

Gratiot County Hazard Mitigation Plan 2010



Preface

Hazard mitigation is any action taken before, during, or after a disaster to permanently eliminate or reduce the long-term risk to human life and property from natural and technological hazards. It is an essential element of emergency management, along with preparedness, response, and recovery. There is a cyclical relationship between the four phases of emergency management. A community prepares for a disaster, and then responds when it occurs. Following the response, there is a transition into the recovery process, during which mitigation measures are evaluated and adopted. This, in turn, improves the preparedness posture of the community for the next incident, and so on. When successful, mitigation will lessen the impacts to such a degree that succeeding incidents will remain incidents and not become disasters.

Hazard mitigation strives to reduce the impact of hazards on people and property through the coordination of resources, programs, and authorities so that, at the very least, communities do not contribute to the increasing severity of the problem by allowing repairs and reconstruction to be completed in such a way as to simply restore damaged property as quickly as possible to pre-disaster conditions. Such efforts expedite a return to "normalcy"; however, replication of pre-disaster conditions results in a cycle of damage, reconstruction, and damage again.

Hazard mitigation is needed to ensure that such cycles are broken, that post-disaster repairs and reconstruction take place after damages are analyzed, and that sounder, less vulnerable conditions are produced. Through a combination of regulatory, administrative, and engineering approaches, losses can be limited by reducing susceptibility to damage. Hazard mitigation provides the mechanism by which communities and individuals can break the cycle of damage, reconstruction, and damage again.

Recognizing the importance of reducing community vulnerability to natural and technological hazards, Gratiot County is actively addressing the issue through the development and subsequent implementation of this plan. The many benefits to be

realized from this effort - protection of the public health and safety, preservation of essential services, prevention of property damage, and preservation of the local economic base, to mention just a few - will help ensure that Gratiot County remains a vibrant, safe, and enjoyable place in which to live, raise a family, and conduct business.

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Executive Summary

Gratiot County has an active Emergency Management community that continues to implement programs and initiatives that improve the general health, safety and welfare of residents and economic interests. The Gratiot County Hazard Mitigation Plan provides additional hazard mitigation actions that complement and expand on existing efforts. The emphasis of this plan is on reducing the impacts of hazards to residents, government and businesses in the community. This plan serves as the foundation for hazard mitigation activities and actions within Gratiot County.

Although hazards can never be mitigated completely, implementation of recommendations in this plan will reduce loss of life, destruction of property, and economic losses that result from natural, technological and social hazards. The plan provides a path toward continuous, proactive reduction of vulnerability to hazards, which can result in repetitive and oftentimes severe social, economic and physical damage. One important goal for any community is to ultimately obtain a state of full integration of hazard mitigation concepts into the routine governmental and business functions and management practices.

This plan employs a broad perspective in examining multi-hazard mitigation activities and opportunities in Gratiot County. Emphasis is placed on hazards that have resulted in threats to the public health, safety and welfare, as well as the social, economic and physical fabric of the community. The plan addresses such hazards as floods, tornadoes, windstorms, winter storms, wildfires, structural fires, hazardous material incidents, and secondary technological hazards that result from natural hazard events. Each hazard is analyzed from a historical perspective, evaluated for potential risk, and considered for possible mitigative action. The plan also lays out the legal basis for planning and the tools to be used for its implementation.

Purpose

The Gratiot County Hazard Mitigation Plan has been created to protect the health, safety, and economic interests of residents by reducing the impacts of natural, technological and social hazards through hazard mitigation planning, awareness, and implementation. The adoption of this plan enables jurisdictions to remain eligible for a variety of federal hazard mitigation grants for a period of five years. This plan has been written to meet the requirements of the Disaster Mitigation Act 2000.

This plan serves as the foundation for hazard mitigation activities throughout Gratiot County. Implementation of the actions and recommendations in this plan will provide for the continuous, proactive reduction of vulnerability to hazards that often result in repetitive social and economic losses. Reduction of vulnerability promotes an environment in the community that is prepared for potentially severe situations that adversely impact the residents and business functions.

The plan provides an overview of the community, examines potential hazards to the county, identifies goals and objectives concerning hazard mitigation and forwards mitigation strategies that can reduce vulnerability to potential hazards.

Planning Process

The Gratiot County Hazard Mitigation Plan examines multi-hazard mitigation activities and opportunities for the community. Emphasis is placed on hazards that have had a significant impact to Gratiot County in the past and will likely pose the greatest potential threat to the county in the future. The planning process for Gratiot County was guided Mr. Michael Sobocinski, Local Hazard Mitigation Specialist, MSP, utilizing the Local

Hazard Mitigation Planning Workbook (EMD-PUB207), which provided information on completing a successful mitigation plan.

A general information meeting was held in December 2003 at the Gratiot County Commissioners room. The purpose of the meeting was to get the Plan started on the right foot by obtaining input from the stakeholders. The City of St. Louis, Ithaca, and Alma, as well as the Village of Ashley, Breckenridge, Perrinton, and the Townships of Arcada, Bethany, Elba, Emerson, Fulton, Hamilton, Lafayette, Newark, New Haven, North Shade, North Star, Pine River, Seville, Sumner, Washington, and Wheeler officials were invited to this meeting to get their opinions on what they perceived to be priorities as well as what would be expected from them during the planning process. The City of St. Louis, Ithaca, and Alma, as well as the Village of Ashley, Breckenridge, Perrinton, and the Townships of Arcada, Bethany, Elba, Emerson, Fulton, Hamilton, Lafayette, Newark, New Haven, North Shade, North Star, Pine River, Seville, Sumner, Washington, Wheeler, each participated individually during the planning process. This was accomplished by holding both public meetings as well as the compilation of data that was provided for community profile information as well as local hazard information. The local communities were also responsible for collecting historical data that is used for quantifying hazards.

During the earliest stages of the planning process roundtable meetings were held with several stakeholders in the Gratiot County Hazard Mitigation Plan (GCHMP). At these meetings the purpose and benefits of having a local Plan were demonstrated. The general consensus was that a Local Planning Group (LPG) would be the lead for developing the plan, however input from other organizations would be requested to provide a plan that was created and owned by all participating jurisdictions and agencies. After the initial review of the draft document, the LPG was expanded to include content experts from the various municipalities. The LPG was tasked with meeting regularly to facilitate the mitigation planning process through guidance and

direct input into the methods and data used to formulate this plan. Existing plans, studies and reports were utilized in order to create a cohesive plan that meshes with other efforts that have already been put into action.

Contacts were made with neighboring communities, Alma College, Verizon, Consumer Energy, Gratiot Community Hospital, and other entities that were interested in the development of the Hazard Mitigation Plan. The Pipeline group for example was very interested in providing data in hopes of reducing their risk of underground pipeline ruptures through public education.

A public hearing was held in November 2008 to solicit public input. The public was again invited in October 2009 during the formation of the new workgroup. Meeting notices were posted at the county courthouse and advertised in the local newspaper. At an April 2010 Board of Commissioners meeting, the draft plan was discussed and public input was again sought. The public was invited to make comment as well as to enhance the community profile as well as the risk assessment by sharing their personal experiences. Meeting dates were posted and the draft document was placed on the county web site. Appendix C contains meeting minutes and sign-in sheets.

The bulleted list below represents a general outline used to complete the Hazard Mitigation Plan for Gratiot County. Detailed accounts of each process are narrated separately in their corresponding sections.

- Develop community profile.
- Identification of hazards and risks.
- Identification and definition of goals and objectives.
- Identification of alternatives for solving problems.
- Selection of evaluation criteria.
- Selection of alternatives (feasible mitigation strategies).
- Preparation of a draft plan.

- Preparation of the final plan.
- Implementation of the plan.
- Monitoring and periodic revision of the plan.

Chapter 1

Community Profile

Community Profile

The Community Profile is the first step in creating a hazard mitigation plan and contains information and data which provides an in-depth look at the different characteristics of each jurisdiction in Gratiot County. In creating the community profile, various maps were produced using the geographic information system (GIS). These maps are presented in order at the end of the Community Profile section. The community profile contains demographic as well as geographic information. This portion of the plan contains several maps that were created using the Gratiot County GIS information.

Demographic information utilizes the State of Michigan Economic Development Corporation (MEDC), as well as the 2000 census data. An important component of the profile is the inclusion of the Gratiot County Warning System map.

Historic Overview

Gratiot County was established in 1855. Gratiot County is located at the center of Michigan's Lower Peninsula between the industrial areas of the south and the recreational area of the north. Much of the county is rural and dependent upon agriculture, producing dry beans, sugar beets, corn, wheat, oats, poultry, pigs, cattle, and dairy products. The commercial and industrial development in the county is centered primarily along the U.S. 127 corridor around the cities of Ithaca, Alma, and St. Louis. Manufactured products in four Certified Business Parks include aircraft parts, auto parts, and plastics. The county also relies on retail trade and service industries. The Pine and Maple Rivers and three State Game Areas offer recreational opportunities in the county. Alma College is located in the City of Alma. Highway U.S. 127 passes through the county roughly north to south. It is intersected to the north by M-46 and to the south by M-57 for east-west access.

The area occupies approximately 570 square miles and serves a population of 42,285 (Gratiot County and 2000 census). Gratiot Counties 365,081 acres are broken down

into 68.4% crop land, 7.5% forested, 1.4% pasture, .2% water. The remaining 14.9% comprises commercial, industrial, residential and roads. (Greater Gratiot Development, Inc 2010).

While the population density of the area is low compared to the densely populated Southeast Michigan, it is typical of the other counties in the region.

Gratiot County is mainly a rural county that contains a large percentage of agricultural land. There is not a great deal of developmental pressure on the County based on the Gratiot County Permits Office. Most residential development is single family projects unlike the subdivision pressures that are typically seen to the South and East of Gratiot County. This information can be used to influence decisions regarding future development in vulnerable areas. A great deal of this information was already contained in the Gratiot County Master Plan.

The following is a general historical overview of the municipalities located in Gratiot County.

Arcada Township; Includes parts of Alma and St Louis. It includes the airport and the Old Mill Pond behind the Alma dam.

Bethany Township; Bethany was named after a Lutheran Mission in 1874.

Elba Township; First settled in 1856, the village of Ashley was formed in 1887.

Emerson Township; Organized in 1855, Emerson is home to an 1879 circa Methodist Church.

Fulton Township; Fulton is part of the Maple River State Game Area.

Hamilton Township; Hamilton is part of the Gratiot-Saginaw State Game Area.

Lafayette Township; A highly rural, fertile agricultural area.

New Haven Township; Organized in 1863, Joseph Wiles was its first postmaster.

Newark Township; Organized in 1857, it contains a fourth of the city of Ithaca.

North Shade Township; An entirely agricultural area within two miles of four cities.

North Star Township; Originally called Douglas the name was changed to North Star in 1884.

Pine River Township; The area was first settled in 1855 by Joseph Clapp.

Seville Township; Organized in 1856 as a station of the Pere Marquette RR.

Sumner Township; Named for Charles Sumner who settled in 1855.

Washington Township; Began in 1854 with the formation of the village of Pompeii.

Wheeler Township; Incorporated in 1861.

City of Alma; Established in 1872 as a village, Alma is the largest city in Gratiot County with a population of 9,275. It is the home of Alma College, Gratiot Medical Center and the Masonic Pathways Home.

City of Ithaca; Established in 1855, Ithaca has a population of 3,098 with a State Historic Courthouse and is the county seat.

City of St. Louis; Established in 1853. St Louis is the geographic center of Lower Michigan.

Village of Ashley; Established in 1887, Ashley was named after railroad owner John Ashley.

Village of Breckenridge; Incorporated in 1908, is the fourth largest community in Gratiot County.

Village of Perrinton; A substantial Mennonite community molds the character of Perrinton.

Topography

Soils that are commonly associated with water and wetlands have been shown on Map 1, Appendix A. Some of these areas have been drained and farmed since the 1800's. Therefore some soils that would be considered wetlands are highly productive farmlands due to the sophisticated drainage system currently utilized and maintained in Gratiot County. Due to the relatively flat topography and gentle slopes and grades within the county, the current drains and water ways are able to adequately divert surface water from run-off water away properly.

Land Use

While the soils map is very detailed and has been established for quite some time, there hasn't been a great deal of influence from the existing USGS Soils Map into any of the Zoning and Residential Development Planning in the past. The Gratiot County Master Plan makes recommendations regarding the development of specific areas within the county. Several jurisdiction have developed their own zoning authorities, while others use Gratiot County zoning. The Gratiot County Master Plan is currently under review.

Table 1.Zoning Authority

Jurisdiction	Zoning authority
City of Alma	Local
City of Ithaca	Local
City of St Louis	Local
Village of Ashley	Local
Village of Breckenridge	Local
Village of Perrinton	Local
Arcada Township	Local
Bethany Township	Local
Elba Township	County
Emerson Township	Local
Fulton Township	Local
Hamilton Township	County
Lafayette Township	County
New Haven Township	Local
Newark Township	County
North Shade Township	Local
North Star Township	County
Pine River Township	Local
Seville Township	Local
Sumner Township	County
Washington Township	Local
Wheeler Township	Local

The Land Use Map (Map 2, Appendix A) shows the collective uses of public and private land throughout the County. This information can also be used to gauge where future development is likely to occur based on use and its proximity to population centers.

Land use regulatory authority is vested in Michigan’s counties, towns, villages, and cities. However, many development and preservation issues transcend local political boundaries. Gratiot County’s land cover can be divided into five major categories. The first category is agriculture, consisting of Ag processing and confined feedlots, which makes up approximately 19.6 percent of the study area. The second category is commercial which covers 17 percent. The third category is Industrial usage at 13.5 percent. The fourth coverage is residential (which is also the largest) at 43.3 percent. The fifth coverage contains the miscellaneous properties totaling 6.6 percent that do not easily fit into the other four categories.

Table 2.Land Use

Land Use	Acreage	Percentage of Total
Agriculture	71,556	19.6
Commercial	62,064	17
Industrial	54,762	13.5
Residential	158,080	43.3
Miscellaneous	24,095	6.6

Known Hazardous Areas

The Brownfield Redevelopment Authority of the County of Gratiot has documented over 100 Brownfield sites, the vast majority related to underground storage tanks (i.e. fueling/service stations). Some of the more serious sites are in the federal Superfund program and/or encompass relatively large tracts of land.

Table 3. Known Hazards

Name	Known Contaminants	Acres	Location
Velsicol Chemical	PBB, PCB, TCE, p-CBSA, DDT, NAPL	53	St Louis/Pine River
Smith Farm	PBB, DDT, Mercury, radioactive waste, others	40	Bethany Twp/St Louis
Gratiot County Landfill	PBB, DDT, Mercury, others		St Louis
Gratiot County Golf Course	PBB, DDT, Mercury, others	5	St Louis
Total Petroleum	Petroleum fueling byproducts		Alma

Population

From 1990 to 2000 The Gratiot County Multi-Jurisdictional Study Area saw a population increase of 8.5%. This represents an increase in population growth from previous 10-year periods of approximately 3.1% from 1970 to 1980 and approximately -3.7% from 1980 to 1990. This increase is projected to continue at roughly the same rate for the next few years. (Map 3 & 4, Appendix A)

Climate

Gratiot County is located approximately 100 miles from Lake Michigan and 57 miles from the southern end of Saginaw Bay. Because of its location and prevailing

southwesterly winds (mean approximately 10 mph), the county occasionally receives lake effect snows from the west. Lake effect snows, however, have little impact on the winter weather picture in Gratiot County and are more likely to produce clouds rather than precipitation.

The continental type climate of Gratiot County means that the area typically experiences larger temperature ranges than in locations of similar latitude near the Great Lakes, which moderates temperatures locally. The area seldom experiences prolonged periods of either extreme cold in the winter or extreme heat and humidity during the summer. The average possible sunshine is variable with about 28% during December and 70% during July with an annual average of 51%.

Gratiot County has moderately warm summers with an average of 14.3 days annually reaching or exceeding 90°F. There have been occasions with temperatures exceeding 100°F, but this is a rare event in mid-Michigan. The record for temperature maximum is 108°F. Winter weather in the county can bring extreme cold, but the Great Lakes typically modify the coldest arctic air masses. The area averages nine days annually when the minimum temperature reaches zero or below.

Table 4. Temperature

Month	Avg. Max	Avg. Min	Mean	Rec. Max	Rec. Min
January	30	15	22	64	-24
February	31	13	22	66	-29
March	41	23	32	83	-18
April	57	34	45	89	6
May	69	44	56	92	21
June	79	54	66	99	33
July	84	59	71	108	39
August	81	56	68	102	33
September	73	49	61	98	24
October	61	39	50	87	12
November	45	30	37	82	-6
December	33	20	26	64	-14°
All temperatures are in degrees Fahrenheit.					

Data: Weatherbase.com 2010

Table 5.Precipitation

Month	Average Precipitation	Average Snowfall	Average Humidity	Average Dew Point
January	1.9	12.1	78	18
February	1.7	10.5	77	19
March	2.2	7.6	73	24
April	2.6	1.7	67	34
May	3.4	0.3	66	45
June	3.1	-	69	56
July	2.7	-	68	59
August	2.9	-	74	59
September	3.2	-	73	51
October	2.6	0.4	72	42
November	2.5	4	75	31
December	2	9.9	78	21

Data: Weatherbase.com 2010

Transportation

Gratiot County Contains a mixture a roads ranging from rural gravel roads to high volume expressways. The most notable roads would be M46 which lies East and West in the Northern part of the county and Highway M57 which lies East and West in the Southern part of the county. Expressway US127 lays North and South. (Map 5, Appendix A)

The Railroad network has been reduced in size and use just as it has in most other places. However there is still a fair amount of Rail in the County and there continues to be freight trains traveling throughout the County. Rail Lines include Mid-Michigan Railroad, Tuscola, Saginaw and Bay.

