecting Williamson County **Objective:** Support compliance with the NFIP	Flood	Williamson County	Low	The Illinois Department of Transportation, Crab Orchard Wildlife Refuge, and the Illinois Department of Natural Resources will oversee the implementation of this project. Local resources will be used to evaluate the severity of the problem. Funding has not been secured, but additional funding will be sought from the Pre-Disaster Mitigation program. Implementation is forecasted to be complete within approximately five years.
Regional Hydrological Study/ Coordination	**Goal:** Create new or revise existing plans/maps related to hazards affecting Williamson County **Objective:** Support compliance with the NFIP	Flood	Williamson County, Bush, Cambria, Carterville, Colp, Crainville, Creal Springs, Energy, Freeman Spur, Herrin, Hurst, Johnston City, Pittsburg, Marion, Spillertown, Stonefort, Whiteash	Low	The Counties of the region will oversee the implementation of this project. Local resources will be used to evaluate the revised hydrology of the area due to recent development. severity of the study. Funding has not been secured. Implementation is forecasted to be complete within approximately five years.
Conduct a local drainage improvement study that focuses on localized flooding especially near Creal Springs	**Goal:** Create new or revise existing plans/maps related to hazards affecting Williamson County **Objective:** Support compliance with the NFIP	Flood	Creal Springs	Low	The County, Creal Springs, and the County EMA will oversee the implementation of this project. Local resources will be used to evaluate the severity of the study. Funding has not been secured. Implementation is forecasted to be complete within approximately five years.
Flood-proof key buildings including medical care facilities, fire and police departments, EOCs, and schools	**Goal:** Create new or revise existing plans/maps related to hazards affecting Williamson County **Objective:** Support compliance with the NFIP	Flood	Creal Springs	Low	The County, Creal Springs, and the County EMA will oversee the implementation of this project. Local resources will be used to evaluate the severity of the study. Funding has not been secured, but additional funding will be sought from the Pre-Disaster Mitigation program. Implementation is forecasted to be complete within approximately five years.
Inventory levees in Williamson County	**Goal:** Create new or revise existing plans/maps related to hazards affecting Williamson County **Objective:** Conduct new studies/research to profile hazards and follow up with mitigation strategies	Flood	Williamson County	Low	The County will work with the Army Corps of Engineers to see the implementation of this project. Implementation is forecasted to be complete within approximately five years

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
Purchase a Hazardous Event Training Trailer; the mobile education center will be taken to school and community events	**Goal:** Develop long-term strategies to educate the public on the hazards affecting Williamson County **Objective:** Raise public awareness on hazard mitigation	All	Williamson County	Low	The County EMA, schools, Red Cross, and other organizations have implemented various forms of this strategy. Local resources have been used to target and inform the resident population. Additional funding will be sought to purchase the educational trailer The educational outreach program is an ongoing project subject to the acquisition of funds.
Develop training for potential hazardous materials spills and improve hazmat response team capabilities	**Goal:** Develop long-term strategies to educate the public on the hazards affecting Williamson County **Objective:** Improve education of emergency personnel and public officials	HAZMAT	Williamson County	Low	The County EMA will oversee the implementation of this project. Local resources will be used to evaluate the capabilities of the Hazmat Response Team. Funding has not been secured as of 2008, but the Pre-Disaster Mitigation program and Community development grants are a possible funding source. Implementation, if funding is available, is forecasted to be complete within approximately 5 years.
Update earthquake and tornado educational videos	**Goal:** Develop long-term strategies to educate the public on the hazards affecting Williamson County **Objective:** Raise public awareness on hazard mitigation	Earthquake, Tornado	Williamson County	Low	The County EMA, schools, Red Cross, and other organizations have implemented various forms of this strategy. Local resources have been used to target and inform the resident population. Additional funding will be sought from the Pre-Disaster Mitigation program.

The Williamson County Emergency Management will be the local champions for the mitigation actions. The county commissioners and the city and town councils will be an integral part of the implementation process. Federal and state assistance will be necessary for a number of the identified actions. Greater Egypt Regional Planning & Development Commission is qualified to provide technical grant writing services to assist the county in seeking resources to achieve the recommended mitigation action.

5.5 Multi-Jurisdictional Mitigation Strategy

As a part of the multi-hazard mitigation planning requirements, at least one identifiable mitigation action item has been addressed for each hazard listed in the risk assessment and for each jurisdiction covered under this plan.

Each of the 17 jurisdictions, including Williamson County, was invited to participate in brainstorming sessions in which goals, objectives, and strategies were discussed and prioritized. Each participant in these sessions was armed with possible mitigation goals and strategies provided by FEMA, as well as information about mitigation projects discussed in neighboring communities and counties. When a community was not able to provide representation at these sessions, they were contacted individually and afforded the opportunity to provide input about their specific jurisdiction and the county strategies in general. In Williamson County, this occurred from the incorporated communities of Bush, Cambria, Carterville, Colp, Crainville, Creal Springs, Energy, Freeman Spur, Herrin, Hurst, Johnston City, Pittsburg, Marion, Spillertown, Stonefort, and Whiteash. All potential strategies and goals that arose through this process are included in this plan. The county planning team used FEMA's evaluation criteria to gauge the priority of all items. A final draft of the disaster mitigation plan was presented to all members to allow for final edits and approval of the priorities.

Section 6 - Plan Maintenance

6.1 Monitoring, Evaluating, and Updating the Plan

Throughout the five-year planning cycle, the Williamson County Emergency management Director will reconvene the MHMP planning team to monitor, evaluate, and update the plan on an annual basis. Additionally, meetings will be held beginning in January 2013 to address the five-year update of this plan. Members of the planning team are readily available to engage in email correspondence between annual meetings. If there is need for an unscheduled meeting, due to new developments or a declared disaster occurs in the county, the team will meet to update mitigation strategies. Depending on grant opportunities and fiscal resources, mitigation projects may be implemented independently by individual communities or through local partnerships.

The committee will review the county goals and objectives to determine their relevance to changing situations in the county. In addition, state and federal policies will be reviewed to ensure they are addressing current and expected conditions. The committee will also review the risk assessment portion of the plan to determine if this information should be updated or modified. The parties responsible for the various implementation actions will report on the status of their projects, and will include which implementation processes worked well, any difficulties encountered, how coordination efforts are proceeding, and which strategies should be revised.

Updates or modifications to the MHMP during the five year planning process will require a public notice and a meeting prior to submitting revisions to the individual jurisdictions for approval. The plan will be updated via written changes, submissions as the committee deems appropriate and necessary, and as approved by the county Commissioners.

The GIS data used to prepare the plan was obtained from existing County GIS data as well as data collected as part of the planning process. This updated HAZUS-MH GIS data has been returned to the county for use and maintenance in the county's system. As newer data becomes available this updated data will be used for future risk assessments and vulnerability analyses.

6.2 Implementation through Existing Programs

The results of this plan will be incorporated into ongoing planning efforts. Many of the mitigation projects identified as part of this planning process are on-going. Where needed, modifications will be made to the county and community planning documents and ordinances as part of regular updates. The mitigation plan will be used to help guide building code changes and land use planning.

6.3 Continued Public Involvement

Continued public involvement is critical to the successful implementation of the MHMP. Comments from the public on the MHMP will be received by the Williamson County Emergency Management Director and forwarded to the MHMP planning committee for discussion. Education efforts for hazard mitigation will be on-going through the local television stations, brochures, and yearly public meetings. Once adopted, a copy of this plan will be posted in the library and on the county website.

Appendix A – Minutes of the Multi-Hazard Mitigation Planning Team Meetings

COUNTY BOARD OF COMMISSIONERS
OF
WILLIAMSON COUNTY

200 WEST JEFFERSON
MARION, ILLINOIS 62959
(618) 997-1301 Ext. 135
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Email: wmsnctycommissioners@yahoo.com

COMMISSIONERS:
Bob Barnett
Brent Gentry
Tracey Glenn

June 11, 2008

Mr. Alan Gower, Director
Williamson County Emergency
Management Agency
8805 EMA Road
Marion, IL 62959

Dear Mr. Gower:

This letter certifies that the Williamson County Board of Commissioners met previously with the Polis Group, SIU-C Geology Department and the Greater Egypt Regional Planning and Development Commission staff in which the Williamson County Planning Team members were identified at the first two meetings. The Planning Team membership may be expanded to include a wider range of stakeholders. It is understood that the planning team may add additional participants during the planning process.

The County Board certifies that the initial Planning Team and other participants added during the planning process is recognized as the Williamson County Planning Team. The EMA Director, Alan Gower, chairs the planning team, and is assisted in facilitating the program by the Polis Group, Indianapolis, Indiana; SIU-C Geology Department; and the Greater Egypt Regional Planning and Development Commission.

Sincerely,

Brent Gentry, Chairman
Williamson County Board

Williamson County City Council Meetings Attended In Connection With The Multi-Hazard Mitigation Plan:

JUNE:
23rd - Herrin-Steve-6:00 p.m.
23rd - Marion-Alan 6:30 p.m.
24th - Johnston City-Steve-6:00 p.m.
24th - Energy-Alan- 7:00 p.m.

JULY:
1st - Cambria-Steve 6:30 p.m.
8th - Crainville- Alan- 6:30 p.m.
8th - Carterville-Alan-7:00 p.m.
14th - Creal Springs- Alan- 7:00 p.m.
14th - Hurst- Steve- 7:00 p.m.
14th - Bush- Steve- 7:30 p.m.

AUGUST:
4th - Spillertown- Steve- 7:00 p.m.
4th - Whiteash-Steve- 7:30 p.m.
11th - Pittsburg- Alan- 6:30 p.m.
19th - Freeman Spur- Steve- 7:00 p.m.

SEPTEMBER:
9th - Stonefort- Alan- 7:00 p.m.

OCTOBER:
6th - Colp- Steve 7:00 p.m.

Steve also made a similar presentation to the Williamson County LEPC on August 5th at 10:00 a.m. at the Williamson County Emergency Management Agency.

Narrative Paragraph:
At each of these meetings Alan and Steve spoke to the council as a group and explained to the council members the concept of a Multi-Hazard Mitigation Plan. They emphasized the importance of having such a plan in the county and the importance of each jurisdiction adopting the document when it is completed. They explained how the plan can provide a roadmap for mitigation activities in the years to come and how adopting the plan can open doors for mitigation grants that previously were not open to us. At the end of the presentation they asked for questions, which were then answered. Each member of the council was encouraged to provide input into the development of the plan and were invited to the next scheduled planning meeting.

IEMA Pre-Disaster Mitigation Plan

Planning Program Oversight Meeting:
County Board Chairmen, Emergency Management Agencies, Greater Egypt Regional Planning & Development Commission, SIUC Geology Department, and IUPIU-Polis

Meeting Date: Wednesday, March 19, 2008

Meeting Time: 1 hour 30 minutes

Place: SIUC Student Center, Kaskaskia Room

Attendance:

Dave Coats	POLIS
John Buechler	POLIS
Nicholas Pinter	SIUC Geology
Andy Flor	SIUC Geology
Harvey Hanson	SIUC Geology
Ike Kirkikis	Greater Egypt Regional Planning & Development Commission
Robert Clodi	Greater Egypt Regional Planning & Development Commission
James Epplin	Perry County Board Chairman
John Evans	Jackson County Board Chairman
Brent Gentry	Williamson County Board Chairman
Randall Crocker	Franklin County Board Chairman
Ted Buck	Jefferson County Board Chairman
Alan Gower	Williamson County EMA
Dennis Litton	Jefferson County EMA
J, Michael Richmond	Perry County EMA
Derek Misener	Jackson County EMA.

The meeting is called to order

Dave Coats (associate director) **and John Buechler** (project manager) from IUPUI, Polis Center explained the Pre-Disaster Mitigation Planning Project. It was explained that FEMA, based on Federal legislation passed in 2000, required that all incorporated communities must have a Pre-Disaster Mitigation Plan in place to be eligible for FEMA mitigation funding. They also explained that a 25% match was needed to receive funding. John Buechler stated that the value of the GIS data and sweat equity that will be put into developing this plan would satisfy the match. He also expresses the importance of tracking and documenting the time spent on the project by each volunteer working on the project.

Dave Coats and John Buechler explained the process for developing the plan and that it will require a total of six meetings in each of the counties. They went into great detail about each of the meeting and the issues that would be addressed. They also estimated that the complete process of developing the plan would take about one year. Lastly, they introduced a website that the planning team will use to organize meeting, post documents, and to access minutes throughout the planning process.

Nicholas Pinter (SIUC Geology) introduced the team and explained the role that SIUC will play in planning process. SIUC will be providing all the technical mapping throughout the planning process.

Ike Kirkikis (Director, GERPDC) asked Andy Flor (SIUC Geology) about the agreement that will need to be made about the restricted use of the GIS data needed for the project. Andy Flor, Nicholas Pinter, Dave Coats, and John Buechler all confirmed that a Memorandum of Understanding would be created and sent to each county for review and acceptance. All the County Board Chairmen expressed their concerns with the discretion of the use of the GIS data.

Rob Clodi (Planner, GERPDC) asked how the planning team would be selected. Dave Coats responded and said that a list of affiliations is provided for ideal team member candidacy. He explained that the Emergency Management Agency is typically selected as the chair of the planning team. Lastly, he mentioned that the planning team must be officially recognized by the County Board. Nicholas Pinter added that as soon as a planning team is assembled the first meeting can be scheduled.

After a few questions that clarified the planning process and the presentation of example planning documents of Posey County, Indiana the meeting was adjourned.

Meeting was adjourned.

IEMA Pre-Disaster Mitigation Plan

Williamson County Planning Team Oversight Meeting:

County Board Chairman, Williamson County Emergency Management Agency, Greater Egypt Regional Planning & Development Commission, SIUC Geology Department, and IUPIU-Polis

Meeting Date: Monday, May 19, 2008, at 1:00 pm

Meeting Time: 2 hours

Place: Williamson County Courthouse

Attendance:

Brent Gentry	Williamson County Board
Jeffery Robinson,	Supervisor of Assessments
Andy Flor	SIUC Geology
Jonathan Remo	SIUC Geology
Nicholas Pinter	SIUC Geology
Dave Coats	Polis
John Buechler	Polis
Steve Land	Williamson County EMA
Alan Gower	Williamson County EMA
Robert Clodi	Greater Egypt Regional Planning & Development Commission
Ike Kirkikis	Greater Egypt Region Planning & Development Commission

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The meeting was called to order.

A brief overview of the pre-disaster mitigation planning process was outlined by John Buechler, Dave Coats, and Nicholas Pinter.

Williamson County representatives expressed the necessity of the plan and are highly motivated in completing the plan.

Discussions for a condensed planning process were brought to the planning directors' (GERPDC, SIUC, and IUPUI Polis) attention. Carterville and Marion School Districts requested an accelerated planning program to complete an approved county plan in order to access grant funding from FEMA. The funding will aid in the hardening of the school structures to provide shelter during occurrences of natural hazards. Meetings one and two will be consolidated into one meeting.

The first meeting was scheduled for 9:00 am, on June 11, 2008. The location will be at the Williamson County EMA Facility.

Jeff Robinson described the available GIS data.

The County's GIS data (Parcel Maps, Tax Assessment Database, and Ortho Arial Photography) was provided to SIUC Geology Planning Team to complete the technical mapping for meeting one.

The recruitment of the County Pre-Disaster Planning Team was discussed. Several names and professional expertise were suggested to round out the planning team. A complete list of planning members will be developed and posted before the first meeting.

Meeting was adjourned.

IEMA Pre-Disaster Mitigation Plan

Assembly of the Williamson County Planning Team Meeting 1 and 2:

Chairman: Alan Gower, Williamson County Emergency Management Agency
Plan Directors: Greater Egypt Regional Planning & Development Commission, SIUC Geology Department, and IUPIU-Polis

Meeting Date: Wednesday, June 11, 2008, at 9:00 am

Meeting Time: 4 hours

Place: Williamson County EMA Facility

Planning Team/Attendance:

Steve Land	Williamson County EMA
Alan Gower	Williamson County EMA
Gabe Wiemken	Williamson County EMA
Andy Flor	SIUC Geology
Jonathan Remo	SIUC Geology
Nicholas Pinter	SIUC Geology
Dave Coats	Polis
John Buechler	Polis
Ike Kirkikis	Greater Egypt Region Planning & Development Commission
Robert Clodi	Greater Egypt Regional Planning & Development Commission
Jeffery Robinson	Williamson County Supervisor of Assessments
Donald Florer	Williamson County Fire Protection District
Dan Swiatowski	Williamson County Fire Protection District
Evelyn Fuqua	Mayor of Crainville
Bruce Talley	Fire Chief of Carterville
Don Smith	Principal of Carterville High School (Representing Tim Bleyer, Superintendent of Carterville C.U.S.D. #5
Jim Webb	Williamson County Engineer/Williamson County Highway Department
Micah Morrow	Creal Springs City Clerk
Kendra Washburn	Williamson County 911
Les Higgins	Williamson County Sheriff's Office
Celeste Sollers	Williamson County Economic Development
Dan Frisk	Crab Orchard Refuge/US Fish and Wildlife Service
Bob Campbell	Regional Economic Development Corp. (REDCO)
Lisa Smith	Assistant Superintendent Marion C.U.S.D. #2
Doug Kimmel	Williamson County Regional Airport

Introduction to the Pre-Disaster Mitigation Planning Process

The meeting was called to order.

Narrative: An outline of the pre-disaster mitigation planning process was presented by John Buechler, Dave Coats, and Nicholas Pinter.

Dave Coats introduced the Planning Team Website. A username and password was given to the planning team to access the web site. He explained that this website is used to schedule meeting dates, contact information and to download material pertaining to the planning process.

Dave Coats noted that there are several components to the planning process. The 1st phase is to organize all the resources. The primary resource is the planning team members. Other resources will include GIS Data and Data from the Supervisor of Assessments Office.

This project is funded by a match grant from FEMA. A twenty-five percent local match will be required from each county to fund this project. The match will be met by sweat equity and GIS data acquired from each county. Sweat equity will be an accumulation of time spent at the meetings, on research assignments, surveys, time spent reviewing a document and time spent producing the planning document. The value of the match is estimated to be $10,000 to $15,000.

The 2nd phase is to assess the risk of the hazards that are present in the county. A profile of the county will be provided by Greater Egypt Regional Planning & Development Commission. Phase 3 of this planning process is to develop a strategy and the projects that the county is interested in. Phase four is the implementation of those strategies over a period of time and monitoring their progress.

Nicholas Pinter added that this is not just an intellectual process. There will be work and research that will need to be performed to finish this project and to get funding for potential projects that result from this plan.

Dave Coat stated that FEMA will not provide funding for projects where the county has not produced a Pre-disaster Mitigation Plan.

He also explained that Williamson County has expressed a necessity for this plan and because of that need, a condensed version of the planning process will take place. Normally there are six meetings to complete this planning process. The 1st and 2nd meetings will be combined into one meeting. This meeting is taking place today.

In the 1st meeting, the planning team will review and will be asked to research the location of all critical facilities within the county. He also discussed a plan for public participation. He explained that all of the meetings are open to the public but there will be a particular effort made to invite the public to the 3rd meeting when the plan is in draft form. At that meeting, SIUC Geology staff will discuss the geology of the area and several facts about this particular county.

In the 2nd meeting, a discussion will focus on disasters that are prone to this area. These hazards will be given a probability rating and ranked in a probability hierarchy. Polis and SIUC Geology will research these hazards and rank them.

A special effort to encourage the public to attend and participate in the 3rd meeting scheduled in July. The Polis and SIUC Geology staff will produce a risk assessment in draft form; each planning team member will get a copy. Strategies and projects will be presented that FEMA and other counties have undertaken.

The 4th meeting consists of a brain storming session focused on the disasters that were modeled and what was learned about them through the analysis of the Chapter 4. The Planning Team will consider strategies and projects mitigate potential loss and damage. FEMA requires that for every identified potential hazard, a strategy to mitigate the loss and damage must be in place. The strategies may range from educational awareness to hardening a building or constructing a levee. Following that meeting, the plan will be in final draft form.

At the 5th meeting the planning team will review and adopt the plan prior to forwarding it to IEMA. IEMA will review the plan and will make recommendations to it as they see fit and then it is submitted to FEMA for review and approval. Once it is approved by FEMA, the plan is sent back to the county.

At the 6th meeting the planning team will present the plan to the Williamson County Board to be adopted. Every incorporated community must have one of these plans, or the communities may be included under the umbrella of the county plan. In order for that to happen, communities are encouraged to participate and contribute to plan development. Once the County Board has adopted the plan, each incorporated community will need to adopt the plan as well. Once the plan has been submitted to FEMA, local governments are eligible to apply for grants to mitigate these established hazards.

Meeting One

Narrative: Dave Coats introduces John Buechler as the project manager.

John Buechler and Andy Flor explained that they met with several agencies i.e. 911, Supervisor of Assessments and others. The information collected from these agencies was mapped and presented them for review to the planning team. The planning team was asked to verify that all critical facilities are identified, are correctly located, and profile information about each facility. The profile information would include the building replacement cost, enrollment/occupancy characteristics and the number of beds in care facilities. After a brief explanation of the critical facilities and the information needed to complete the database, team members are assigned critical facilities by category to research and verify the accuracy of the information.

Critical Facility Categories/Responsible Team Member

Wastewater Facilities	Ike Kirkikis, Greater Egypt Regional Planning and Development Commission
Potable Water Facilities	Ike Kirkikis, Greater Egypt Regional Planning and Development Commission
Police Stations	Kendra Washburn, Williamson County 911
Medical Facilities	Celeste Sollers, Williamson County Economic Development
Airports	Doug Kimmel, Williamson County Regional Airport
Railroads	Bob Campbell, Regional Economic Development Corporation
Schools	Lisa Smith, Assistant Superintendent Marion CUSD #2
Oil Facilities	Jeffery Robinson, Williamson County Supervisor of Assessments
Natural Gas Facilities	Jeffery Robinson, Williamson County Supervisor of Assessments; Alan Gower, Williamson County EMA
Electric Facilities	Jeffery Robinson, Williamson County Supervisor of Assessments
Hazmat	Alan Gower, Williamson County EMA
Dams	Alan Gower, Williamson County EMA
Fire Stations	Dan Swiatkowski, Williamson County Fire Protection District
Communications	Steve Land, Williamson County EMA
Bus Facilities	Steve Land, Williamson County EMA
User Define	Donald Florer, Williamson County Fire Protection District

John Buechler adds that in about two weeks Andy Flor will contact these team members to collect the information that is being asked to be gathered.

The Planning Team asks that a general list of questionable buildings and facilities to be put together and review by the team.

Williamson County EMA offered to collect the digital document by e-mail and redistribute them to the other Planning Team Members through e-mail.

A Brief Intermission is taken.

Meeting Two (June 11, 2008)

Narrative: Nicholas Pinter reconvenes the Planning Team for Meeting Two.

Nicholas Pinter stated that the objective of the meeting was to prioritize a list of disasters that are relevant to Williamson County.

Kendra Washburn, Williamson County 911 offered to help identify addresses for elusive critical facilities.

Nicholas Pinter stated the 3rd meeting (the next scheduled meeting) will be held with public involvement. Nicholas and his team will present a list and description the historic disasters that affected Williamson County.

He referred to the second meeting and stated that Polis has put together a map, a list of events and their location of historical weather related disasters recorded by National Climatic Data Center.

Narrative: A list of all historical weather related events was distributed to the Planning Team. A map with locations and areas affected by the event was presented. The Planning Team is asked to validate the location of historical weather related disasters from the map.

Jeffery Robinson offered a .shp file of the most current flood map of Williamson County, for SIUC Geology's GIS database.

Narrative: The Planning Team identified incorrect data and made corrections directly to the map. The corrections are as follows:

> The path of travel from the 1982 Tornado was corrected.
>
> The path of travel from the Nov. 19, 1991 Tornado was corrected.
>
> The path of travel from the Oct. 18, 2004 Tornado was corrected.
>
> An event was noted about straight line wind that took place on July 2, 1980. Many of the Planning Team Members had many accounts of severe wind damage to buildings, vehicles and the local economy. The area affected in Marion was on Carbon Street.
>
> The flood map presented was an older version; two new corrections just south of Marion were added.
>
> The sites of the new Carterville High School, Marion High School, and Creal Spring School were identified and all will soon be under construction.

Nicholas Pinter described the risk assessment ranking that FEMA has established. He explained that a low probability does not mean the risk won't be high and vice versa.

Narrative: The Planning Team was then asked to assess a risk level to each disaster that was identified in Williamson County. The risk level is ranked as followed:

High	4	Mid-High	3
Mid	2	Low	1

Flooding	3
Dam/Levee Failure	2
Tornado	4+
Winter Storms	3
Hazmat Release	3
Earthquake	3.5
Extreme Heat	2
Droughts	2
Landslide	1
Wild Fire	2
Subsidence	2

Nicholas Pinter assigned Andy Flor and his assistant the task to research historical hazard information (i.e. newspaper articles) to be added to the appendix of the pre-disaster mitigation plan.

Narrative: The planning team agreed to complete the Critical Facility research assignment in two weeks and return for the third meeting in six weeks. The third meeting was scheduled for July 23, 2008 at 9:00am. The location will be at the Williamson County EMA Facility.

Meeting was adjourned.

IEMA Pre-Disaster Mitigation Plan

Assembly of the Williamson County Planning Team Meeting 3:
Chairman: Alan Gower, Williamson County Emergency Management Agency
Plan Directors: Greater Egypt Regional Planning & Development Commission, SIUC Geology Department, and IUPIU-Polis

Meeting Date: Wednesday, July 23, 2008, at 9:00 am

Meeting Time: 2 hours

Place: Williamson County EMA Facility

Planning Team/Attendance:

Andy Flor	SIUC Geology
Jonathan Remo	SIUC Geology
Nicholas Pinter	SIUC Geology
Harvey Henson	SIUC Geology
Adam Campbell	Polis
Dave Coats	Polis
Robert Clodi	Greater Egypt Regional Planning & Development Commission
Ike Kirkikis	Greater Egypt Region Planning & Development Commission
Steve Land	Williamson County EMA
Alan Gower	Williamson County EMA
Rick Shryock	IEMA
Rachel Deffenbaugh	Franklin-Williamson County Bi-County Health Department
Ronda Koch	Franklin-Williamson Bi-County Health Department
Chris Brown	Illinois Department of Public Health
Donald Florer	Williamson County Fire Protection District
Dan Swiatowski	Williamson County Fire Protection District
Joe Fisher	City of Creal Springs
Phil Jeralds	City of Creal Springs
Evelyn Fuqua	Mayor of Crainville
Bruce Talley	Fire Chief of Carterville
Kendra Washburn	Williamson County 911
Les Higgins	Williamson County Sheriff's Office
Celeste Sollers	Williamson County Economic Development
Dan Frisk	Crab Orchard Refuge/US Fish and Wildlife Service
Bob Campbell	Regional Economic Development Corp. (REDCO)
Lisa Smith	Assistant Superintendent Marion C.U.S.D. #2
Gail West	City of Marion

April Bennett	Withers Radio
Jerry Hjerpe	Independent
Keith Liddell	Carterville High School
Codell Rodriguez	The Southern Illinoisan
Peggy Russell	Williamson County Family Crisis Center
Channel 3	News Media
Channel 6	News Media.