Gratiot County is also home to the Gratiot Community Airport. The Airport is located southwest of Alma and is home to several hangars containing private planes. Currently it is a public airport that is not always “manned” at the tower.

Economy

In 2008 manufacturing was the largest sector of Gratiot County employment. It had an average wage per job of \$40,828. Per capita income declined by 4% between 1997 and 2007 (adjusted for inflation).

Table 6. People and Income Overview

People and Income Overview	Value
Population (2008)	42, 245
Growth (%) since 1990	8.4%
Households (2000)	14,501
Labor force (persons) (2008)	19,559
Unemployment rate (2008)	9.5
Per Capita Personal Income (2007)	\$24,599
Median Household Income (2007)	\$41,497
Poverty Rate (2007)	15.2

Data source: Indiana University, 2010

Table 7.Industrial Overview

Industrial Overview	Value
Covered Employment	13,251
Average wage per job	\$33,604
Manufacturing-% all jobs	14.2%
Average wage per job	\$40,828
Transportation and Warehouse-% all jobs	0.7%
Average wage per job	\$38,336
Finance and Insurance-%all jobs	2.7%
Average wage per job	\$40,694

Data source: Indiana University, 2010

Key Properties

There are several notable facilities that offer health, employment, education, or other critical services. The purpose of noting the following organizations is to demonstrate the recognition that damage or failure of these services could be detrimental to the health, safety and/or well being of the Gratiot County residents.

Table 8. Principal Employers

Company Name	Location	Employees	Description
Gratiot Medical Center	Alma	982.5	Hospital
Michigan Correctional Facilities	St. Louis/Bethany Twp.	871.0	Prisons (3)
International Automotive Components	Alma	429.0	Automotive Interior Products
Cartridges Are Us	Ithaca	328.0	Inkjet Cartridge Remanufacturing
Alma College	Alma	294.5	Secondary Education
Alma Public Schools	Alma	289.5	Public Schools
Masonic Pathways	Alma	277.0	Senior Living
Alma Products	Alma	201.0	Automotive Components
Ithaca Public Schools	Ithaca	163.5	Public Schools
Bear Truss & Components	St. Louis	151.5	Wooden Truss Manufacturing
Consumers Energy	Alma	150.0	Utilities
Firstbank - Alma	Alma, Ithaca, St. Louis, Ashley	150.0	Banking
Wal-Mart	Alma/Pine River Twp.	150.0	Discount Retail
St. Louis Public Schools	St. Louis	135.0	Public Schools
Gratiot County Government	Ithaca	133.5	Government
Great Lakes Petroleum	Alma	127.0	Petroleum Product Distribution
Garr Tool Company	Alma/Pine River Twp.	123.0	Carbide Cutting Tool Manufacturing
Contech	Alma	123.0	Automotive Components
Schnepf's Health Care Center	St. Louis	115.0	Senior Living
Fulton Public Schools	Fulton Twp.	113.0	Public Schools
City of Alma	Alma	101.5	Government
Breckenridge Public Schools	Breckenridge	94.0	Public Schools
Merrill Fabricators	Alma	85.0	Metal Fabrication / Manufacturing
Avalon & Tahoe Mfg.	Alma	82.0	Pontoon Boat Manufacturing
Anchor Danly	Ithaca	75.0	Industrial Die Set Manufacturing

Barry Controls	Ithaca	74.0	Anti-Vibration Component Manufacturing
Commercial Bank	Ithaca, Alma, St. Louis, Middleton	67.0	Banking
Aircraft Precision Products	Ithaca	66.0	Aircraft Engine Components
Mid Michigan Industries	Alma	53.5	Contracted Services
Ashley Public Schools	Ashley	50.0	Public Schools
Glen's Markets	Alma	48.0	Grocery/Pharmacy
Warwick Living Center	Alma	48.0	Senior Living
Plasti-Paint	St. Louis	42.0	Paint/Coating Service
Alpha Plastics	St. Louis	38.5	Plastic Profile Extrusion
Gratiot County Road Commission	Ithaca	38.0	Government
Bader & Sons	St. Louis/Bethany Twp.	36.0	Farm Equipment Dealer / Service
Dept. of Human Services	Ithaca	36.0	Government
JER-DEN Plastics	St. Louis	35.0	Rotational Molded Plastics
Michigan Chloride Sales	St. Louis	35.0	Road Chloride Distributing
Dufrene Machinery	Ithaca	34.0	Industrial Equipment Contracting
Powell Fabrication & Manufacturing	St. Louis/Bethany Twp.	33.0	Chlorine Equipment Manufacturing
Craig Frames	Ithaca	30.0	Picture Frame Manufacturing / Distributing, Custom Framing
Crippen Manufacturing	St. Louis	30.0	Agricultural Commodity Handling Equipment
Isabella Bank	Breckenridge, Ithaca	29.5	Banking
Apex Marine	St. Louis	29.0	Pontoon Boat Manufacturing
JCPenney	Alma	27.0	Retail
Alma Tire Service	Alma	27.0	Tire Re-Treading, Service
Ithaca Coatings	Ithaca	26.0	Autophoretic Coating
Janson Equipment	Breckenridge/Wheeler Twp.	23.5	Farm Equipment Dealer / Service
Liquipak	Alma	22.0	Fluid Packet / Packaging

			Manufacturing
ABC Fastener	Alma	21.5	Fastener Distributing
Precision Plastic & Die	Ithaca	20.0	Plastic Component Manufacturing
Medler Electric	Alma	18.0	Electrical Component Distributing
Verizon	Alma	18.0	Telecommunications
Michigan Agricultural Commodities	Breckenridge	18.0	Agricultural Commodity Handling / Marketing
Sparks Pickle Co.	Ithaca/Newark Twp.	17.5	Pickle Processing
Terry Asphalt Materials	Alma	16.0	Asphalt Processing & Distribution
Crop Production Services	St. Louis/Bethany Twp.	15.0	Agricultural Product Distributing
Mid-State Asbestos Removal	St. Louis	15.0	Asbestos abatement
Chemical Bank & Trust	St. Louis, Alma	14.5	Banking
Brink's Machine	Alma/Pine River Twp.	14.0	Tool & Die / Machining
Padnos Central Michigan	Alma	13.0	Recycling
Alma Container	Alma	12.0	Corrugated cardboard container manufacturing
Petticoat Junction	Alma/Pine River Twp.	12.0	Restaurant/Truck Stop
Armour Eckrich Meats	Alma	11.5	Meat distribution
United Producers	St. Louis	11.0	Livestock exchange
Production Machining of Alma	Alma	10.0	Machining
Precision Machine & Manufacturing	Ithaca	10.0	Machining / Fabrication

Source: Greater Gratiot Development, Inc: Full Time Equivalent (FTE) survey of significant firms in Gratiot County, June 2009.

Table 9.Schools

Name	Address	District
Alma High School	1500 N. Pine Ave	Alma Public Schools
Alma Middle School	1700 N. Pine Ave	Alma Public Schools
Hillcrest Elementary	515 E. Elizabeth St	Alma Public Schools
Luce Road Elementary	6265 N. Luce Rd	Alma Public Schools
Pine Avenue Elementary	1025 Pine Ave	Alma Public Schools
Ashley Elementary	104 N. New St	Ashley Public Schools
Ashley Junior/Senior High School	104 N. New St	Ashley Public Schools
Breckenridge Elementary	515 Summit St	Breckenridge Community Schools
Breckenridge High/Middle School	700 Wright St	Breckenridge Community Schools
Fulton Elementary	8060 Ely Hwy	Fulton Schools
Fulton Middle/High School	8060 Ely Hwy	Fulton Schools
Countryside Christian School	4308 S. Luce Rd	Parochial School
Seventh Day Adventist	935 N. Pine River Rd	Parochial School
Ithaca Junior/Senior High School	710 N. Union St	Ithaca Public Schools
North Elementary	201 E. Arcadia St	Ithaca Public Schools
South Elementary	400 Webster St	Ithaca Public Schools
Carrie Knause Elementary	121 I and K St	St Louis Public Schools
Nikkari Elementary	301 N. State St	St Louis Public Schools
St Louis High School	113 E. Saginaw St	St Louis Public Schools
T.S. Nurnberger Middle School	312 N. Union St	St Louis Public Schools
Alma College	614 W. Superior St,	

Table 10. Major facilities

Name	Address	Description
Gratiot County Courthouse	214 E. Center St, Ithaca	Court/Government Offices
Sheriff Department/Jail	226 E. Center St, Ithaca	Government offices/jail
Alma City Hall	525 E. Superior St, Alma	Government offices
St Louis City Hall	108 W. Saginaw St, St Louis	Government offices
Ithaca City Hall	129 W. Emerson St, Ithaca	Government offices
Gratiot County Road Commission	200 Commerce Dr, Ithaca	Government offices
Gratiot Community Airport	3999 W. Seaman Rd, Alma	Airport
Gratiot Community Hospital	300 Warwick, Alma	General Hospital
Gratiot County Fairgrounds	701 W. Lincoln Rd, Alma	Fairgrounds/events
Mid Michigan District Health Department	151 Commerce Drive, Ithaca	Health department
Isabella-Gratiot Regional Education Service District	1131 E. Center St., Ithaca	School Resource

Emergency Warning System

Gratiot County has a combination of manual and automated warning systems. (Map 6, Appendix A). The cities of Alma, St Louis and Ithaca sirens can be controlled from Gratiot County Central Communications and the local fire departments. The other three are activated manually by the Ashley, Breckenridge and Perrington fire departments.

Chapter 2

Risk Assessment

HAZARD IDENTIFICATION

Introduction

This section of the plan involves examining *all hazards* and determining a level of risk/vulnerability that each hazard presents to Gratiot County. The hazard analysis process examines the risk/vulnerability of the community to technological hazards, natural hazards and social hazards. The hazard analysis process used for Gratiot County included identifying hazards faced by each jurisdiction, determining a level of risk/vulnerability to each hazard and providing a summary of each hazard in terms of: 1) Hazard Name/Description; 2) Location of hazard; 3) History of hazard occurrence; 4) Likelihood of future occurrence and 5) Analysis category. The hazard analysis used for this plan is the process suggested in the Local Hazard Mitigation Planning Workbook.

The hazard analysis process provided two separate forums for public involvement. First, a general information presentation was made in December 2003 in the Gratiot County Board of Commissioners Room. In January 2004, a second public hearing was held. In October 2009, the public was again invited to participate in the further development of the plan.

After initial review, the draft plan was set aside as the county focused on other areas. In 2009, a change in administration refocused attention on the plan and a new planning group was formed to continue to upgrade the draft plan. Again assisted by Mike Sobocinski, the 2009 draft plan was reviewed and an outline for improvement was created.

Hazard Identification

The hazard identification process seeks to determine hazards that pose a threat to jurisdictions in the county. A hazard is an event that could occur and result in damage to social, economic or natural resource interests.

The workgroup discussed a variety of measures to accomplish the task of identifying hazards and risks for Gratiot County. The process began by seeking public involvement, which was first initiated at a December 2003 meeting. One of the challenges of creating this plan was ensuring that there was participation from all affected jurisdictions. Participation from each of the different jurisdictions was different. For example team members would meet with some jurisdictions individually to ensure their participation, while others were very helpful and provided a tremendous amount of data, such as St. Louis, who provided hundreds of pages of data from the fire department site assessments of different facilities within the MMCFD jurisdiction. The City also provided data referring to their critical facilities, including locations as well as replacement costs. The City of St. Louis, Ithaca, and Alma, as well as the Village of Ashley, Breckenridge, Perrinton, and the Townships of Arcada, Bethany, Elba, Emerson, Fulton, Hamilton, Lafayette, Newark, New Haven, North Shade, North Star, Pine River, Seville, Sumner, Washington, Wheeler, each participated individually during the planning process. This was accomplished by holding both public meetings as well as the compilation of data that was provided for community profile information as well as local hazard information. The local communities were also responsible for collecting historical data that is used for quantifying hazards (Appendix C).

The following section was created based on a hazards list and definitions offered by the State of Michigan. It was decided that the list would be used in the same order as the State in the Identification portion. The Risk Assessment section will contain the list as it was prioritized by the Planning Group.

Civil Disturbance

A civil disturbance is defined as a public demonstration or gathering (such as a sports event), or an uprising in a prison or other institution, that results in some disruption of essential community functions, or in rioting, looting, arson or other unlawful behavior. Large-scale civil disturbances rarely occur, but when they do they are usually an

offshoot or result of one or more of the following events: 1) labor disputes where there is a high degree of animosity between the two dissenting parties; 2) high profile/controversial judicial proceedings; 3) the implementation of controversial laws or other governmental actions; 4) resource shortages caused by a catastrophic event; 5) disagreements between special interest groups over a particular issue or cause; or 6) a perceived unjust death or injury to a person held in high esteem or regard by a particular segment of society. Areas subject to civil disturbances may encompass large portions of a community. Types of facilities that may be subject to or adversely impacted by civil disturbances may include government buildings, military bases, nuclear power plants, universities, businesses, and critical service facilities such as police and fire stations. Prison uprisings are normally the result of perceived injustice by inmates regarding facility rules, operating procedures and living conditions, or insurrections started by rival groups or gangs within the facility. Civil disturbances (including prison uprisings) often require the involvement of multiple community agencies in responding to and recovering from the incident.

Drought

A prolonged period with precipitation levels well below average, particularly during the planting and growing seasons in agricultural areas. Drought can also adversely affect urban areas, particularly those dependent on reservoirs for their water. Decreased water levels due to insufficient rain can lead to restriction of water uses and amounts. It is difficult to predict or forecast when a drought will begin, and how long it will last. Increased pumping of groundwater and surface irrigation in drought periods can result in land subsidence problems in some areas of the country. Virtually all areas of the country are subject to impact from drought - whether it is reduced agricultural outputs, reduced water supply, land subsidence, power outages caused by excessive energy use, increase in wildfires, reduced marine navigation capabilities, etc. The most vulnerable regions of the country for drought are the arid southwest and the Great Plains.

Earthquakes

An earthquake is a sudden motion or trembling in the earth caused by an abrupt release of slowly accumulating strain which results in ground shaking, surface faulting, or ground failures. Most areas of the United States are subject to earthquakes (including parts of Michigan), and they occur literally thousands of times per year. Most earthquake occurrences are minor tremors and result in little or no damage. However, when moderate or severe earthquakes occur, the results can be devastating in terms of loss of life, property and essential services. One of the most dangerous characteristics of earthquakes is their ability to cause severe and sudden loss. Within 1 to 2 minutes, an earthquake can devastate an area through ground shaking, surface fault ruptures, and ground failures. Most deaths and injuries are not directly caused by the earthquake itself, but rather indirectly through the collapse of structures. Earthquakes are measured by their magnitude and intensity. Magnitude is a measure of the amount of energy released at the epicenter or origin of the event. The Richter Magnitude Scale is commonly used to determine earthquake magnitude. An earthquake of 5.0 is a moderate event, 6.0 characterize a strong event, 7.0 is a major earthquake, and 8.0 is a catastrophic earthquake. Earthquake intensity is the measure of damage done at a given location. In the U.S., the most commonly used intensity scale is the Modified Mercalli Intensity Scale, which describes 12 increasing levels of intensity ranging from imperceptible to catastrophic. Although earthquake risks in Michigan are generally quite low, this often means that structures or utilities (such as gas mains) may not have been built to withstand even the forces of relatively gentle seismic occurrences. Thus, although *risks* may be low, *vulnerabilities* may be moderate or high in such cases. Mitigation strategies in Michigan would mainly focus on evaluating and improving the seismic-resistance of vulnerable utility systems that did not take seismic disturbances into account.

Extreme Temperatures

Prolonged periods of very high or very low temperatures, often accompanied by exacerbating conditions such as high humidity and lack of rain, or heavy snowfall and

high winds. Extreme temperatures, whether it is extreme heat or extreme cold, share a commonality in that they both primarily affect the most vulnerable segments of society such as the elderly, children, impoverished individuals, and people in poor health. The major threats of extreme heat are heatstroke (a major medical emergency), and heat exhaustion. Extreme heat is a more serious problem in urban areas, where the combined effects of high temperature and high humidity are more intense. The major threats of extreme cold are hypothermia (also a major medical emergency) and frostbite. Michigan is subject to both temperature extremes.

Fire Hazards

Scrap Tire

Any instance of uncontrolled burning at scrap tire storage or recycling site. Each year in the U.S., an estimated 250 million vehicle tires have to be disposed of. Michigan alone generates 7.5-9 million scrap tires annually. Many of these scrap tires end up in disposal sites (legal or illegal), some of which may have several hundred thousand tires. Michigan currently has more than 24 million scrap tires at disposal sites scattered across the state. Tire disposal sites can be fire hazards due to the large quantity of “fuel” onsite, coupled with the fact that the shape of a tire allows air to flow into the interior of a tire pile, rendering standard fire fighting practices nearly useless. Flowing burning oil released by the burning tires spreads the fire to adjacent areas. Some scrap tire fires have burned for months, creating acrid smoke and an oily residue which can leach into the soil, creating long-term environmental problems. Scrap tire fires differ from conventional fires in several respects: 1) even relatively small scrap tire fires can require significant resources to control and extinguish; 2) the costs of fire management are often far beyond that which local government can absorb; 3) the environmental consequences of a major tire fire can be significant; and 4) the extreme heat from the fire converts a standard passenger vehicle tire into about

two gallons of oily residue, which can then leach into the soil or migrate to streams.