The meeting is called to order.

Dave Coats briefed the audience with the background and reasoning for the Pre-Disaster Mitigation Plan. He explained that this Planning Project is mandated by the Disaster Mitigation Act of 2000. He continued to explain that the county would not have any out of pocket expense to complete this project. A twenty-five percent match to FEMA's Grant would be obtained though sweat equity, work and data achieved or performed during the planning process. Dave Coats then introduced Nicholas Pinter to present the Hazard Risk Assessment.

Nicholas Pinter introduced the lead agencies involved in the Williamson County pre-disaster mitigation planning project. His presentation began with a list of natural hazards that had historically occurred within the county and rated their potential risk. The hierarchy was approved by the planning team at the 2nd meeting. He noted that the list is in draft form and is subject for reevaluation. Nicholas Pinter and Harvey Henson both gave historical references of past natural hazards that affected the Southern Illinois Region. Nicholas Pinter provided some solutions that the county could act upon to limit or eliminate the effect hazards have. The solutions were to avoid, protect, and prepare for hazards. He described the definition of mitigation and explained the evolvement of mitigation in the Pre-Disaster Mitigation Plan.

Narrative: Dave Coats presented the risk assessment information contained in Chapter 4.

Dave Coats initially described the different chapters presented in the draft plan. He outlined the format of the Chapter 4 and sources from which the information was accumulated. He explained how the methods and calculations were established. He focused on a particular hazard modeled by the HAZUS-MH program that simulated the circumstances and resulting cost analysis generated by an earthquake. A handout produced by FEMA lists several mitigation strategies and projects which may be utilized in the development of the plan. He asked the planning team and members of the public to review the draft plan and mitigation handout. In the 4th meeting, the planning team and members of the public will have an opportunity to voice their opinions on mitigation projects and strategies; and offer critiques on the planning document. He asked that each person come to the meeting with five ideas they think need to occur in the County to mitigate these disasters. A ranking procedure will be executed to prioritize the most important and significant projects and strategies for County.

Narrative: Once all the information is collected, the process of completing the final planning document will commence. A final draft will be presented to the Planning Team for approval. Following local approval, the plan is transmitted to IEMA for review and approval. IEMA forwards the plan to FEMA for its approval. Subsequently, the plan is submitted to the county by FEMA for adoption.

The 4^{th} meeting was set for Wednesday at 9:00am, August 20, 2008.

In-kind forms were collected from planning team members by Greater Egypt Regional Planning and Development Commission.

Meeting was adjourned.

IEMA Pre-Disaster Mitigation Plan

Assembly of the Williamson County Planning Team Meeting 4:
Chairman: Alan Gower, Williamson County Emergency Management Agency
Plan Directors: Greater Egypt Regional Planning & Development Commission, SIUC Geology Department, and IUPIU-Polis

Meeting Date: Wednesday, August 20, 2008 at 9:00 am

Meeting Time: 1 1/2 hours

Place: Williamson County EMA Facility

Planning Team/Attendance:

Andy Flor	SIUC Geology
Jonathan Remo	SIUC Geology
Nicholas Pinter	SIUC Geology
Harvey Henson	SIUC Geology
John Buechler	Polis
Steve Land	Williamson County EMA
Alan Gower	Williamson County EMA
Robert Clodi	Greater Egypt Regional Planning & Development Commission
Ike Kirkikis	Greater Egypt Region Planning & Development Commission
Donald Florer	Williamson County Fire Protection District
Dan Swiatowski	Williamson County Fire Protection District
Bruce Talley	Fire Chief of Carterville
Ken Smith	Williamson County 911
Celeste Sollers	Williamson County Economic Development
Dan Frisk	Crab Orchard Refuge/US Fish and Wildlife Service
Bob Campbell	Regional Economic Development Corp. (REDCO)
Lisa Smith	Assistant Superintendent Marion C.U.S.D. #2
Gail West	City of Marion
Joe Fisher	City of Creal Springs
Ronda Koch	Franklin-Williamson Bi-County Health Department
Curtis Rogers	Village of Crainville
Vic Ritter	City of Herrin, Mayor
Joe Lapinski	City of Herrin Public Works
Tim Bleyer	Carterville Superintendent
Doug Kimmel	Williamson County Regional Airport
Jeffery Robinson	Williamson County Supervisor of Assessments

The meeting is called to order.

John Buechler re-introduced the motives that are driving the Pre-Disaster Mitigation Planning process and describes the focus of meeting that was being held. He began the presentation by explaining that as a result of the Disaster Mitigation Act of 2000 and the astronomical growth in funds diverted to disaster recovery effort, each incorporated community in the United States must produce a Pre-Disaster Mitigation Plan in order to apply for funds in the future. During this meeting the Planning Team and public participants collaborated and addressed each hazard with a mitigation strategy or project. After the all the mitigation strategies and project were listed John asked the attendees to prioritize them. When prioritizing these mitigation items the overall merit weighed against the overall estimated benefits of each mitigation action.

Narrative: The collaboration began and each hazard was address. Noted below are the items listed and their prioritized ranking for each disaster.

Mitigation Item	Hazards Addressed	Jurisdictions Covered	Priority
Devil's Kitchen Dam Study	Earthquake	Devil's Kitchen	Low
Incident Management Team	All	All	Low
Weather Radios	Tornado, Severe Weather	All	Low
Emergency Preparedness Kit	All	All	Low
Cooling Centers	Extreme Heat	All	Low
Fan Distribution	Extreme Heat	All	Low
NOAA Storm Ready Designation	Tornado, Severe Weather, Winter Storms	County	Low
Mapping	Earthquake, Flood	All	Low
Inertial Valves	Earthquake	All	Low
Grounding Radio Towers	Tornado, Severe Weather	All	Low
Install Generators at all Shelters	All	All	Low
Reverse 911 or Alert Now	All	All	Low
311 Serve	All	All	Low
Building Codes	Earthquake, Tornado, Severe Weather	All	Low
Zoning Ordinances	Flood	All	Low
Hazmat Response Team	Hazmat	All	Low
Positive Air Pressure HVAC	Hazmat	Marion and Carterville	Low
Draining Improvements	Flood	Creal Springs	Low
Flow Study	Flood	County	Low
Regional Hydrological Study/Coordination	Flood	All	Low
Flood Proofing	Flood	All	Low

Emergency Action Plan/ Operational Maintenance Plan	Earthquake, Flooding	All	Low
Fire Department Response for Special Needs Population	All	All	Low
Tree Trimming	Tornado, Severe Weather, Winter Storms	All	Low
Emergency/ Evacuation Shelter Road Signage	All	All	Low
Regional Potable Water Distribution Study	Drought, Earthquake	All	Low
Williamson County Regional Airport	All	All	Low
Underground Power Lines	Tornado, Severe Weather, Winter Storms	All	Medium
Education Outreach	All	All	Medium
Sanitary Sewer/ Storm Water	Flood	All	Medium
Road Barriers	Flood, Tornado, Severe Weather, Winter Storms	Creal Springs, Marion, Crab Orchard and Carterville	Medium
Retro-Fit Critical Structures	Earthquake, Tornado, Severe Weather, Winter Storms, Flood	All	High
Capital Improvement	Earthquake, Tornado, Severe Weather	Marion and Carterville	High
Sirens/Warning System	Tornado, Severe Weather, Hazmat	All	High

Narrative: After the prioritizing process was finished, a complete list of mitigation strategies and projects in their prioritized hierarchy was documented.

Meeting was adjourned.

IEMA Pre-Disaster Mitigation Plan

Assembly of the Williamson County Planning Team Meeting 5:
Chairman: Alan Gower, Williamson County Emergency Management Agency
Plan Directors: Greater Egypt Regional Planning & Development Commission, SIUC Geology Department, and IUPIU-Polis

Meeting Date: Tuesday, October 28, 2008 at 9:00 am

Meeting Time: 2 hours

Place: Williamson County EMA Facility

Planning Team/Attendance:

Andy Flor	SIUC Geology
Jonathan Remo	SIUC Geology
John Buechler	Polis
Dave Coats	Polis
Steve Land	Williamson County EMA
Alan Gower	Williamson County EMA
Robert Clodi	Greater Egypt Regional Planning & Development Commission
Ike Kirkikis	Greater Egypt Region Planning & Development Commission
Donald Florer	Williamson County Fire Protection District
Jeremy Norris	Williamson County Fire Protection District
Kendra Washburn	Williamson County 911
Celeste Sollers	Williamson County Economic Development
Bob Campbell	Regional Economic Development Corp. (REDCO)
Lisa Smith	Assistant Superintendent Marion C.U.S.D. #2
Gail West	City of Marion
Vic Ritter	City of Herrin, Mayor
Joe Lapinski	City of Herrin Public Works
Tim Bleyer	Carterville Superintendent
Doug Kimmel	Williamson County Regional Airport
Les Higgins	Williamson County Sheriff's Office
Peggy Russell	Williamson County Family Crisis Center - Homeless Shelter

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The meeting is called to order.

Ike Kirkikis presented the planning team with the Final Draft of the Williamson County Pre-Disaster Mitigation Plan and two maps that defining and locate the critical facilities and hazards in Williamson County. He called onto the planning team to voice any changes or correction to be made in the plan.

Narrative: The planning team made several suggestions about the content of the plan. Listed below are the changes and corrections that were addressed at the meeting.

Page(s)	Description	Changes
6	Table 1-1 Planning Team Members	**Update** member list
12	Table 2-2 Jurisdiction Participation	**Update** member list; **Correct** Celeste Sollers name; Don Smith (former principal), new principal Keith Liddell
13	Williamson County EMA	**Add** Alan Gower with Steve Land
14	counties bounding Williamson County	**Correct** spelling of Johnson County
25	Under title Critical Facilities List	**Correct** Appendix F and Appendix G change from C and D
18	Table 3-3 Major Employers	**Add** Marion School District #2, 450 Employees; Verizon; Crisp Container Corp., 100 Employees; **Correct** Excel Mining Systems to Minova USA Inc.; Electric/Gas for Ameren/CIPS; 450 to 700 for Herrin Hospital.
41	Table 4-18 National Inventory of Dams	**Add** Herrin Lake 1 and 2
51	Vulnerability to Future Asset/Infrastructure for Dam and Levee Failure	**Rewrite** entire entry, Williamson County does not have a Zoning Ordinance or Planning Commission
104	Table 5-3 Fire Department Ratings	Bush and Hurst are missing ISO Ratings
110	Comments column for, Provided presentations, videos, and drills that demonstrate proper emergency procedures and awareness	**Correct** $10,000 per School to $10,000 for schools county wide
118	Under title Multi-Jurisdictional Mitigation Strategy	**Correct** 17 incorporated communities to 17 jurisdictions
152-167	Appendix F Critical Facilities	**Update**, **restructure**, make **corrections** throughout the entire appendix
192, 212, 232	Debris Generation	**Recalculate** debris generated and truck loads
213	Shelter Requirement	**Recalculate** number of people seeking shelter
214	Table 11 Casualty Estimates	**Recalculate** entire table

Alan Gower motioned to have additional time to review the planning document.

Narrative: The Planning Team agreed with the motion.

Bob Campbell motioned to have an executive meeting with the team leaders to divide the report into sections. These sections will be given to a specific planning team member that has expertise in the area it covers.

Narrative: The Planning Team agreed with the motion and a date was set for Nov. 6th, 2008. GERPDC, REDCO, WCEMA, and SIUC will attend this meeting and review the content of the planning document.

Meeting was adjourned.

EMA Pre-Disaster Mitigation Plan

Assembly of the Williamson County Planning Team Executive Meeting:
Chairman: Alan Gower, Williamson County Emergency Management Agency
Plan Directors: Greater Egypt Regional Planning & Development Commission, SIUC Geology Department, and IUPIU-Polis

Meeting Date: Thursday, November 6, 2008 at 10:00 am

Meeting Time: 2 hours

Place: Williamson County EMA Facility

Planning Team/Attendance:

Jonathan Remo	SIUC Geology
Steve Land	Williamson County EMA
Alan Gower	Williamson County EMA
Robert Clodi	Greater Egypt Regional Planning & Development Commission
Ike Kirkikis	Greater Egypt Region Planning & Development Commission
Bob Campbell	Regional Economic Development Corp. (REDCO)

The meeting is called to order.

Narrative: The Executive Members of the Planning Team began the analysis of the Pre-Disaster Mitigation Plan. The corrections and changes have been listed as follows:

Page(s)	Description	Changes
18	Table 3-3 Major Employers	**Add** Crisp Container Inc.; Crab Orchard School District; Marion School District
79	Table 4-34 and all similar tables	**Correct** 0K to 0
104	Table 5-3 Fire Department Ratings	**Add** Bush, ISO 7; Hurst, ISO 6
109-110	Table 5-4 Completed Mitigation Actions	**Correct** Mitigation Item, Install Weather Radios *in homes of the low income population* to Public Assemble Places; **Move** Mitigation Item, Supply all critical facilities with an emergency preparedness kit of basic survival gear, food, and water to Table 5-6;

Page(s)	Description	Changes
113-117	Table 5-6 Mitigation Strategies	**Correct** Mitigation Item, Harden *emergency facilities* to critical facilities and list all jurisdictions that have critical facilities listed; Mitigation Item, Installation of centralized positive-pressure HVAC systems in schools, list all school districts; **Move** Mitigation Item, Update DFIRMS for Williamson County to Table 5-4.
122	Oversight Meeting Minutes	**Correct** *Williamson County* School Districts to Carterville and Marion, in the third paragraph. **Add** the minutes from the meeting with the County Chairmen and all other missing minutes i.e. Meeting 5 and executive meetings.
152-167	Critical Facilities	**Correction** Communication, All Clear Channel Stations are Withers; Fire Department, missing contact information for Stonefort and Bush; Medical, Marion Memorial is Heartland Regional; Police, Marion Police station on the backside of the mall, missing contact information for Hurst; reformat the tables to read better; Hazardous Material, Primex/Olin is General Dynamics; Pennzoil is Warren Oil; Diagraph Corp. is located on 5307 Meadowland Parkway, Marion; Orpack-Stone Corp. is Natural Enrichment; GTE is Verizon; **Delete** Hazard Material, Maytag Magic Chef;
170	Appendix I – Hazus – MH: Reports	**Re-Generate** the Flood and Earthquake scenarios
N/A	Critical Facilities Map	**Add** Siren icons in their locations with a general 1 mile alert design buffer; River Radio Towers in Crainville; Channel 3 TV Tower in Crainville; User Define list to the map with major employers; Verizon Building on West Old Main St., Marion; Missing Tower Icon, Incorporate all Agencies on the map; Copyright designated to WCEMA; **Relocate**, Bridge Icon in wrong location, Dam for Devil's Kitchen; Waste Water Facility at Marion Lake move to the State Prison; a double bridge on East Route 13; **Delete**, Potable Water Facility in Union County; Numbers associated with icons or make the numbers refer to a number system that can be identified to the critical facilities list; **Create** a second set of maps 11 x 17 to be bound into the plan for local municipalities.

Page(s)	Description	Changes
N/A	Hazard Map	**Add** Undermine layer to the map **Correct** the 1982Tornado path

Narrative: The Executive Planning Team agreed to continue to analysis the critical facilities data base and other correction throughout the planning document until Nov. 14, 2008. After that point a tentative send off date to IEMA was set for, Nov. 21, 2008.

Meeting was adjourned.

Appendix B – Articles Published by Local Newspapers

O.E. 1/30/08

Faculty to help 17 counties prepare for disaster

Project receives $1.3 million in federal funding

Allison Petty
Daily Egyptian

Roughly $1.3 million in federal funds could help university faculty prepare southern Illinois for disaster.

Faculty members would work under a $1,288,000 grant to help 17 southern Illinois counties prepare for natural disasters, university officials announced Tuesday. The Federal Emergency Management Agency supplied the funding, which will last until 2010, said geology professor Nicholas Pinter.

"There is a real need in this area to look at what disasters can occur, have occurred in the past and ... reduce the threat, should these things occur in the future," Pinter said.

He described the region as the "southern California of the Midwest," referencing a history of major floods, tornados and earthquakes in southern Illinois.

Pinter said he and other professors would collaborate with members of Indiana University-Purdue University Indianapolis and five Illinois regional planning commissions on the project.

> **There is a real need in this area to look at what disasters can occur, have occurred in the past and . . . reduce the threat, should these things occur in the future.**
>
> — Nicolas Pinter, geology professor at SIU

Counties covered by the grant include Pulaski, Massac, Union, Johnson, Jackson, Williamson, Franklin, Jefferson, Perry, Gallatin, Edwards, White, Crawford, Bond, St. Clair and Clinton. The city of Cairo in Alexander County will also participate in the project.

Pinter said the grant would help officials meet federal requirements for disaster planning. He added that the funding would help pay for several students to help with the project.

Andy Flor is the first of these students.

Flor, a graduate student from Flossmoor studying geology, said he would help gather and record data from the counties about their current emergency preparations.

Flor and other researchers will enter the data into a computer database, he said. Computer software helps develop more detailed planning and preparation for natural disasters.

"What we're really trying to do is inform communities where the flood plan is, what areas are going to be at risk, and you can plan around that," Flor said.

He added the project would focus on a variety of natural disasters.

"Floods are pretty obvious," Flor said. "In these counties they pose a big risk, but there's other things too — earthquakes, tornados."

Harvey Henson, a geology professor, said he has studied earthquakes for the past 22 years.

Under the grant, he said, it would be possible to raise a greater awareness about earthquakes.

"You've got to go out and talk to the public," Henson said. "When we have a small tremor, public awareness is heightened and more people are interested in, 'Why are we having earthquakes? What does it mean potentially? Is it a threat, and what can we do about it?'"

Henson said southern Illinois' position on the New Madrid Seismic Zone made it vulnerable to the possibility of a large quake.

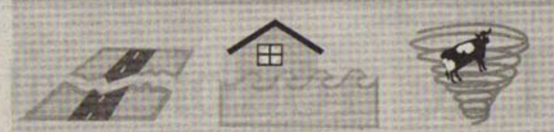
"It's a backyard threat to southern Illinois," Henson said. "We have a small earthquake every so often which reminds us of that."

> **You've got to go out and talk to the public. When we have a small tremor, public awareness is heightened and more people are interested in, 'Why are we having earthquakes? What does it mean potentially? Is it a threat, and what can we do about it?'**
>
> — Harvey Henson, geology professor at SIU

Allison Petty can be reached 536-3311 ext. 259 or allison.petty@siude.com.

Southern Illinois natural disasters

New $1.3 million federal grant will allow university faculty to help 17 southern Illinois counties prepare for natural disasters.



New Madrid Earthquake of 1812
- Occurred in Missouri
- Ranked ninth-largest in the history of the United States
- Reached 7.9 magnitude level

Great Flood of 1993
- Caused $15 billion in damages
- Killed 50 people
- Covered nine states
- Remained in some areas for almost 200 days

Tri-State Tornado of 1925
- Affected 219 miles in Missouri, Illinois and Indiana
- Killed 695 people
- Injured 2,027 people
- Destroyed 15,000 homes

Source: National Weather Service

Michelle Arras ~ Daily Egyptian

Daily Egyptian 1/30/08

Federal grant helps university lead 17-county disaster readiness effort

BY SCOTT FITZGERALD
THE SOUTHERN

CARBONDALE — Southern Illinois is not immune to natural disaster.

With help from the federal government and Southern Illinois University Carbondale researchers, however, the 17-county region in this part of the state can get a leg up on being prepared and reacting when flooding, earthquakes or other major disasters occur.

SIUC officials announced Tuesday during a news conference in the Student Center that Federal Emergency Management Agency is funding a $1.2 million cooperative effort of SIUC and five Illinois regional planning commissions in writing pre-disaster mitigation plans.

Hear the full news conference online at www.thesouthern.com.

FEMA requires and approves the plans that can open the door for more funding to help areas prepare for disaster.

"This grant from FEMA will help counties identify the risks they have and make plans to deal with any of those potential disasters," said Nicholas Pinter, a geology professor in SIUC's College of Science.

Pinter did not have a breakdown of the grant funding SIUC will share with colleagues from Indiana University-Purdue University Indianapolis' Polis Center who are assisting with the project and the five regional planning commissions.

Those commissions are: Southern Five Regional Planning Commission, Greater Egypt Regional Planning and Development Commission, Greater Wabash Regional Planning Commission and Southwestern Illinois Planning Commission.

"What's important is that the planning commissions would have to pay anywhere from $50,000 to $60,000 each to go out and hire

SEE GRANT / PAGE 7A

CHUCK NOVARA / THE SOUTHERN

Professor Nicholas Pinter walks from the podium after announcing SIUC will lead a $1.2 million emergency preparedness effort funded by the federal government.

GRANT: Helps SIUC lead disaster readiness effort

FROM PAGE 1

expertise to put together and write their mitigation plans. Under this arrangement, we're providing the expertise for free," Pinter said.

Pinter said he will hire another full-time staff person and several graduate students to work on the effort through 2010.

The money is administered through the Illinois Emergency Management Agency.

Andy Flor, a second-year graduate student in geology at SIUC, said the field work will consist of identifying areas that are prone to disasters and passing that information along to the planning commissions.

His graduate thesis, "Levee Safety, Levee Failure," identifies weak levee structures along the Mississippi in Southern Illinois, such as those structures near Grand Tower in Jackson County.

Grand Tower Levee District Commissioner Shawn McMahan said in April that high waters from the great flood of 1993 took their toll on the levee infrastructures.

About 17.5 miles of sliding levee needs to be stabilized and 75 locking structures need repair or replacement, McMahan said.

The local levee district's $15,000 annual budget collected from property taxes hardly meets the task at hand, said McMahan, who has sought federal assistance for many years.

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The Southern Illinoisan 1/30/08

SI 7/24/08

Williamson County EMA prepares for disasters

BY CODELL RODRIGUEZ
THE SOUTHERN

MARION — As far as natural disasters go in 2008, Southern Illinois is about a forest fire away from hitting for the cycle.

To prepare for future misfortunes, the Williamson County Emergency Management Agency is working with Southern Illinois University Carbondale, Greater Egypt Regional Planning and Development and The Polis Center out of Purdue University to form a pre-disaster mitigation project.

The plan is a requirement of the Federal Disaster Mitigation Act of 2000 in which local governments must sort out a plan for disasters to receive federal assistance.

The consortium had its third of six meetings Wednesday at the Emergency Management Agency office in Marion. The group must take several steps including risk assessment, mitigation strategy and plan maintenance before sending a final draft to the Illinois EMA, who will pass it along to the Federal Emergency Management Agency.

Alan Gower, director of Williamson County Emergency Management Agency, said there are 17 counties working on the mitigation project, but Williamson County is pushing to

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WILLIAMSON COUNTY: *Prepares*

FROM PAGE 1B

get its plan in as soon as possible, mostly because Carterville and Marion are building new high schools and they will need the assistance to make them disaster ready.

"It kind of pushed Williamson County to the front of the pack as far as need," Gower said.

During the meeting, Nicholas Pinter and Harvey Henson with the SIUC department of geology, addressed steps already taken and highlighted disasters in the past. They made a list of the deadliest potential disasters for Southern Illinois with tornadoes, severe storms and earthquakes in the top three.

"There is a long history of really big disasters in Southern Illinois — more than any location other than California," Pinter said.

David Coats, associate director of the Polis Center, said that in the 1990s, $25 billion was spent on disasters, but with events such as Hurricane Katrina in the last few years, the need for money is increasing.

Southern Illinois has experienced earthquakes, flooding, tornado activity and extreme winter weather just in 2008.

"Stop and think about what has happened during this decade," Coats said. "It makes that $25 billion seem relatively small."

Gower said so far the group has made great progress and is on the fast track to making Williamson County a part of the mitigation program.

Coats said that while being a part of the plan will not save the region from natural disasters, it can at least help soften the blow if one were to occur.

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The Southern Illinoisan 7/24/08

BRIEFLY

Disaster prep meeting scheduled for this morning

MARION — The Williamson County Emergency Management Agency will host a public meeting at 9 a.m. today at its office on Illinois 148 south at the Crab Orchard Wildlife Refuge to conduct pre-disaster planning.

Greater Egypt Regional Planning and Development Director Ike Kirkikis said his agency will take part in the planning as will Southern Illinois University Carbondale. Featured speaker will be Nicholas Pinter of the college's Department of Geology.

Kirkikis said Pinter will speak on natural hazards in Williamson County and help identify potential weaknesses in public structures.

— John Homan

TODAY'S EVENTS

Williamson County FEMA "Disaster Mitigation Plan" meeting: 9 a.m. Williamson County EMA office, 200 W. Jefferson St., Marion. Presentation by Prof. Nicholas Pinter and Harvey Henson on Natural Hazards and Historical Disasters in Williamson County. Contact Steve Land at 993-2323, steve_wcema@yourclearwave.com.

Chill Out in the Park: 1 to 2 p.m. Attucks Park, Carbondale. Free water spray activities by Carbondale Fire Department for children. 549-4222.

American Red Cross blood drive: 2 to 6 p.m. Carbondale Civic Center. Jennifer Freeze at (573) 339-4806.

The Southern Illinoisan 7/23/08

Disaster preparedness necessary year-round, workshop leaders say

BY DIANE WILKINS
MARION DAILY REPUBLICAN
wilkins@mariondaily.com
618-993-2626 x106

CARTERVILLE — Southern Illinois residents normally think of disaster preparedness in terms of tornadoes and flooding. However in light of last week's ice storms and the threat of another significant storm, preparedness is a year-round necessity.

A workshop on Disaster Preparedness was cosponsored by the Williamson County Emergency Management Agency and the American Red Cross. WCEMA Director Alan Gower and Deputy Director Steve Land were joined by Red Cross Director Sandy Webster and Dave Mathews.

The keys to assuring your families preparedness include getting informed, making a plan, assembling a survival kit and maintaining your plan and kit.

In the middle of a tornado event, earthquake or ice storm is not the time to try to decide what to do.

To make a workable plan, learn what possible disasters may hit your particular area, find out about local community plans and

● See PREPARED – page 7

Prepared

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warning systems and meet with family to design a plan for your particular needs.

Designate an "out-of-town" contact number that can let other members know that you are alright. In the event of an emergency locally, telephones may not be useful.

Check your home for particular hazards and take precautions. One example would be to bolt hot water heater to walls in the event of an earthquake of flood.

Decide where your safe area would be in the home. If there is a basement, that would be the first choice. An interior closet, hall or bathroom with no windows would be the next choice. Go over these safe areas with children frequently.

In preparing an emergency kit for home or vehicle, remember to plan for the elderly of disabled in the family that may have special needs.

Keeping important family documents safe and readily available is important for the recovery process after a disaster. In a waterproof, portable container keep wills, insurance policies, contracts, deeds, stock and bonds. Also passports, social security cards, immunization records and bank account number would be useful. A list of medictions for each family member is important along with name, address and phone number of the contact person outside of the area. Also an inventory of valuable household goods and important numbers should be included.

Have a survival kit prepared that will allow you and your family to survive independently for a minimum of 72 hours.

If you have children, remember that they will take their cues from your reactions. Stay calm and assure them that things will be alright. Once the initial event is over, it is important for children to return to as normal a lifestyle as possible.

In Southern Illinois, tornadoes are what usually cause the most concern, although we are also located on a major earthquake fault.

In the event of a tornado or earthquake, seek and interior area away from windows such as a bathroom, closet or hallway. If possible, take cover under a piece of furniture that will protect from falling objects or flying glass; cover your head with something.

Both the American Red Cross at 988-1147 or the Williamson County Emergency Management Agency at 993-2323.

Diane Wilkins Photos

Psychologist Dave Matthews, who works with the American Red Cross, discussed specific ways of helping children deal with an emergency or disaster.
Below, Sandy Webster, Director for the American Red Cross in the southernmost 14 counties of Illinois, was also one of the speakers.

Suggested supplies for a Disaster Kit

- Three-day supply of non-perishable food and manual can opener
- Three-day supply of water (one gallon per person)
- Portable, battery-powered radio or television and batteries
- Flashlight with extra batteries
- First aid kit and manual
- Sanitation and hygiene items (hand sanitizer, moist towelettes and toilet paper
- Matches in waterproof container
- Whistle
- Extra clothing and blankets
- Cooking utensils and Coleman stove
- Photocopies of identification
- Cash
- Special needs items such as prescription medications, eye glasses, contact solution, hearing aid batteries
- Infant items such as formula, diapers, bottles and pacifiers
- Entertainment items for children and adults
- Tools, pet supplies, and any other items that may be unique to your family situation

Marion Daily 2/21/08

Williamson County fine tunes its emergency plan

5.I. 11/6/08

BY CODELL RODRIGUEZ
THE SOUTHERN

MARION — Williamson County is one step closer to eligibility for federal funding now that it has completed the final draft of its hazard mitigation plan.

To receive federal assistance for disasters, the Federal Disaster Mitigation Act of 2000 requires local governments submit a plan of action. The Williamson County Emergency Management Agency enlisted the help of Southern Illinois University Carbondale, Greater Egypt Regional Planning and Development Commission and The Polis Center out of Purdue University to come up with a plan.

Assistant Director of WCEMA Steve Land said the final draft is about 240 pages and he reviewed it for any errors or inconsistencies.

He said it will be viewed several more times before it is submitted to the Illinois Emergency Management Agency and then to the Federal Emergency Management Agency.

"Once it is approved by FEMA, we'll be set and be able to open up doors," Land said.

Land said one of the main benefits of having the funding available is being able to apply for assistance in building new schools. Land said they can receive funding to make sure new schools are more disaster proof with additions such as stronger structure.

Land said the final draft has other benefits.

"It has a lot of data we'll be able to use down the road," he said.

He said the plan should be submitted to IEMA before Thanksgiving.

Ike Kirkikis, Greater Egypt executive director, said the plan was well-received.

"We were very pleased with the way the group responded," Kirkikis said.

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The Southern Illinoisan 11/6/08

Appendix C – Adoption Resolution

Appendix D – Williamson County Historical Hazards

Table of Contents

Droughts/ Extreme Heat

On August 17, 2007 The Bank of Marion temperature gauge shows the temperature at 102°F. Picture provided by:
http://www.southernillinoisian.com/articles/2007/08/17/top/21195362.txt

BLISTERING HEAT WAVE EXPECTED TO CONTINUE
http://www.southernillinoisian.com/articles/2007/08/13/top/21153871.txt

HOT! HOT! HOT!
In the summer of 2007 Southern Illinois experiences the 3rd hottest August on record.
http://thesouthern.com/articles/2007/08/23/top/21272694.prt

Earthquake

Resident in Mt. Carmel, Illinois surveys the damage to her home after the April 18, 2008 earthquake. Picture provided by:
http://www.foxnews.com/story/0,2933,351698,00.html

ANOTHER SMALL QUAKE SHAKES SOUTHERN ILLINOIS
http://thesouthern.com/articles/2005/06/28/top/104674.prt

EARTHQUAKE RATTLES SKYSCRAPERS, NERVES ACROSS MIDWEST STATES
April 18, 2008 a 5.2 magnitude earthquake.
http://thesouthern.com/articles/2008/04/18/front_page/24175640.prt

Fire

A fire burnt down a building holding two businesses March 30, 2008 in Marion, IL. The church next door sustained minimal damage. Picture provided by:
http://www.wsiltv.com/p/news_details.php?newsID=4502&type=top

Fire that damaged 5 businesses in downtown Herrin, IL has been attributed to a 24 year old man from Herrin.
"ARSON CHARGED IN DOWNTOWN FIRE." Chicago Tribune April 30, 1985, MIDWEST FINAL, NEWS: 3. August 21, 2008. <http://infoweb.newsbank.com>.

WINDS AGGRAVATE BRUSH FIRE IN MARION
http://thesouthern.com/articles/2008/01/29/breaking_news/doc479fafcde1901651271925.prt

Flooding

Flooding at Crab Orchard Lake Campground after the lake rose six feet from the spring 2008 rain. Picture provided by:
http://www.wsiltv.com/p/news_details.php?newsID=4425&type=top

FIREFIGHTERS RESCUE WOMAN FROM CAR STRANDED IN HIGH WATER
http://thesouthern.com/articles/2008/03/18/breaking_news/doc47e0562b194ab637253428.prt

FLOODING CLOSES ROADS
Flooding in Franklin County and Southern Illinois causes roads to be closed.
http://www.southernillinoisian.com/articles/2001/12/18/top/export6629.txt

Subsidence

Mine subsidence on December 12, 1990 in Herrin, Illinois caused the three homes above the mine to sink as much as three feet.
"EVEN THE KITCHENS SINK IN SOUTHERN ILLINOIS." Chicago Tribune December 14, 1990, NORTH SPORTS FINAL, NEWS: 6. August 21, 2008. <http://infoweb.newsbank.com>.

Home cracks in half because of subsidence in coal mines below.
"OLD MINES HAVE SOME ILLINOISANS ON SHAKY GROUND." Chicago Tribune March 15, 1999, CHICAGOLAND FINAL, NEWS: 1. August 21, 2008.
<http://infoweb.newsbank.com>.

Thunderstorms/ High Winds/ Hall/ Lightning

Thunderstorm over Marion, IL on July, 12, 2008. Picture provided by:
http://photo.weather.com/interact/photogallery/details.html?pid=213126&activitiesCategory=&weatherCategory=4480&where=&locid=USIL0727&submitter=&dateOfPhoto=&page=

Storm hits Marion, Illinois causing damage to the high school, homes and 20-25 people were injuring.
"MARION PUMMELED BY HIGH WINDS, RAIN." Chicago Tribune November 20, 1991, FINAL, NEWS: 3. August 21, 2008. <http://infoweb.newsbank.com>.

PRESIDENT DECLARES 30 LOCAL COUNTIES DISASTER
On April 21, 2002 tornadoes, thunderstorms and damaging winds caused damage to 30 counties in Southern Illinois.
http://thesouthern.com/articles/2002/05/22/top/export9433.prt

STORMS BATTER REGION: POSSIABLE TORNADO SIGHTED; RAIN, HAIL CAUSE DAMAGE
Southern Illinois hit by storm May 26, 2004.
http://thesouthern.com/articles/2004/05/27/top/export23692.prt

Tornado

Pictures from the 1982 Tornado that hit Marion, IL causing $250 million in property damage. Pictures provided by Williamson County EMA.

Transportation Hazardous Materials Release

Traffic all around Marion was still being rerouted after truck crash carrying hazardous material ethyl acetate on Interstate 57 December 28, 2006. The interstate south of Marion was closed in both lanes. Picture provided by:
http://www.southernillinoisian.com/articles/2006/12/29/top/18684896.txt

Emergency personnel wait for a back hoe to dig a trench around a delivery truck July 30, 2007 at the Crab Orchard National Wildlife Refuge. The truck was carrying oil products and officials were worried about a spill. Picture provided by:
http://www.southernillinoisian.com/articles/2007/07/31/top/21018586.txt

Winter storms

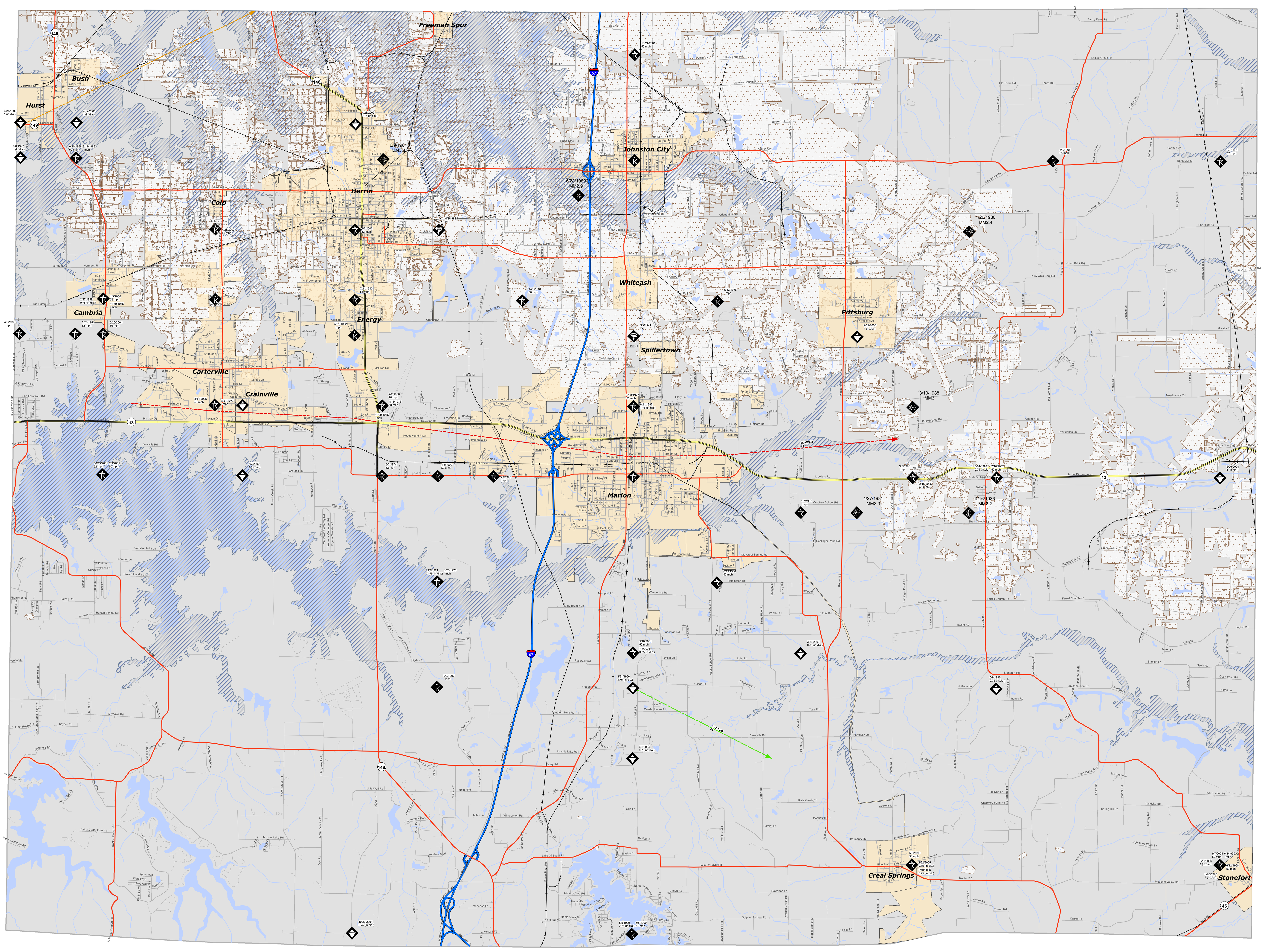
Traffic on Interstate 57 south of Benton moves carefully around a jack-knifed semi that was pulling a manufactured home before sliding off the roadway on December 8, 2005. Picture provided by: http://www.southernillinoisian.com/articles/2005/12/09/top/10002295.txt

Only a pile of rubble is left from the Bunny Bread store in Herrin. The building was damaged beyond repair in the first ice storm of this year, the company then tore the building down. Picture provided by:
http://www.southernillinoisan.com/articles/2008/02/27/front_page

Herrin High School students' brave snow and ice Tuesday, March 4, 2008 to load into a school bus shortly after classes ended for the day. Picture provided by: http://www.southernillinoisian.com/articles/2008/03/05/front_page/23618562.txt

ICE AND SNOW HIT REGION HARD
Storm hits Southern Illinois February 12, 2008.
http://www.southernillinoisian.com/articles/2008/02/12/front_page/23332915.txt

Appendix E – Hazard Map



0 1 2 4 6 8 Miles

Williamson County Pre-Disaster Mitigation Plan

Historical Natural Hazards Map

Williamson County Emergency Management Agency
8805 EMA Road
Marion, IL 62959

Greater Egypt Regional Planning and Devlopment Commission
608 E College Street
Carbondale, IL 62901

The Polis Center
IUPUI
1200 Waterway Blvd.
Indianapolis, IN 46202

Department of Geology
Southern Illinois University Carbondale
1259 Lincoln Drive
Carbondale, IL 62901

Legend

- Severe Thunderstorm (Hail Event)
- Severe Thunderstorm (Wind Event)
- Tornado Touchdown
- Earthquake Epicenter
- F1
- F2
- F3
- F4
- F5
- Interstate
- Expressway
- State/County Highway
- Local Road
- Railroad
- River
- 100 Year Flood Area
- Underground Mine
- Lake
- City

N W E S

Data Sources: NOAA - National Climatic Data Center; Geographic Names Information System (GNIS); Illinois Natural Resources Geospatial Data Clearinghouse; Williamson County E911; Illinois Geologic Survey; Center for Earthquake Information, University of Memphis

Appendix F – Complete List of Critical Facilities

Airport Facilities

Facility Name	Address	Analysis Class	Back-up Power	City	Facility Owner	Primary Function	Replacement Cost ($1,000)
WILLIAMSON COUNTY REGIONAL	10400 Terminal Dr.	ADFLT	Yes	MARION	Public	Public	6049.5

Bus Facilities

Facility Name	Address	Analysis Class	Back-up Power	City	Contact Person	Facility Name	Replacement Cost ($1,000)	Telephone Number
First Student	200 N 5th St	BDFLT	No	Marion	John Wagner	Laidlaw Transit Inc	1209.9	6189976449
Rides Transportation	1202 Dufor St	BDFLT	No	Marion		Rides Transportation	1209.9	

Communication Facilities

Facility Name	Analysis Class	Back-up Power	City	Facility Owner	Latitude	Longitude	Primary Function	Replacement Cost ($1,000)
WDDD 810	CBR	Yes	Marion	Withers Broadcasting	37.753757	-88.934365	AM	111
WSIL-TV CH 3	CBT	No	Carterville	WSIL-TV, INC.	37.612575	-88.872537	TV	111
WTCT-TV CH 27	CBT	No	Marion	TCT Ministries	37.845542	-88.929529	TV	111
WJPF 1340	CBR	No	Carterville	River Radio	37.834398	-89.0278	AM	111
WGGH 1150	CBR	No	MARION	Fishback Medio	37.728517	-88.89805	AM	111
WBVN CH 283	CBR	No	CARRIER MILLS	KENNETH W. AND JANE A. AN	37.77366	-88.73895	FM	111
WQUL CH 249	CBR	Yes	Marion	Withers Broadcasting	37.753752	-88.934355	FM	111
Olive & Park	CBO	No	Herrin		37.79	-89.028306	Siren	50
Lou Ann Drive	CBO	No	Herrin		37.75075	-89.024056	Siren	50
Camarato Dr & W. Herrin St.	CBO	No	Herrin		37.811111	-89.051944	Siren	50
Sycamore & S. Maple	CBO	No	Cambria		37.774082	-89.119477	Siren	50
Hall & N. Maple	CBO	No	Cambria		37.785908	-89.119267	Siren	50
Herrin City Park & N. 5th St	CBO	No	Herrin		37.759861	-88.946306	Siren	50
33rd & Walnut	CBO	No	Herrin		37.8015	-89.047833	Siren	50
New 13 West	CBO	No	Marion		37.744722	-89.011944	Siren	50
WMSN Cnty Parkway & Sioux Dr	CBO	No	Marion		37.75175	-88.973778	Siren	50
Saluki Dr	CBO	No	Marion		37.738889	-88.978611	Siren	50
Cornell St	CBO	No	Marion		37.743056	-88.951944	Siren	50
Suzanne & Warren	CBO	No	Marion		37.721667	-88.948889	Siren	50
501 W. Boynton	CBO	No	Marion		37.722167	-88.930111	Siren	50
100 S. Madison	CBO	No	Marion		37.730611	-88.926167	Siren	50
400 Morningside Dr	CBO	No	Marion		37.747222	-88.924444	Siren	50
South Market South of Golf Course Rd	CBO	No	Marion		37.704722	-88.923889	Siren	50
Old Creal Springs Rd at Old Golf Course	CBO	No	Marion		37.712222	-88.901944	Siren	50
George Sims Dr & East Main	CBO	No	Marion		37.7295	-88.903639	Siren	50
Calico & Buckley	CBO	No	Marion		37.753278	-88.883889	Siren	50
Russell & Boulevard	CBO	No	Marion		37.736722	-88.941667	Siren	50
Broeking Rd	CBO	No	Marion		37.742778	-88.901111	Siren	50
City Park	CBO	No	Energy		37.775	-89.025278	Siren	50
Hurst Fire & Ambulance Dept	CBO	No	Hurst		37.818167	-89.134472	Siren	50
9th & Washington	CBO	No	Johnston City		37.819194	-88.927361	Siren	50
410 W. Blue Avenue	CBO	No	Creal Springs		37.619797	-88.841274	Siren	50
Cannon Dr	CBO	No	Carterville		37.761449	-89.092126	Siren	50
WDDD 107.3	CBR	Yes	Marion	Withers Broadcasting	37.753759	-88.934371	FM	111
WFRX 1300	CBR	Yes	Marion	Withers Broadcasting	37.753749	-88.934371	AM	111
WTAO 105.1	CBR	Yes	Marion	Withers Broadcasting	37.753749	-88.934376	FM	111
WVZA 92.7	CBR	Yes	Marion	Withers Broadcasting	37.753749	-88.934371	FM	111
WCIL 101.5	CBR	No	Carterville	River Radio	37.834398	-89.0278	FM	111
WOOZ 99.9	CBR	No	Carterville	River Radio	37.834398	-89.0278	FM	111
WUEZ 95.1	CBR	No	Carterville	River Radio	37.834398	-89.0278	FM	111
WXLT 103.5	CBR	No	Carterville	River Radio	37.834398	-89.0278	FM	111

Electric Power Facilities

Facility Name	Address	City	Class	Replacement Cost ($1,000)
Southern Illinois	11543 Lake of Egypt Rd.	Marion	EDFLT	122100

EOC Facilities

Facility Name	Address	Back-up Power	City	Contact Person	Facility Class	Replacement Cost ($1,000)
Williamson County EMA	8805 EMA Rd.	No	Marion	Alan M. Gower	EFEO	976

Fire Station Facilities

Facility Name	Address	Back-up Power	City	Contact Person	Facility Class	Number of Stories	Replacement cost ($1,000)	Telephone Number
Marion Fire Dept	204 N Court St	Yes	Marion	Fire Departments	EFFS		666	
Lake of Egypt Fire Station #4	11708 Lake of Egypt Road	No	Marion	Kirby Crites	EFFS	1	1700	618-964-1278
Cambria Fire Department	103 South Maple	No	Cambria	Bruce Hagler	EFFS	1	150	618-985-3431
Carterville Fire Department	300 North Division	No	Carterville	Bruce Talley	EFFS	1	1400	618-985-5053
Williamson County Fire Dept - Station #7	410 West Blue Ave	No	Creal Springs	Don Swiatkowski	EFFS	1	120	618-996-2341
Energy Fire Department	210 Front Street	No	Energy	Andrew Barclay	EFFS	1	120	618-942-7827
Herrin Fire Department	400 South Park Avenue	Yes	Herrin	Mike Steh	EFFS	1	1400	618-942-6514
Hurst Fire Department	123 N Bush	No	Hurst	Duke Woolsey	EFFS	1	120	618-987-2469
Johnston City Police & Fire Department	500 Washington St	No	Johnston City	Girolomo Intravaia	EFFS	1	120	618-983-8311
Marion Fire Department	204 North Court	No	Marion	Anthony Rinella	EFFS	1	1400	618-997-5730
Pittsburg Volunteer Fire Department	109 South Lodge Street	No	Pittsburg	James Merrow	EFFS	1	150	618-993-8260
Williamson County Fire Dept - Station #6	3232 South Park Avenue	No	Herrin	Don Swiatkowski	EFFS	1	1400	618-997-4802
Bush Fire Station	504 Poplar St	No	Bush		EFFS	1	812	
City of Stonefront Fire Station	202 Cedar St	No	Stonefront		EFFS	1	812	
Lake of Egypt Fire Station #5	7913 Grassy Rd	No	Marion	Kirby Crites	EFFS	1	120	618-964-1278
Williamson County Fire Dept - Station #4	20938 Corinth Rd	No	Thompsonville	Don Swiatkowski	EFFS	1	120	618-982-2822
Williamson County Fire Dept - Station #5	1600 W Broadway Blvd	No	Johnston City	Don Swiatkowski	EFFS	1	120	618-983-6980
Williamson County Fire Dept - Station #1	1505 E Main St	No	Marion	Don Swiatkowski	EFFS	1	1000	618-997-3874
Williamson County Fire Dept - Station #2	1205 N Division St	No	Carterville	Don Swiatkowski	EFFS	1	120	618-985-8241
Williamson County Fire Dept - Station #3	9366 Paulton Rd	No	Crab Orchard	Don Swiatkowski	EFFS	1	120	618-982-2830
Lake of Egypt Fire Station #1	13205 Lakeview Dr	No	Creal Springs	Kirby Crites	EFFS		120	618-964-1278

Police Station Facilities

Facility Name	Address	Back-up Power	City	Contact Person	Facility Class	Replacement Cost ($1,000)	Telephone Number
Marion City Police	100 S Madison St	No	Marion	Gene Goolsby	EFPS	1554	618-993-2124
Cambria Police Dept	105 S Maple St	No	Cambria	Rick Upton	EFPS	1554	618-985-2211
Williamson County Sheriff's Dept	200 W Jefferson St	No	Marion	Tom Cundiff	EFPS	1554	618-997-6541
Herrin Police Dept	321 N. 14th St	Yes	Herrin	Stu Riddings	EFPS	1554	618-942-4132
Hurst Police Dept	213 N Bush Ave	No	Hurst	Ron Harnvel	EFPS	1554	
Crainville Police Dept	1205 N Main St	No	Crainville	Curtis Rodgers	EFPS	1554	618-985-4311
Spillertown Police Dept	102 Community Dr	No	Marion	Mike Byrne	EFPS	1554	618-997-5533
Whiteash Police Dept	200 Sanders Ave	No	Whiteash	Kressie McKnew	EFPS	1554	618-993-3710
Carterville Police Dept	300 N Division	No	Carterville	Monty Jeralds	EFPS	1554	618-985-4853
Energy Police Dept	210 N Pershing St	No	Energy	Shawn Ladd	EFPS	1554	618-942-5833
Johnston City Police Dept	500 Washington Ave	No	Johnston City	Jerald Kobler	EFPS	1554	618-983-5888
John A Logan College	700 Logan College Dr	No	Carterville	Tom Horn	EFPS	1554	618-985-2828
Pittsburg Police Dept	302 W Avery Ave	No	Pittsburg	Jack Queen	EFPS	1554	618-997-6646
Freemanspur Police Dept	19072 Freemanspur Rd	No	Freemanspur	Anthony Beck	EFPS	1554	618-942-3594
Creal Springs Police Dept	507 Walnut St	No	Creal Springs	Phil Jeralds	EFPS	1554	618-996-2049

Medical Care Facilities

Facility Name	Address	Back-up Power	City	Facility Class	Number of Beds	Replacement Cost ($1,000)
Herrin Hospital	201 S 14th St	Yes	Herrin	EFHM	94	5213.3846
Veteran's Admin. Hospital	2401 W Main St	Yes	Marion	EFHS	45	2495.7692
Chestnut Manor	1404 S 14th St	No	Herrin	MDFLT	16	887.3846
Fifth Season Residential	401 E Reichert Dr	No	Marion	MDFLT	14	776.4615
Fountains Care Facility	1301 E Deyoung St	No	Marion	MDFLT	120	6655.3846
Heartland Regional Medical Center	3333 W Deyoung St	Yes	Marion	EFHM	92	5102.4615
Friendship Care Center	1900 N Park Ave	No	Herrin	MDFLT	47	2606.6923
Parkway Manor	3116 Williamson County Parkway	No	Marion	MDFLT	119	6599.9231
Shawnee Christian Nursing Center	1901 N 13th St	No	Herrin	MDFLT	159	8818.3846
Veterans Administration Nursing Home	2309 W Main St	No	Marion	MDFLT	60	3327.6923
Williamson County Ambulance 1	808 E Deyoung St.	No	Marion	MDFLT	0	16470
Williamson County Ambulance 2	201 S Park Ave.	No	Herrin	MDFLT	0	16470
Lifeline Ambulance	1003 W. Cherry St.	No	Marion	MDFLT	0	16470