Structural

Any instance of uncontrolled burning which results in structural damage to residential, commercial, industrial, institutional, or other properties in developed areas. In terms of average annual loss of life and property, structural fires, often referred to as the “universal hazard” because they occur in virtually every community, are by far the biggest hazard facing most communities in Michigan and across the country. Each year in the U.S., fires result in approximately 5,000 deaths and 300,000 injuries requiring medical treatment. According to some sources, structural fires cause more loss of life and property damage than all types of natural disasters combined. Particularly devastating are large urban conflagrations, in which multiple structures are damaged or destroyed. Not surprisingly, Michigan’s structural fire experience mirrors the national figures. The State Fire Marshal estimates that a structural fire occurs in Michigan approximately every 33 minutes. Of accidental fires, 46.3% occur through neglect or carelessness with items such as candles, cigarettes, pipes, cigars, matches, lighters, and fireworks, especially when used by children. Another main cause is from improper maintenance or use of items such as clothes dryers, holiday decorations (Christmas trees, decorations, extension cords/plugs), and cooking equipment and ingredients. Most of these causes could probably be prevented through awareness and education of their dangers and proper means of use.

Wildfires

A wildfire is an uncontrolled fire in forested areas, grass or brush lands. The most immediate dangers from wildfires are the destruction of homes and timber, wildlife, and injury or loss of life to persons who live in the affected area or who are using recreational facilities in the area. Long-term effects can be numerous

and include scorched and barren land, soil erosion, landslides/mudflows, water sedimentation, and loss of recreational opportunities. Forests cover approximately one-half of Michigan's total land base. As a result, much of the state is vulnerable to wildfire. In addition, development in and around forests and grasslands is increasing rapidly, making public safety a primary consideration in wildfire mitigation and suppression efforts.

Flooding Hazards

Dam Failures

The collapse or failure of an impoundment resulting in downstream flooding. Dam failures can result in loss of life and extensive property or natural resource damage for miles downstream from the dam. Failure of a dam does not only occur during flood events, which may cause overtopping of a dam. Failure can also result from poor operation, lack of maintenance and repair, and vandalism. Such failures can be catastrophic because they occur unexpectedly, with no time for evacuation. Michigan has experienced over 260 dam failures in its history. The worst recorded dam failure in U.S. history occurred in Johnstown, Pennsylvania, in 1889. More than 2,200 people were killed when a dam upstream from Johnstown failed; sending a huge wall of water downstream which completely inundated the town.

Riverine and Urban Flooding

Riverine flooding is defined as the periodic occurrence of over bank flows of rivers and streams resulting in partial or complete inundation of the adjacent floodplain. Riverine floods are generally caused by prolonged, intense rainfall, snowmelt, ice jams, dam failures, or any combination of these factors. Such over bank flows are natural events that may occur on a regular basis. Riverine floods occur on river systems whose tributaries may drain large geographic areas and encompass many independent river basins. Floods on large river systems may

continue for several days. Many areas of Michigan are subject to riverine flooding. Flash flooding differs from riverine flooding in extent and duration. Flash floods are brief, heavy flows on small streams or in normally dry creeks. Flash floods are normally the result of locally-intense thunderstorms resulting in significant rainfall. Flash floods are typically characterized by high velocity water, often carrying large amounts of debris. Urban flooding involves the overflow of storm sewer systems and is usually caused by inadequate drainage following heavy rainfall or rapid snowmelt.

Hazardous Materials Incident

Fixed Site

An uncontrolled release of hazardous materials from a fixed site, capable of posing a risk to health, safety, property and the environment. Hazardous materials are present in quantities of concern in business and industry, agriculture, universities, hospitals, utilities, and other community facilities. Hazardous materials are materials or substances which, because of their chemical, physical, or biological nature, pose a potential threat to life, health, property and the environment if they are released. Examples of hazardous materials include corrosives, explosives, flammable materials, radioactive materials, poisons, oxidizers, and dangerous gases. Hazardous materials are highly regulated by the government to reduce risk to the general public, property and the environment. Despite precautions taken to ensure careful handling during the manufacture, transport, storage, use and disposal of these materials, accidental releases are bound to occur. Areas at most risk are within a 1-5 mile radius of identified hazardous material sites. Many communities have detailed plans and procedures in place for responding to incidents at these sites, but releases can still cause severe harm to people, property and the environment if proper mitigative action is not taken in a timely manner. The world's deadliest hazardous material incident occurred on December 4, 1984 in Bhopal, India. A

cloud of methyl isocyanate gas, an extremely toxic chemical, escaped from a Union Carbide chemical plant, killing 2,500 people and injuring tens of thousands more. This incident triggered historical Federal legislation intended to minimize such disasters from occurring in the United States.

Transportation Incidents

An uncontrolled release of hazardous materials during transport, capable of posing a risk to health, safety, property or the environment. All modes of transportation, highway, railroad, seaway, airway, and pipeline, are carrying thousands of hazardous material shipments on a daily basis through local communities. A transportation accident involving any one of those hazardous material shipments could cause a local emergency affecting many people. The U.S. Department of Transportation regulates the transportation and shipping of over 18,000 different materials. Areas most at risk are within a 1-5 mile radius of a major transportation route along which hazardous material shipments move. All areas in Michigan are potentially vulnerable to a hazardous material transportation incident, although the heavily urbanized and industrialized areas in southern Michigan are particularly vulnerable due to the highly-concentrated population, the large number of transportation routes that criss-cross the area, and the large number of hazardous material shipments that occur on a daily basis.

Infrastructure Failures

A failure of critical public or private utility infrastructure resulting in a temporary loss of essential functions and/or services. Such interruptions could last for periods of a few minutes to several days or more. Public and private utility infrastructure provides essential life supporting services such as electric power, heating and air conditioning, water, sewage disposal and treatment, storm drainage, communications, and transportation. When one or more of these independent, yet inter-related systems fails

due to disaster or other cause, even for a short period of time, it can have devastating consequences. For example, when power is lost during periods of extreme heat or cold, people can literally die in their homes. When the water or wastewater treatment systems in a community are inoperable, serious public health problems arise that must be addressed immediately to prevent outbreaks of disease. When storm drainage systems fail due to damage or an overload of capacity, serious flooding can occur. All of these situations can lead to disastrous public health and safety consequences if immediate mitigative steps are not taken. Typically, it is the most vulnerable segments of society, the elderly, children, ill or frail individuals, etc., that are most heavily impacted by an infrastructure failure. If the failure involves more than one system, or is large enough in scope and magnitude, whole communities and even regions can be negatively impacted.

Nuclear Attack

Any hostile attack against the United States, using nuclear weapons, which results in destruction of military and/or civilian targets. All areas of the United States are conceivably subject to the threat of nuclear attack. However, the strategic importance of military bases, population centers and certain types of industries place these areas at greater risk than others. The nature of the nuclear attack threat against the U.S. has changed dramatically with the end of the “Cold War” and the conversion of previous adversaries to more democratic forms of government. Even so, the threat still exists for a nuclear attack against this country. Despite the dismantling of thousands of nuclear warheads aimed at U.S. targets, there still exist in the world a large number of nuclear weapons capable of destroying multiple locations simultaneously. In addition, controls on nuclear weapons and weapons components are sporadic at best in the former Soviet Union, and the number of countries capable of developing nuclear weapons continues to grow despite the ratification of an international nuclear nonproliferation treaty. The possibility of nuclear materials being used in a terrorist attack is also becoming uncomfortably plausible. It appears that the threat of nuclear attack will continue to be a hazard in this country for some time in the future. At this point, attack planning guidance

prepared by the Federal government in the late 1980s still provides the best basis for a population protection strategy for Michigan. That guidance has identified 25 potential target areas in Michigan and 4 in Ohio and Indiana that would impact Michigan communities, classified as follows: 1) commercial power plants; 2) chemical facilities; 3) counterforce military installations; 4) other military bases; 5) military support industries; 6) refineries; and 7) political targets. For each of these target areas, detailed plans have been developed for evacuating and sheltering the impacted population, protecting critical resources, and resuming vital governmental functions in the post attack environment. While it is possible for a device to be detonated accidentally in unintended or seemingly random locations due to error, technological device limitations, or mission failure, it is still a good assumption that the locations that are at the greatest risk of attack are those that are most vital to our country's operation. In addition to specific ground target areas, some high-altitude detonation sites may be selected with the intention of maximizing the disruptive effects of a nuclear weapon's electromagnetic pulse on our country's electronic infrastructure.

Nuclear Power Plant Accidents

An actual or potential release of radioactive material at a commercial nuclear power plant or other nuclear facility, in sufficient quantity to constitute a threat to the health and safety of the off-site population. Such an occurrence, though not probable, could affect the short and long-term health and safety of the public living near the nuclear power plant, and cause long-term environmental contamination around the plant. As a result, the construction and operation of nuclear power plants are closely monitored and regulated by the Federal government. Communities with a nuclear power plant must develop detailed plans for responding to and recovering from such an incident, focusing on the 10 mile Emergency Planning Zone (EPZ) around the plant, and a 50 mile Secondary EPZ that exists to prevent the introduction of radioactive contamination into the food chain. Michigan has 3 active commercial nuclear power plants and 1 inactive one, in addition to 4 small nuclear testing/research facilities located at 3 state universities and within the City of Midland.

Oil and Gas Well Accidents

An uncontrolled release of oil or gas from wells, or its poisonous by-product, hydrogen sulfide (see the section on Petroleum and Natural Gas Pipeline Accidents for more information). Oil and gas are produced from fields in over 60 counties in the Lower Peninsula. Over 40,000 wells have been drilled in these counties. Of that total, approximately one-half (20,000) have produced oil or gas. Over 1.1 billion barrels of crude oil and 3.6 trillion cubic feet of gas have been withdrawn from these wells.

Petroleum and Natural Gas Pipeline Accidents

An uncontrolled release of petroleum or natural gas, or the poisonous by-product hydrogen sulfide, from a pipeline. As a major petroleum and natural gas consumer in the United States, vast quantities of petroleum and natural gas are transported through and stored in Michigan. Though often overlooked as a threat because much of the petroleum and gas infrastructure in the state is located underground, petroleum and gas pipelines can leak, erupt or explode, causing property damage, environmental contamination, injuries and loss of life. In addition to these hazards, there is also a danger of hydrogen sulfide release. Hydrogen sulfide is an extremely poisonous gas that is also explosive when mixed with air temperatures of 500 degrees or above. In addition to pipelines, these dangers can be found around oil and gas wells, pipeline terminals, storage facilities, and transportation facilities where the gas or oil has high sulfur content.

Public Health Emergencies

A widespread and/or severe epidemic, incident of contamination, or other situation that presents a danger to or otherwise negatively impacts the general health and well-being of the public. Public health emergencies can take many forms: 1) disease epidemics; 2) large-scale incidents of food or water contamination; 3) extended periods without

adequate water and sewer services; 4) harmful exposure to chemical, radiological or biological agents; or 5) large-scale infestations of disease carrying insects or rodents. Public health emergencies can occur as primary events by themselves, or they may be secondary events another disaster or emergency, such as a flood, tornado, or hazardous material incident. The common characteristic of most public health emergencies is that they adversely impact, or have the potential to adversely impact, a large number of people. Public health emergencies can be statewide, regional, or localized in scope and magnitude.

Sabotage/Terrorism

An intentional, unlawful use of force or violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political, social, or religious objectives. Sabotage/terrorism can take many forms or have many vehicles for delivery, including: 1) bombings; 2) assassinations; 3) organized extortion; 4) use of nuclear, chemical, radiological, and biological weapons; 5) information warfare; 6) ethnic/religious/gender intimidation (hate crimes); 7) state and local militia groups that advocate overthrowing the U.S. Government; 8) eco-extremism, designed to destroy or disrupt specific research or resource-related activities; and 9) widespread and organized narcotics smuggling and distribution organizations. Because sabotage/terrorism objectives are so widely varied, so too are the potential targets of such actions. Virtually any public facility or infrastructure, or place of public assembly, can be considered a potential target. In addition, certain types of businesses engaged in controversial activities are also potential targets, as are large computer systems operated by government agencies, banks, financial institutions, large businesses, health care facilities, and colleges/universities. One of the first acts of domestic sabotage/terrorism ever carried out occurred in Michigan on May 18, 1927, in Bath. A disgruntled taxpayer and farmer detonated 1,000 pounds of explosives under the newly constructed Bath Consolidated School, killing 38 students and 3 teachers and injuring 58 others. The perpetrator then blew himself up, along with the school superintendent. As tragic as that event was, it could have been worse were it not for the fact that half of

the explosives failed to detonate as planned, which certainly would have killed many more students and teachers. Concentrated activities to prevent terrorist activities have become even more vital with the passage of time and in the wake of the 9/11 events of destruction in New York City and Washington, D.C. Many more resources may be anticipated to be mobilized to prevent terrorist activities in the near future.

Subsidence

Depressions, cracks, and sinkholes in the ground surface, which can threaten people and property. Subsidence depressions, which normally occur over many days to a few years, may damage structures with low strain tolerances, such as dams, nuclear reactors, and utility infrastructure. The sudden collapse of the ground surface to form sinkholes poses an immediate threat to life and property. Such ground movements may continue for several days, weeks, months or even years, until the walls stabilize. The population most at risk would be in areas where industrial or residential development has occurred above active or abandoned mines where underground cavities are present near the surface, as well as areas where an extensive amount of groundwater has been withdrawn.

Thunderstorm Hazards

Hail

A condition where atmospheric water particles from thunderstorms form into rounded or irregular lumps of ice that falls to the earth. Hail is a product of the strong thunderstorms that frequently move across the state. As one of these thunderstorms passes over, hail usually falls near the center of the storm, along with the heaviest rain. Sometimes, however, strong winds occurring at high altitudes in the thunderstorm can blow the hailstones away from the storm center, causing an unexpected hazard at places that otherwise might not appear threatened. Hailstones range in size from a pea to a golf ball, and hailstones larger than baseballs are possible in the most severe thunderstorms. Hail is

formed when strong updrafts in thunderstorms provide a medium for the growth and accumulation of ice crystals. A hailstone continues to grow until updrafts can no longer hold its weight aloft. Hailstones then descend to the ground, battering crops, denting autos, and injuring wildlife and people. Hail causes \$1 billion in damage nationwide each year. Large hail is a characteristic of severe thunderstorms, and it can be associated with the occurrence of a tornado.

Lightning

The discharge of electricity from within a thunderstorm. Although lightning is often perceived as a minor hazard, it damages many structures and kills and injures more people in the U.S. per year, on average, than tornadoes or hurricanes. Many lightning deaths and injuries could be avoided if people would have more respect for the threat that lightning presents. Michigan ranks second in the nation in both lightning-related deaths and lightning-related injuries.

Severe Wind

According to the National Weather Service, winds 58 miles per hour or greater are classified as a windstorm. Windstorms are a fairly common occurrence in many areas in Michigan. Along the Great Lakes shoreline, strong winds occur with regularity, and gusts of over 74 miles per hour (hurricane velocity) do occasionally occur in conjunction with a storm system. Severe windstorms can cause damage to homes and businesses, power lines, trees and agricultural crops, and may require temporary sheltering of individuals without power for extended periods of time. Windstorms occur in all areas of Michigan, although more often along the lakeshore and in central and southern lower Michigan.

Tornadoes

A violently rotating column of air extending downward to the ground from a cumulonimbus cloud. The funnel cloud associated with a tornado may have winds up to 300 miles per hour and an interior air pressure that is 10-20 percent below that of the surrounding atmosphere. The typical length of a tornado path is approximately 16 miles, but tracks much longer than that, some even up to 200 miles, have been reported. Tornado path widths are generally less than one-quarter mile wide, but can be over one mile wide. Historically, tornadoes have resulted in the greatest loss of life of any natural hazard, with the mean national annual death toll being 111 persons. Property damage from tornadoes is in the hundreds of millions of dollars every year. Michigan averages approximately 18 tornadoes per year, most occurring in the southern Lower Peninsula.

Air, Land and Water Transportation Accidents

A crash or accident involving an air, land or water-based commercial passenger carrier resulting in death or serious injury. Vulnerable areas would include: 1) communities with, or near, an airport offering commercial passenger service; 2) communities with railroad tracks on which commercial rail passenger service is provided; 3) communities in which commercial intercity passenger bus or local transit bus service is provided; 4) communities with school bus service; and 5) communities in which commercial marine passenger ferry service is provided. A serious accident involving any of the above modes of passenger transportation could result in a mass casualty incident, requiring immediate life-saving community response. In addition, a marine transportation accident would require a water rescue operation, possibly under dangerous conditions on the Great Lakes. In terms of commercial passenger transportation service, Michigan has approximately: 1) 19 airports that offer commercial air passenger service; 2) 130 certified intercity passenger bus carriers providing service to 220 communities; 3) 72 local bus transit systems serving 85 million

passengers; 4) 19 marine passenger ferry services; and 5) 3 intercity rail passenger routes operating on 568 miles of track, along 3 corridors, serving 22 communities.