Potable Water Facilities

Facility Name	Analysis Class	Back-up Power	City	Latitude	Longitude	Replacement Cost ($1,000)	Year Built (Between 1500 and 2100)
LAKE OF EGYPT WATER AND SEWER DISTRICT	PDFLT	No	MARION	37.62667	-88.94167	36963	
MARION WATER DEPARTMENT	PDFLT	No	MARION	37.734678	-88.925628	36963	
US FEDERAL PENITENTIARY WTP	PDFLT	No	MARION	37.689945	-88.989566	36963	
Bush Tower	PDFLT	No	Bush	37.84310105	-89.13430621	200	1940
Cambria Ground Tank	PDFLT	No	Cambria	37.79292779	-89.11251015	200	1953
Carterville Ground Tank	PDFLT	No	Carterville	37.76717438	-89.05692981	400	1972
Carterville Water Tower	PDFLT	No	Carterville	37.76147178	-89.06796438	400	1935
Coal Valley Water Tower 1	PDFLT	No	Paulton	37.76118866	-88.80321066	400	1972
Coal Valley Water Tower 2	PDFLT	No	Paulton	37.76118198	-88.80271305	400	2001
Colp Water Tower	PDFLT	No	Colp	37.80372428	-89.08614478	200	2001
Corinth Water Tower 1	PDFLT	No	Corinth	37.78694444	-88.78972222	200	1975
Corinth Water Tower 2	PDFLT	No	Corinth	37.82444444	-88.75333333	200	
Crainville Ground Tank	PDFLT	No	Crainville	37.76037996	-89.05333708	200	1991
Crainville Stand Pipe	PDFLT	No	Crainville	37.73972222	-89.05944444	350	
Creal Springs Water Tower	PDFLT	No	Creal Springs	37.62115115	-88.8316279	400	
Devil's Kitchen Water Tower 1	PDFLT	No	N/A	37.609777	-89.10287637	200	1979
Freemanspur Water Tower	PDFLT	No	Freemanspur	37.85847754	-89.00142263	200	
Herrin Water Ground Tank	PDFLT	No	Herrin	37.81204822	-89.0318137	400	1967
Herrin Water Tower 1	PDFLT	No	Herrin	37.80081984	-89.0461435	200	1967
Herrin Water Tower 2	PDFLT	No	Herrin	37.7683752	-89.03585853	400	1990
Herrin Water Tower 3	PDFLT	No	Herrin	37.78520828	-89.03034705	200	1940
Hurst Water Tower	PDFLT	No	Hurst	37.8308878	-89.14430044	200	1940
Johnston City Ground Tank	PDFLT	No	Johnston City	37.82555556	-88.915	400	
Johnston City Water Tower	PDFLT	No	Johnston City	37.82547544	-88.93049158	400	
Lake of Egypt	PDFLT	No	N/A	37.62620891	-88.9421727	4500	1974
Marion WTP	PDFLT	No	Marion	37.73450487	-88.92551024	1400	1904
Marion Water Tower 1	PDFLT	No	Marion	37.74078562	-88.98405724	400	
Marion Water Tower 2	PDFLT	No	Marion	37.73166667	-88.94833333	400	
Marion Water Tower 3	PDFLT	No	Marion	37.7230172	-88.95362432	400	
Marion Water Tower 4	PDFLT	No	Marion	37.73472222	-88.92555556	200	
Marion Water Tower 5	PDFLT	No	Marion	37.73600454	-88.92468111	200	
US Federal Penitentiary Water Tower	PDFLT	No	N/A	37.66192134	-88.98695948	200	
Little Grassy Water Tower	PDFLT	No	N/A	37.62416667	-89.12722222	200	
Stonefort Water Tower	PDFLT	No	Stonefort	37.6218984	-88.71313818	200	
Crab Orchard Lake Water Tower 1	PDFLT	No	N/A	37.72305556	-89.04555556	200	
Crab Orchard Lake Water Tower 2	PDFLT	No	N/A	37.72694444	-89.02111111	200	
Crab Orchard Lake Water Tower 3	PDFLT	No	N/A	37.66388889	-89.03055556	200	
Crab Orchard Lake Water Tower 4	PDFLT	No	N/A	37.67943899	-88.9992907	200	
Pittsburg Water Tower	PDFLT	No	Pittsburg	37.78628298	-88.85399416	200	

Rail Facilities

Facility Name	Analysis Class	Back-up Power	Latitude	Longitude	Misc. Comments	Primary Function	Replacement Cost ($1,000)
COER/Transload Inc	RDF	No	37.741321	-89.042613	Container cargo	Cargo	2419.8
COER/Transload Inc	RDF	No	37.733427	-88.947818	Container cargo	Cargo	2420.8
COER/Transload Inc	RDF	No	37.726569	-88.906611	Container cargo	Cargo	2421.8
COER/Transload Inc	RDF	No	37.733963	-88.92865	Container cargo	Cargo	2422.8
Maytag Warehouse Spur	RDF	No	37.800303	-89.018901	Container cargo	Cargo	2423.8
East Lumber Supply Comp.	RDF	No	37.803354	-89.019736	Container cargo	Cargo	2424.8

School Facilities

Facility Name	Address	Back-up Power	City	Facility Class	Number of Stories	Number of Students	Phone Number	Replacement Cost ($1,000)
SIU ADMINISTRATION BUILDING 2	5601 OLD ROUTE 13	No	CARTERVILLE	EFS1	1	200		272.8477
CREAL SPRINGS GRADE SCHOOL	400 S LINE ST	No	CREAL SPRINGS	EFS1	3	194		264.6623
JOHN A LOGAN COLLEGE	700 LOGAN COLLEGE RD	No	CARTERVILLE	EFS1	3	6100		8321.8543
Herrin District Office	500 N 10TH ST	No	HERRIN	EFS1	1	0		0
Crab Orchard Elementary and High School	19189 Cory Bailey St.	No	Marion	EFS1	1	442		602.9933
WCECC (Pre-K)	500 Plaza Dr	No	Carterville	EFS1	1	200		272.8477
Carterville HS	West Grand Ave	No	Carterville	EFS1	2	750		1023.1788
Carterville Intermediate School	300 School St	No	Carterville	EFS1	1	510		695.7616
OUR LADY-MOUNT CARMEL SCHOOL	316 W MONROE STREET	No	HERRIN	EFS1	1	219	6189424484	298.7682
MARION SEVENTH DAY ADVENTIST S	9314 OLD ROUTE 13	No	MARION	EFS1	1	10	6189971430	13.6424
Unity Christian School	100 E College St	No	Energy	EFS1	1	129	6189423802	175.9868
PROJECT ECHO	900 WASHINGTON	No	JOHNSON CITY	EFS1	2	75	6189836628	102.3179
CartervilleTri Elementary	1405 W Grand Ave	No	CARTERVILLE	EFS1	1	750	6189852456	1023.1788
Herrin Elementary School	5200 HERRIN RD	No	HERRIN	EFS1	1	647	6189422744	882.6623
HERRIN HIGH SCHOOL	700 N 10TH ST	No	HERRIN	EFS1	2	713	6189426606	972.702
NORTH SIDE PRIMARY CENTER	601 N 17TH ST	No	HERRIN	EFS1	1	532	6189425418	725.7748
Herrin Middle School	700 S 14TH ST	No	HERRIN	EFS1	1	529	6189427461	721.6821
Jefferson Elementary School	1108 GRAND AVE	No	JOHNSTON CITY	EFS1	1	351	6189837561	478.8477
JOHNSTON CITY HIGH SCHOOL	1500 JEFFERSON AVE	No	JOHNSTON CITY	EFS1	2	353	6189834700	481.5762
LINCOLN SCHOOL ELEMENTARY SCHOOL	20163 CORINTH RD	No	PITTSBURG	EFS1	1	95	6189822130	129.6026
Washington Elementary and Middle School	100 E 12TH ST	No	JOHNSTON CITY	EFS1	1	480	6189837581	654.8344
Jefferson School	700 EAST BLVD	No	MARION	EFS1	1	344	6189975766	469.298
LINCOLN SCHOOL	400 MORNINGSIDE	No	MARION	EFS1	1	589	6189976063	803.5364
LONGFELLOW SCHOOL	1400 W HENDRICKSON	No	MARION	EFS1	1	326	6189933230	444.7417
MARION HIGH SCHOOL	1501 S CARBON ST	No	MARION	EFS1	1	1120	6189938196	1527.947
MARION JR HIGH SCHOOL	1609 W MAIN ST	No	MARION	EFS1	1	841	6189971317	1147.3245
WASHINGTON SCHOOL	420 E MAIN ST	No	MARION	EFS1	1	674	6189938534	919.4967
High School Extention Center	712 N. Carbon	No	Marion	EFS1	1			
School For Hearing Impaired	801 E Reeves	No	Marion	EFS1	1			
Learning Center	409 S. Court	No	Marion	EFS1	1			

User Defined

FacilityName	City	Address	Latitude	Longitude	Replacement Cost ($1,000)
Marion City Hall	Marion		37.730214	-88.927612	
Armory 11427	Marion		37.750218	-89.003482	13000
General Dynamics Corporation	Marion	8820 Rte-148			
Excel Mining System	Marion	809 Skyline Dr			
Aisin MFG IL,LLC	Marion	11000 Redco Dr			
Aisin Light Metals, Inc.	Marion	10900 Redco Dr			
Aisin Electronics, IL, LLC	Marion	11200 Redco Dr			
Pepsi Mid American	Marion	2605 W Main St			
Walmart	Marion	2705 Walton Way			
Home Depot	Marion	3200 Banterra Dr			
Menards	Marion	2500 Blue Heron Drive			
Circuit City	Marion	1100 Circuit City Road			
Blue Cross/Blue Shield	Marion	5001 Meadowland Pkwy			
Wisconsin Physicians Services	Marion	912 N Pentecost Dr			
Rent One Park	Marion	1000 Miners Drive			21000
Crisp Container Corp.	Marion	700 Skyline Dr			
Walmart	Herrin	1713 S Park Ave			
Federal Prison	N/A		37.661668	-88.98404	500000

Waste Water Facilities

Facility Name	Address	Analysis Class	Back-up Power	City	Latitude	Longitude	Replacement Cost ($1,000)
CAMBRIA STP	RAILROAD ST	WDFLT	No	CAMBRIA	37.781718	-89.128451	1500
COLP STP	VILLAGE HALL	WDFLT	No	COLP	37.80167	-89.07506	1500
CRAINVILLE STP	1205 MAIN ST	WDFLT	No	CARTERVILLE	37.756481	-89.053312	1500
CREAL SPRINGS STP	CITY HALL	WDFLT	No	CREAL SPRINGS	37.6235	-88.835288	1500
ENERGY STP	VILLAGE HALL	WDFLT	No	ENERGY	37.774695	-89.036359	1500
HERRIN STP	WEAVER ROAD	WDFLT	No	HERRIN	37.81611	-89.03583	5000
HURST STP	GOSNELL ROAD	WDFLT	No	HURST	37.816862	-89.142935	1500
JOHNSTON CITY STP	SOUTH WATER STREET	WDFLT	No	JOHNSTON CITY	37.805298	-88.933332	4000
LAKE OF EGYPT STP	11484 LAKE OF EGYPT ROAD	WDFLT	No	MARION	37.626839	-88.941214	4000
MARION SOUTHEAST STP	1321 SOUTH VAN BUREN STREET	WDFLT	No	MARION	37.719745	-88.930542	13500
PITTSBURG STP	COUNTY ROAD 1200 NORTH AND	WDFLT	No	PITTSBURG	37.776065	-88.831576	1500
CARTERVILLE STP	ELLES AVENUE	WDFLT	No	CARTERVILLE	37.754062	-89.084788	4000
Williamson County Airport Authority	Route 13	WDFLT	No	Marion	37.745612	-89.020216	1000
CRAB ORCHARD GRADE HS	19189 CORY BAILEY ST	WDFLT	No	MARION	37.726324	-88.806418	1000
LINCOLN GRADE SCHOOL	RURAL ROUTE	WDFLT	No	JOHNSTON CITY	37.819526	-88.786037	1000
Devil's Kitchen Campground		WDFLT	No		37.646298	-89.107562	750
US Federal Penitentiary		WDFLT	No		37.666324	-88.966425	4000
Little Grassy Campground		WDFLT	No		37.643449	-89.145013	750
Little Grassy Hatchery (DNR)		WDFLT	No		37.650433	-89.132859	1000

Hazardous Materials

Facility Name	Address	Analysis Class	Chemical Name	City
AEROFLITE/TEXACO	7700 AVIATION DR	HDFLT	JET FUEL	MARION
D J M OIL CO	101 N 27TH ST	HDFLT	GASOLINE	HERRIN
CHECKER OIL CO	300 S PERSHING ST	HDFLT	GASOLINE	ENERGY
BUDMARK OIL INC	10575 MINUTEMAN DR	HDFLT	OIL	MARION
BOWMAN OIL CO	1300 NORMAN RD	HDFLT	OIL	MARION
MOTOMART	100 E PLAZA DR	HDFLT	GASOLINE	CARTERVILLE
FKG OIL	101 W COMMERCIAL DR	HDFLT	GASOLINE	CARTERVILLE
VEACH SHORT STOP	202 S DIVISION ST	HDFLT	GASOLINE	CARTERVILLE
Hucks	3228 S PARK AVE	HDFLT	GASOLINE	HERRIN
HERRIN PHILLIPS 66	3225 S PARK AVE	HDFLT	GASOLINE	HERRIN
SHELL PIPELINE	2800 WESTMINSTER RD	HDFLT	OIL/GAS	MARION
JOHNSTON CITY SHELL	1105 W BROADWAY BLVD	HDFLT	GASOLINE	JOHNSTON CITY
SOUTHERN ILLINOIS POWER COOP	10898 LAKE OF EGYPT RD	HDFLT	FUEL OIL, ANHYDROUS AMMONIA, CHLORINE	MARION
SOUTHERN ILLINOIS POWER COOP	14936 LAKE OF EGYPT RD	HDFLT	FUEL OIL	MARION
JERALDS SERVICE CENTER	302 S MAPLE ST	HDFLT	GASOLINE/OIL	CAMBRIA
AmeriGas Eagle Propane, L. P.	6166 Old Route 13	HDFLT		Carterville
Marion Ferrellgas	1821 N Court St	HDFLT		Marion
United Parcel Service	1810 Industrial Drive	HDFLT		Marion
IL Army National Guard, Marion Armory	11427 Minutemen Road	HDFLT		Marion
CARTERVILLE SEWER DEPT	901 WILLOW ST	HDFLT		CARTERVILLE
CARTERVILLE STREET DEPT	612 W IDAHO AVE	HDFLT		CARTERVILLE
GENE'S AUTO	124 W ILLINOIS AVE	HDFLT		CARTERVILLE
PITTSBURG MINI MART	16258 PITTSBURG RD	HDFLT	GASOLINE	PITTSBURG
HURST MINI MART	211 E RUSSELL ST	HDFLT	GASOLINE/PRO	HURST
JD STREET & CO	709 GRAND AVE	HDFLT	GASOLINE/PRO	JOHNSTON CITY
Verizon	502 ADAMS AVE	HDFLT		JOHNSTON CITY
US FEDERAL PENETENTIARY	4500 PRISON RD	HDFLT		MARION
SOUTHERN MOLD INC	500 FOLLIS AVE	HDFLT		JOHNSTON CITY
THE SOLLAMI COMPANY	1200 WEAVER RD	HDFLT		HERRIN
PALMERS SERVICE/HOLLIDAY OIL	100 E KEELY ST	HDFLT		CREAL SPRINGS
CASEY'S GENERAL STORE	1700 N PARK AVE	HDFLT	GASOLINE/PRO	HERRIN
Verizon	8656 OLD ROUTE 13	HDFLT		MARION
Verizon	4416 ROUTE 37	HDFLT		MARION
Verizon	10451 ROUTE 166	HDFLT		MARION
Verizon	117 S SEBA ST	HDFLT		HURST
AmerenCIPS Johnston City Gas Storage	15940 Harris School Road	HDFLT		Johnston City
AmerenCIPS Marion Substation Shop	1800 West Main Street	HDFLT		Marion
Centennial-Creal Springs Terminal	3134 Doron Rd	HDFLT		Creal Springs
Verizon	203 MICHIGAN AVE	HDFLT		CARTERVILLE
Verizon	821 E MONROE ST	HDFLT		HERRIN
Verizon	15265 LAKE OF EGYPT RD	HDFLT		MARION
Verizon	10895 PAULTON RD	HDFLT		MARION
CASEY'S GENERAL STORE	1117 GRAND AVE	HDFLT	GASOLINE/PRO	JOHNSTON CITY
CASEY'S GENERAL STORE	1207 S DIVISION ST	HDFLT	GASOLINE/OIL	CARTERVILLE
VEACH OIL CO	12124 LAKE OF EGYPT RD	HDFLT	GASOLINE/OIL	MARION
REACO BATTERY SERVICE CO	17217 ROUTE 37	HDFLT		JOHNSTON CITY

Hazardous Materials

Facility Name	Address	Analysis Class	Chemical Name	City
GAS/PROPANE	6166 OLD ROUTE 13	HDFLT		CARTERVILLE
JD STREET & CO	701 S PARK AVE	HDFLT	GASOLINE/OIL	HERRIN
VEACH OIL COMPANY	500 N PARK AVE	HDFLT	GASOLINE/OIL	HERRIN
Verizon	1683 GRASSY RD	HDFLT		MARION
TESKE 1		HDFLT	OIL	STIRITZ
LITTLEFAIR		HDFLT	OIL	STIRITZ
BUFAY	HARRIS SCHOOL RD	HDFLT	OIL	COUNTY
MADISON	CORINTH RD	HDFLT	OIL	COUNTY
OWENS	LIBERTY SCHOOL RD	HDFLT	OIL	COUNTY
MITCHELL LEASE	PAULTON RD	HDFLT	OIL	COUNTY
AIKMAN	ALLEGHANY RD	HDFLT	OIL	COUNTY
Heartland Propane Gas, Inc	721 West Herrin Street	HDFLT		Herrin
Herrin Citgo #233	701 South Park	HDFLT		Herrin
BP	3225 Park	HDFLT		Herrin
VERIZON Marion Main CO (IL5615001)	208 West Union	HDFLT		Marion
VERIZON MARION SO #5 RSU (IL5617002)	ST HWY 37 & CO HWY 19	HDFLT		MARION
Carbondale MSC (Old)	422 McKinney Hill Lane	HDFLT		Carbondale
The Sollami Company	1200 Weaver Road	HDFLT		Herrin
Southern FS, INC. - Marion	1501 East Deyoung	HDFLT		Marion
Southern Illinois Power Cooperative	10825 Lake of Egypt Road	HDFLT		Marion
Shakespeare Oil Co., Inc. - COBB LEASE	Sec. 8-T8S-R3E	HDFLT		Johnston City
Shakespeare Oil Co., Inc. - ROE LEASE	Sec. 7-T8S-R3E	HDFLT		Johnston City
Sam? Club #8180	2709 Walton Way	HDFLT		Marion
Marion East Citgo #237	207 East DeYoung	HDFLT		Marion
First Student, Inc.-332-Marion	200 N. 5th St.	HDFLT		Marion
Johnston City Citgo #236	709 North Grand	HDFLT		Johnston City
Perma Treat of Illinois, Inc.	1800 Permatreat Drive	HDFLT		Marion
Aisin Light Metals LLC	10900 Redco Dr	HDFLT		Marion
Aisin Manufacturing Illinois, LLC	11000 Redco Dr	HDFLT		Marion
P & S GRAIN, LLC	401 Old Creal Springs Rd	HDFLT		Marion
GENERAL DYNAMICS - OTS AREA-13	6000 WEST OGDEN ROAD	HDFLT		MARION
GENERAL DYNAMICS - OTS BF-AREA	8788 WOLF CREEK ROAD	HDFLT		MARION
GENERAL DYNAMICS - OTS FAM-AREA	3055 PIGEON CREEK ROAD	HDFLT		MARION
GENERAL DYNAMICS - OTS AREA-6	8545 ROUTE 148	HDFLT		MARION
GENERAL DYNAMICS - OTS I-AREA	6658 ROUTE 148	HDFLT		MARION
GENERAL DYNAMICS - OTS P-AREA	6038 PIGEON CREEK RD	HDFLT		MARION
Air Evac Marion Base 35	9842 Old Bainbridge Road	HDFLT		Marion
Marion Transfer Station	1410 W. Longstreet Rd.	HDFLT		Marion
DIAGRAPH MSP GROUP	5307 MEADOWLAND PARKWAY	HDFLT		Marion
Home Depot Store # 1979	3200 Banterra Drive	HDFLT		Marion
Midwest Equipment	8894 Route 166	HDFLT		Creal Springs
Aisin Electronics Illinois, LLC	11200 Redco Drive	HDFLT		Marion
Verizon Herrin (IL5491001)	401 North 14th Street	HDFLT		Herrin
Southern Illinois Asphalt Co. Inc.	205 East Reid	HDFLT		Marion
CASEY'S GENERAL STORE	16060 Cambria Rd.	HDFLT	Gas/ Oil	HURST
CASEY'S GENERAL STORE	650 N. Pershing St.	HDFLT	Gas/ Oil	ENERGY

Dams

Facility Name	Action Plan	Analysis Class	County Name	Distance to Nearest City (mile)	Drainage Area of Dam (sq. miles)	Height of Dam (ft)	Length of Dam (ft)	Latitude	Longitude	Maximum Discharge Rate (ft3/sec)	Maximum Storage Area (acre-ft)	Name of River	NATDAM ID Number	Nearest City to Dam	Normal Storage Area (acre-ft)	Owner of the Dam	Purpose of the Dam	Relative Hazard Rating Emergency	Spillway Type on Dam	Spillway Volume (cubic yards)	Spillway Width (ft)	Structural Height of Dam (ft)	Surface Area of Water (acres)	Year Built
SMITHLAND LOCKS & DAM	Y	HPDG	POPE	1	144000	0	130	37.7633	-89.035	190000	738700	OHIO RIVER	IL00050	SMITHLAND	406000	CELRL	NRFS	S	N	885400	0	56	23600	1980
JOHNSTON CITY SEWAGE LAGOON DAM	N	HPDE	WILLIAMSON	1	0	12	1600	37.806308	-88.932353	0	165	LAKE CREEK	IL00103	JOHNSTON CITY	75	City of Johnston City	O	S	U	0	0	0	0	1963
PLEASANT VALLEY LAKE DAM	N	HPDE	WILLIAMSON	17	0	21	600	37.619405	-89.008789	0	132	WOLF CREEK	IL00023	CARBONDALE	87	Pleasant Valley Club	R	L	U	0	42	0	0	1958
KNIGHTS OF PYTHIAS LAKE DAM	N	HPDE	WILLIAMSON	14	0	14	550	37.686711	-88.885112	0	67	TRIB SOUTH FORK SALLINE RIVER	IL00047	SALINE	57	Knights of Pythias	R	L	U	0	40	0	0	1928
DURST LAKE DAM	N	HPDE	WILLIAMSON	1	0	13	500	37.772443	-88.785199	0	103	TRIB CRAB ORCHARD CREEK	IL00024	PAULTON	54	Charles A. Durst	I	L	U	0	50	0	0	1942
MADISON LAKE DAM	N	HPDE	WILLIAMSON	6	0	19	660	37.810577	-89.1115	0	225	TRIB HURRICANE CREEK	IL00052	HURST	181	Madison Coal Company	R	L	U	0	240	0	0	1919
MARION COUNTRY CLUB LAKE DAM	N	HPDE	WILLIAMSON	18	0	17	658	37.641419	-88.942643	0	414	TRIB SOUTH FORK SALINE RIVER	IL00022	SALINE	277	Marion Country Club	R	L	U	0	47	0	0	1914
FREEMAN UNITED/ /FRESH WATER LAKE DAM	N	HPDE	WILLIAMSON	3	0	30	690	37.804042	-88.875332	0	642	TRIB LAKE CREEK	IL00016	JOHNSTON CITY	333	Freeman United Coal Minin	O	S	N	0	0	0	0	
LAKE OF EGYPT DAM	Y	HPDE	WILLIAMSON	7	33.3	55	2850	37.62306	-88.947028	40666	82942	SOUTH FORK SALINE RIVER	IL00015	MARION-OFFSTREAM	41215	Southern Illinois Power C	OR	H	U	0	200	0	2265	1962
MARION RESERVOIR DAM	Y	HPDE	WILLIAMSON	2	24.4	25	895	37.683361	-88.952543	0	1931	LIMB BRANCH	IL00014	MARION	966	City of Marion	S	S	U	0	0	0	0	1971
BELFORD LAKE DAM	N	HPDE	WILLIAMSON	14	0	26	385	37.641086	-88.876127	0	155	TRIB LITTLE CANA CREEK	IL00089	SALINE	122	Arthur Breford	R	L	U	0	50	0	0	
ZEIGLER COAL LAKE 5 DAM	N	HPDE	WILLIAMSON	2	0	18	1150	37.823077	-88.892174	0	194	TRIB LAKE CREEK	IL00088	JOHNSTON CITY	176	Zeigler Coal Company	O	S	U	0	40	0	0	
SWEET LAKE DAM	N	HPDE	WILLIAMSON	0.1	0	16	840	37.827222	-88.907251	0	355	TRIB LAKE CREEK	IL00087	JOHNSTON CITY	162	Zeigler Coal Company	R	S	U	0	0	0	0	
TEAL LAKE DAM	N	HPDE	WILLIAMSON	19	0	12	670	37.653956	-88.965633	0	168	TRIB LIMB BRANCH	IL00086	CARBONDALE	106	Teal Lake Association	R	L	U	0	18	0	0	
JOHNSTON CITY LAKE DAM	N	HPDE	WILLIAMSON	3	0	14	855	37.802314	-88.866616	0	601	TRIB LAKE CREEK	IL00048	JOHNSTON CITY	466	City of Johnston City	S	S	U	0	80	0	0	1921
HERRIN RESERVOIR 2 DAM	N	HPDE	WILLIAMSON	15	0	27	630	37.636348	-89.013867	0	659	MIDDLE WOLF CREEK	IL00049	CARBONDALE	411	Herrin Water Company	SR	S	U	0	95	0	0	1926
SIPCO SOUTH FLY ASH POND DAM	N	HPDE	WILLIAMSON	0.1	0	29	2100	37.610128	-88.952157	91	165	TRIB LAKE OF EGYPT	IL50100	GOREVILLE	117	Southern Illinois Power C	D	L	U	0	0	0	0	1989
FREEMAN UNITED/ORIENT 4/EAST SLURRY DAM	Y	HPDE	WILLIAMSON	0.1	0	66	5300	37.790689	-88.862512	11	1745	TRIB LAKE CREEK	IL50059	PITTSBURGH	1584	Freeman United Coal Minin	O	H	U	0	1	0	0	1985
BLEYAR LAKE DAM	N	HPDE	WILLIAMSON	10	0	20	590	37.6467	-89.0567	0	153	TRIB CANEY BRANCH CREEK	IL00943	CARBONDALE	115	Frank Bleyar	P	L	U	0	39	0	0	
MARTEL LAKE DAM	N	HPDE	WILLIAMSON	1	0	20	815	37.813587	-88.897194	0	78	TRIB LAKE CREEK	IL00942	JOHNSTON CITY	61	Joseph Martel	R	L	U	0	30	0	0	1974
FREEMAN UNITED/ORIENT 4/AUXILARY SLURRY	N	HPDE	WILLIAMSON	0.1	0	47	3300	37.789865	-88.860209	6	918	TRIB LAKE CREEK	IL50150	PITTSBURG	828	Freeman United Coal Minin	O	L	U	0	2	0	0	1986
MARION NEW LAKE DAM	Y	HPDE	WILLIAMSON	0.1	0	67	2750	37.609936	-88.827083	62800	45000	SUGAR CREEK	IL50169	MARION	16600	City of Marion	SR	H	U	0	570	0	0	