Railroads are a critical service to Gratiot County. They serve as the means of transporting many goods to and from Gratiot County. It should be recognized that with Gratiot County being so heavily proficient in the Agricultural Commodities that loss of ability to ship our mature crops for sale could have a devastating impact on our local economy.

Severe Winter Weather Hazards

Ice and Sleet Storms

A storm that generates sufficient quantities of ice or sleet to result in hazardous conditions and/or property damage. Sleet storms differ from ice storms in that sleet is similar to hail (only smaller) and can be easily identified as frozen rain drops (ice pellets) and bounce when hitting the ground or other objects. Sleet does not stick to trees and wires, but sleet in sufficient depth does cause hazardous driving conditions. Ice storms are the result of cold rain that freezes on contact with the surface, coating the ground, trees, buildings, overhead wires, etc. with ice, sometimes causing extensive damage. When electric lines are downed, inconveniences are felt in households and economic loss and disruption of essential services is often experienced in affected communities. Michigan has had numerous damaging ice storms over the past few decades.

Snowstorms

A period of rapid accumulation of snow often accompanied by high winds, cold temperatures, and low visibility. Blizzards are the most dramatic and perilous of all snowstorms, characterized by low temperatures and strong winds bearing enormous amounts of snow. Most of the snow accompanying a blizzard is in the form of fine, powdery particles of snow which are wind-blown in such great quantities that, at times, visibility is reduced to only a few feet. Blizzards have the

potential to result in property damage and loss of life. Just the cost of clearing the snow can be enormous. As a result of being surrounded by the Great Lakes, Michigan experiences large differences in snowfall in relatively short distances. The annual mean accumulation ranges from 30 to 170 inches of snow. The highest accumulations are in the northern and western parts of the Upper Peninsula. Because of the "lake effect" on weather patterns, snowstorms tend to be more severe if prevailing winds bring them in from over one of the Great Lakes.

Risk Assessment

The next step in the hazard analysis process involved compiling the Hazard Mitigation Survey worksheets to assess risk. Risk is considered the likelihood or probability that an event, such as a hazard, will occur. The information returned in the worksheets provided insight into what hazards the community perceived as having the greatest impact to social and economic interests in the area. An initial cursory assessment using GIS, surveys and the community profile was conducted to determine general vulnerabilities and risk in the county. The general assessment was completed purely through qualitative means related to information found in surveys, the community profile and maps produced from GIS. The general assessment, however, did provide a good starting point to understanding the hazard rating process and the many variables that impact risk and vulnerability. Prioritization was based on real experiences with past incidents as well as knowledge of weaknesses that were contained within their local community. There was a fair amount of discussion regarding incidents that have never, and probably will never happen. Part of that discussion was in the context of some participants wanting to define an all encompassing list of hazards while others were more interested in sticking with historical incidents that have shown strengths as well as weaknesses in the County. After meeting with community leaders and the public regarding the list and completion of the subsequent survey sheets by the individual jurisdictions, a more accurate assembly of information was possible.

Each hazard was then rated based on the significance of impact it presented to the community. An integral part of this task involved completing a Hazard Rating Table (Appendix B), which provided for the quantitative and qualitative measures used to determine the overall impact/significance of each hazard. Much of the information used to complete the Hazard Rating table was derived from the Hazard Identification Surveys (Appendix B).

Initially, the workgroup, assisted by Mike Sobocinski, selected six hazard aspects to be used in determining the overall impact/significance of each hazard. Each member of the workgroup completed a hazard aspect prioritization work session in which the importance of each hazard aspect was considered. After completing the hazard aspect prioritization work session (Appendix B, Hazard Aspects Table) the results were combined and ranked based on the average value of importance (0 – 4, with 4 being the most important). The following hazard aspects were the six selected for use in Gratiot County:

- 1) Likely casualties
- 2) Likelihood of occurrence
- 3) Ability to mitigate
- 4) Property damage potential
- 5) Predictability
- 6) Environmental impact

The workgroup then assigned weights to the six selected hazard aspects. Weights were assigned based on the aforementioned ranking of each hazard aspect and quantitative assessments made by the workgroup. Each hazard was subsequently assigned a significance value (1 – 5, with 5 being the most significant) for each of the six hazard aspects. The value for each hazard was determined whenever possible by qualitative means, but there were specific hazard aspects, or elements of hazard aspects (e.g. Predictability) that required a qualitative assessment. See Appendix B for the Hazard Rating Table and details concerning the qualitative and quantitative measures used to assign values to individual hazards.

The results of the Hazard Rating Table provided a value that was assigned to each hazard, with the value being representative of the significance of a particular hazard. This final value is highly dependent on the information collected through hazard surveys and information derived in the workgroup meetings. The values determined for each

hazard were used to assess the overall significance of impact for the corresponding hazard. Finally, hazards were assigned a ranking based on the significance of impact values derived from the hazard rating table. A survey was prepared and sent to twenty-eight people in the community. The group received fifteen responses, which verified the original results of the group's risk assessment. To view the final Risk Assessment Summary Table, which combines elements of the hazard identification survey and hazard rating process, see Appendix B.

The following priorities were identified.

Top Priority

Winter weather hazards

Tornados

Severe winds

High Priority

Fires-major structural

Lightning/thunderstorms

Flood/river

Medium Priority

Transportation accidents/major

Hazardous materials accidents/fixed site

Hazardous materials accidents/transportation

Public health emergency

Well contamination

Pipeline accident-oil, gas, etc

Infrastructure failures

Extreme temperatures

Terrorism/sabotage

Fires/wildfire

Flood/dam failure

Oil/gas well accidents

Civil unrest

Drought

This list contains the community concerns. It was created based upon discussions held with local jurisdictions during public hearings and planning meetings. The following sections of the plan give more detail about how this list of priorities was created.

HAZARD ANALYSIS

The following organizational framework will be used to examine each hazard, its descriptive characteristics and the potential risk(s) to Gratiot County. All hazards identified in the previous section are examined here.

Hazard name: The name of the hazard as displayed on the Hazard Rating Table.

Geographic location of hazard: Locations in Gratiot County most likely to be affected by the hazard.

Hazard description and previous occurrences: A description of the hazard and data reflecting previous incidents.

Likelihood of future occurrences: The likelihood of future occurrences categorized as; high (once or more per year), moderate (once every 10 years) and low (once every 100 years).

Analysis type: One of three types of analysis was performed for each hazard.

- **None** describes hazards that are not applicable to the area or are beyond the scope of the plan to consider.
- **Standard** is performed for those hazards that have occurred in the past and are likely to occur again, but are considered moderate priority for mitigation.
- **Advanced** considers hazards that meet the standard criteria and are considered high priority for mitigation actions.

Hazard name: Winter weather hazards

Geographic location of hazard: Anywhere in Gratiot County.

Hazard description and previous occurrence: There are three main types of severe winter hazards: ice storms, sleet storms and snow storms. Ice storms are cold rains that freeze on contact with the surface. Ice coats the ground, trees, buildings and overhead wires. The weight of the ice can cause significant damage to trees, overhead wires and even buildings. The ice on the ground can make driving treacherous if not impossible. If wires are downed, the power outage can disrupt businesses and create housing problems for residents. Sleet is identified as frozen rain drops. Sleet is similar to hail but smaller in size. Sleet does not stick to trees and wires. Sleet can cause dangerous driving conditions. Snow storms are defined as a period of rapid accumulation of snow often accompanied by high winds, cold temperatures, and low visibility. Blizzards are most dramatic and perilous of all snowstorms, characterized by low temperatures and strong winds bearing an enormous amount of snow. Snowstorms can cause property damage and loss of life. The cost of clearing snow after storms can be enormous.

Generally the entire county is affected when severe winter weather strikes Gratiot County. Severe winter weather can make basic transportation needs difficult and dangerous. While the entire county is affected, life in the rural sections of the county is most difficult. While snow can impede travel anywhere, remote sections of the county may have longer waiting times for the roads to be cleared. Transportation to the grocery store, the doctor or hospital can become very difficult or even impossible during a snowstorm. Severe winter weather can force businesses to temporary close and can reduce the demand for commercial services.

During the typical winter in Gratiot County, 25-30 snow events are likely to occur (according to assessments for road crews and budgets). Most of the winter weather events are minor inconveniences for area residents. Some of the winter weather events are large enough to have significant impacts on the community and its economy. Based upon records of 52 significant events during the 16 year period from 1993 to 2009, there

is an average of 3.25 significant winter weather events per year in the county. These larger recent events include:

Date	Event
01/21/1993	Ice Storm
01/28/1993	Heavy snow
02/22/1993	Lake effect snow
01/27/1994	Heavy snow/Freezing rain
02/07/1994	Snow
12/06/1994	Heavy Snow
01/20/1995	Heavy Snow
02/03/1995	Heavy Snow
02/11/1995	Heavy Snow
02/25/1995	Heavy Snow
02/27/1995	Ice Storm
03/06/1995	Ice Storm
12/13/1995	Ice Storm
10/26/1997	Heavy Snow
12/24/1997	Winter Storm
01/04/1998	Freezing Rain
01/07/1998	Winter Storm
01/22/1998	Winter storm
01/29/1998	Heavy Snow
03/09/1998	Winter Storm
03/13/1998	Heavy Snow
01/02-04/1999	Blizzard, Heavy Snow
02/05/1999	Freezing Rain
03/04/1999	Snow
03/08/1999	Snow
01/03/2000	Winter Storm
01/12/2000	Winter Storm
12/11/2000	Winter Storm
12/16/2000	Heavy Snow
01/10/2001	Snow Emergency
1/30-31/2002	Winter Storm
2/1/2002	Winter Storm
2/25-26/2002	Winter Storm
03/02-03/2002	Winter Storm
03/04-05/2003	Winter Storm
04/03-04/2003	Ice Storm
01/14/2004	Heavy Snow

01/27/2004	Winter Storm
11/24/2004	Winter Storm
02/13/2005	Ice Storm
02/20/2005	Heavy Snow
02/27/2005	Heavy Snow
12/08/2005	Heavy Snow
01/20/2006	Heavy Snow
02/16/2006	Ice Storm
12/01/2006	Heavy Snow and Ice
03/01/2007	Winter Storm
12/15/2007	Heavy Snow
01/21/2008	Winter Storm
02/01/2008	Winter Storm
02/06/2008	Winter Storm
11/30/2008	Winter Storm
12/08/2008	Winter Storm

Likelihood of future occurrence: High Gratiot County has a very high probably of severe winter weather in the future. The entire county is at risk for severe winter weather. The roads and streets are likely to be snow covered. Transportation during major winter events is likely to be difficult. Ice storms and some snow storms are likely to cause power outages

Analysis type: Advanced

Hazard name: Tornados

Geographic location of hazard: Anywhere in Gratiot County.

Hazard description and previous occurrence: A tornado is a violently rotating column of air extending downward to the ground from a cumulonimbus cloud. The funnel cloud associated with a tornado may have winds up to 300 miles per hour and an interior air pressure that is 10-20 percent below that of the surrounding atmosphere. The typical length of a tornado path is approximately 16 miles, but tracks can be much longer, even up to 200 miles long. Tornado path widths are generally less than one-quarter mile wide but some have been reported at over one mile wide. Historically, tornados have resulted

in the greatest loss of life of any natural hazard. The mean national annual death toll is 111 persons killed by tornado per year. Michigan averages approximately 18 tornados per year. Most tornados in Michigan occur in the southern Lower Peninsula.

Tornados can strike anywhere in Gratiot County. Tornado season is generally from May through September but a tornado can form in any month (although less likely to do so).

Tornados are not a common occurrence in Gratiot County, but they do happen. When tornados hit Gratiot County, they can cause extensive damage. A history of major tornados in Gratiot County includes:

Date	Event	Location	Damage
10/15/1954	Tornado	Ashley	\$25,000
05/12/1956	Tornado	Emerson Twp.	\$250,000
06/26/1956	Tornado	Perrinton	\$250,000
04/11/1965	4 Tornados	Emerson Twp., Pine River Twp., Sumner Twp.	\$325,000
06/11/1968	Tornado	Washington Twp.	\$25,000
06/15/1982	Tornado	Newark Twp.	\$250,000
05/21/2001	Tornado	Elwell (Seville Twp.), Ithaca	Property: \$175,000 Crop: \$25,000
05/25/2006	Tornado	Beebe (Emerson Twp.), Breckenridge	\$2,000

Likelihood of future occurrence: Moderate Tornados are likely to strike Gratiot County again in the future. Based upon the 8 known events during the 59 year period from 1950 to 2009, there is an average of 0.14 tornado events per year in the county. The entire county remains at risk for tornados. Future tornados have the potential to destroy whatever lies in their paths. Fortunately, in Gratiot County, tornados tend to have only short paths on the ground. When tornados do strike the ground, they cause extensive damage. Tornados remain a real threat to human life in Gratiot County.

Analysis type: Advanced

Hazard name: Severe Winds

Geographic location of hazard: Anywhere in Gratiot County.

Hazard description and previous occurrence: According to the National Weather Service, winds 58 miles per hour (50 knots) or greater are classified as severe. Windstorms are a common occurrence in many areas in Michigan including Gratiot County. Severe winds can cause damage to homes businesses, power lines, trees and agricultural crops. Windstorms can cause widespread power outages which can require temporary sheltering of people. Coupled with freezing rain, windstorms can cause significant damage.

In Gratiot County, windstorms can strike anywhere. The more densely populated areas such as Alma, Ashley, Breckenridge, Ithaca, and Saint Louis are more likely to suffer damage to power lines and property damage from falling trees. The rural areas are more likely to suffer from crop damage.

Windstorms are a common occurrence in Gratiot County. Some of the more notable windstorms include:

Date	Event	Location	Damage
10/23/1955	Thunderstorm Winds	Ithaca	
08/08/1962	Thunderstorm Winds	NW Alma	
04/05/1967	Thunderstorm Winds	NW Alma	
06/01/1969	Thunderstorm Winds	Montcalm: Bloomer Twp.	
05/19/1971	Thunderstorm Winds	North Star Twp, Ithaca, Montcalm: Bloomer Twp.	
07/14/1974	Thunderstorm Winds	Ithaca	
04/18/1975	Thunderstorm Winds	Montcalm: Bloomer Twp.	
6/18/1976	Thunderstorm Winds	SW Ithaca	
09/19/1977	Thunderstorm Winds	Wheeler Twp.	

07/20/1980	Thunderstorm Winds	Elba Twp.	
07/28/1983	Thunderstorm Winds	Newark Twp.	
07/29/1983	Thunderstorm Winds	Newark Twp.	
04/13/1984	Thunderstorm Winds	Newark Twp.	
09/02/1984	Thunderstorm Winds	Arcada Twp.	
05/26/1985	Thunderstorm Winds	Newark Twp.	
06/09/1985	Thunderstorm Winds	Fulton Twp.	
07/09/1987	Thunderstorm Winds	Fulton Twp.	
07/20/1987	Thunderstorm Winds	Ithaca	
07/25/1988	Thunderstorm Winds	Sumner Twp.	
08/03/1988	Thunderstorm Winds	Alma	
08/05/1988	Thunderstorm Winds	Ashley	
08/16/1988	Thunderstorm Winds	NE Ithaca	
08/17/1988	Thunderstorm Winds	Breckenridge	
05/25/1989	Thunderstorm Winds	NE Ithaca	
09/06/1990	Thunderstorm Winds	St. Louis	
06/15/1991	Thunderstorm Winds	St. Louis	
07/07/1991	Thunderstorm Winds	SW Ithaca	
06/17/1992	Thunderstorm Winds	W. Seville Twp., Alma	
07/05/1994	Thunderstorm Winds	Breckenridge, St. Louis, Ithaca	Downed power lines
07/13/1995	Thunderstorm Winds	Alma, Ashley, Breckenridge, Ithaca, St. Louis	Downed power lines, tree damage
08/07/1996	Thunderstorm Winds	Sickles (Hamilton Twp.)	Trees downed

04/06/1997	Straight Line Winds	Alma, Saint Louis	
07/02/1997	Thunderstorm Winds	Middleton (Fulton Twp.)	\$2,500
07/02/1997	Thunderstorm Winds	Sumner (Sumner Twp.)	\$5,000
07/14/1997	Thunderstorm Winds	Saint Louis	\$10,000
05/29/1998	Thunderstorm Winds	Ithaca	\$20,000
05/31/1998	Straight Line Winds	Alma, Saint Louis,	\$610,000 in public damage. Wide spread power outage.
11/10/1998	High winds	Entire County	
02/11/1999	Thunderstorm Winds	Alma	\$10,000
05/17/1999	Thunderstorm Winds	Entire County	\$50,000
06/13/1999	Thunderstorm Winds	Sumner (Sumner Twp.)	\$10,000
07/23/1999	Thunderstorm Winds	Ithaca, Perrinton	\$10,000
07/24/1999	Thunderstorm Winds	Perrinton, Ithaca	Power outages and downed trees
06/01/2000	Thunderstorm Winds	Bannister (Elba Twp.)	\$25,000
06/14/2000	Thunderstorm Winds	Alma	\$25,000
07/14/2000	Thunderstorm Winds	Sumner (Sumner Twp.)	\$20,000
08/02/2000	Thunderstorm Winds	Sumner (Sumner Twp.)	\$20,000
08/22/2000	Thunderstorm Winds	Elba Township	\$20,000
04/12/2001	High Wind Warnings		
07/29/2001	Thunderstorm Winds	Riverdale (Montcalm: Richland Twp.) Bannister (Elba Twp.)	Property: \$50,000 Crop: \$10,000 \$25,000
09/07/2001	Thunderstorm Winds	Alma	\$15,000
10/24/2001	Thunderstorm Winds	Ashley	\$25,000

03/09/2002	High winds	Entire County	
08/13/2002	Thunderstorm Winds	NE Ithaca	\$5,000
11/12-13/2003	High Wind Warning		
06/09/2004	Thunderstorm Winds	Ashley	\$10,000
08/25/2004	Thunderstorm Winds	Ithaca	\$10,000
10/30/2004	High Winds	Entire County	
06/05/2005	Thunderstorm Winds	Ithaca	\$10,000
06/14/2005	Thunderstorm Winds	Alma	\$5,000
06/28/2005	Thunderstorm Winds	Bethany Twp., St. Louis, Breckenridge	
05/30/2006	Thunderstorm Winds	Alma	\$5,000
07/17/2006	Thunderstorm Winds	Ithaca	Property: \$20,000 Crops: \$5,000
07/09/2007	Thunderstorm Winds	Breckenridge	\$20,000
07/18/2007	Thunderstorm Winds	Pine River Twp.	\$75,000
08/22/2007	Thunderstorm Winds	Ithaca	\$20,000
08/29/2007	Thunderstorm Winds	Bannister (Elba Twp.)	\$20,000
09/25/2007	Thunderstorm Winds	North Shade Twp.	\$5,000
09/27/2007	Thunderstorm Winds	North Shade Twp.	
10/18/2007	Thunderstorm Winds	Seville Twp.	\$5,000
12/23/2007	Thunderstorm Winds	Alma, Ithaca, St. Louis	\$15,000
06/27/2008	Thunderstorm Winds	North Shade Township	
12/28/2008	High Winds		
06/08/2009	Thunderstorm Winds	North Star Township	

Likelihood of future occurrence: High Severe windstorms have been common in the past and are likely to continue to be a hazard in the future. Based upon the detailed 10

year period from August 1999 to July 2009 (31 events), there is an annual expected frequency of 3.1 severe wind events per year. As in the past, the entire county is at risk, and the larger financial impact is likely to be in the more densely developed areas. These areas include: Alma, Ashley, Breckenridge, Ithaca, Perrinton, and Saint Louis. As is common for most communities, trees and power lines are most at-risk from severe wind damage. While homes and other structures can be damaged by strong winds, most of the damage is caused by falling trees and downed power lines. In several cases, homes and businesses have been without power for several days, which can result in loss to businesses and occasional needs for temporary housing. When trees are blown down, roads can be blocked and anything in their way can be damaged.

Analysis type: Advanced

Hazard name: Fire-Major structural

Geographic location of hazard: Primarily in built up areas such as Alma, St Louis, Ithaca, Breckenridge, Ashley, and Perrinton. Ithaca and Alma have suffered severe losses during fire events in the past.

Hazard description and previous occurrence: Significant structural fires have occurred in the population centers of St. Louis, Ithaca, and Alma. These and other fire-related events are considered to be hazardous because of their impacts on medical facilities and emergency medical responders and the need for food- and shelter-support services. The older housing stock in many areas in Gratiot County has not yet been updated with sprinklers and is vulnerable to fire. Of particular concern in Gratiot County and the municipalities with respect to fire involve the ability of the local fire and emergency response personnel to respond to fires that occur in the smaller towns and rural areas where fire suppression equipment and water is not readily available. There are typically several fires each year in Gratiot County. Most fires are limited to structure fires and small to medium brush fires. Structure fires are typically residential and range from minor damage to total losses depending on the situation. Historically there have been some large fires in urban centers and downtown business districts.

These fires have been very destructive and due to the use of common walls fire spread can be catastrophic in these areas.

There have been some substantial losses in the last 20 years in the commercial and industrial sector in Gratiot County:

- Terry Materials (petroleum by products) substantial damage in Alma.
- Bear Truss (wood truss manufacturer) near total loss in Alma.
- Ithaca Downtown (downtown business district, Feb 1987) substantial loss

Historic losses have been limited in the recent past due to the increasing efficiency in the various fire departments.

Likelihood of future occurrence: Moderate Urban areas have the potential for greater damage to infrastructure, loss of life, and strain on existing healthcare facilities and emergency responders due to their higher structural and population densities. The population centers in Gratiot County are mainly concentrated in the cities of Ithaca, St. Louis, and Alma. There are also several villages, including Breckenridge, Ashley, Bannister, Pompeii, Perrinton and Middleton that contain a substantial population base as well as infrastructure. Structural fires typically impact individual or closely clustered buildings.

Analysis type: Standard

Name of Hazard: Lightning/thunderstorm

Geographic location of hazard: Anywhere in Gratiot County. Lightning strikes will be isolated incidents with little effect on major populations or properties.

Hazard description and previous occurrence: See data reference Severe Winds.

Likelihood of future occurrences: Moderate.

Analysis type: Standard.

Name of Hazard: Flooding

Geographic location of hazard: Anywhere in Gratiot County due to heavy rainfall or melting snow, however, primarily in areas identified by FEMA as floodplains, in particular the cities of Alma, St Louis and Ithaca. Alma has identified their wastewater system as a potential problem for flooding due to the combination of sanitary and storm sewer lines flowing into the facility. Ithaca has identified a potential hazard area in the development property adjacent to US 127 (Appendix A, Map 12). FIRM information is currently in the review process.

Hazard description and previous occurrence: Flooding of land adjoining the normal course of a stream or river has been a natural occurrence since the beginning of time. If these floodplain areas were left in their natural state, flooding would not cause significant damage. Development has increased the potential for serious flooding because rainfall that used to soak into the ground or take several days to reach a river or stream via a natural drainage basin, now quickly runs off streets, parking lots, and rooftops, and through man-made channels and pipes.

Floods can damage or destroy public and private property, disable utilities, make roads and bridges impassable, destroy crops and agricultural lands, cause disruption to emergency services, and result in fatalities. People may be stranded in their homes for several days without power or heat, or they may be unable to reach their homes at all. Long-term collateral dangers include the outbreak of disease, widespread animal death, and broken sewer lines causing water supply pollution, downed power lines, broken gas lines, fires, and the release of hazardous materials.

Flood-prone areas are found throughout the state, as every lake, river, stream, and county drain has a floodplain. The type of development that exists within the floodplain will determine whether or not flooding will cause damage. The Michigan Department of

Environmental Quality estimates that about 6% of Michigan's land is flood-prone, which includes about 200,000 buildings in those areas.

Floodplain areas are identified based on hydrological and topographical surveys, as well as, soil studies and land cover characteristics. The result of this research is a statistical model that indicates an area vulnerable to the "100 year" flood. The term "100 year flood" is often used incorrectly and can be misleading. It does not refer to a certain flood that will occur once every 100 years. Rather, it is the flood elevation that has a 1% chance of being equaled or exceeded each year. So actually, the 100-year flood could occur more than once in a relatively short period of time. It is also referred to as the "1% annual chance flood".

The 100-year flood, which is the standard used by most federal and state agencies, is used by the National Flood Insurance Program (NFIP) as the standard for floodplain management and to determine the need for flood insurance. The 100-year flood has only a 1% chance of occurring in any given year, but structures located in the flood hazard area have a 26% chance of suffering flood damage during the term of a 30-year mortgage. This means a home in the mapped flood hazard area is five times more likely to be damaged by flood than to have a major fire.

The southern half of the Lower Peninsula contains the areas with the most flood damage potential. The primary flooding sources include the Great Lakes and connecting waters (Detroit River, St. Clair River, and St. Mary's River), thousands of miles of rivers and streams, and hundreds of inland lakes. Michigan is divided into 63 major watersheds. All of these watersheds experience flooding, although the following watersheds have experienced the most extensive flooding problems or have significant damage potential: 1) Clinton River; 2) Ecorse River; 3) Grand River; 4) Huron River; 5) Kalamazoo River; 6) Muskegon River; 7) Saginaw River; 8) Rifle River; 9) River Raisin; 10) Rouge River; 11) St. Joseph River; and 12) Whitefish River. The flooding is not restricted to the main branches of these rivers. Most Riverine flooding occurs in early spring and is the result of excessive rainfall and/or the combination of rainfall and snowmelt. Ice jams also cause flooding in winter and early spring.

Severe thunderstorms may cause flooding during the summer or fall, although these are normally localized and have more impact on watercourses with smaller drainage areas. Oftentimes, flooding may not necessarily be directly attributable to a river, stream or lake overflowing its banks. Rather, it may simply be a combination of excessive rainfall and/or snowmelt, saturated ground, and inadequate drainage. With no place to go, the water will find the lowest elevations-areas that are often not in a floodplain. This type of flooding is becoming increasingly prevalent in Michigan, as development outstrips the ability of the drainage infrastructure to properly carry and disburse the water flow. Flooding also occurs due to the combined storm and sanitary sewers that cannot handle the tremendous flow of water that often accompanies storm events. Typically, the result is water backing up into basements, which damages mechanical systems and can create serious public health and safety concerns.

From 1975-1999, Michigan experienced seven flood disasters that resulted in both a Presidential Major Disaster declaration and a Governor’s Disaster Declaration, and seven that resulted in a Governor’s Disaster Declaration. Combined, these flood disasters have caused hundreds of millions of dollars damage to homes, businesses, personal property, and agriculture. See the Table below for a list of recent Gratiot County floods.

Date	Event	Location	Damage
9-1975	Rainstorm/high winds & flooding		Presidential Declaration
9-1986	Flooding		Gubernatorial Declaration
02/21/1997	Flash Flooding	Ithaca	
05/18/2000	Flooding	Countywide	Property \$100,000 Crop \$ 50,000
02/09/2001	Flooding	Countywide	Property \$400,000

02/24/2001	Flooding	Countywide	Property \$190,000
05/15/2001	Flooding	Countywide	Property \$75,000 Crop \$75,000
05/28/2001	Flash Flooding-road closings		
05/21/2004	Flooding	Statewide	Property \$25,000,000 Crop \$4,600.00
04/01/2008	Heavy Rain	Breckenridge	

An important step in hazard mitigation involves knowing where the county's floodplains are located. This information could impact future land use decisions. Also, homes or businesses already located in the floodplain may need to take action to mitigate the effects of the next flood on their property. Floodplain maps for Gratiot County were developed by the NFIP. These maps, called Flood Insurance Rate Maps (FIRM), indicate which areas are vulnerable to flood hazards. These maps were then digitized using computer software, and can now be used as an overlay on county maps that show where property is located.

For years the only areas that had their floodplains mapped were the Cities of Alma and St. Louis. In addition to these two communities, the only other community that is participating in the NFIP is Fulton Township, which the 1999 analysis determined had "No Special Flood Hazard Area". Gratiot County has had no repetitive loss properties. Since 2007, FEMA, through its contractor, has been developing floodplain maps for all of Gratiot County. These maps have been developed and are currently going through the local comment and review process. A review of the proposed maps disclosed they are very similar to the current maps. The main difference is the inclusion of flood maps along ditches, drains and creeks. For the most part, these do not present a problem. Some development property in Alma and Ithaca has been identified as in the floodplain. Floodplain maps are available for review in the county drain commissioner's office. It is projected that these maps will take effect in late 2010 or sometime in 2011.

Likelihood of future occurrence: High. During the past ten years, Gratiot County has had seven flood events. Based on these numbers, the county can expect 0.7 flood events per year.

Analysis type: Advanced

Name of Hazard: Transportation Accident-Major

Geographic location of hazard: Primarily on US 127, M 46, M 57 and the T&SB railroad line. See Appendix A, Map 5.

Hazard description and previous occurrence: Gratiot County is serviced by three principal roads, two state highways, M-57 and M-46 both running west to east and by US-127 running south to north. County roads cover most of Gratiot County, generally following section lines. The balance of the road inventory is provided by the municipalities and villages. Gratiot County's roads and highways are serviced by approximately 138 bridges and overpasses plus those owned by the Michigan Department of Transportation; twenty three of which are considered sub-standard and have restricted load capacities.

Some transportation emergencies for roads and highways are actually the influence of other emergency situations; such as, severe weather, flooding, or fog. Roads and highways can be impassable because of severe weather conditions, or flooding, bridges and roads can be washed out because of floods or dam failures. A vulnerability of transportation which is not necessarily caused by other emergency events is the collapse of a bridge or overpass structure. Twenty three structures are listed as sub-standard and are either in need of major repairs or replacement. Although such an event is possible, the likelihood of such an event occurring except as a secondary event to a larger emergency such as flooding is low. Scheduled engineering inspections of all bridges within the state keep such structures within safe working loading conditions. While no incidents have taken place, it is estimated that catastrophic structural failure of a major bridge or overpass would be expected to occur at a rate of less than 0.01 events per year.

Gratiot County is roughly bisected by two railroads-one extending eastward from Alma to Saginaw and one that runs north and south through the county from Owosso to Mt. Pleasant. All railroad activity within the county involves the movement of freight, presently there is no passenger service within the county. Railroad accidents can and do occur, but without the presence of passenger rail service, rail accidents are confined to “hazardous materials – transportation” incidents.

There are no private or commercial forms of water transportation within Gratiot County, only the use of small recreational craft. Water transportation presents no risk to Gratiot County.

The Gratiot Community Airport is not serviced by any common carriers or passenger service. Use of the airport is restricted to private aircraft and small commercial craft, which presents little risk as a county emergency.

Likelihood of future occurrence: Moderate

Analysis type: Standard

Name of Hazard: Hazardous Materials-fixed site

Geographic location of hazard: The Brownfield Redevelopment Authority of the County of Gratiot has documented over 100 Brownfield sites, the vast majority related to underground storage tanks (i.e. fueling/service stations). Some of the more serious sites are in the federal Superfund program and/or encompass relatively large tracts of land (see Table 3, page 11).

Hazard description and previous occurrence: Gratiot County’s economy industrialized relatively early, in the 19th Century, leaving an environmental legacy of known and potentially hazardous sites, commonly referred to as Brownfield sites. The Brownfield Redevelopment Authority of the County of Gratiot has documented over 100 Brownfield sites, the vast majority related to underground storage tanks (i.e.

fueling/service stations). Some sites may pose little health risks to area residents, while others pose known serious human health hazards, and the vast majority poses unknown risks due to a lack of information. Some of those more serious sites are in the federal Superfund program and/or encompass relatively large tracts of land.

The Velsicol Chemical plant site, located in St. Louis along the Pine River is the largest, most severely contaminated site known in Gratiot County. Byproducts of approximately 50 years of DDT, PBB, and other toxic chemical manufacturing have been found in extremely high concentrations throughout the soils of the 53 acre site, in sediments of the adjacent Pine River, and even in the soils of nearby residential neighborhoods. Over \$100 million in State and Federal funds have been spent to clean up the Pine River, but it has now been confirmed that the slurry wall around the plant site is failing, resulting in recontamination of the river. In addition, trace amounts of p-CBSA, a by-product of DDT manufacturing have been found in all of the City's municipal drinking water wells, which serve 4,100 people. At this time the U.S. EPA has issued statements that the low levels of p-CBSA are safe for humans, however, the Michigan Department of Environmental Quality has advised the City to explore alternative sources of water, as it is anticipated that higher concentrations of more dangerous contaminations will soon show up in the City's water wells. Cost estimates for replacing the City of St. Louis' water system are in the \$25-\$30 million range.

Velsicol Chemical also disposed of toxic waste in at least three other locations in Gratiot County, including the Smith Farm, the Gratiot County landfill, and the Gratiot County Golf Course. In addition, petroleum refining took place in the Alma area for nearly 70 years, most notably at the former Total Petroleum refinery site, which is undergoing a continuous groundwater cleanup program.

A search of the EPA website reveals that there are 159 registered handlers of hazardous materials in Gratiot County. These handlers include operating gasoline stations, laundry dry cleaners, industrial firms, car washes, agricultural operations, auto parts stores/service stations, utilities, municipalities, transportation firms, etc. The vast majority of these hazardous materials handlers are low risk, low volume handlers.

Likelihood of future occurrences: Low

Analysis type: Standard.

Name of Hazard: Hazardous Materials-transportation

Geographic location of hazard: Primarily on US 127, M 46, M 57 and the T&SB railroad line. See Appendix A, Map 5.

Hazard description and previous occurrence: All modes of transportation carry thousands of hazardous material shipments on a daily basis through, or near local communities. The uncontrolled release of hazardous materials during transport is capable of posing a risk to health, safety, property or the environment.

The U.S. Department of Transportation regulates the transportation and shipping of over 18,000 different materials. Areas most at risk are within a 1-5 mile radius of a major transportation route along which hazardous material shipments move. All areas in Michigan are potentially vulnerable to a hazardous material transportation incident, although the heavily urbanized and industrialized areas in southern Michigan are particularly vulnerable due to the highly-concentrated population, the large number of transportation routes that exist in the area and the large number of hazardous material shipments that occur on a daily basis.

Gratiot County is prone to a variety of transportation based incidents involving hazardous materials. The transport of agricultural chemicals used in farm production is a common occurrence and one that the general public has little awareness to. There are also several pipelines that transport natural gas through the county, three primary road transportation routes and a rail transport route that runs north and south through the area. Alma, St. Louis and the surrounding densely populated areas are the most vulnerable based on the number of transportation types and population density. Refer to the Appendix A maps for geographic areas near agricultural areas, primary roads and railroads (Maps 4, 5 and 7).

Likelihood of future occurrences: High.

Analysis type: Standard.