Dams

Facility Name	Action Plan	Analysis Class	County Name	Distance to Nearest City (mile)	Drainage Area of Dam (sq. miles)	Height of Dam (ft)	Length of Dam (ft)	Latitude	Longitude	Maximum Discharge Rate (ft3/sec)	Maximum Storage Area (acre-ft)	Name of River	NATDAM ID Number	Nearest City to Dam	Normal Storage Area (acre-ft)	Owner of the Dam	Purpose of the Dam	Relative Hazard Rating Emergency	Spillway Type on Dam	Spillway Volume (cubic yards)	Spillway Width (ft)	Structural Height of Dam (ft)	Surface Area of Water (acres)	Year Built
SOUTHERN IL POWER FLY ASH DISP POND B-3	N	HPDE	WILLIAMSON	0.1	0	36	700	37.620459	-88.949243	175	140	TRIB LITTLE SALINE CREEK	IL50160	HUGDENS	45	Southern Illinois Power C	D	L	U	0	9	0	140	1986
LITTLE GRASSY	N	HPDZ	WILLIAMSON	0	15.6	88	3560	37.646791	-89.137705	18200	28714	LITTLE GRASSY CREEK	IL00084		23687	DOI FWS	BLANK	L	*	0	0	88	1015	
DEVIL'S KITCHEN	N	HPDZ	WILLIAMSON	0	50	120	670	37.642266	-89.11853	41927	31500	GRASSY CREEK	IL00085		24500	DOI FWS	BLANK	L	*	0	100	120	890	
CRAB ORCHARD	N	HPDZ	WILLIAMSON	3	215	64	3800	37.71667	-89.15	0	87500	CRAB ORCHARD CREEK	IL10000		57800	DOI FWS	BLANK	L	*	0	411	63.8	9500	
ORIENT NO.4	N	HPDZ	WILLIAMSON	2	0.59	15	0	37.791044	-88.839932	700	140		IL83460	PITTSBURG	0	FREEMAN UNITED COAL CO.	S	S	U	0	0	0	0	
ORIENT NO.4	N	HPDZ	WILLIAMSON	2	0.04	15	0	37.789858	-88.842755	280	450		IL83461	PITTSBURG	0	FREEMAN UNITED COAL CO.	T	S	U	0	0	0	0	
ORIENT NO.4	N	HPDZ	WILLIAMSON	2	0.07	18	0	37.791593	-88.843382	280	144		IL83462	PITTSBURG	0	FREEMAN UNITED COAL CO.	S	S	U	0	0	0	0	
Visitor's Center Dam		HPDE	WILLIAMSON					37.707511	-89.021691							DOI FWS								
ORIENT NO.4	N	HPDZ	WILLIAMSON	2	0.07	50	0	37.798164	-88.849518	280	890		IL83463	PITTSBURG	0	FREEMAN UNITED COAL CO.	T	S	U	0	0	0	0	
ORIENT NO.4 MINE	N	HPDZ	WILLIAMSON	2	0.07	64	0	37.799086	-88.842064	100	890		IL83513	PITTSBURG	0	FREEMAN UNITED COAL MININ	T	S	U	0	0	0	0	

Highway Bridges

Bridge Name	Analysis Class	Bridge Length (m)	Bridge Owner	Bridge Width (m)	Daily Traffic (cars/day)	Flood Structure Foundation Type	Latitude	Longitude	Maximum Span Length (m)	Number of Spans	Pier Type	Replacement Cost ($1,000)	Scour Index	Skew Angle (degrees)	Year Built (Between 1500 and 2100)
TR 3	HWB3	17	Town Highway Agency	7.4	19	4	37.86211	-88.98985	16	1	N000000000	226.2136	8	0	1986
WEST GATE ROAD	HWB3	16	Bureau of Fish & Wildlife	3.7	2	4	37.67833	-89.08	14.6	1	N000000000	172.6272	6	0	1959
WOLF CREEK ROAD	HWB12	47	Bureau of Fish & Wildlife	8	25	4	37.71	-89.05833	18	3	N000000000	676.1232	6	0	1938
A-3 ROAD	HWB4	19	Bureau of Fish & Wildlife	7.3	400	4	37.72	-89.035	18	1	N000000000	249.4103	6	0	1990
GRASSY ROAD	HWB12	38	Bureau of Fish & Wildlife	10	550	4	37.64667	-89.13833	18.3	2	N000000000	683.316	8	20	1939
NO. DEVILS KITCHEN	HWB15	94	Bureau of Fish & Wildlife	8.8	200	4	37.64167	-89.09833	27.4	3	N000000000	1487.471	6	0	1959
ROAD 265E	HWB3	10	Bureau of Fish & Wildlife	4.4	1	4	37.67333	-89.10667	9.4	1	N000000000	107.892	6	0	1964
OGDEN ROAD	HWB28	25	Bureau of Fish & Wildlife	6.8	35	4	37.67833	-89.02333	14	3	N000000000	305.694	6	0	1999
OLD RAILROAD GRADE	HWB26	17	Bureau of Fish & Wildlife	3	1	4	37.66667	-89.05167	4.3	4	N000000000	183.4164	6	0	1962
OLD RAILROAD GRADE	HWB15	27	Bureau of Fish & Wildlife	3.7	5	4	37.70333	-88.97667	3.4	8	N000000000	291.3084	6	0	1962
TRIPP TRAIL WEST	HWB3	12	Bureau of Fish & Wildlife	3.7	1	4	37.66	-89.07333	12.2	1	N000000000	129.4704	6	0	1962
TRIPP TRAIL EAST	HWB3	12	Bureau of Fish & Wildlife	3.7	1	4	37.66	-89.04833	12.2	1	N000000000	129.4704	6	0	1962
NORTH TRAIL EAST	HWB26	9	Bureau of Fish & Wildlife	3.7	5	4	37.73	-88.975	4.3	2	N000000000	97.1028	6	0	1942
TR 301	HWB3	16	Town Highway Agency	7.4	75	4	37.60723	-88.70857	15.2	1	N000000000	212.9069	5	0	1982
FAI 57 SB	HWB10	53	State Highway Agency	11	14000	4	37.70099	-88.96472	20.2	3	N000000000	1048.3506	5	31	1959
FAI 57 NB	HWB10	53	State Highway Agency	11	14000	4	37.70113	-88.96467	20.2	3	N000000000	1048.3506	5	31	1959
INTERSTATE 57 NB	HWB15	47	State Highway Agency	11.3	14000	4	37.72996	-88.95843	21.1	3	H043900000	955.024	N	2	1960
INTERSTATE 57 SB	HWB15	47	State Highway Agency	15.7	14200	4	37.72995	-88.95878	21.1	3	H043900000	1326.8918	N	2	1960
INTERSTATE 57 NB	HWB15	47	State Highway Agency	16.3	14200	4	37.73345	-88.95889	16.9	3	R071100000	1377.601	N	1	1960
INTERSTATE 57 SB	HWB15	47	State Highway Agency	11.6	14200	4	37.73361	-88.95889	16.9	3	R071100000	980.3786	N	1	1960
INTERSTATE 57 NB	HWB15	64	State Highway Agency	15.2	16600	4	37.74065	-88.95817	31.8	3	H044200000	1749.289	N	12	1960
INTERSTATE 57 SB	HWB15	64	State Highway Agency	15.9	16600	4	37.74064	-88.95846	31.8	3	H043700000	1829.8483	N	12	1960
INTERSTATE 57 NB	HWB3	12	State Highway Agency	13.5	16600	4	37.79925	-88.94592	11.6	1	N000000000	291.3084	5	37	1961
INTERSTATE 57 SB	HWB3	12	State Highway Agency	13.5	16600	4	37.79939	-88.94592	11.6	1	N000000000	291.3084	5	37	1961
INTERSTATE 57 NB	HWB15	48	State Highway Agency	12.2	16600	4	37.81183	-88.94599	17.1	3	N000000000	1053.0259	5	20	1961
INTERSTATE 57 SB	HWB15	48	State Highway Agency	15.2	16600	4	37.81196	-88.946	17.1	3	N000000000	1311.9667	5	20	1961
ILL 13 EB	HWB15	40	State Highway Agency	12.7	13400	4	37.74495	-89.13177	15.5	3	N000000000	913.4856	7	0	1964
ILL 13 EB	HWB15	38	State Highway Agency	12.7	13400	4	37.74496	-89.1224	14.3	3	N000000000	867.8113	7	0	1964
ILL 13 EB	HWB15	33	State Highway Agency	10.9	7350	4	37.73183	-88.88851	11.7	3	N000000000	646.8125	7	0	1962
ILL 13 WB	HWB15	33	State Highway Agency	10.9	7350	4	37.73175	-88.88835	11.7	3	N000000000	646.8125	7	0	1962
ILL 37	HWB15	49	State Highway Agency	9.3	3800	4	37.63493	-88.96225	18.6	3	R066500000	819.4397	N	21	1940
ILL 37	HWB3	18	State Highway Agency	11.1	3850	4	37.59733	-88.97805	17.4	1	N000000000	359.2804	7	36	1931
ILL 166	HWB15	48	State Highway Agency	10.7	2700	4	37.68229	-88.85894	15.9	3	N000000000	923.5555	5	24	1934
ILL 166	HWB3	22	State Highway Agency	10.2	1100	4	37.61699	-88.82849	21.2	1	N000000000	403.5161	8	0	1933
ILL 148	HWB15	137	State Highway Agency	10.7	4350	4	37.86063	-89.0601	29.6	6	N000000000	2635.9814	5	0	1931
ILL 148	HWB15	54	State Highway Agency	10.7	4350	4	37.84788	-89.05512	21.8	3	N000000000	1039	5	0	1931
ILL 148	HWB10	36	State Highway Agency	10.5	4200	4	37.67779	-89.02108	13.6	3	N000000000	679.7196	5	0	1956
ILL 148	HWB3	12	State Highway Agency	13.8	4200	4	37.65822	-89.0207	11.3	1	N000000000	297.7819	4	0	1958
ILL 148	HWB10	30	State Highway Agency	10.5	3850	4	37.6448	-89.01617	11.1	3	N000000000	566.433	5	34	1962
ILL 148	HWB15	53	State Highway Agency	10.2	3850	4	37.63273	-89.00237	19.1	3	N000000000	972.1069	5	20	1962
ILL 148 EXIT 45	HWB15	76	State Highway Agency	11.8	3850	4	37.62178	-88.98737	25.4	4	H049300000	1612.6258	N	0	1960
FAS 903 (CH 2)	HWB15	72	State Highway Agency	10.9	5800	4	37.81686	-88.94606	23	4	H048300000	1411.2274	N	1	1961

Highway Bridges

Bridge Name	Analysis Class	Bridge Length (m)	Bridge Owner	Bridge Width (m)	Daily Traffic (cars/day)	Flood Structure Foundation Type	Latitude	Longitude	Maximum Span Length (m)	Number of Spans	Pier Type	Replacement Cost ($1,000)	Scour Index	Skew Angle (degrees)	Year Built (Between 1500 and 2100)
FAS 908 (CH 11)(UN	HWB3	16	State Highway Agency	10.6	5700	4	37.81129	-89.07178	15.7	1	N000000000	304.9747	5	15	1949
FAS 908 (CH 11)(UN	HWB3	16	State Highway Agency	10.5	5700	4	37.81121	-89.06789	14.6	1	N000000000	302.0976	5	45	1949
FAS 1900 (CH 25)	HWB10	74	State Highway Agency	9.6	800	4	37.64786	-88.97632	23.6	4	H049300000	1277.4413	N	12	1959
SBI 13 (UNMARKED)	HWB3	10	State Highway Agency	9.3	1800	4	37.73783	-89.03387	8.9	1	N000000000	167.2326	5	0	1920
SBI 13 (UNMARKED)	HWB3	8	City Highway Agency	9.6	6200	4	37.72989	-88.90939	7.3	1	N000000000	138.1018	5	30	1924
FAS 1887 (UNMARKED	HWB3	8	State Highway Agency	10.1	2300	4	37.72998	-88.79993	7.5	1	N000000000	145.2946	5	0	1921
TR 23 (STIRITZ RD)	HWB15	71	State Highway Agency	9.7	800	4	37.84001	-88.9444	23	4	H048800000	1238.4203	N	5	1961
TR 241 (CEDAR GROV	HWB15	77	State Highway Agency	9.1	750	4	37.76331	-88.94935	24.2	4	H049000000	1259.9987	N	18	1961
WESTMINSTER DR	HWB10	58	State Highway Agency	9.1	19	4	37.71896	-88.95849	17.6	4	H050500000	949.09	N	2	1959
CH 4 (STOTLAR RD)	HWB15	74	State Highway Agency	10.3	2400	4	37.79233	-88.94579	23	4	H049000000	1370.588	N	0	1961
I-24 RAMP 0.94	HWB15	85	State Highway Agency	8.5	100	4	37.60994	-88.99465	36.3	2	H049000000	1299.1995	N	4	1972
INTERSTATE 24 EB	HWB15	120	State Highway Agency	13.4	8350	4	37.60403	-88.99672	43	2	H050300000	2891.5056	N	45	1972
FAS 907 (CH 9)(UNM	HWB15	144	State Highway Agency	10.7	4600	4	37.81834	-89.13018	39.9	4	N000000000	2770.6666	5	0	1937
ILL 13 WB	HWB15	41	State Highway Agency	13.2	13400	4	37.74495	-89.13158	15.5	3	N000000000	973.1858	7	0	1939
ILL 13 WB	HWB15	38	State Highway Agency	13.2	13400	4	37.74496	-89.12222	14.3	3	N000000000	901.9771	7	0	1939
NEW IL 13 (WB)	HWB23	45	State Highway Agency	13.2	3950	4	37.7321	-88.72777	15	3	N000000000	1068.1308	8	30	1990
ILL 148	HWB15	47	State Highway Agency	10.7	6100	4	37.70403	-89.02138	17.9	3	N000000000	904.3148	8	0	1938
ILL 166	HWB23	37	State Highway Agency	10.7	2700	4	37.679	-88.86009	21.1	2	N000000000	711.9074	5	0	1991
NEW IL 13 EB	HWB23	45	State Highway Agency	13.1	3950	4	37.73203	-88.72793	15	3	N000000000	1060.0389	8	30	1994
ILL 37	HWB23	62	State Highway Agency	11.9	5200	4	37.71523	-88.93269	21.3	3	N000000000	1326.712	8	15	1997
FAS 2887-IL 37	HWB4	23	State Highway Agency	13	7700	4	37.80828	-88.93267	21.9	1	N000000000	537.6618	8	0	2000
ILL 37	HWB28	17	State Highway Agency	12.5	7700	4	37.81047	-88.93263	3	5	N000000000	382.1175	6	0	1951
ILL 37	HWB28	12	State Highway Agency	11.2	5200	4	37.69699	-88.94165	3.7	3	N000000000	241.6781	6	0	1954
IL 37-FAU 9637	HWB28	10	State Highway Agency	12.8	6500	4	37.73152	-88.93272	9.9	3	N000000000	230.1696	6	0	1946
FAS 903 (UNMARKED)	HWB3	12	State Highway Agency	11.6	5400	4	37.81092	-89.00457	11.6	1	N000000000	250.3094	7	35	1956
FAS 903 (UNMARKED)	HWB15	25	State Highway Agency	9.2	5200	4	37.81375	-88.99918	9.1	3	N000000000	413.586	5	0	1956
FAS 903 (UNMARKED)	HWB15	23	State Highway Agency	10	5400	4	37.81758	-88.97169	8.5	3	N000000000	413.586	5	0	1956
FAS 903 (UNMARKED)	HWB15	69	State Highway Agency	9.1	5800	4	37.81762	-88.96364	26.2	3	N000000000	1129.0898	5	0	1956
FAS 1900	HWB3	8	County Highway Agency	11.9	850	4	37.6519	-89.02512	7.6	1	N000000000	171.1886	8	0	1942
FAS 1900	HWB3	17	County Highway Agency	9.2	750	4	37.65121	-89.01426	16.5	1	N000000000	281.2385	8	0	1942
FAS 1900	HWB3	52	County Highway Agency	9.2	800	4	37.65435	-89.08499	24.7	1	N000000000	860.2589	8	0	1942
CH 13	HWB12	40	County Highway Agency	8.4	2050	4	37.64018	-88.92819	15.2	3	N000000000	604.1952	8	0	1968
TR 276	HWB12	44	Town Highway Agency	8.9	800	4	37.59953	-88.9475	16.8	3	N000000000	704.1751	8	0	1962
FAS 2904	HWB3	31	County Highway Agency	10.9	2350	4	37.6246	-88.94331	29.9	1	N000000000	607.6118	8	50	1962
TR 557	HWB3	8	Town Highway Agency	6.2	225	4	37.69271	-88.94688	7.3	1	N000000000	89.1907	5	0	1900
FAS 904	HWB28	30	County Highway Agency	11.4	2600	4	37.73758	-88.85527	10.1	3	N000000000	614.9844	8	0	1972
FAS 904	HWB28	33	County Highway Agency	11.6	1850	4	37.75748	-88.85509	11	3	N000000000	688.351	8	30	1972
FAS 1901	HWB5	21	County Highway Agency	9.1	700	4	37.67648	-89.09868	10.4	2	N000000000	343.636	8	0	1976
FAS 1901	HWB17	52	County Highway Agency	10.1	1000	4	37.71483	-89.15087	18.3	3	N000000000	944.4146	7	0	1976
TR 544	HWB28	21	Town Highway Agency	6.8	125	4	37.8548	-88.81698	10.7	2	N000000000	256.783	8	0	1977
TR 29	HWB28	21	Town Highway Agency	6.9	75	4	37.85161	-88.79912	10.7	2	N000000000	260.5592	8	0	1977
TR 505	HWB3	19	Town Highway Agency	7.4	200	4	37.61479	-89.01179	18	1	N000000000	252.8269	8	0	1977

Highway Bridges

Bridge Name	Analysis Class	Bridge Length (m)	Bridge Owner	Bridge Width (m)	Daily Traffic (cars/day)	Flood Structure Foundation Type	Latitude	Longitude	Maximum Span Length (m)	Number of Spans	Pier Type	Replacement Cost ($1,000)	Scour Index	Skew Angle (degrees)	Year Built (Between 1500 and 2100)
TR 505	HWB3	16	Town Highway Agency	7.4	200	4	37.6111	-89.01863	14.9	1	N000000000	212.9069	8	0	1977
TR 603	HWB3	23	Town Highway Agency	7.3	225	4	37.62263	-88.81181	22.3	1	N000000000	301.9178	8	0	1977
TR 573	HWB5	35	Town Highway Agency	6.8	175	4	37.65586	-88.9013	11.6	3	N000000000	427.9716	8	0	1977
TR 505 A	HWB3	16	Town Highway Agency	6.4	225	4	37.61258	-89.05041	15.8	1	N000000000	184.1357	8	0	1977
TR 423	HWB5	28	Town Highway Agency	6.9	450	4	37.66188	-89.11865	9.1	3	N000000000	347.4122	8	20	1978
TR 440	HWB17	35	Town Highway Agency	6.7	125	4	37.65393	-88.90741	11.6	3	N000000000	421.6779	8	0	1978
TR 350	HWB5	35	Town Highway Agency	6.8	325	4	37.80757	-88.92887	11.6	3	N000000000	427.9716	8	0	1978
TR 606	HWB28	28	Town Highway Agency	6.6	150	4	37.82655	-88.71146	9.1	3	N000000000	332.3074	8	45	1978
CH 14	HWB5	30	County Highway Agency	9.2	450	4	37.81921	-88.90988	9.8	3	N000000000	496.3032	8	0	1980
CH 1	HWB3	38	County Highway Agency	9.3	650	4	37.81382	-88.94181	15.2	1	N000000000	635.4839	8	0	1979
CH 1	HWB3	14	County Highway Agency	9.3	650	4	37.81196	-88.94182	13.1	1	N000000000	234.1256	8	0	1979
TR 608	HWB17	64	Town Highway Agency	7.5	225	4	37.74989	-88.71471	20.7	3	N000000000	863.136	N	0	1978
TR-573	HWB3	19	Town Highway Agency	7.5	200	4	37.65633	-88.85444	18	1	N000000000	256.2435	8	0	1981
CH 5	HWB17	46	County Highway Agency	8.7	75	4	37.65775	-88.72186	15.2	3	N000000000	719.6396	8	0	1983
TR 140	HWB17	25	Town Highway Agency	7.4	200	4	37.81883	-89.07768	14.9	2	N000000000	332.667	8	0	1981
CH 4	HWB3	19	County Highway Agency	12.2	2600	4	37.79589	-88.98042	18	1	N000000000	416.8228	8	0	1983
TR 548B	HWB17	28	Town Highway Agency	7.4	200	4	37.76642	-88.83666	9.1	3	N000000000	372.587	8	30	1983
TR-167	HWB3	13	Town Highway Agency	7.4	100	4	37.79689	-88.74842	11.9	1	N000000000	172.9868	8	0	1983
TR 143	HWB17	31	Town Highway Agency	7.4	150	4	37.80476	-88.87068	12.2	3	N000000000	412.5071	8	30	1987
TR 612	HWB3	16	Town Highway Agency	7.4	75	4	37.79702	-88.74394	14.9	1	N000000000	212.9069	8	0	1985
TR 548	HWB17	23	Town Highway Agency	7.4	175	4	37.86015	-88.83562	7.6	3	N000000000	306.0536	8	0	1985
TR 202	HWB3	11	Town Highway Agency	7.4	225	4	37.73819	-89.03092	10.4	1	N000000000	146.3735	8	0	1984
FAS 2903-CH 4	HWB3	19	County Highway Agency	12.3	3050	4	37.79585	-88.99251	18	1	N000000000	420.2393	8	20	1987
FAS 2904	HWB3	25	County Highway Agency	13	3050	4	37.62046	-88.96751	23.8	1	N000000000	584.415	8	0	1983
TR 23	HWB17	34	Town Highway Agency	7.4	75	4	37.8399	-89.00097	15.2	3	N000000000	452.4271	8	0	1985
TWP ROAD 601	HWB3	19	Town Highway Agency	7.3	375	4	37.61423	-88.74563	18	1	N000000000	249.4103	8	30	1986
FAS 1887	HWB19	25	County Highway Agency	7.4	200	4	37.62949	-88.72749	9.1	3	N000000000	332.667	8	0	1990
TR 606	HWB3	19	Town Highway Agency	7.4	150	4	37.78726	-88.7116	18	1	N000000000	252.8269	8	20	1985
FAS 876	HWB17	68	County Highway Agency	9.2	1650	4	37.85295	-89.0105	22.6	3	N000000000	1124.9539	8	32	1989
TR 556	HWB3	19	Town Highway Agency	7.4	150	4	37.80634	-88.87285	18	1	N000000000	252.8269	8	10	1987
TR 509	HWB3	19	Town Highway Agency	7.3	19	4	37.64068	-89.02554	18	1	N000000000	249.4103	8	20	1986
TR 604	HWB4	19	Town Highway Agency	7.4	50	4	37.82225	-88.73479	18	1	N000000000	252.8269	8	0	1992
CH 13/S MARKET ST	HWB17	44	County Highway Agency	9.9	2700	4	37.71418	-88.9242	15.8	2	N000000000	783.2959	8	0	1986
FAS 1887-CH 12	HWB17	23	County Highway Agency	8.6	950	4	37.67975	-88.8039	7.6	3	N000000000	355.684	8	0	1988
FAS 903-CH 2	HWB4	19	County Highway Agency	8.6	500	4	37.82725	-88.70987	18	1	N000000000	293.8259	8	15	1991
TWP ROAD 652	HWB17	34	Town Highway Agency	7.4	49	4	37.65227	-88.78994	15.2	3	N000000000	452.4271	8	0	1989
TR 278	HWB19	29	Town Highway Agency	8.6	29	4	37.62516	-88.95574	10.7	3	N000000000	448.4711	8	0	1990
TR 552	HWB19	37	Town Highway Agency	7.4	125	4	37.86235	-88.85436	15.2	3	N000000000	492.3472	8	30	1994
TR 605	HWB4	16	Town Highway Agency	7.4	100	4	37.62658	-88.85246	14.9	1	N000000000	212.9069	8	0	1990
TR 315	HWB4	13	Town Highway Agency	7.4	75	4	37.68824	-88.71969	11.9	1	N000000000	172.9868	8	0	1991
FAS 1900-CH 25	HWB4	19	County Highway Agency	8.6	800	4	37.65327	-89.07371	18	1	N000000000	293.8259	8	0	1991
TR 610	HWB4	19	Town Highway Agency	7.4	39	4	37.79172	-88.72549	18	1	N000000000	252.8269	8	0	1992