Name of Hazard: Public Health Emergency

Geographic location of hazard: Anywhere in Gratiot County, particularly in areas with denser populations. See Appendix A, Map 3 and 4.

Hazard description and previous occurrence: The epidemic hazard for Gratiot County is risk of disease outbreak in humans and agricultural resources, including crops and livestock. Agricultural epidemics are not considered highly likely to affect large tracts or numbers of animals in the study area; however, the dependence of the local economy on agriculture is such that a major epidemic could have a major adverse impact on Gratiot County and the municipalities. Infrastructure, building stock, and critical facilities are not likely to be affected by agricultural epidemic. The effects of a serious health disaster would deeply impair the County services. The Mid-Michigan Health Department has been a very proactive organization regarding health concerns in the past, including annual educational supplements to the media and local organizations regarding flu shots and other vaccinations. There has been no history of major health epidemics in Gratiot County in recent history regarding humans. However, in the early 1970s there were several cattle farmers that were delivered PBB (fire retardant) instead of the Feed supplement that they were expecting. Thousands of head of cattle ingested the PBB. There were many stories told of disfigured cattle and the mass slaughters that had to be performed since the animals had been poisoned. This mishap cost the farmers thousands of dollars and led to the closing of the Velsicol Chemical plant in St. Louis.

Likelihood of future occurrences: Low, with the exception of a potential outbreak of H1N1.

Analysis: Standard

Name of Hazard: Well Contamination

Geographic location of hazard: Residents and businesses located in Gratiot County receive nearly all of their potable and processed water supplies either directly or indirectly from wells. Generally residents and businesses which are located within municipal boundaries receive their water from municipal systems, those businesses and residents outside of those boundaries acquire water from private wells.

Hazard description and previous occurrence: As with much of the State of Michigan, Gratiot County generally has multiple aquifers which reside at various elevations within the subsoil which are separated from each other by non water bearing soil types. The aquifers within the county vary greatly by geographical location with respect to elevation, thickness, and natural protection from adjacent non-water bearing soil layers.

Water sources are vulnerable to both biological and chemical contamination, both of which can affect the utilization of the water for potable use. Shallow aquifers and those without protection of impervious soils are at much greater risk of contamination by both biological or chemical contaminants. Other sources of contamination include improperly abandoned wells, improper use of landscaping chemicals, agriculture, industrial processes, mineral extraction, or accidental spills of chemical or biological agents.

Gratiot County has experienced ground water contamination of some of its aquifers and has historically had contaminated industrial sites mitigated to varying degrees of success. There are also currently contaminated industrial sites that are presently undergoing environmental mitigation work as well as sites identified as future clean-up sites.

Contamination of ground water aquifers, fortunately tend to affect an isolated geographical area and not large areas of the county. Limited geographical areas do not necessarily limit the impact upon a relatively large percentage of the population. The exact location of contamination can have a large impact upon large sections of the county population. For example, the contamination of one of the wells in the City of Alma in the early 1960's or the present contamination of wells in the City of St Louis;

both from industrial sites that were located within their City boundaries. All Gratiot County residents and businesses are susceptible to contamination of ground water sources, but not from a single polluting source or event. Although Gratiot County has had a number of incidents regarding contamination of aquifers and a number of Brownfield sites, those that have had an effect upon a relatively large region would be expected to occur at a rate of 0.03 events per year.

Likelihood of future occurrences: Moderate.

Analysis type: Standard.

Name of Hazard: Pipeline Accident

Geographic location of hazard: See Appendix A, Map 7.

Hazard description and previous occurrence: Petroleum and natural gas pipeline accidents are characterized as a release of petroleum or natural gas, or the poisonous by-product hydrogen sulfide, from a pipeline. As a major petroleum and natural gas consumer in the United States, vast quantities of petroleum and natural gas are transported through and stored in Michigan. Though often overlooked as a threat because much of the petroleum and gas infrastructure in the state is located underground, petroleum and gas pipelines can leak, erupt or explode, causing property damage, environmental contamination, injuries and loss of life. In addition to these hazards, there is also a danger of hydrogen sulfide release.

According to 1998 figures released by the U.S. Department of Transportation (Pipeline Division), Michigan gas companies had to repair 9,300 leaking underground gas lines. The Michigan Public Service Commission indicates that many more gas line breaks go unreported. Michigan ranks second in the nation, Texas is first, in the number of gas line repairs to damaged lines.

Gratiot County has had several incidents of gas line damages. These are generally related to construction accidents during excavation. There have been no injuries or

property damage related to these incidents. There have been no major breaks or damage reported to primary lines.

Likelihood of future occurrence: High

Analysis type: Standard.

Name of Hazard: Infrastructure Failure

Geographic location of hazard: Anywhere in Gratiot County. See Appendix A, Map 7.

Hazard description and previous occurrence: Public infrastructure typically fails based upon one of two causes; first the infrastructure may experience failure such as, equipment malfunction, or transmission main failure which is unrelated to other hazards or causes. The second cause of infrastructure failure is generally caused by other emergency hazards such as storm events or technological causes.

Public Water Systems: In Gratiot County municipal water systems are generally limited to urban areas within the County (such as Breckenridge, Ithaca, St. Louis and Alma). Failure of water systems can result in public health issues for the entire community served, and could affect fire protection and public safety in large sections of the County. Other effects could be economic loss to local business and industry. Based upon historical records of infrastructure failure from the local water systems, failure of critical equipment or transmission mains would be expected to occur at a rate of 0.06 events per year.

Public Sanitary sewer Systems: In Gratiot County municipal sanitary sewer systems are generally limited to urban areas within the County (such as Breckenridge, Ithaca, St. Louis and Alma). Failure of sanitary sewer systems can result in public health issues for the entire community served by such utility. Other effects could be economic loss to local business and industry within the service area, and possible property damage resulting from system failure. Based upon historical records of infrastructure failure from

the local sanitary sewer systems, failure of critical equipment or transmission mains would be expected to occur at a rate of 0.03 events per year.

Electrical Power Distribution System: The electrical power distribution system is likewise susceptible to equipment failure and transmission system malfunction similar to public water systems or public sewer system, but the electrical distribution system is also at greater risk with respect to other natural hazards such as winter storms, tornados, or thunderstorms. Failure of the electrical power system can result in failure of public water and sewer systems in urban areas, private water and sewer systems in rural areas of the County, safety issues with respect to critical equipment such as items for live support to traffic signals, and economic loss to area business and industry. Electrical power distribution system failure can be isolated to relatively small areas or can be County wide in nature. Based upon historical records of infrastructure failure from the City of St. Louis electrical department, failure of critical equipment or transmission mains would be expected to occur at a rate of 0.10 events per year.

Likelihood of future occurrences: Moderate

Analysis type: Standard

Name of Hazard: Extreme Temperatures

Geographic location of hazard: Anywhere in Gratiot County but primarily affecting the elderly or low-income populations. While extreme temperatures can occur in Gratiot County, for the most part the community is prepared for the hazard. If there is a power outage at the same time as extreme temperatures, our residents are more likely to be at risk.

Hazard description and previous occurrence: There are demographic groups that are more likely to be affected such as the elderly and impoverished. The following chart is intended to organize those groups by jurisdiction. Prolonged periods of very high or

very low temperature are often accompanied by exacerbating conditions such as high humidity and lack of rain, or heavy snowfall and high winds. Extreme temperatures, whether it is extreme heat or extreme cold, share a commonality in that they both primarily affect the most vulnerable segments of society such as the elderly, children, the impoverished and people in poor health. The major threats of extreme heat are heatstroke (a major medical emergency) and heat exhaustion. Extreme heat is a more serious problem in urban areas, where the combined effects of high temperature and high humidity are more intense. The major threats of extreme cold are hypothermia (also a major medical emergency) and frostbite. Michigan is subject to both temperature extremes.

Each year, our winter temperatures drop below zero. We have seen minus 15 and minus 20 degree weather. Most years our summer maximum temperature reaches the mid-nineties. We have had a maximum daytime temperature of over one hundred degrees Fahrenheit.

Municipality	Population over 65	Population with income less than 20k per year	Total Population
Alma, city	1572	955	9275
Arcada Township	244	175	1708
Bethany Township	200	359	3492
Elba Township	242	143	1394
Emerson Township	171	99	966
Fulton Township	312	248	2413
Hamilton Township	68	50	491
Ithaca, city	435	319	3098
Lafayette Township	91	67	656
New Haven Township	136	104	1016
Newark Township	169	118	1149
North Shade	85	72	706

Township			
North Star Township	156	102	996
Pine River Township	418	252	2451
Seville Township	270	244	2375
St. Louis, city	512	462	4494
Sumner Township	227	196	1911
Washington Township	123	93	909
Wheeler Township	339	286	2785

Data source: Greater Gratiot Development

Likelihood of future occurrences: Moderate. The future occurrences of extreme temperatures are likely to follow historical patterns. The entire county is likely to experience the extreme temperatures at the same time. For the most part, the county is prepared for extreme temperatures unless there is a power outage

Analysis: Standard

Name of Hazard: Terrorism/sabotage

Geographic location of hazard: Features located within Gratiot County that could be subject to terrorist attack include surface water supplies, water storage tanks, dams, power generation facilities, and natural gas and petroleum pipelines. Utilities are also subject to terrorist attack.

Hazard description and previous occurrence: Terrorist activities are by design difficult to predict, and intended to cause psychological impacts to large, far-reaching populations of people. Terrorist attacks take many forms and affect multiple targets and sectors of life. Terrorist events have not been reported in Gratiot County. Terrorism is a unique hazard that is a high national and international priority. Unlike most other hazards evaluated in mitigation plans such as this one, funds are available from multiple federal and state programs to counties and municipalities for terrorism response, mitigation, and prevention programs.

Likelihood of future occurrences: Low.

Analysis type: Standard.

Name of Hazard: Fires-wildfire

Geographic location of hazard: Small brush fires occasionally occur in the study area.

Hazard description and previous occurrence: Wild land fire, while generally local in impact in Gratiot County and the municipalities, is capable of rapidly causing complete destruction of property, assets, natural resources, and life. The costs associated with fire prevention, fighting, and recovery can be very high. The climate of Gratiot County is not conducive to large-scale drought and dry climate vegetation that are primary causes of the massive and highly destructive wildfires that occur periodically in the Western United States. Of particular concern in Gratiot County and the municipalities with respect to fire involve the ability of the local fire and emergency response personnel to respond to fires that occur in the smaller towns and rural areas where fire suppression equipment and water is not readily available.

Likelihood of future occurrences: High

Analysis type: Standard

Name of Hazard: Flood-dam failure

Geographic location of hazard: The City of St Louis has a hydroelectric dam with six (6) tainter gates, each with a nominal width of approximately 19 feet. Each gate is equipped with an electric motor actuator for lifting the gates. A dam failure would result in potential low level flooding of several areas in the city along River Court, including the high school and athletic complex.

Hazard description and previous occurrence: A dam failure can result in loss of life and extensive property or natural resource damage for miles downstream from the dam. Dam failures occur not only during flood events, which may cause overtopping of a dam, but also as a result of poor operation, lack of maintenance and repair, and vandalism. Such failures can be catastrophic because they occur unexpectedly, with no time for evacuation.

The Michigan Department of Environmental Quality (MDEQ) has documented approximately 263 dam failures throughout Michigan. There are over 2,400 dams in the state of Michigan and about 935 of them are regulated by Part 315 of the Dam Safety Program. Dams are regulated when they are over 6 feet in height, and when over 5 acres are impounded during the design flood (a flood that does not exceed the magnitude of the discharge for the design frequency).

Permits are required for construction and repair of regulated dams. Inspection reports are also required every three to five years for dams based on their hazard potential rating. The hazard potential rating is determined by the Dam Safety Program, and is based on an assessment of the potential for loss of life, property damage, and environmental damage in the area downstream of a dam in the event of dam failure or appurtenant works. The definitions for the hazard classification as specified in the state's Dam Safety Statute, Part 315, Dam Safety, of Act 451, P.A. 1994 are as follows:

Low hazard potential dam means a dam located in an area where failure may cause damage limited to agriculture, uninhabited homes, agricultural buildings, structures, or township or county roads, where environmental degradation would be minimal, and where danger to individuals is slight or nonexistent.

Significant hazard potential dam means a dam located in an area where failure may cause damage limited to isolated homes, agricultural buildings, structures, secondary highways, short line railroads, or public utilities, where environmental degradation may be significant, or where danger to individuals exists.

High hazard potential dam means a dam located in an area where failure may cause serious damage to inhabited homes, agricultural buildings, campgrounds, recreational

facilities, industrial or commercial buildings, public utilities, main highways, or Class I carrier railroads, or where environmental degradation would be significant, or where danger exists with the potential for loss of life.

Part 315 of the Dam Safety Program also requires that dam owners prepare and keep current, Emergency Action Plans (EAP) for all high hazard and significant hazard potential dams. An EAP is a plan developed by the owner that establishes notification procedures for its departments, public off-site authorities, and other agencies of the emergency actions to be taken before and following an impending or actual dam failure.

The City of St Louis has developed an EAP for dam failure and exercises the plan annually.

After the events of September 11th, it became evident that dams could be attractive targets to terrorists. Dam failures could not only cause enormous loss of life, property and infrastructure damage, but could have residual long-lasting social, economic, and public health impacts.

Name of Hazard: Oil/gas well accident

Geographic location of hazard: MDEQ records indicate there are 58 active well locations in Gratiot County, the vast majority used for natural gas storage. Most wells are located in the Sumner/New Haven Township area. There are also 438 terminated and plugged wells located within the county.

Hazard description and previous occurrence: According to MDEQ records there are 58 active well locations in Gratiot County the vast majority used for natural gas storage. Most wells are located in the Sumner/New Haven Township area. There are also 438 terminated and plugged wells located within the county. While oil and natural gas wells do present a hazard in respect to fire, the true hazard which exists from such wells is the possible release of hydrogen sulfide which is dangerous even in relatively small concentrations, but not all well sites produce the harmful gas, hydrogen sulfide. An uncontrolled release of petroleum or natural gas, or the poisonous by-product hydrogen

sulfide, petroleum and gas wells can leak, erupt or explode, causing property damage, environmental contamination, injuries and loss of life. Hydrogen sulfide is an extremely poisonous gas that is also explosive when mixed with air temperatures of 500 degrees or above.

No known occurrence of a uncontrolled release from a petroleum or natural gas well site within Gratiot County is documented by MDEQ and therefore based upon historical records it is assumed that the rate of occurrence is low. Area affected and number of residents in the area of influence would normally be restricted to the immediate area of the incident and would have very limited effect on large groups of the population. Uncontrolled releases from either petroleum or natural gas wells, will have to be controlled under similar conditions as a “hazardous materials – fixed site” situation.

Likelihood of future occurrences: Low.

Analysis type: Standard.

Name of Hazard: Civil Unrest

Geographic location of hazard: There are facilities that could be potential sites for civil disturbance. Most notably would be the three prisons that are shared by the City of St. Louis and Bethany Township. The other potential site may be Alma College.

Hazard description and previous occurrence:

Mid-Michigan Correctional Facility

General

This minimum-security prison is sited on 40 acres of land in the northeast section of St. Louis, in Gratiot County. It consists of separate buildings for administration, food services, education, maintenance, storage and prisoner housing. There are eight separate housing units contained in four buildings. Each unit houses 120 prisoners in a dormitory-style setting. Modular units have been placed in the facility to provide space

for programs and prisoner property storage.

Programming

Pre-release preparation, psychological counseling, Strategies for Thinking Productively (STP is a cognitive restructuring program) and substance-abuse treatment are offered. Other programs and services include general and law library, hobby craft, religious services, recreation programs, and a barbershop.

An academic and vocational program offers educational opportunities. Vocational programs are offered in the areas of custodial maintenance technology, business education technology, horticulture, and building trades. Academic classes are offered in adult basic education and general education development.

Prisoners are provided with on-site routine medical and dental care. Serious problems are treated at the department's Duane L. Waters Hospital in Jackson, and emergencies are referred to the local hospital.

Security

The facility is surrounded by two fences, with razor-ribbon wire on the side and top of the exterior fence. The perimeter is also monitored by an electronic detection system. The perimeter of the facility is patrolled by armed personnel. Surveillance cameras are also used

Pine River Correctional Facility

General

The Pine River Correctional Facility is composed of eight separate housing units contained in four buildings. Each unit has 120 beds. The six remaining buildings include Administration, Food Service, School, Maintenance/Warehouse, Prisoner Services, and Training.

Programming

Academic programming includes: Adult Basic Education and General Education Development completion, as well as individual and group counseling, prerelease programming, and parenting classes. Psychotherapy is provided for assault and sex offenders. Vocational training includes: Food technology, business educational trades,

and horticulture. Other activities include law and general libraries, hobby craft, religious services, and barbershop. Prisoners are provided on-site routine medical and dental care. Serious problems are treated at the department's Duane L. Waters Hospital in Jackson.

Security

The facility was built incorporating the latest concepts and designs for correctional institutions. The facility is surrounded by two 12-foot fences with rolls of razor-ribbon wire on the side and top of the outside fence. The perimeter is monitored by a series of electronic devices including an electrified "stun" fence. A patrol road surrounds the perimeter and a patrol vehicle responds to all detection system alarms.

St. Louis Correctional Facility

General

This multi-level correctional facility houses prisoners classified as Level III (medium security) and Level IV (close custody). The prison is sited on 67 acres of land in the northeast section of St. Louis, in Gratiot County. It consists of separate buildings for administration, food services, education, maintenance, storage and prisoner housing. There are seven separate housing units. Each unit houses up to 192 prisoners in a double-bunked individual cell setting.

Programming

Pre-release preparation, psychological counseling, Strategies for Thinking Productively (STP is a cognitive restructuring program); Cage Your Rage and substance-abuse treatment are offered. An academic and vocational program offers Adult Basic Education, General Education Development opportunities and Custodial Maintenance Technology. Other programs and services include general and law library, hobby craft, religious services, recreation programs, and a barbershop.

Prisoners are provided with on-site routine medical, including x-ray, and dental care. Telemedicine is available and there is a mini-clinic in each housing unit. Serious problems are treated at the department's Duane L. Waters Hospital in Jackson, and

emergencies can be referred to the local hospital.

Security

The facility is surrounded by two fences, with razor-ribbon wire on the side and top of the exterior fence. The perimeter is also monitored by an electronic detection system. There are armed gun towers and the perimeter of the facility is patrolled by armed personnel. Surveillance cameras are extensively used.

All three prisons have demonstrated their ability to restrain the prisoners properly. There has only been 1 known escape that took place from the minimum security facility in the mid 90's. It was the common consensus that if there were a riot or other disturbance, the chances were high that the problem would be contained within the facility itself where it could be handled by the proper authorities.

Alma College

The Alma College facility has been a great asset to the community, providing a place of higher learning for young adults. The college is home to many fraternities and sororities, which can be a detriment at many universities. There has been very little trouble associated with the college or student groups beyond an isolated incident or two.

Likelihood of future occurrences: Low

Analysis type: Standard

Name of Hazard: Drought

Geographic location of hazard: Anywhere in Gratiot County.

Hazard description and previous occurrence: Gratiot County has a lot of industry and service tied directly to agriculture. Keeping that in mind, a drought could potentially be catastrophic even though the frequency of serious damaging droughts has not occurred on a regular basis. The potential for severe financial loss exists, however the

use of Crop Insurance and other subsidies offered by the U.S. Dept of Agriculture has been able to sustain the efforts of local growers. Based on the National Climate Data Center data base, there have been 0 drought event(s) reported in Gratiot County between 01/01/1950 and 03/31/2007. Although there have been some very dry seasons there always seems to be sufficient rainfall for portions of the crops in the County to perform.

Likelihood of future occurrences: Low.

Analysis type: None

Chapter 3

Goals and Objectives

Mitigation Strategies

Goals and objectives are used in hazard mitigation planning to identify broad measures that are capable of reducing vulnerability to potential hazards. Goals are established to define general guidelines for what a community would like to achieve concerning hazard mitigation. Goals have been supplemented with objectives, which provide more detail in the steps required to meet a specific goal.

The development of goals and objectives for this plan were aimed at reducing the impacts of the top six hazards as identified in the Risk Assessment Table (see Appendix B). Many of the goals and objectives, however, will also reduce vulnerability to other hazards not included in the top six. Goals and objectives may also reduce vulnerability to more than one hazard, especially those concerning weather related hazards.

Background and past accomplishments

In the past, Gratiot County and the participating municipalities have undertaken a number of activities that demonstrate a continued and sustained effort to implement hazard mitigation activities and projects. For example, some communities have prepared comprehensive emergency management plans to address an all hazards preparation and response. Additionally, Gratiot County and the local municipalities have completed projects to address concerns related to specific hazards, including:

- Bridge replacement at three locations to better handle high water events and improve traffic safety.
- New piles (breaker walls) and riprap at the Mill Pond Dam spillway in St Louis to provide a more stable bank for the St Louis Light Plant.
- Demolition and removal of the Total Petroleum Facility has greatly reduced the potential for a catastrophic event in Alma.

These past activities have contributed to communities understanding of mitigation activities cost and benefits.

Goals and Objectives:

The goals of the Gratiot County Hazard Mitigation Planning Group were created with the best intentions to provide a safe and prosperous future within the County. It was the general consensus that just as the “Planning Workbook” suggests, the goals would be broad and global in nature with more detail reflected in the objectives. The goals that were agreed upon are as follows:

Incorporate the hazard mitigation plan into the County Master Plan and Emergency Operations Plan.

Minimize the harmful effects of severe weather hazards.

- Increase coverage and use of NOAA weather radio.
- Enhance public early warning systems and network.
- Enforcement of building and property maintenance codes.
- Establish heating centers/shelters for vulnerable populations.
- Improve infrastructure to lessen impact of severe weather.
- Reduce flood losses.

Improve the efficiency of all local emergency response services.

- Increase communication interoperability with all emergency responders and support agencies.
- Utilize GIS to assist in identifying hazards.

Reduce frequency of utility loss.

- Promote aggressive tree management for all utilities.

Mitigation Alternatives

The first step in developing mitigation strategies involves identifying a range of possible mitigation alternatives to address a specific hazard or multiple hazards. The development of mitigation alternatives for Gratiot County followed two primary steps. First a range of alternatives were identified for each objective. These alternatives were then rated in terms of acceptance using input acquired through discussion and other local expertise. The results were then compiled and presented to the group. The approved list of acceptable alternatives was reviewed by the workgroup for the selection of mitigation strategies. The selected mitigation strategies are presented later in this section of the plan. The selection of mitigation strategies involved a wide range of input that included workgroup discussions and discussions with specialists where required.

Specialists provided expertise in areas such as health, planning, transportation, community not-for profit organizations and other areas as required by the workgroup. Every effort was made to align alternatives with existing task oriented actions defined by other departments or agencies in an existing or developing plans, such as the County Master Plan.

Mitigation strategies

An important component of the hazard mitigation planning process is to develop a list of feasible mitigation strategies for Gratiot County. The feasible strategies for Gratiot County represent projects or processes that result in lessening the community's vulnerability to hazards. Mitigation strategies are the result of a process that identifies actions that are intended to meet objectives and ultimately goals that have been set for the community. These strategies must present actions that are equitable to the community, technically possible, do not pose environmental harm and are economically feasible.

Mitigation strategies presented in this plan are intended to meet the requirements of the Federal Emergency Management Agency (FEMA) for FEMA funded mitigation projects. To meet FEMA requirements a mitigation project must provide a benefit to the community. This implies that the benefit of a project must be greater than the cost. Mitigation strategies in this plan were selected to a large extent based on an approximate cost-benefit analysis that relied on data obtained from this hazard mitigation plan and estimated project costs.

Determining the cost of mitigation is complex and requires examination of several variables. First, costs can result in tangible outcomes such as damage to property, identifiable economic losses, and injuries or in extreme instances loss of life. Tangible costs can be estimated using information from the Community Profile and from the potential hazard impact information obtained from the Risk Assessment Table and the Hazard Rating Table (see Appendix B). Less lucid are the intangible outcomes of a hazard.

Intangible outcomes from a hazard are manifold. The result of a hazard can produce significant economic losses, property damage not included, and are often difficult to measure. Economic losses often take more time to work entirely through a community and linger long after the actual disaster event. Government and business alike can experience economic hardships that eventually impact residents and other government functions or businesses in the community. A simple example that reflects these losses is easily identifiable during a long winter where above average snow and ice removal is required. The additional funding required to remove the snow is taken from other programs or budget items, thus resulting in a potential loss or reduction of services, employees, business functions or other benefits to the local community.

Every effort was made to insure that actions can be accomplished that would have the result of reducing vulnerability. Two primary limitations for the mitigation strategies in

this plan include funding opportunities and the general political processes that direct limited resources across expanding needs. Consideration to these limitations is reflected in the selection of mitigation strategies, which seek to reduce vulnerability with actions that have been previously identified in an existing plan (i.e. County Master Plan), that are volunteer based, that introduce manageable financial commitment from local government, or that provide a funding option from an external agency. Unfunded mitigation strategies have been estimated to provide a benefit over cost.

Mitigation Strategies Layout

The following is a description of items that will be presented for each mitigation strategy:

Goal: as defined from the Goals & Objectives section of this plan.

Objective(s): objective(s) that have been defined for each Goal as determined in the Goals & Objectives section of this plan

Mitigation Strategy: feasible activity to mitigate a potential hazard or hazards.

Hazard Addressed: the hazard(s) that are addressed by the specific mitigation strategy. While all hazards have been addressed, the list emphasizes the six highest ranked.

Winter weather hazards	1
Tornados	2
Severe winds	3
Fires-major structural	4
Lightning/thunderstorms	5
Flood/river	6

Potential Lead Organization/Department: the potential entity responsible for implementing the mitigation strategy.

Initiation Date: potential date for initiating the mitigation strategy.

Potential Funding Sources: Local EOC, State EMD, FEMA, Local Government, State Government, Community Organizations

Geographic Area Impacted: the area impacted by the mitigation strategy. Categories are defined as follows: 1) County 2) Region in County 3) Localized. For the last two geographies a reference will be made to specific regions within Gratiot County or local jurisdictions when applicable.

Priority: This is rated as top, high or medium priority.

The following schema will be used to present the Mitigation Strategies for this plan:

Outline Schema:

1. Goal

1.1 Objective

1.1.1 Mitigation Strategy

1.1.2 Mitigation Strategy

Mitigation Strategies for Gratiot County

1. **Goal:** *Minimize the harmful effects of severe weather hazards.*

1.1 **Objective:** Increase coverage and use of NOAA weather radio.

1.1.1 Mitigation Strategy: Seek funding for NOAA weather radios for facilities caring for special needs populations and special needs populations living independently.

Hazard Addressed: addresses four hazards – 1, 2, 3, 5

Potential Lead Organization/Department: Gratiot County Emergency Management

Initiation Date: 6 months.

Potential Funding Sources: Local EOC, State EMD, FEMA

Geographic Area Impacted: Localized

Priority: High

1.1.2 Mitigation Strategy: Promote the use of NOAA weather radios through the distribution of brochures at community events.

Hazard Addressed: addresses four hazards – 1, 2, 3, 5

Potential Lead Organization/Department: Gratiot County Emergency Management

Initiation Date: Immediately

Potential Funding Sources: Local Government, Community Organizations.

Priority: High

1.1.3 Mitigation Strategy: Encourage the construction of shelters at City and County Parks.

Hazard Addressed: addresses three hazards – 2, 3, 5

Potential Lead Organization/Department: Local Government Parks and Recreation Departments

Initiation Date: 24 months.

Potential Funding Sources: Local EOC, State EMD, FEMA, Local Government through normal budgeting for infrastructure maintenance and improvement.

Geographic Area Impacted: Localized

Priority: Medium

1.2 Objective: Enhance public early warning systems and networks.

1.2.1 Mitigation Strategy: Upgrade the warning sirens in Breckenridge, Ashley and Perrinton to be remotely operated by Gratiot County Central Communications.

Hazard Addressed: addresses three hazards – 2, 3, 5

Potential Lead Organization/Department: Gratiot County Emergency Management

Initiation Date: 12 months

Potential Funding Sources: Local EOC, State EMD, FEMA

Geographic Area Impacted: Breckenridge, Ashley, Perrinton and surrounding areas.

Priority: Medium

1.3 Objective: Enforcement of Building and Property Maintenance codes.

1.3.1 Mitigation Strategy: Encourage each municipality to adopt building codes and property maintenance codes. Proper construction, anchoring, and maintenance will reduce the amount of damage caused by heavy snows, high winds, heavy rain and fire.

Hazards Addressed: addresses five hazards – 1, 2, 3, 4, 5

Potential Lead Organization/Department: Local government, Planning Boards

Initiation Date: 6 months.

Potential Funding Sources: Local Government through normal budget procedures.

Geographic Area Impacted: Gratiot County

Priority: High

1.3.2 Mitigation Strategy: Increase education regarding the importance of securing all structures as well as taking care of clutter to help eliminate flying debris.

Hazards Addressed: addresses five hazards – 1, 2, 3, 4, 5

Potential Lead Organization/Department: Local government, code enforcement, fire departments.

Initiation Date: 12 months

Potential Funding Sources: Local Government

Geographic Area Impacted: Gratiot County

Priority: Medium

1.4 Objective: Establish heating centers/shelters for vulnerable populations.

1.4.1 Mitigation Strategy: Work with Red Cross, Commission on Aging and District Health Department to identify vulnerable populations. Using GIS, plot relationship of vulnerable populations with shelters identified by Red Cross.

Hazards Addressed: addressed one hazard -1

Potential Lead Organization/Department: Emergency Operations Center

Initiation Date: 12 months

Potential Funding Sources: Local EOC, State EMD, FEMA, Local Government

Geographic Area Impacted: Gratiot County

Priority: High

1.5 Objective: Improve infrastructure to lessen impact of severe weather.

1.5.1 Mitigation Strategy: Separate the City of Alma's sanitary and storm sewer system to prevent overflow during severe weather events which can cause local flooding and public health issues.

Hazards Addressed: addresses two hazards – 6, and public health hazards.

Potential Lead Organization/Department: City of Alma Public Works

Initiation Date: 60 months

Potential Funding Sources: FEMA, Local Government through normal budgeting procedures for infrastructure maintenance and improvement.

Geographic Area Impacted: City of Alma

Priority: High

1.5.2 Mitigation Strategy: Expand the county drain capacity along US 127 in Ithaca to help protect existing and future businesses in a potential commercial and industrial development area.

Hazards Addressed: addresses one hazard-6

Potential Lead Organization/Department: City of Ithaca and Gratiot County Road Commission.

Initiation Date: 24 months.

Potential Funding Sources: FEMA, State and Local Government through grant match monies.

Geographic Area Impacted: Development zone adjacent to US127 in Ithaca.

Priority: Medium.

1.6 Objective: Reduce flood losses.

1.6.1 Mitigation Strategy: Encourage all municipalities to participate in the NFIP and to adopt FEMA floodplain maps.

Hazards Addressed: addresses one hazard – 6.

Potential Lead Organization/Department: Local Government.

Initiation Date: Immediately.

Potential Funding Sources: None needed.

Geographic Area Impacted: Gratiot County.

Priority: Top

1.6.2 Mitigation Strategy: Identify better data to produce more accurate floodplain maps.

Hazards Addressed: addresses one hazard- 6,

Potential Lead Organization/Department: Gratiot County Information Management.

Initiation Date: Immediately.

Potential Funding Sources: Local Government, State EMD, FEMA.

Geographic Area Impacted: Gratiot County.

Priority: Top

1.6.3 Mitigation Strategy: Encourage adoption of zoning ordinances that enhance floodplain management.

Hazards Addressed: addresses one hazard -6.

Potential Lead Organization/Department: Local Government.

Initiation Date: 12 months.

Potential Funding Sources: None needed.

Geographic Area Impacted: Gratiot County.

Priority: High

1.6.4 Mitigation Strategy: Reconstruct bridges and culverts to eliminate obstructions to the floodway.

Hazards Addressed: addresses one hazard -6.

Potential Lead Organization/Department: City of Alma.

Initiation Date: 12 months.

Potential Funding Sources: FEMA, State or Local Government through grant match monies.

Geographic Area Impacted: Alma.

Priority: Top

2. Goal: *Improve the efficiency of all local emergency responders.*

2.1 Objective: Increase communications interoperability with all first responders.

2.1.1 Mitigation Strategy: Work with local public works departments to assure interoperability with other first responders (police, fire EMS).

Hazards Addressed: addresses six hazards – 1, 2, 3, 4, 5, 6

Potential Lead Organization: Gratiot County Emergency Management

Initiation Date: Immediately

Potential Funding Sources: Local EOC, State EMD, FEMA, Local Government through normal budget procedures for maintenance and improvement.

Geographic Area Impacted: Gratiot County.

Priority: High

2.1.2 Mitigation Strategy: Develop county-wide communication plan for emergency responders.

Hazards Addressed: addresses all hazards

Potential Lead Organization: Gratiot County Central Communications

Initiation Date: 6 months

Potential Funding Sources: Local EOC

Geographic Area Impacted: Gratiot County

Priority: High

2.2 Objective: Utilize GIS to assist in identifying hazards.

2.2.1 Mitigation Strategy: Develop map layers identifying areas where hazardous materials are stored, critical infrastructure exists, and previous hazard situations have existed.

Hazards Addressed: addresses six hazards – 1, 2, 3, 4, 5, 6, as well as hazardous materials spills.

Potential Lead Organization/Department: Gratiot County Information Management.

Initiation Date: 24 months.

Potential Funding Sources: Local Government, EOC.

Geographic Area Impacted: Gratiot County.

Priority: Top

3. Goal: *Reduce the frequency of utility loss.*

3.1 Objective: Promote aggressive tree management for all utilities.

3.1.1 Mitigation Strategy: Create a liaison for all utilities to discuss trimming matters as well as partnering for these tasks.

Hazards Addressed: addresses four hazards – 1, 2, 3, 5.

Potential Lead Organization/Department: Local Department of Public Works.

Initiation Date: 12 months..

Potential Funding Sources: Local Government, Local Utilities Companies.

Geographic Area Impacted: Gratiot County.