Highway Bridges

Bridge Name	Analysis Class	Bridge Length (m)	Bridge Owner	Bridge Width (m)	Daily Traffic (cars/day)	Flood Structure Foundation Type	Latitude	Longitude	Maximum Span Length (m)	Number of Spans	Pier Type	Replacement Cost ($1,000)	Scour Index	Skew Angle (degrees)	Year Built (Between 1500 and 2100)
TR 432	HWB19	52	Town Highway Agency	7.4	200	4	37.66364	-88.88546	18.1	3	N000000000	691.9474	8	30	1992
FAS 1887-CH 12	HWB19	31	County Highway Agency	8.6	400	4	37.65542	-88.76366	12.2	3	N000000000	479.4001	8	0	1995
TR 245	HWB19	45	Town Highway Agency	7.4	250	4	37.77226	-88.71447	17.1	3	R070100000	598.8006	N	0	1995
TR 43-CHITTYVILLE	HWB4	16	Town Highway Agency	7.4	225	4	37.83255	-89.00422	14.9	1	N000000000	212.9069	8	0	1996
FAS1887-SARAVILLE	HWB19	49	County Highway Agency	8.6	950	4	37.67799	-88.80359	18.3	3	N000000000	757.7615	8	10	1997
TR 35-THORN ROAD	HWB4	16	Town Highway Agency	7.4	125	4	37.84207	-88.78556	14.9	1	N000000000	212.9069	8	0	1997
TR 5-HARMONY CH RO	HWB4	13	Town Highway Agency	7.4	275	4	37.86243	-88.89293	11.9	1	N000000000	172.9868	8	0	1997
TR 29-DEAN ROAD	HWB4	11	Town Highway Agency	7.4	200	4	37.84616	-88.85827	10.4	1	N000000000	146.3735	8	0	1998
TR 29-DEAN ROAD	HWB4	13	Town Highway Agency	7.4	125	4	37.84991	-88.82646	11.9	1	N000000000	172.9868	8	0	1998
TR 606-SOMERS CH R	HWB4	16	Town Highway Agency	7.4	150	4	37.81335	-88.71155	14.9	1	N000000000	212.9069	8	0	1998
CS 7000 OFF FAS 90	HWB28	8	State Highway Agency	7.7	700	4	37.82007	-88.95663	3.7	2	N000000000	110.7691	6	0	1956
FAS 904	HWB28	8	County Highway Agency	11.5	2600	4	37.73392	-88.8553	3.7	2	N000000000	165.4344	6	0	1972
TR 566	HWB28	8	Town Highway Agency	8.3	275	4	37.75271	-88.87762	3.7	2	N000000000	119.4005	6	0	1974
VICKSBURG STREET	HWB28	7	City Highway Agency	9.4	850	4	37.73407	-88.93845	3	2	N000000000	118.3216	6	0	1979
WILDCAT DRIVE	HWB28	8	City Highway Agency	13.3	2350	4	37.71513	-88.93907	3.7	2	N000000000	191.3285	6	0	1980
BOYTON ST	HWB28	8	City Highway Agency	11.2	3400	4	37.72226	-88.92226	3.4	2	N000000000	161.1187	6	45	1967
FUTURE STREET	HWB3	8	City Highway Agency	6.8	800	4	37.72889	-88.92006	7.4	1	N000000000	97.8221	5	0	1900
COLLEGE & GRANITE	HWB3	12	City Highway Agency	15.9	2200	4	37.72978	-88.93144	10.9	1	N000000000	343.0966	8	40	1989
BOYTON ST-FAU 9631	HWB28	13	City Highway Agency	12.2	5400	4	37.72247	-88.9275	12.3	3	N000000000	285.1945	6	15	1997
OLD CREAL SPRINGS	HWB19	55	City Highway Agency	9.6	1850	4	37.71608	-88.90375	18.3	3	N000000000	949.4496	8	0	1999
TR 167	HWB28	39	Railroad	5.3	125	4	37.80171	-88.72083	7	7	R064500000	371.6879	N	0	1900
TR 551	HWB28	32	Railroad	6.5	19	4	37.66238	-88.95853	6.7	7	R121900000	374.0256	N	0	1900
TR 557	HWB28	35	Railroad	5.8	225	4	37.69276	-88.95407	6.7	7	R065000000	365.0346	N	15	1900
TR 3	HWB3	17	Town Highway Agency	7.4	19	4	37.86211	-88.98985	16	1	N000000000	226.2136	8	0	1986
WEST GATE ROAD	HWB3	16	Bureau of Fish & Wildlife	3.7	2	4	37.67833	-89.08	14.6	1	N000000000	172.6272	6	0	1959
WOLF CREEK ROAD	HWB12	47	Bureau of Fish & Wildlife	8	25	4	37.71	-89.05833	18	3	N000000000	676.1232	6	0	1938
A-3 ROAD	HWB4	19	Bureau of Fish & Wildlife	7.3	400	4	37.72	-89.035	18	1	N000000000	249.4103	6	0	1990
GRASSY ROAD	HWB12	38	Bureau of Fish & Wildlife	10	550	4	37.64667	-89.13833	18.3	2	N000000000	683.316	8	20	1939
NO. DEVILS KITCHEN	HWB15	94	Bureau of Fish & Wildlife	8.8	200	4	37.64167	-89.09833	27.4	3	N000000000	1487.471	6	0	1959
ROAD 265E	HWB3	10	Bureau of Fish & Wildlife	4.4	1	4	37.67333	-89.10667	9.4	1	N000000000	107.892	6	0	1964
OGDEN ROAD	HWB28	25	Bureau of Fish & Wildlife	6.8	35	4	37.67833	-89.02333	14	3	N000000000	305.694	6	0	1999
OLD RAILROAD GRADE	HWB26	17	Bureau of Fish & Wildlife	3	1	4	37.66667	-89.05167	4.3	4	N000000000	183.4164	6	0	1962
OLD RAILROAD GRADE	HWB15	27	Bureau of Fish & Wildlife	3.7	5	4	37.70333	-88.97667	3.4	8	N000000000	291.3084	6	0	1962
TRIPP TRAIL WEST	HWB3	12	Bureau of Fish & Wildlife	3.7	1	4	37.66	-89.07333	12.2	1	N000000000	129.4704	6	0	1962
TRIPP TRAIL EAST	HWB3	12	Bureau of Fish & Wildlife	3.7	1	4	37.66	-89.04833	12.2	1	N000000000	129.4704	6	0	1962
NORTH TRAIL EAST	HWB26	9	Bureau of Fish & Wildlife	3.7	5	4	37.73	-88.975	4.3	2	N000000000	97.1028	6	0	1942
TR 301	HWB3	16	Town Highway Agency	7.4	75	4	37.60723	-88.70857	15.2	1	N000000000	212.9069	5	0	1982
FAI 57 SB	HWB10	53	State Highway Agency	11	14000	4	37.70099	-88.96472	20.2	3	N000000000	1048.3506	5	31	1959
FAI 57 NB	HWB10	53	State Highway Agency	11	14000	4	37.70113	-88.96467	20.2	3	N000000000	1048.3506	5	31	1959
INTERSTATE 57 NB	HWB15	47	State Highway Agency	11.3	14000	4	37.72996	-88.95843	21.1	3	H043900000	955.024	N	2	1960
INTERSTATE 57 SB	HWB15	47	State Highway Agency	15.7	14200	4	37.72995	-88.95878	21.1	3	H043900000	1326.8918	N	2	1960
INTERSTATE 57 NB	HWB15	47	State Highway Agency	16.3	14200	4	37.73345	-88.95889	16.9	3	R071100000	1377.601	N	1	1960

Highway Bridges

Bridge Name	Analysis Class	Bridge Length (m)	Bridge Owner	Bridge Width (m)	Daily Traffic (cars/day)	Flood Structure Foundation Type	Latitude	Longitude	Maximum Span Length (m)	Number of Spans	Pier Type	Replacement Cost ($1,000)	Scour Index	Skew Angle (degrees)	Year Built (Between 1500 and 2100)
INTERSTATE 57 SB	HWB15	47	State Highway Agency	11.6	14200	4	37.73361	-88.95889	16.9	3	R071100000	980.3786	N	1	1960
INTERSTATE 57 NB	HWB15	64	State Highway Agency	15.2	16600	4	37.74065	-88.95817	31.8	3	H044200000	1749.289	N	12	1960
INTERSTATE 57 SB	HWB15	64	State Highway Agency	15.9	16600	4	37.74064	-88.95846	31.8	3	H043700000	1829.8483	N	12	1960
INTERSTATE 57 NB	HWB3	12	State Highway Agency	13.5	16600	4	37.79925	-88.94592	11.6	1	N000000000	291.3084	5	37	1961
INTERSTATE 57 SB	HWB3	12	State Highway Agency	13.5	16600	4	37.79939	-88.94592	11.6	1	N000000000	291.3084	5	37	1961
INTERSTATE 57 NB	HWB15	48	State Highway Agency	12.2	16600	4	37.81183	-88.94599	17.1	3	N000000000	1053.0259	5	20	1961
INTERSTATE 57 SB	HWB15	48	State Highway Agency	15.2	16600	4	37.81196	-88.946	17.1	3	N000000000	1311.9667	5	20	1961
ILL 13 EB	HWB15	40	State Highway Agency	12.7	13400	4	37.74495	-89.13177	15.5	3	N000000000	913.4856	7	0	1964
ILL 13 EB	HWB15	38	State Highway Agency	12.7	13400	4	37.74496	-89.1224	14.3	3	N000000000	867.8113	7	0	1964
ILL 13 EB	HWB15	33	State Highway Agency	10.9	7350	4	37.73183	-88.88851	11.7	3	N000000000	646.8125	7	0	1962
ILL 13 WB	HWB15	33	State Highway Agency	10.9	7350	4	37.73175	-88.88835	11.7	3	N000000000	646.8125	7	0	1962
ILL 37	HWB15	49	State Highway Agency	9.3	3800	4	37.63493	-88.96225	18.6	3	R066500000	819.4397	N	21	1940
ILL 37	HWB3	18	State Highway Agency	11.1	3850	4	37.59733	-88.97805	17.4	1	N000000000	359.2804	7	36	1931
ILL 166	HWB15	48	State Highway Agency	10.7	2700	4	37.68229	-88.85894	15.9	3	N000000000	923.5555	5	24	1934
ILL 166	HWB3	22	State Highway Agency	10.2	1100	4	37.61699	-88.82849	21.2	1	N000000000	403.5161	8	0	1933
ILL 148	HWB15	137	State Highway Agency	10.7	4350	4	37.86063	-89.0601	29.6	6	N000000000	2635.9814	5	0	1931
ILL 148	HWB15	54	State Highway Agency	10.7	4350	4	37.84788	-89.05512	21.8	3	N000000000	1039	5	0	1931
ILL 148	HWB10	36	State Highway Agency	10.5	4200	4	37.67779	-89.02108	13.6	3	N000000000	679.7196	5	0	1956
ILL 148	HWB3	12	State Highway Agency	13.8	4200	4	37.65822	-89.0207	11.3	1	N000000000	297.7819	4	0	1958
ILL 148	HWB10	30	State Highway Agency	10.5	3850	4	37.6448	-89.01617	11.1	3	N000000000	566.433	5	34	1962
ILL 148	HWB15	53	State Highway Agency	10.2	3850	4	37.63273	-89.00237	19.1	3	N000000000	972.1069	5	20	1962
ILL 148 EXIT 45	HWB15	76	State Highway Agency	11.8	3850	4	37.62178	-88.98737	25.4	4	H049300000	1612.6258	N	0	1960
FAS 903 (CH 2)	HWB15	72	State Highway Agency	10.9	5800	4	37.81686	-88.94606	23	4	H048300000	1411.2274	N	1	1961
FAS 908 (CH 11)(UN	HWB3	16	State Highway Agency	10.6	5700	4	37.81129	-89.07178	15.7	1	N000000000	304.9747	5	15	1949
FAS 908 (CH 11)(UN	HWB3	16	State Highway Agency	10.5	5700	4	37.81121	-89.06789	14.6	1	N000000000	302.0976	5	45	1949
FAS 1900 (CH 25)	HWB10	74	State Highway Agency	9.6	800	4	37.64786	-88.97632	23.6	4	H049300000	1277.4413	N	12	1959
SBI 13 (UNMARKED)	HWB3	10	State Highway Agency	9.3	1800	4	37.73783	-89.03387	8.9	1	N000000000	167.2326	5	0	1920
SBI 13 (UNMARKED)	HWB3	8	City Highway Agency	9.6	6200	4	37.72989	-88.90939	7.3	1	N000000000	138.1018	5	30	1924
FAS 1887 (UNMARKED	HWB3	8	State Highway Agency	10.1	2300	4	37.72998	-88.79993	7.5	1	N000000000	145.2946	5	0	1921
TR 23 (STIRITZ RD)	HWB15	71	State Highway Agency	9.7	800	4	37.84001	-88.9444	23	4	H048800000	1238.4203	N	5	1961
TR 241 (CEDAR GROV	HWB15	77	State Highway Agency	9.1	750	4	37.76331	-88.94935	24.2	4	H049000000	1259.9987	N	18	1961
WESTMINSTER DR	HWB10	58	State Highway Agency	9.1	19	4	37.71896	-88.95849	17.6	4	H050500000	949.09	N	2	1959
CH 4 (STOTLAR RD)	HWB15	74	State Highway Agency	10.3	2400	4	37.79233	-88.94579	23	4	H049000000	1370.588	N	0	1961
I-24 RAMP 0.94	HWB15	85	State Highway Agency	8.5	100	4	37.60994	-88.99465	36.3	2	H049000000	1299.1995	N	4	1972
INTERSTATE 24 EB	HWB15	120	State Highway Agency	13.4	8350	4	37.60403	-88.99672	43	2	H050300000	2891.5056	N	45	1972
FAS 907 (CH 9)(UNM	HWB15	144	State Highway Agency	10.7	4600	4	37.81834	-89.13018	39.9	4	N000000000	2770.6666	5	0	1937
ILL 13 WB	HWB15	41	State Highway Agency	13.2	13400	4	37.74495	-89.13158	15.5	3	N000000000	973.1858	7	0	1939
ILL 13 WB	HWB15	38	State Highway Agency	13.2	13400	4	37.74496	-89.12222	14.3	3	N000000000	901.9771	7	0	1939
NEW IL 13 (WB)	HWB23	45	State Highway Agency	13.2	3950	4	37.7321	-88.72777	15	3	N000000000	1068.1308	8	30	1990
ILL 148	HWB15	47	State Highway Agency	10.7	6100	4	37.70403	-89.02138	17.9	3	N000000000	904.3148	8	0	1938
ILL 166	HWB23	37	State Highway Agency	10.7	2700	4	37.679	-88.86009	21.1	2	N000000000	711.9074	5	0	1991
NEW IL 13 EB	HWB23	45	State Highway Agency	13.1	3950	4	37.73203	-88.72793	15	3	N000000000	1060.0389	8	30	1994

Highway Bridges

Bridge Name	Analysis Class	Bridge Length (m)	Bridge Owner	Bridge Width (m)	Daily Traffic (cars/day)	Flood Structure Foundation Type	Latitude	Longitude	Maximum Span Length (m)	Number of Spans	Pier Type	Replacement Cost ($1,000)	Scour Index	Skew Angle (degrees)	Year Built (Between 1500 and 2100)
ILL 37	HWB23	62	State Highway Agency	11.9	5200	4	37.71523	-88.93269	21.3	3	N000000000	1326.712	8	15	1997
FAS 2887-IL 37	HWB4	23	State Highway Agency	13	7700	4	37.80828	-88.93267	21.9	1	N000000000	537.6618	8	0	2000
ILL 37	HWB28	17	State Highway Agency	12.5	7700	4	37.81047	-88.93263	3	5	N000000000	382.1175	6	0	1951
ILL 37	HWB28	12	State Highway Agency	11.2	5200	4	37.69699	-88.94165	3.7	3	N000000000	241.6781	6	0	1954
IL 37-FAU 9637	HWB28	10	State Highway Agency	12.8	6500	4	37.73152	-88.93272	9.9	3	N000000000	230.1696	6	0	1946
FAS 903 (UNMARKED)	HWB3	12	State Highway Agency	11.6	5400	4	37.81092	-89.00457	11.6	1	N000000000	250.3094	7	35	1956
FAS 903 (UNMARKED)	HWB15	25	State Highway Agency	9.2	5200	4	37.81375	-88.99918	9.1	3	N000000000	413.586	5	0	1956
FAS 903 (UNMARKED)	HWB15	23	State Highway Agency	10	5400	4	37.81758	-88.97169	8.5	3	N000000000	413.586	5	0	1956
FAS 903 (UNMARKED)	HWB15	69	State Highway Agency	9.1	5800	4	37.81762	-88.96364	26.2	3	N000000000	1129.0898	5	0	1956
FAS 1900	HWB3	8	County Highway Agency	11.9	850	4	37.6519	-89.02512	7.6	1	N000000000	171.1886	8	0	1942
FAS 1900	HWB3	17	County Highway Agency	9.2	750	4	37.65121	-89.01426	16.5	1	N000000000	281.2385	8	0	1942
FAS 1900	HWB3	52	County Highway Agency	9.2	800	4	37.65435	-89.08499	24.7	1	N000000000	860.2589	8	0	1942
CH 13	HWB12	40	County Highway Agency	8.4	2050	4	37.64018	-88.92819	15.2	3	N000000000	604.1952	8	0	1968
TR 276	HWB12	44	Town Highway Agency	8.9	800	4	37.59953	-88.9475	16.8	3	N000000000	704.1751	8	0	1962
FAS 2904	HWB3	31	County Highway Agency	10.9	2350	4	37.6246	-88.94331	29.9	1	N000000000	607.6118	8	50	1962
TR 557	HWB3	8	Town Highway Agency	6.2	225	4	37.69271	-88.94688	7.3	1	N000000000	89.1907	5	0	1900
FAS 904	HWB28	30	County Highway Agency	11.4	2600	4	37.73758	-88.85527	10.1	3	N000000000	614.9844	8	0	1972
FAS 904	HWB28	33	County Highway Agency	11.6	1850	4	37.75748	-88.85509	11	3	N000000000	688.351	8	30	1972
FAS 1901	HWB5	21	County Highway Agency	9.1	700	4	37.67648	-89.09868	10.4	2	N000000000	343.636	8	0	1976
FAS 1901	HWB17	52	County Highway Agency	10.1	1000	4	37.71483	-89.15087	18.3	3	N000000000	944.4146	7	0	1976
TR 544	HWB28	21	Town Highway Agency	6.8	125	4	37.8548	-88.81698	10.7	2	N000000000	256.783	8	0	1977
TR 29	HWB28	21	Town Highway Agency	6.9	75	4	37.85161	-88.79912	10.7	2	N000000000	260.5592	8	0	1977
TR 505	HWB3	19	Town Highway Agency	7.4	200	4	37.61479	-89.01179	18	1	N000000000	252.8269	8	0	1977
TR 505	HWB3	16	Town Highway Agency	7.4	200	4	37.6111	-89.01863	14.9	1	N000000000	212.9069	8	0	1977
TR 603	HWB3	23	Town Highway Agency	7.3	225	4	37.62263	-88.81181	22.3	1	N000000000	301.9178	8	0	1977
TR 573	HWB5	35	Town Highway Agency	6.8	175	4	37.65586	-88.9013	11.6	3	N000000000	427.9716	8	0	1977
TR 505 A	HWB3	16	Town Highway Agency	6.4	225	4	37.61258	-89.05041	15.8	1	N000000000	184.1357	8	0	1977
TR 423	HWB5	28	Town Highway Agency	6.9	450	4	37.66188	-89.11865	9.1	3	N000000000	347.4122	8	20	1978
TR 440	HWB17	35	Town Highway Agency	6.7	125	4	37.65393	-88.90741	11.6	3	N000000000	421.6779	8	0	1978
TR 350	HWB5	35	Town Highway Agency	6.8	325	4	37.80757	-88.92887	11.6	3	N000000000	427.9716	8	0	1978
TR 606	HWB28	28	Town Highway Agency	6.6	150	4	37.82655	-88.71146	9.1	3	N000000000	332.3074	8	45	1978
CH 14	HWB5	30	County Highway Agency	9.2	450	4	37.81921	-88.90988	9.8	3	N000000000	496.3032	8	0	1980
CH 1	HWB3	38	County Highway Agency	9.3	650	4	37.81382	-88.94181	15.2	1	N000000000	635.4839	8	0	1979
CH 1	HWB3	14	County Highway Agency	9.3	650	4	37.81196	-88.94182	13.1	1	N000000000	234.1256	8	0	1979
TR 608	HWB17	64	Town Highway Agency	7.5	225	4	37.74989	-88.71471	20.7	3	N000000000	863.136	N	0	1978
TR-573	HWB3	19	Town Highway Agency	7.5	200	4	37.65633	-88.85444	18	1	N000000000	256.2435	8	0	1981
CH 5	HWB17	46	County Highway Agency	8.7	75	4	37.65775	-88.72186	15.2	3	N000000000	719.6396	8	0	1983
TR 140	HWB17	25	Town Highway Agency	7.4	200	4	37.81883	-89.07768	14.9	2	N000000000	332.667	8	0	1981
CH 4	HWB3	19	County Highway Agency	12.2	2600	4	37.79589	-88.98042	18	1	N000000000	416.8228	8	0	1983
TR 548B	HWB17	28	Town Highway Agency	7.4	200	4	37.76642	-88.83666	9.1	3	N000000000	372.587	8	30	1983
TR-167	HWB3	13	Town Highway Agency	7.4	100	4	37.79689	-88.74842	11.9	1	N000000000	172.9868	8	0	1983
TR 143	HWB17	31	Town Highway Agency	7.4	150	4	37.80476	-88.87068	12.2	3	N000000000	412.5071	8	30	1987

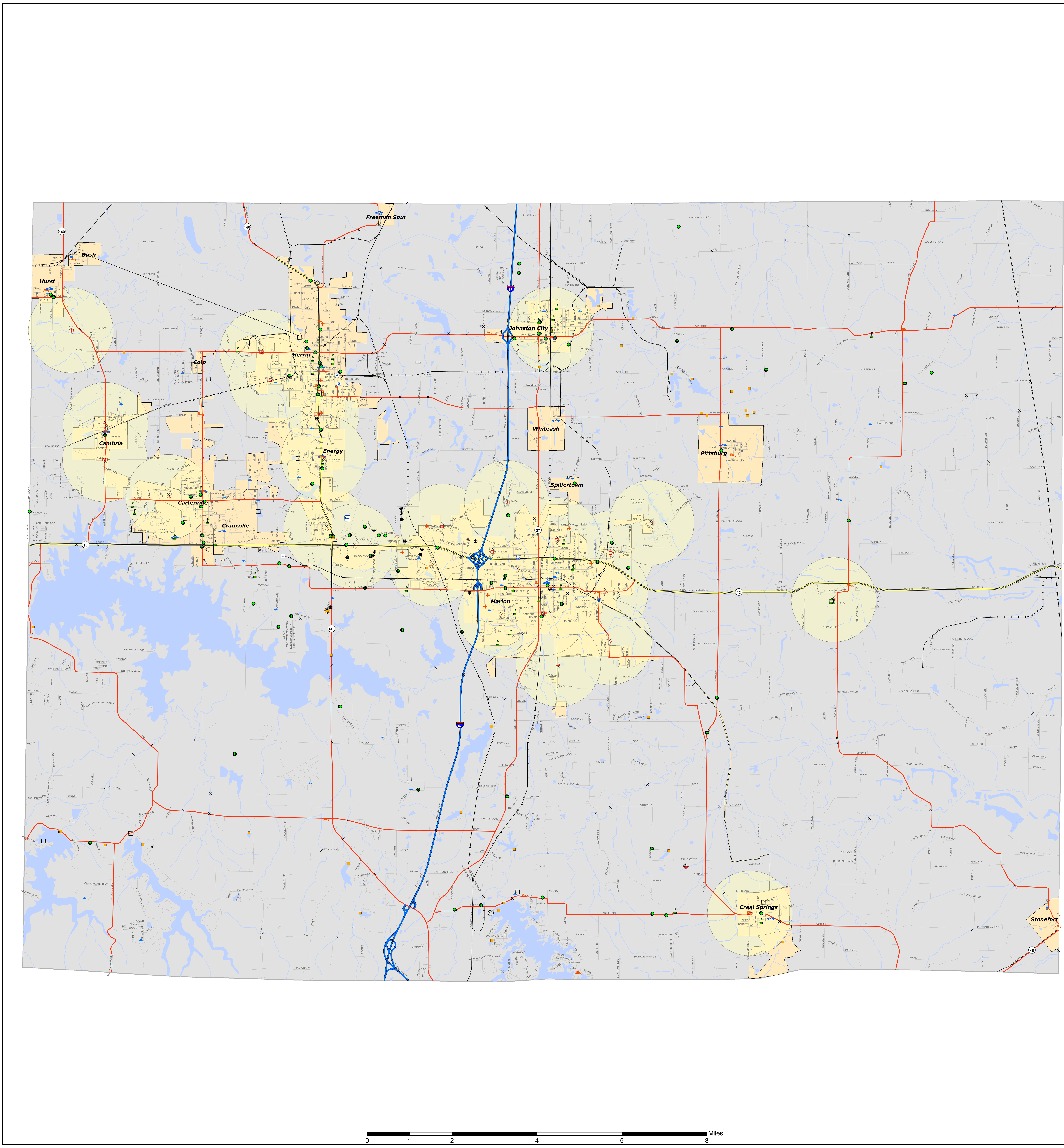
Highway Bridges

Bridge Name	Analysis Class	Bridge Length (m)	Bridge Owner	Bridge Width (m)	Daily Traffic (cars/day)	Flood Structure Foundation Type	Latitude	Longitude	Maximum Span Length (m)	Number of Spans	Pier Type	Replacement Cost ($1,000)	Scour Index	Skew Angle (degrees)	Year Built (Between 1500 and 2100)
TR 612	HWB3	16	Town Highway Agency	7.4	75	4	37.79702	-88.74394	14.9	1	N000000000	212.9069	8	0	1985
TR 548	HWB17	23	Town Highway Agency	7.4	175	4	37.86015	-88.83562	7.6	3	N000000000	306.0536	8	0	1985
TR 202	HWB3	11	Town Highway Agency	7.4	225	4	37.73819	-89.03092	10.4	1	N000000000	146.3735	8	0	1984
FAS 2903-CH 4	HWB3	19	County Highway Agency	12.3	3050	4	37.79585	-88.99251	18	1	N000000000	420.2393	8	20	1987
FAS 2904	HWB3	25	County Highway Agency	13	3050	4	37.62046	-88.96751	23.8	1	N000000000	584.415	8	0	1983
TR 23	HWB17	34	Town Highway Agency	7.4	75	4	37.8399	-89.00097	15.2	3	N000000000	452.4271	8	0	1985
TWP ROAD 601	HWB3	19	Town Highway Agency	7.3	375	4	37.61423	-88.74563	18	1	N000000000	249.4103	8	30	1986
FAS 1887	HWB19	25	County Highway Agency	7.4	200	4	37.62949	-88.72749	9.1	3	N000000000	332.667	8	0	1990
TR 606	HWB3	19	Town Highway Agency	7.4	150	4	37.78726	-88.7116	18	1	N000000000	252.8269	8	20	1985
FAS 876	HWB17	68	County Highway Agency	9.2	1650	4	37.85295	-89.0105	22.6	3	N000000000	1124.9539	8	32	1989
TR 556	HWB3	19	Town Highway Agency	7.4	150	4	37.80634	-88.87285	18	1	N000000000	252.8269	8	10	1987
TR 509	HWB3	19	Town Highway Agency	7.3	19	4	37.64068	-89.02554	18	1	N000000000	249.4103	8	20	1986
TR 604	HWB4	19	Town Highway Agency	7.4	50	4	37.82225	-88.73479	18	1	N000000000	252.8269	8	0	1992
CH 13/S MARKET ST	HWB17	44	County Highway Agency	9.9	2700	4	37.71418	-88.9242	15.8	2	N000000000	783.2959	8	0	1986
FAS 1887-CH 12	HWB17	23	County Highway Agency	8.6	950	4	37.67975	-88.8039	7.6	3	N000000000	355.684	8	0	1988
FAS 903-CH 2	HWB4	19	County Highway Agency	8.6	500	4	37.82725	-88.70987	18	1	N000000000	293.8259	8	15	1991
TWP ROAD 652	HWB17	34	Town Highway Agency	7.4	49	4	37.65227	-88.78994	15.2	3	N000000000	452.4271	8	0	1989
TR 278	HWB19	29	Town Highway Agency	8.6	29	4	37.62516	-88.95574	10.7	3	N000000000	448.4711	8	0	1990
TR 552	HWB19	37	Town Highway Agency	7.4	125	4	37.86235	-88.85436	15.2	3	N000000000	492.3472	8	30	1994
TR 605	HWB4	16	Town Highway Agency	7.4	100	4	37.62658	-88.85246	14.9	1	N000000000	212.9069	8	0	1990
TR 315	HWB4	13	Town Highway Agency	7.4	75	4	37.68824	-88.71969	11.9	1	N000000000	172.9868	8	0	1991
FAS 1900-CH 25	HWB4	19	County Highway Agency	8.6	800	4	37.65327	-89.07371	18	1	N000000000	293.8259	8	0	1991
TR 610	HWB4	19	Town Highway Agency	7.4	39	4	37.79172	-88.72549	18	1	N000000000	252.8269	8	0	1992
TR 432	HWB19	52	Town Highway Agency	7.4	200	4	37.66364	-88.88546	18.1	3	N000000000	691.9474	8	30	1992
FAS 1887-CH 12	HWB19	31	County Highway Agency	8.6	400	4	37.65542	-88.76366	12.2	3	N000000000	479.4001	8	0	1995
TR 245	HWB19	45	Town Highway Agency	7.4	250	4	37.77226	-88.71447	17.1	3	R070100000	598.8006	N	0	1995
TR 43-CHITTYVILLE	HWB4	16	Town Highway Agency	7.4	225	4	37.83255	-89.00422	14.9	1	N000000000	212.9069	8	0	1996
FAS1887-SARAVILLE	HWB19	49	County Highway Agency	8.6	950	4	37.67799	-88.80359	18.3	3	N000000000	757.7615	8	10	1997
TR 35-THORN ROAD	HWB4	16	Town Highway Agency	7.4	125	4	37.84207	-88.78556	14.9	1	N000000000	212.9069	8	0	1997
TR 5-HARMONY CH RO	HWB4	13	Town Highway Agency	7.4	275	4	37.86243	-88.89293	11.9	1	N000000000	172.9868	8	0	1997
TR 29-DEAN ROAD	HWB4	11	Town Highway Agency	7.4	200	4	37.84616	-88.85827	10.4	1	N000000000	146.3735	8	0	1998
TR 29-DEAN ROAD	HWB4	13	Town Highway Agency	7.4	125	4	37.84991	-88.82646	11.9	1	N000000000	172.9868	8	0	1998
TR 606-SOMERS CH R	HWB4	16	Town Highway Agency	7.4	150	4	37.81335	-88.71155	14.9	1	N000000000	212.9069	8	0	1998
CS 7000 OFF FAS 90	HWB28	8	State Highway Agency	7.7	700	4	37.82007	-88.95663	3.7	2	N000000000	110.7691	6	0	1956
FAS 904	HWB28	8	County Highway Agency	11.5	2600	4	37.73392	-88.8553	3.7	2	N000000000	165.4344	6	0	1972
TR 566	HWB28	8	Town Highway Agency	8.3	275	4	37.75271	-88.87762	3.7	2	N000000000	119.4005	6	0	1974
VICKSBURG STREET	HWB28	7	City Highway Agency	9.4	850	4	37.73407	-88.93845	3	2	N000000000	118.3216	6	0	1979
WILDCAT DRIVE	HWB28	8	City Highway Agency	13.3	2350	4	37.71513	-88.93907	3.7	2	N000000000	191.3285	6	0	1980
BOYTON ST	HWB28	8	City Highway Agency	11.2	3400	4	37.72226	-88.92226	3.4	2	N000000000	161.1187	6	45	1967
FUTURE STREET	HWB3	8	City Highway Agency	6.8	800	4	37.72889	-88.92006	7.4	1	N000000000	97.8221	5	0	1900
COLLEGE & GRANITE	HWB3	12	City Highway Agency	15.9	2200	4	37.72978	-88.93144	10.9	1	N000000000	343.0966	8	40	1989
BOYTON ST-FAU 9631	HWB28	13	City Highway Agency	12.2	5400	4	37.72247	-88.9275	12.3	3	N000000000	285.1945	6	15	1997

Highway Bridges

Bridge Name	Analysis Class	Bridge Length (m)	Bridge Owner	Bridge Width (m)	Daily Traffic (cars/day)	Flood Structure Foundation Type	Latitude	Longitude	Maximum Span Length (m)	Number of Spans	Pier Type	Replacement Cost ($1,000)	Scour Index	Skew Angle (degrees)	Year Built (Between 1500 and 2100)
OLD CREAL SPRINGS	HWB19	55	City Highway Agency	9.6	1850	4	37.71608	-88.90375	18.3	3	N000000000	949.4496	8	0	1999
TR 167	HWB28	39	Railroad	5.3	125	4	37.80171	-88.72083	7	7	R064500000	371.6879	N	0	1900
TR 551	HWB28	32	Railroad	6.5	19	4	37.66238	-88.95853	6.7	7	R121900000	374.0256	N	0	1900
TR 557	HWB28	35	Railroad	5.8	225	4	37.69276	-88.95407	6.7	7	R065000000	365.0346	N	15	1900

Appendix G – Map of Critical Facilities



Williamson County Pre-Disaster Mitigation Plan

Critical Facilities Map

Williamson County Emergency Management Agency
8805 EMA Road
Marion, IL 62959

Greater Egypt Regional Planning and Devlopment Commission
608 E College Street
Carbondale, IL 62901

The Polis Center
IUPUI
1200 Waterway Blvd.
Indianapolis, IN 46202

Department of Geology
Southern Illinois University Carbondale
1259 Lincoln Drive
Carbondale, IL 62901

N
W E
S

Legend

- Care Facility
- Emergency Operation Center
- Fire Station
- Police Station
- School
- Siren
- Airport
- Bridge
- Bus Facility
- Dams
- Electric Power Facility
- Communication Tower
- Hazardous Material
- Natural Gas Facility
- Potable Water Facility
- Rail Facility
- Wastewater Facility
- User Defined
- Interstate
- Expressway
- State/County Highway
- Local Road
- Railroad
- City
- Lake
- River
- Approximate Siren Alert Area (1 mile)

Data Sources: Geographic Names Information System (GNIS); HAZUS-MH; U.S. Geologic Survey; Illinois Department of Health; Illinois State Fire Marshall; Environmental Protection Agency (EPA); Illinois Emergency Management Agency (IEMA); Illinois Department of Transportation; Williamson County E911

Appendix H – Top ten flood flows form the USGS Stream Gauge Data

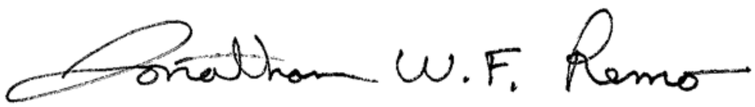
County	Williamson County		Jackson County		Franklin County	
Station	Marion, IL		Murphysboro, IL		Plumfield, IL	
River	Crab Orchard Creek		Big Muddy River		Big Muddy River	
Period of Record	1952-2007		1917-2007		1971-2007	
Latitude	37.7311		37.7481		37.9014	
Longitude	89.8892		89.3467		89.0139	
Rank	**Year**	**Discharge (cfs)**	**Year**	**Discharge (cfs)**	**Year**	**Discharge (cfs)**
1	2002	84.1	1983	3864	1983	1515
2	1983	66.6	1985	3665	1985	1278
3	1985	61.2	2002	3438	2002	1168
4	1996	57.2	1979	3285	1979	1141
5	1979	50.3	1973	2906	1994	1124
6	1993	46.8	1994	2903	1973	1045
7	1973	45.5	1974	2680	1975	1031
8	2006	43.2	1984	2664	1984	1023
9	1997	42.8	1996	2557	1989	974.9
10	1982	40.7	1989	2498	1974	923.4

Appendix I – HAZUS - MH Reports

To the Reviewer:

Upon review of the automatically generated HAZUS earthquake output, a potential HAZUS recording error was discovered within the debris generation report. For all earthquake scenarios modeled, the debris generation report indicated 0.00 millions ton of debris was generated. We believe this to be incorrect. The Polis Center in cooperation with FEMA is currently investigating this potential HAZUS error. The preparers of the hazard analysis (Southern Illinois University and the Polis Center) do not believe this error significantly impacts the conclusions or mitigation planning presented in the Williamson County Pre-Disaster Mitigation Plan. If there are any questions or concerns please do not hesitate to contact me.

Sincerely,



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HAZUS-MH: Flood Event Report

Region Name:	IL_Williamson_FLR_EQL
Flood Scenario:	Williamson_FDG_Analysis
Print Date:	Wednesday, July 16, 2008

Disclaimer:

Totals only reflect data for those census tracts/blocks included in the user's study region.

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

Table of Contents

General Description of the Region

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

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

- Illinois

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

The geographical size of the region is 423 square miles and contains 3,934 census blocks. There are over 25 thousand households in the region and has a total population of 61,296 people (2000 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 33,903 buildings in the region with a total building replacement value (excluding contents) of 4,260 million dollars (2006 dollars). Approximately 92.94% of the buildings (and 71.04% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

HAZUS estimates that there are 33,903 buildings in the region which have an aggregate total replacement value of 4,260 million (2006 dollars). Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	3,025,848	71.0%
Commercial	796,137	18.7%
Industrial	157,974	3.7%
Agricultural	22,265	0.5%
Religion	146,812	3.4%
Government	34,756	0.8%
Education	75,785	1.8%
Total	**4,259,577**	**100.00%**

Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	690,660	63.6%
Commercial	252,187	23.2%
Industrial	87,923	8.1%
Agricultural	7,745	0.7%
Religion	27,400	2.5%
Government	8,383	0.8%
Education	12,415	1.1%
Total	**1,086,713**	**100.00%**

Essential Facility Inventory

For essential facilities, there are 10 hospitals in the region with a total bed capacity of 766 beds. There are 31 schools, 21 fire stations, 15 police stations and 1 emergency operation center.

Flood Scenario Parameters

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

Study Region Name:	IL_Williamson_FLR_EQL
Scenario Name:	Williamson_FDG_Analysis
Return Period Analyzed:	100
Analysis Options Analyzed:	0

Building Damage

General Building Stock Damage

HAZUS estimates that about 152 buildings will be at least moderately damaged. This is over 8% of the total number of buildings in the study case. There are an estimated 18 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the HAZUS Flood technical manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	0	0.00	1	50.00	1	50.00	0	0.00	0	0.00	0	0.00
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	1	100.00	0	0.00	0	0.00	0	0.00
Religion	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	0	0.00	12	8.05	33	22.15	41	27.52	45	30.20	18	12.08
Total	**0**		**13**		**35**		**41**		**45**		**18**	

Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Concrete	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
ManufHousing	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	4	100.00
Masonry	0	0.00	0	0.00	3	33.33	3	33.33	3	33.33	0	0.00
Steel	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Wood	0	0.00	12	8.82	30	22.06	38	27.94	42	30.88	14	10.29

Essential Facility Damage

Before the flood analyzed in this study case, the region had 0 hospital beds available for use. On the day of the scenario flood event, the model estimates that 0 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Fire Stations	21	0	0	0
Hospitals	10	0	0	0
Police Stations	15	0	0	0
Schools	31	0	0	0

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

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

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

Induced Flood Damage

Debris Generation

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

The model estimates that a total of 9,696 tons of debris will be generated. Of the total amount, Finishes comprises 50% of the total, Structure comprises 27% of the total. If the debris tonnage is converted into an estimated number of truckloads, it will require 388 truckloads (@25 tons/truck) to remove the debris generated by the flood.

Social Impact

Shelter Requirements

HAZUS estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. HAZUS also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 1,011 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 1,368 people (out of a total population of 61,296) will seek temporary shelter in public shelters.

Economic Loss

The total economic loss estimated for the flood is 112.76 million dollars, which represents 10.38 % of the total replacement value of the scenario buildings.

Building-Related Losses

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

The total building-related losses were 111.77 million dollars. 1% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 34.50% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	24.43	11.25	5.42	1.47	42.56
	Content	14.40	25.84	17.13	8.26	65.64
	Inventory	0.00	0.50	2.94	0.13	3.57
	Subtotal	**38.84**	**37.59**	**25.49**	**9.86**	**111.77**
Business Interruption						
	Income	0.00	0.22	0.00	0.03	0.26
	Relocation	0.05	0.05	0.01	0.00	0.11
	Rental Income	0.01	0.04	0.00	0.00	0.05
	Wage	0.01	0.16	0.01	0.40	0.57
	Subtotal	**0.07**	**0.48**	**0.02**	**0.42**	**0.99**
ALL	**Total**	**38.90**	**38.07**	**25.51**	**10.29**	**112.76**

Appendix A: County Listing for the Region

Illinois
- Williamson

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
Illinois				
Williamson	61,296	3,025,848	1,233,729	4,259,577
Total	**61,296**	**3,025,848**	**1,233,729**	**4,259,577**
Total Study Region	**61,296**	**3,025,848**	**1,233,729**	**4,259,577**

HAZUS-MH: Earthquake Event Report

Region Name IL_Williamson_EQ_Analysis_wLiquefaction

Earthquake Scenario: IL_Centroid_M55

Print Date: September 12, 2008

Totals only reflect data for those census tracts/blocks included in the user's study region.

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

Table of Contents

General Description of the Region

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

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

Illinois

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

The geographical size of the region is 444.02 square miles and contains 14 census tracts. There are over 25 thousand households in the region and has a total population of 61,296 people (2000 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 25 thousand buildings in the region with a total building replacement value (excluding contents) of 4,259 (millions of dollars). Approximately 98.00 % of the buildings (and 71.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 1,018 and 197 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

HAZUS estimates that there are 25 thousand buildings in the region which have an aggregate total replacement value of 4,259 (millions of dollars) . Appendix B provides a general distribution of the building value by State and County.

In terms of building construction types found in the region, wood frame construction makes up 66% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

HAZUS breaks critical facilities into two (2) groups: essential facilities and high potential loss (HPL) facilities. Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 10 hospitals in the region with a total bed capacity of 766 beds. There are 31 schools, 21 fire stations, 15 police stations and 1 emergency operation facilities. With respect to HPL facilities, there are 31 dams identified within the region. Of these, 3 of the dams are classified as 'high hazard'. The inventory also includes 90 hazardous material sites, 0 military installations and 0 nuclear power plants.

Transportation and Utility Lifeline Inventory

Within HAZUS, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 2 and 3.

The total value of the lifeline inventory is over 1,215.00 (millions of dollars). This inventory includes over 160 kilometers of highways, 212 bridges, 4,591 kilometers of pipes.

Table 2: Transportation System Lifeline Inventory

System	Component	# locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	212	241.70
	Segments	38	591.10
	Tunnels	0	0.00
		Subtotal	**832.70**
Railways	Bridges	6	1.00
	Facilities	4	3.10
	Segments	87	105.60
	Tunnels	0	0.00
		Subtotal	**109.70**
Light Rail	Bridges	0	0.00
	Facilities	0	0.00
	Segments	0	0.00
	Tunnels	0	0.00
		Subtotal	**0.00**
Bus	Facilities	1	1.20
		Subtotal	**1.20**
Ferry	Facilities	0	0.00
		Subtotal	**0.00**
Port	Facilities	0	0.00
		Subtotal	**0.00**
Airport	Facilities	1	6.00
	Runways	2	69.00
		Subtotal	**75.00**
		Total	**1,018.70**

Table 3: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	45.90
	Facilities	36	15.30
	Pipelines	0	0.00
		Subtotal	**61.20**
Waste Water	Distribution Lines	NA	27.50
	Facilities	19	50.50
	Pipelines	0	0.00
		Subtotal	**78.00**
Natural Gas	Distribution Lines	NA	18.40
	Facilities	1	1.20
	Pipelines	0	0.00
		Subtotal	**19.60**
Oil Systems	Facilities	2	1.60
	Pipelines	0	0.00
		Subtotal	**1.60**
Electrical Power	Facilities	1	126.00
		Subtotal	**126.00**
Communication	Facilities	42	3.00
		Subtotal	**3.00**
		Total	**289.40**

Earthquake Scenario

HAZUS uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.

Scenario Name	IL_Centroid_M55
Type of Earthquake	Arbitrary
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	NA
Longitude of Epicenter	-88.94
Latitude of Epicenter	37.74
Earthquake Magnitude	5.50
Depth (Km)	10.00
Rupture Length (Km)	NA
Rupture Orientation (degrees)	NA
Attenuation Function	Toro et al. (1997)

Building Damage

Building Damage

HAZUS estimates that about 3,453 buildings will be at least moderately damaged. This is over 14.00 % of the total number of buildings in the region. There are an estimated 172 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the HAZUS technical manual. Table 4 below summaries the expected damage by general occupancy for the buildings in the region. Table 5 summaries the expected damage by general building type.

Table 4: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	9	0.05	3	0.05	2	0.09	1	0.15	0	0.10
Commercial	241	1.44	87	1.59	65	2.40	21	3.60	5	2.62
Education	12	0.07	3	0.06	3	0.10	1	0.14	0	0.14
Government	20	0.12	6	0.10	4	0.16	1	0.20	0	0.19
Industrial	43	0.26	14	0.26	12	0.44	4	0.69	1	0.41
Other Residential	2,641	15.83	975	17.94	718	26.65	107	18.37	17	9.91
Religion	39	0.23	13	0.25	10	0.36	3	0.55	1	0.47
Single Family	13,676	81.99	4,330	79.73	1,882	69.80	446	76.30	149	86.17
Total	**16,679**		**5,431**		**2,696**		**585**		**173**	

Table 5: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	11,949	71.64	3527	64.94	1,103	40.93	135	23.04	54	31.34
Steel	110	0.66	31	0.56	31	1.13	10	1.63	1	0.61
Concrete	160	0.96	48	0.89	37	1.37	9	1.56	1	0.62
Precast	27	0.16	8	0.14	10	0.36	5	0.78	0	0.24
RM	23	0.14	5	0.09	6	0.23	2	0.42	0	0.11
URM	2,493	14.94	1095	20.16	913	33.88	349	59.60	109	63.28
MH	1,919	11.51	718	13.22	596	22.10	76	12.97	7	3.80
Total	**16,679**		**5,431**		**2,696**		**585**		**173**	

*Note:

RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had 766 hospital beds available for use. On the day of the earthquake, the model estimates that only 17 hospital beds (2.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 47.00% of the beds will be back in service. By 30 days, 77.00% will be operational.

Table 6: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	10	7	0	0
Schools	31	11	0	0
EOCs	1	0	0	0
PoliceStations	15	4	0	0
FireStations	21	5	0	0

Transportation and Utility Lifeline Damage

Table 7 provides damage estimates for the transportation system.

Table 7: Expected Damage to the Transportation Systems

System	Component	Number of Locations				
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	38	0	0	38	38
	Bridges	212	0	0	212	212
	Tunnels	0	0	0	0	0
Railways	Segments	87	0	0	87	87
	Bridges	6	0	0	6	6
	Tunnels	0	0	0	0	0
	Facilities	4	2	0	3	4
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	1	1	0	1	1
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	1	0	0	1	1
	Runways	2	0	0	2	2

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 8-10 provide information on the damage to the utility lifeline systems. Table 8 provides damage to the utility system facilities. Table 9 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, HAZUS performs a simplified system performance analysis. Table 10 provides a summary of the system performance information.

Table 8 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	36	20	0	14	36
Waste Water	19	8	0	3	19
Natural Gas	1	0	0	1	1
Oil Systems	2	2	0	0	0
Electrical Power	1	0	0	0	1
Communication	42	27	0	27	42

Table 9 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water	2,296	20	6
Waste Water	1,377	16	5
Natural Gas	918	17	5
Oil	0	0	0

Table 10: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	25,358	0	0	0	0	0
Electric Power		11,492	6,687	2,328	359	15

Induced Earthquake Damage

Fire Following Earthquake

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. HAZUS uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 2 ignitions that will burn about 0.06 sq. mi 0.01 % of the region's total area.) The model also estimates that the fires will displace about 47 people and burn about 4 (millions of dollars) of building value.

Debris Generation

HAZUS estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0.00 million tons of debris will be generated. Of the total amount, Brick/Wood comprises 61.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Social Impact

Shelter Requirement

HAZUS estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 275 households to be displaced due to the earthquake. Of these, 184 people (out of a total population of 61,296) will seek temporary shelter in public shelters.

Casualties

HAZUS estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 11 provides a summary of the casualties estimated for this earthquake

Table 11: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	0	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	1	0	0	0
	Industrial	0	0	0	0
	Other-Residential	22	4	0	1
	Single Family	69	14	2	3
	Total	**93**	**19**	**2**	**4**
2 PM	Commercial	35	7	1	2
	Commuting	0	0	0	0
	Educational	15	3	0	1
	Hotels	0	0	0	0
	Industrial	3	1	0	0
	Other-Residential	5	1	0	0
	Single Family	17	4	0	1
	Total	**75**	**16**	**2**	**4**
5 PM	Commercial	29	6	1	2
	Commuting	0	1	1	0
	Educational	2	0	0	0
	Hotels	0	0	0	0
	Industrial	2	0	0	0
	Other-Residential	9	2	0	0
	Single Family	28	6	1	1
	Total	**69**	**15**	**3**	**4**

Economic Loss

The total economic loss estimated for the earthquake is 342.23 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

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

The total building-related losses were 308.60 (millions of dollars); 11 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 56 % of the total loss. Table 12 below provides a summary of the losses associated with the building damage.

Table 12: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Loses							
	Wage	0.00	0.94	9.90	0.24	0.82	11.90
	Capital-Related	0.00	0.40	8.50	0.14	0.21	9.24
	Rental	3.35	3.00	5.15	0.09	0.35	11.94
	Relocation	0.39	0.08	0.32	0.01	0.12	0.91
	Subtotal	**3.73**	**4.42**	**23.85**	**0.48**	**1.49**	**33.99**
Capital Stock Loses							
	Structural	17.35	4.60	9.13	1.52	3.06	35.66
	Non_Structural	74.41	27.16	35.36	7.93	10.88	155.73
	Content	32.54	9.18	25.66	6.10	7.68	81.17
	Inventory	0.00	0.00	0.64	1.31	0.10	2.05
	Subtotal	**124.30**	**40.94**	**70.79**	**16.86**	**21.72**	**274.62**
	Total	**128.03**	**45.36**	**94.65**	**17.35**	**23.21**	**308.60**

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, HAZUS computes the direct repair cost for each component only. There are no losses computed by HAZUS for business interruption due to lifeline outages. Tables 13 & 14 provide a detailed breakdown in the expected lifeline losses.

HAZUS estimates the long-term economic impacts to the region for 15 years after the earthquake. The model quantifies this information in terms of income and employment changes within the region. Table 15 presents the results of the region for the given earthquake.

Table 13: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	591.06	$0.02	0.00
	Bridges	241.68	$1.96	0.81
	Tunnels	0.00	$0.00	0.00
	Subtotal	**832.70**	**2.00**	
Railways	Segments	105.61	$0.00	0.00
	Bridges	1.02	$0.00	0.18
	Tunnels	0.00	$0.00	0.00
	Facilities	3.10	$1.14	36.76
	Subtotal	**109.70**	**1.10**	
Light Rail	Segments	0.00	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Bus	Facilities	1.21	$0.54	44.82
	Subtotal	**1.20**	**0.50**	
Ferry	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Port	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Airport	Facilities	6.05	$2.05	33.91
	Runways	69.00	$0.00	0.00
	Subtotal	**75.00**	**2.10**	
	Total	**1018.70**	**5.70**	

Table 14: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.00	$0.00	0.00
	Facilities	15.30	$2.64	17.33
	Distribution Lines	45.90	$0.10	0.23
	Subtotal	**61.16**	**$2.75**	
Waste Water	Pipelines	0.00	$0.00	0.00
	Facilities	50.50	$9.34	18.49
	Distribution Lines	27.50	$0.08	0.30
	Subtotal	**78.05**	**$9.42**	
Natural Gas	Pipelines	0.00	$0.00	0.00
	Facilities	1.20	$0.14	11.68
	Distribution Lines	18.40	$0.09	0.48
	Subtotal	**19.57**	**$0.23**	
Oil Systems	Pipelines	0.00	$0.00	0.00
	Facilities	1.60	$0.56	34.38
	Subtotal	**1.62**	**$0.56**	
Electrical Power	Facilities	126.00	$14.27	11.32
	Subtotal	**126.00**	**$14.27**	
Communication	Facilities	3.00	$0.69	22.97
	Subtotal	**3.02**	**$0.69**	
	Total	**289.42**	**$27.91**	

Table 15. Indirect Economic Impact with outside aid
(Employment as # of people and Income in millions of $)

	LOSS	Total	%
First Year			
	Employment Impact	0	0.00
	Income Impact	(2)	-0.37
Second Year			
	Employment Impact	0	0.00
	Income Impact	(7)	-1.12
Third Year			
	Employment Impact	0	0.00
	Income Impact	(9)	-1.44
Fourth Year			
	Employment Impact	0	0.00
	Income Impact	(9)	-1.44
Fifth Year			
	Employment Impact	0	0.00
	Income Impact	(9)	-1.44
Years 6 to 15			
	Employment Impact	0	0.00
	Income Impact	(9)	-1.44

Appendix A: County Listing for the Region

Williamson,IL

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
Illinois					
	Williamson	61,296	3,025	1,233	4,259
Total State		**61,296**	**3,025**	**1,233**	**4,259**
Total Region		**61,296**	**3,025**	**1,233**	**4,259**

HAZUS-MH: Earthquake Event Report

Region Name	IL_Williamson_EQ_Analysis_wLiquefaction
Earthquake Scenario:	IL_Williamson_WV_M71
Print Date:	September 12, 2008

Totals only reflect data for those census tracts/blocks included in the user's study region.

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

Table of Contents

General Description of the Region

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

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

Illinois

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

The geographical size of the region is 444.02 square miles and contains 14 census tracts. There are over 25 thousand households in the region and has a total population of 61,296 people (2000 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 25 thousand buildings in the region with a total building replacement value (excluding contents) of 4,259 (millions of dollars). Approximately 98.00 % of the buildings (and 71.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 1,018 and 197 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

HAZUS estimates that there are 25 thousand buildings in the region which have an aggregate total replacement value of 4,259 (millions of dollars) . Appendix B provides a general distribution of the building value by State and County.

In terms of building construction types found in the region, wood frame construction makes up 66% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

HAZUS breaks critical facilities into two (2) groups: essential facilities and high potential loss (HPL) facilities. Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 10 hospitals in the region with a total bed capacity of 766 beds. There are 31 schools, 21 fire stations, 15 police stations and 1 emergency operation facilities. With respect to HPL facilities, there are 31 dams identified within the region. Of these, 3 of the dams are classified as 'high hazard'. The inventory also includes 90 hazardous material sites, 0 military installations and 0 nuclear power plants.

Transportation and Utility Lifeline Inventory

Within HAZUS, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 2 and 3.

The total value of the lifeline inventory is over 1,215.00 (millions of dollars). This inventory includes over 160 kilometers of highways, 212 bridges, 4,591 kilometers of pipes.

Table 2: Transportation System Lifeline Inventory

System	Component	# locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	212	241.70
	Segments	38	591.10
	Tunnels	0	0.00
		Subtotal	**832.70**
Railways	Bridges	6	1.00
	Facilities	4	3.10
	Segments	87	105.60
	Tunnels	0	0.00
		Subtotal	**109.70**
Light Rail	Bridges	0	0.00
	Facilities	0	0.00
	Segments	0	0.00
	Tunnels	0	0.00
		Subtotal	**0.00**
Bus	Facilities	1	1.20
		Subtotal	**1.20**
Ferry	Facilities	0	0.00
		Subtotal	**0.00**
Port	Facilities	0	0.00
		Subtotal	**0.00**
Airport	Facilities	1	6.00
	Runways	2	69.00
		Subtotal	**75.00**
		Total	**1,018.70**

Table 3: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	45.90
	Facilities	36	15.30
	Pipelines	0	0.00
		Subtotal	**61.20**
Waste Water	Distribution Lines	NA	27.50
	Facilities	19	50.50
	Pipelines	0	0.00
		Subtotal	**78.00**
Natural Gas	Distribution Lines	NA	18.40
	Facilities	1	1.20
	Pipelines	0	0.00
		Subtotal	**19.60**
Oil Systems	Facilities	2	1.60
	Pipelines	0	0.00
		Subtotal	**1.60**
Electrical Power	Facilities	1	126.00
		Subtotal	**126.00**
Communication	Facilities	42	3.00
		Subtotal	**3.00**
		Total	**289.40**

Earthquake Scenario

HAZUS uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.

Scenario Name	IL_Williamson_WV_M71
Type of Earthquake	User-defined
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	NA
Longitude of Epicenter	NA
Latitude of Epicenter	NA
Earthquake Magnitude	7.10
Depth (Km)	NA
Rupture Length (Km)	NA
Rupture Orientation (degrees)	NA
Attenuation Function	NA

Building Damage

Building Damage

HAZUS estimates that about 13 buildings will be at least moderately damaged. This is over 0.00 % of the total number of buildings in the region. There are an estimated 0 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the HAZUS technical manual. Table 4 below summaries the expected damage by general occupancy for the buildings in the region. Table 5 summaries the expected damage by general building type.

Table 4: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	15	0.06	0	0.07	0	0.10	0	0.00	0	0.00
Commercial	414	1.63	4	1.77	0	2.06	0	0.00	0	0.00
Education	19	0.07	0	0.11	0	0.13	0	0.00	0	0.00
Government	31	0.12	0	0.15	0	0.18	0	0.00	0	0.00
Industrial	73	0.29	1	0.29	0	0.37	0	0.00	0	0.00
Other Residential	4,352	17.18	100	45.85	6	42.98	0	0.00	0	0.00
Religion	65	0.26	1	0.35	0	0.42	0	0.00	0	0.00
Single Family	20,363	80.39	113	51.40	7	53.76	0	0.00	0	0.00
Total	**25,331**		**219**		**14**		**0**		**0**	

Table 5: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	16,756	66.15	12	5.45	0	0.00	0	0.00	0	0.00
Steel	181	0.72	0	0.21	0	0.15	0	0.00	0	0.00
Concrete	254	1.00	1	0.56	0	0.35	0	0.00	0	0.00
Precast	48	0.19	1	0.25	0	0.66	0	0.00	0	0.00
RM	36	0.14	0	0.06	0	0.11	0	0.00	0	0.00
URM	4,839	19.10	111	50.74	8	59.17	0	0.00	0	0.00
MH	3,216	12.70	94	42.72	5	39.57	0	0.00	0	0.00
Total	**25,331**		**219**		**14**		**0**		**0**	

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had 766 hospital beds available for use. On the day of the earthquake, the model estimates that only 383 hospital beds (50.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 97.00% of the beds will be back in service. By 30 days, 100.00% will be operational.

Table 6: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	10	0	0	0
Schools	31	0	0	0
EOCs	1	0	0	0
PoliceStations	15	0	0	0
FireStations	21	0	0	0

Transportation and Utility Lifeline Damage

Table 7 provides damage estimates for the transportation system.

Table 7: Expected Damage to the Transportation Systems

System	Component	Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 % After Day 1	With Functionality > 50 % After Day 7
Highway	Segments	38	0	0	38	38
	Bridges	212	0	0	212	212
	Tunnels	0	0	0	0	0
Railways	Segments	87	0	0	87	87
	Bridges	6	0	0	6	6
	Tunnels	0	0	0	0	0
	Facilities	4	0	0	4	4
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	1	0	0	1	1
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	1	0	0	1	1
	Runways	2	0	0	2	2

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 8-10 provide information on the damage to the utility lifeline systems. Table 8 provides damage to the utility system facilities. Table 9 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, HAZUS performs a simplified system performance analysis. Table 10 provides a summary of the system performance information.

Table 8 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	36	4	0	32	36
Waste Water	19	4	0	15	19
Natural Gas	1	0	0	1	1
Oil Systems	2	0	0	2	2
Electrical Power	1	1	0	0	1
Communication	42	0	0	42	42

Table 9 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water	2,296	21	5
Waste Water	1,377	17	4
Natural Gas	918	18	4
Oil	0	0	0

Table 10: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	25,358	0	0	0	0	0
Electric Power		1,445	951	392	69	2

Induced Earthquake Damage

Fire Following Earthquake

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. HAZUS uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 2 ignitions that will burn about 0.02 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 9 people and burn about 0 (millions of dollars) of building value.

Debris Generation

HAZUS estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0.00 million tons of debris will be generated. Of the total amount, Brick/Wood comprises 93.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Social Impact

Shelter Requirement

HAZUS estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the earthquake. Of these, 0 people (out of a total population of 61,296) will seek temporary shelter in public shelters.

Casualties

HAZUS estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 11 provides a summary of the casualties estimated for this earthquake

Table 11: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	0	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	0	0	0	0
	Other-Residential	0	0	0	0
	Single Family	0	0	0	0
	Total	**0**	**0**	**0**	**0**
2 PM	Commercial	0	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	0	0	0	0
	Other-Residential	0	0	0	0
	Single Family	0	0	0	0
	Total	**0**	**0**	**0**	**0**
5 PM	Commercial	0	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	0	0	0	0
	Other-Residential	0	0	0	0
	Single Family	0	0	0	0
	Total	**0**	**0**	**0**	**0**

Economic Loss

The total economic loss estimated for the earthquake is 69.02 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

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

The total building-related losses were 19.30 (millions of dollars); 1 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 61 % of the total loss. Table 12 below provides a summary of the losses associated with the building damage.

Table 12: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Loses							
	Wage	0.00	0.00	0.03	0.00	0.01	0.04
	Capital-Related	0.00	0.00	0.03	0.00	0.00	0.03
	Rental	0.01	0.01	0.03	0.00	0.00	0.05
	Relocation	0.00	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.01**	**0.01**	**0.08**	**0.00**	**0.01**	**0.12**
Capital Stock Loses							
	Structural	0.08	0.04	0.04	0.01	0.02	0.19
	Non_Structural	5.08	1.72	2.19	0.89	0.81	10.69
	Content	3.92	0.82	1.89	0.68	0.78	8.10
	Inventory	0.00	0.00	0.05	0.14	0.01	0.21
	Subtotal	**9.08**	**2.58**	**4.17**	**1.72**	**1.63**	**19.19**
	Total	**9.10**	**2.60**	**4.26**	**1.72**	**1.64**	**19.30**

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, HAZUS computes the direct repair cost for each component only. There are no losses computed by HAZUS for business interruption due to lifeline outages. Tables 13 & 14 provide a detailed breakdown in the expected lifeline losses.

HAZUS estimates the long-term economic impacts to the region for 15 years after the earthquake. The model quantifies this information in terms of income and employment changes within the region. Table 15 presents the results of the region for the given earthquake.

Table 13: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	591.06	$0.00	0.00
	Bridges	241.68	$0.22	0.09
	Tunnels	0.00	$0.00	0.00
	Subtotal	**832.70**	**0.20**	
Railways	Segments	105.61	$0.00	0.00
	Bridges	1.02	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	3.10	$0.27	8.65
	Subtotal	**109.70**	**0.30**	
Light Rail	Segments	0.00	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Bus	Facilities	1.21	$0.12	10.17
	Subtotal	**1.20**	**0.10**	
Ferry	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Port	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Airport	Facilities	6.05	$0.62	10.18
	Runways	69.00	$0.00	0.00
	Subtotal	**75.00**	**0.60**	
	Total	**1018.70**	**1.20**	

Table 14: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.00	$0.00	0.00
	Facilities	15.30	$2.12	13.92
	Distribution Lines	45.90	$0.09	0.21
	Subtotal	**61.16**	**$2.22**	
Waste Water	Pipelines	0.00	$0.00	0.00
	Facilities	50.50	$4.02	7.96
	Distribution Lines	27.50	$0.07	0.27
	Subtotal	**78.05**	**$4.09**	
Natural Gas	Pipelines	0.00	$0.00	0.00
	Facilities	1.20	$0.05	4.23
	Distribution Lines	18.40	$0.08	0.43
	Subtotal	**19.57**	**$0.13**	
Oil Systems	Pipelines	0.00	$0.00	0.00
	Facilities	1.60	$0.07	4.23
	Subtotal	**1.62**	**$0.07**	
Electrical Power	Facilities	126.00	$41.85	33.22
	Subtotal	**126.00**	**$41.85**	
Communication	Facilities	3.00	$0.13	4.23
	Subtotal	**3.02**	**$0.13**	
	Total	**289.42**	**$48.49**	

Table 15. Indirect Economic Impact with outside aid
(Employment as # of people and Income in millions of $)

	LOSS	Total	%
First Year			
	Employment Impact	0	0.00
	Income Impact	0	-0.02
Second Year			
	Employment Impact	0	0.00
	Income Impact	0	-0.06
Third Year			
	Employment Impact	0	0.00
	Income Impact	(1)	-0.08
Fourth Year			
	Employment Impact	0	0.00
	Income Impact	(1)	-0.08
Fifth Year			
	Employment Impact	0	0.00
	Income Impact	(1)	-0.08
Years 6 to 15			
	Employment Impact	0	0.00
	Income Impact	(1)	-0.08

Appendix A: County Listing for the Region

Williamson,IL

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
Illinois					
	Williamson	61,296	3,025	1,233	4,259
Total State		**61,296**	**3,025**	**1,233**	**4,259**
Total Region		**61,296**	**3,025**	**1,233**	**4,259**

HAZUS-MH: Earthquake Event Report

Region Name	IL_Williamson_EQ_Analysis_wLiquefaction
Earthquake Scenario:	IL_Williamson_NM_NE_M77
Print Date:	September 12, 2008

Totals only reflect data for those census tracts/blocks included in the user's study region.

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

Table of Contents

General Description of the Region

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

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

Illinois

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

The geographical size of the region is 444.02 square miles and contains 14 census tracts. There are over 25 thousand households in the region and has a total population of 61,296 people (2000 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 25 thousand buildings in the region with a total building replacement value (excluding contents) of 4,259 (millions of dollars). Approximately 98.00 % of the buildings (and 71.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 1,018 and 197 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

HAZUS estimates that there are 25 thousand buildings in the region which have an aggregate total replacement value of 4,259 (millions of dollars) . Appendix B provides a general distribution of the building value by State and County.

In terms of building construction types found in the region, wood frame construction makes up 66% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

HAZUS breaks critical facilities into two (2) groups: essential facilities and high potential loss (HPL) facilities. Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 10 hospitals in the region with a total bed capacity of 766 beds. There are 31 schools, 21 fire stations, 15 police stations and 1 emergency operation facilities. With respect to HPL facilities, there are 31 dams identified within the region. Of these, 3 of the dams are classified as 'high hazard'. The inventory also includes 90 hazardous material sites, 0 military installations and 0 nuclear power plants.

Transportation and Utility Lifeline Inventory

Within HAZUS, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 2 and 3.

The total value of the lifeline inventory is over 1,215.00 (millions of dollars). This inventory includes over 160 kilometers of highways, 212 bridges, 4,591 kilometers of pipes.

Table 2: Transportation System Lifeline Inventory

System	Component	# locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	212	241.70
	Segments	38	591.10
	Tunnels	0	0.00
		Subtotal	**832.70**
Railways	Bridges	6	1.00
	Facilities	4	3.10
	Segments	87	105.60
	Tunnels	0	0.00
		Subtotal	**109.70**
Light Rail	Bridges	0	0.00
	Facilities	0	0.00
	Segments	0	0.00
	Tunnels	0	0.00
		Subtotal	**0.00**
Bus	Facilities	1	1.20
		Subtotal	**1.20**
Ferry	Facilities	0	0.00
		Subtotal	**0.00**
Port	Facilities	0	0.00
		Subtotal	**0.00**
Airport	Facilities	1	6.00
	Runways	2	69.00
		Subtotal	**75.00**
		Total	**1,018.70**

Table 3: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	45.90
	Facilities	36	15.30
	Pipelines	0	0.00
		Subtotal	**61.20**
Waste Water	Distribution Lines	NA	27.50
	Facilities	19	50.50
	Pipelines	0	0.00
		Subtotal	**78.00**
Natural Gas	Distribution Lines	NA	18.40
	Facilities	1	1.20
	Pipelines	0	0.00
		Subtotal	**19.60**
Oil Systems	Facilities	2	1.60
	Pipelines	0	0.00
		Subtotal	**1.60**
Electrical Power	Facilities	1	126.00
		Subtotal	**126.00**
Communication	Facilities	42	3.00
		Subtotal	**3.00**
		Total	**289.40**

Earthquake Scenario

HAZUS uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.

Scenario Name	IL_Williamson_NM_NE_M77
Type of Earthquake	User-defined
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	NA
Longitude of Epicenter	NA
Latitude of Epicenter	NA
Earthquake Magnitude	7.70
Depth (Km)	NA
Rupture Length (Km)	NA
Rupture Orientation (degrees)	NA
Attenuation Function	NA

Building Damage

Building Damage

HAZUS estimates that about 1,478 buildings will be at least moderately damaged. This is over 6.00 % of the total number of buildings in the region. There are an estimated 54 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the HAZUS technical manual. Table 4 below summaries the expected damage by general occupancy for the buildings in the region. Table 5 summaries the expected damage by general building type.

Table 4: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	9	0.04	4	0.09	2	0.15	0	0.26	0	0.08
Commercial	260	1.32	110	2.48	44	3.24	3	5.64	1	1.22
Education	12	0.06	5	0.11	2	0.13	0	0.15	0	0.07
Government	20	0.10	8	0.17	3	0.20	0	0.21	0	0.10
Industrial	44	0.22	20	0.44	10	0.70	1	1.27	0	0.22
Other Residential	2,262	11.51	1,399	31.56	768	56.22	21	35.67	8	15.11
Religion	44	0.23	15	0.34	6	0.44	0	0.68	0	0.24
Single Family	17,001	86.51	2,872	64.80	532	38.93	32	56.12	45	82.95
Total	**19,653**		**4,433**		**1,367**		**58**		**54**	

Table 5: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	15,137	77.02	1546	34.88	44	3.23	4	7.78	36	67.35
Steel	102	0.52	47	1.05	31	2.24	3	4.45	0	0.56
Concrete	150	0.76	76	1.72	28	2.03	1	1.57	1	0.98
Precast	27	0.14	12	0.27	9	0.67	1	1.43	0	0.17
RM	25	0.13	7	0.15	4	0.29	0	0.36	0	0.14
URM	2,887	14.69	1513	34.12	517	37.87	30	52.58	11	21.13
MH	1,325	6.74	1233	27.81	734	53.68	18	31.83	5	9.67
Total	**19,653**		**4,433**		**1,367**		**58**		**54**	

*Note:

RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had 766 hospital beds available for use. On the day of the earthquake, the model estimates that only 44 hospital beds (6.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 64.00% of the beds will be back in service. By 30 days, 88.00% will be operational.

Table 6: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	10	0	0	0
Schools	31	0	0	0
EOCs	1	0	0	0
PoliceStations	15	0	0	0
FireStations	21	0	0	0

Transportation and Utility Lifeline Damage

Table 7 provides damage estimates for the transportation system.

Table 7: Expected Damage to the Transportation Systems

System	Component	Number of Locations				
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 % After Day 1	With Functionality > 50 % After Day 7
Highway	Segments	38	0	0	38	38
	Bridges	212	0	0	212	212
	Tunnels	0	0	0	0	0
Railways	Segments	87	0	0	87	87
	Bridges	6	0	0	6	6
	Tunnels	0	0	0	0	0
	Facilities	4	1	0	4	4
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	1	0	0	1	1
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	1	0	0	1	1
	Runways	2	0	0	2	2

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 8-10 provide information on the damage to the utility lifeline systems. Table 8 provides damage to the utility system facilities. Table 9 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, HAZUS performs a simplified system performance analysis. Table 10 provides a summary of the system performance information.

Table 8 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	36	19	0	17	36
Waste Water	19	11	0	0	19
Natural Gas	1	1	0	0	1
Oil Systems	2	2	0	0	2
Electrical Power	1	1	0	0	1
Communication	42	27	0	42	42

Table 9 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water	2,296	21	7
Waste Water	1,377	17	6
Natural Gas	918	18	6
Oil	0	0	0

Table 10: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	25,358	0	0	0	0	0
Electric Power		8,338	4,332	1,223	151	12

Induced Earthquake Damage

Fire Following Earthquake

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. HAZUS uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 2 ignitions that will burn about 0.04 sq. mi 0.01 % of the region's total area.) The model also estimates that the fires will displace about 16 people and burn about 1 (millions of dollars) of building value.

Debris Generation

HAZUS estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0.00 million tons of debris will be generated. Of the total amount, Brick/Wood comprises 69.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Social Impact

Shelter Requirement

HAZUS estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 59 households to be displaced due to the earthquake. Of these, 41 people (out of a total population of 61,296) will seek temporary shelter in public shelters.

Casualties

HAZUS estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 11 provides a summary of the casualties estimated for this earthquake

Table 11: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	0	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	0	0	0	0
	Other-Residential	9	1	0	0
	Single Family	16	3	0	0
	Total	**25**	**4**	**0**	**1**
2 PM	Commercial	8	1	0	0
	Commuting	0	0	0	0
	Educational	4	1	0	0
	Hotels	0	0	0	0
	Industrial	1	0	0	0
	Other-Residential	2	0	0	0
	Single Family	4	1	0	0
	Total	**19**	**3**	**0**	**0**
5 PM	Commercial	7	1	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	1	0	0	0
	Other-Residential	3	0	0	0
	Single Family	6	1	0	0
	Total	**18**	**3**	**0**	**0**

Economic Loss

The total economic loss estimated for the earthquake is 199.56 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

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

The total building-related losses were 146.67 (millions of dollars); 8 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 53 % of the total loss. Table 12 below provides a summary of the losses associated with the building damage.

Table 12: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Loses							
	Wage	0.00	0.15	3.93	0.11	0.37	4.56
	Capital-Related	0.00	0.06	3.37	0.07	0.09	3.59
	Rental	0.79	0.76	2.25	0.04	0.13	3.96
	Relocation	0.09	0.03	0.12	0.00	0.04	0.27
	Subtotal	**0.87**	**1.00**	**9.66**	**0.23**	**0.62**	**12.38**
Capital Stock Loses							
	Structural	4.58	1.98	3.31	0.64	1.11	11.62
	Non_Structural	31.92	13.30	18.30	4.68	5.71	73.91
	Content	19.41	5.19	14.56	3.55	4.86	47.56
	Inventory	0.00	0.00	0.37	0.77	0.07	1.21
	Subtotal	**55.91**	**20.47**	**36.54**	**9.63**	**11.75**	**134.29**
	Total	**56.78**	**21.47**	**46.20**	**9.86**	**12.37**	**146.67**

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, HAZUS computes the direct repair cost for each component only. There are no losses computed by HAZUS for business interruption due to lifeline outages. Tables 13 & 14 provide a detailed breakdown in the expected lifeline losses.

HAZUS estimates the long-term economic impacts to the region for 15 years after the earthquake. The model quantifies this information in terms of income and employment changes within the region. Table 15 presents the results of the region for the given earthquake.

Table 13: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	591.06	$0.15	0.03
	Bridges	241.68	$0.69	0.29
	Tunnels	0.00	$0.00	0.00
	Subtotal	**832.70**	**0.80**	
Railways	Segments	105.61	$0.01	0.01
	Bridges	1.02	$0.00	0.35
	Tunnels	0.00	$0.00	0.00
	Facilities	3.10	$0.92	29.77
	Subtotal	**109.70**	**0.90**	
Light Rail	Segments	0.00	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Bus	Facilities	1.21	$0.36	29.58
	Subtotal	**1.20**	**0.40**	
Ferry	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Port	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Airport	Facilities	6.05	$1.79	29.58
	Runways	69.00	$0.00	0.00
	Subtotal	**75.00**	**1.80**	
	Total	**1018.70**	**3.90**	

Table 14: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.00	$0.00	0.00
	Facilities	15.30	$2.64	17.34
	Distribution Lines	45.90	$0.11	0.25
	Subtotal	**61.16**	**$2.76**	
Waste Water	Pipelines	0.00	$0.00	0.00
	Facilities	50.50	$8.58	16.99
	Distribution Lines	27.50	$0.09	0.33
	Subtotal	**78.05**	**$8.67**	
Natural Gas	Pipelines	0.00	$0.00	0.00
	Facilities	1.20	$0.24	19.92
	Distribution Lines	18.40	$0.10	0.52
	Subtotal	**19.57**	**$0.34**	
Oil Systems	Pipelines	0.00	$0.00	0.00
	Facilities	1.60	$0.32	19.91
	Subtotal	**1.62**	**$0.32**	
Electrical Power	Facilities	126.00	$36.36	28.86
	Subtotal	**126.00**	**$36.36**	
Communication	Facilities	3.00	$0.50	16.58
	Subtotal	**3.02**	**$0.50**	
	Total	**289.42**	**$48.95**	

Table 15. Indirect Economic Impact with outside aid
(Employment as # of people and Income in millions of $)

	LOSS	Total	%
First Year			
	Employment Impact	0	0.00
	Income Impact	(1)	-0.16
Second Year			
	Employment Impact	0	0.00
	Income Impact	(3)	-0.50
Third Year			
	Employment Impact	0	0.00
	Income Impact	(4)	-0.65
Fourth Year			
	Employment Impact	0	0.00
	Income Impact	(4)	-0.65
Fifth Year			
	Employment Impact	0	0.00
	Income Impact	(4)	-0.65
Years 6 to 15			
	Employment Impact	0	0.00
	Income Impact	(4)	-0.65

Appendix A: County Listing for the Region

Williamson,IL

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
Illinois					
	Williamson	61,296	3,025	1,233	4,259
Total State		**61,296**	**3,025**	**1,233**	**4,259**
Total Region		**61,296**	**3,025**	**1,233**	**4,259**