Priority: High

Local Mitigation Strategy Selection

	Seeking NOAA radio funding	Promote NOAA radio use 1.1.2	Shelter construction	Upgrade warning sirens	Adopt building codes 1.3.1	Increase storm education 1.3.2	Heating shelters 1.4.1	Improve infrastructure	Adopt NFIP 1.6.1	Improve floodplain maps	Adopt zoning ordinances	Assure interoperability	Develop communication	Develop GIS 2.2.1	Tree Management liaison 3.1.1
City of St Louis		x							x						x
City of Ithaca				x					x	x				x	
City of Alma		x	x		x	x	x	x	x	x	x	x	x	x	x
Arcada Township		x							x						
Bethany Township		x							x	x					
Elba Township		x							x						
Emerson Township		x													
Fulton Township			x							x	x				
Hamilton Township		X													
Lafayette Township		X								x				x	
Newark Township						x								x	
New Haven Township	x	X			x	x			x	x	x	x	x	x	
North Shade Township		X													
North Star Township		X													
Pine River Township		x							x					x	
Seville Township		x				x	x	x	x						x
Sumner Township		x				x			x	x			x	x	
Washington Township			X												
Wheeler Township			x												
Village of Ashley				x											
Village of Breckenridge				x							x				x
Village of Perrinton				x											

PLAN MONITORING AND UPDATING

This plan shall be reviewed and updated every 5 years, to comply with the planning requirements of the Disaster Mitigation Act of 2000. Since this current plan was completed in 2010, the next scheduled update shall take place during 2015.

Monitoring of the plan will take place annually, to lead up to the 5 year update. The planning team will collect information (about any progress or obstacles involved in the implementation of the mitigation strategies) from the agencies involved in the implementation of mitigation projects or activities identified in this section. Meetings, phone calls, and electronic communications will be used to contact the lead agencies responsible for overseeing the projects.

The results will be discussed by the planning team and will be used to evaluate the information in the plan, with that evaluation process then informing the 2015 update of the plan. Monitoring and evaluating the effectiveness of this plan will be a collaborative effort of the Planning Commission, Zoning Officials, GIS staff, and the Emergency Management office, with the primary lead role given to the Gratiot County Planning Commission. Where obstacles to hazard mitigation are found, the planning team will evaluate how the plan might be updated in 2015 to overcome these obstacles. By monitoring the implementation of this plan on an annual basis, the planning group will be able to evaluate which projects have been completed, which are no longer feasible, and whether funding is being provided. If situations or priorities within the county change, to suggest a change in the importance of hazards or projects, then such changes will be taken into account and evaluated with respect to relevant project funding and implementation potential, and the changes that would need to be reflected in the 2015 update of this plan.

Plan updates shall be addressed at the annual organizational meeting of the Planning Commission, who will also note any upcoming master plan update processes and

evaluate whether and how any hazard mitigation goals or activities might be integrated into the goals, objectives, and action steps for those master plans. The Planning Commission will periodically inform the public, and various local officials, about the status and progress of these activities through public announcements (e.g. newspaper articles, other media).

COUNTY PLANNING INTEGRATION

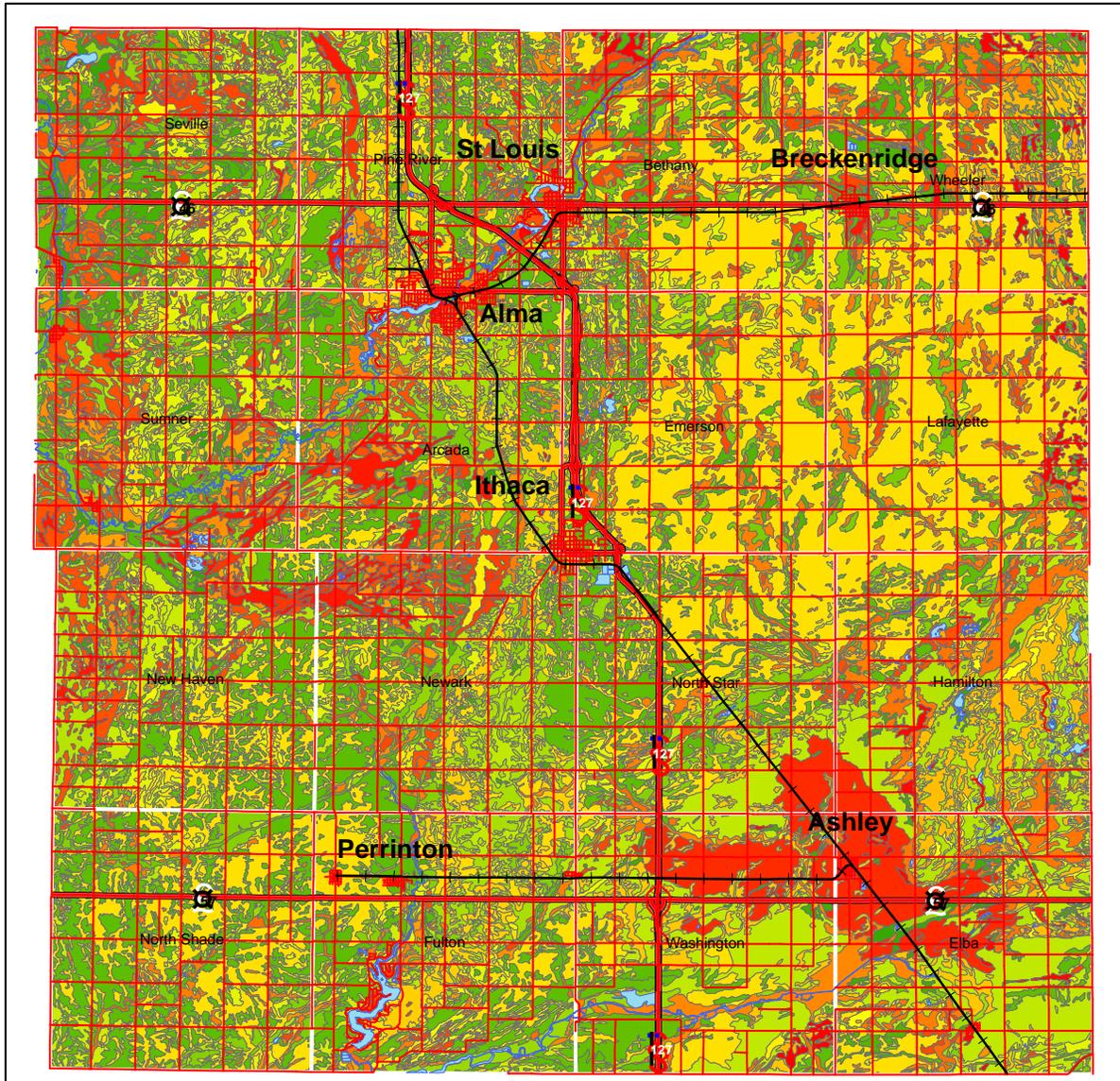
As part of the mitigation plan the Gratiot County Master Plan shall be amended during the next update to not only recognize the importance of the Mitigation Plan but to take the Plan and use the information that it contains to assist with the future development of the County. These processes should include future land use, locating and prioritizing infrastructure improvements, and projected population increases. Local plans and Zoning Ordinances shall be amended, if appropriate, to reflect these adjustments in proposed uses that would minimize the development in areas that would not be consistent with the plan intentions.

CONTINUED PUBLIC INPUT

Public Input is an integral part of this plan. As part of the monitoring process as well as the 5 year review/update there will be online access to information soliciting public input as well as advertised Public Hearings each year at the annual update meeting.

Appendix A Maps

Map 1. Topography/Soils



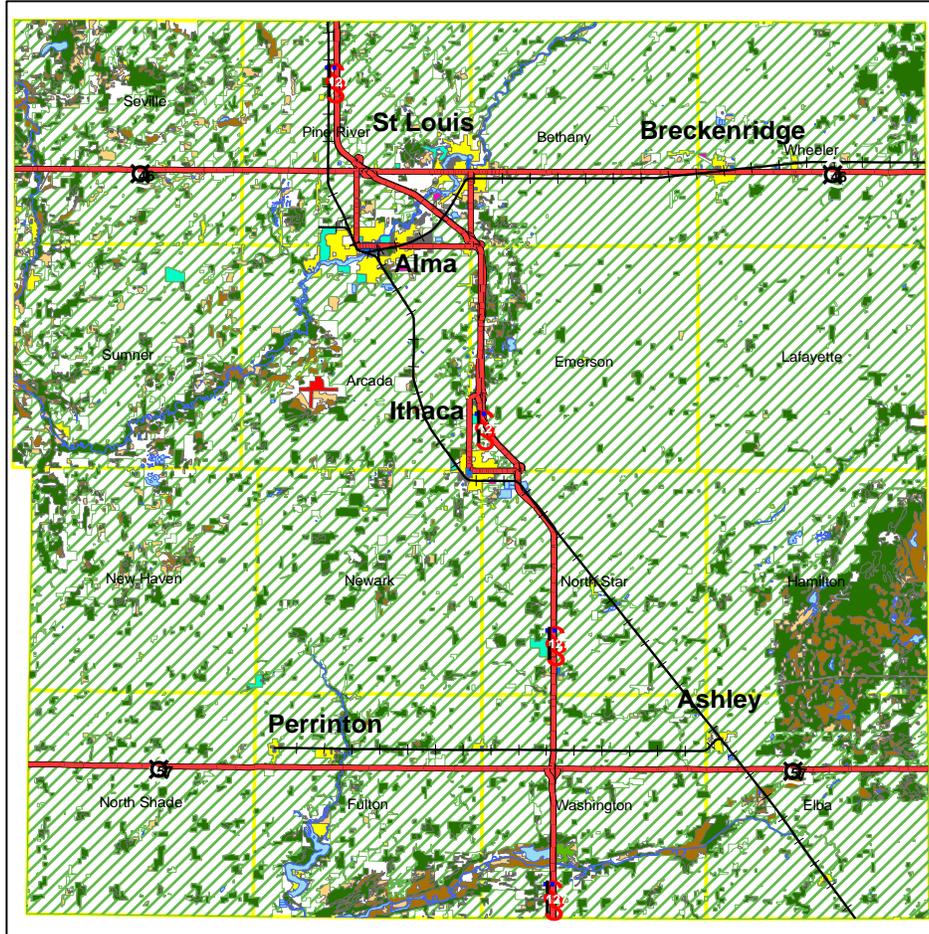
Gratiot County Soils Map

Legend

Soils	ArC	Ch	Ho	MaB	OaB	PIA	RdA	SpC	Ts
MUSYM	Be	Co	HuB	MaC	Oe	PpA	Sa	TdA	Ve
	Ad	BoB	Cr	ItA	Mc	Pa	PrA	SeA	TeA
	AfA	CaA	DxA	Ke	MeA	Ph	PtB	Sk	Th
	AkA	CcA	Ed	La	MtB	PkB	PtC	Sn	Tm
	ArB	Ce	Gd	Le	MvB	PkC	PtC	SpB	To
									W
									Wa
									WxA



Map 2.Land Use



Gratiot County Land Cover / Use



Legend

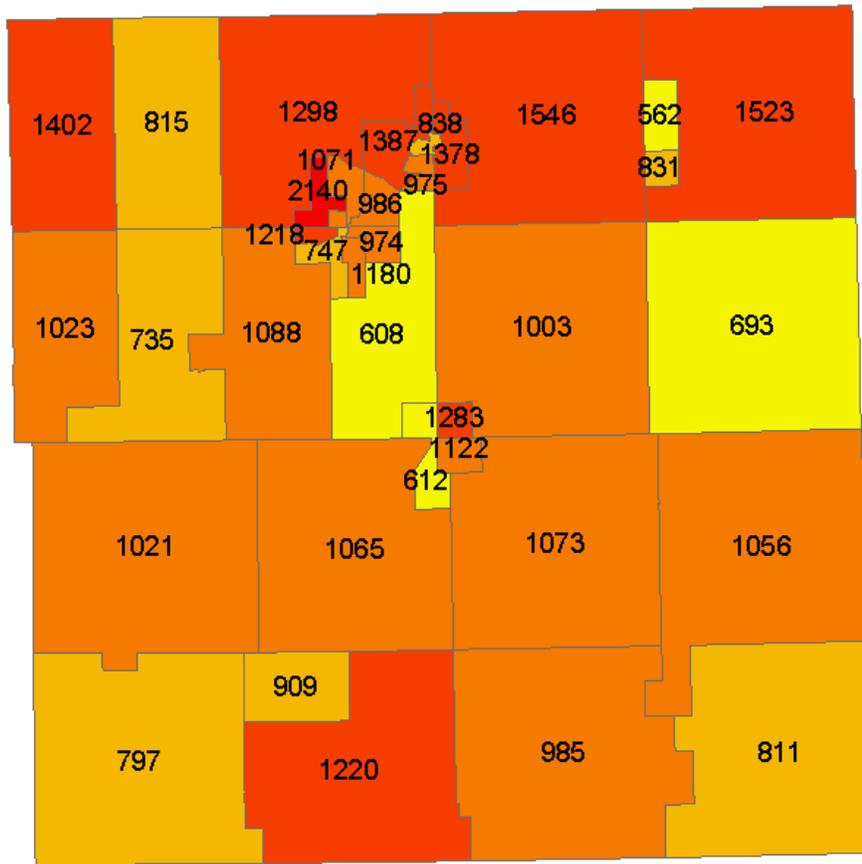
Land Cover/Use

LABEL

Central Hardwood	Outdoor Recreation	Wooded Wetland
Lowland Hardwood	Industrial Park	Shrub/Scrub Wetland
Central Business District	Multi-Family-Low Rise	Shrub Rangeland
Neighborhood Business	Mobile Home Park	Cropland, Rotation, and Permanent Pasture
Industrial	Multi-Family-Medium to High Rise	Air Transportation
	Emergent Wetland	

Map 3. Population

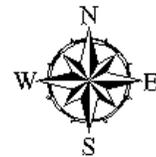
Population Map



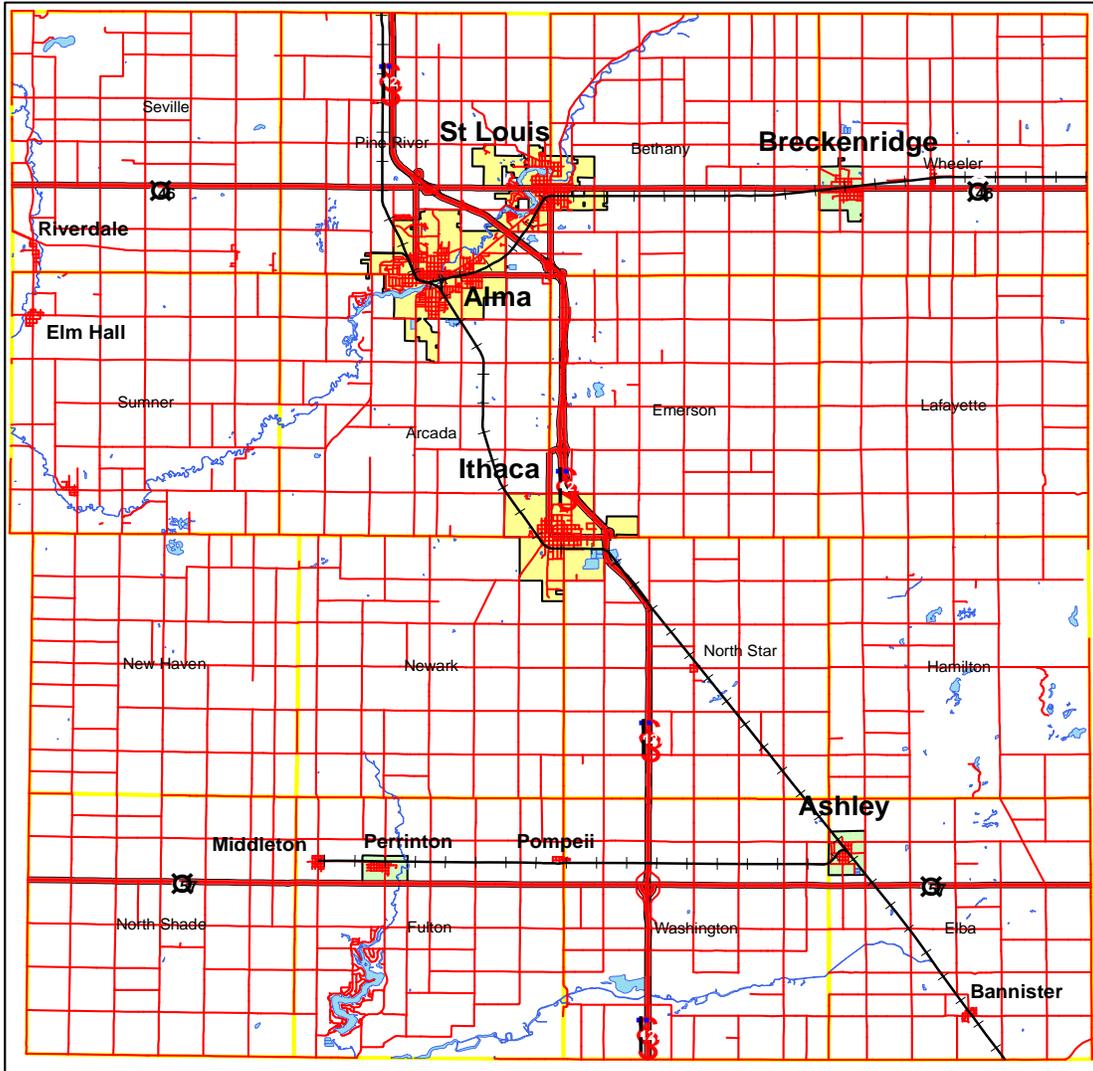
Legend

TOTPOP

562 - 693
694 - 909
910 - 1180
1181 - 1546
1547 - 2140



Map 4. Population Centers



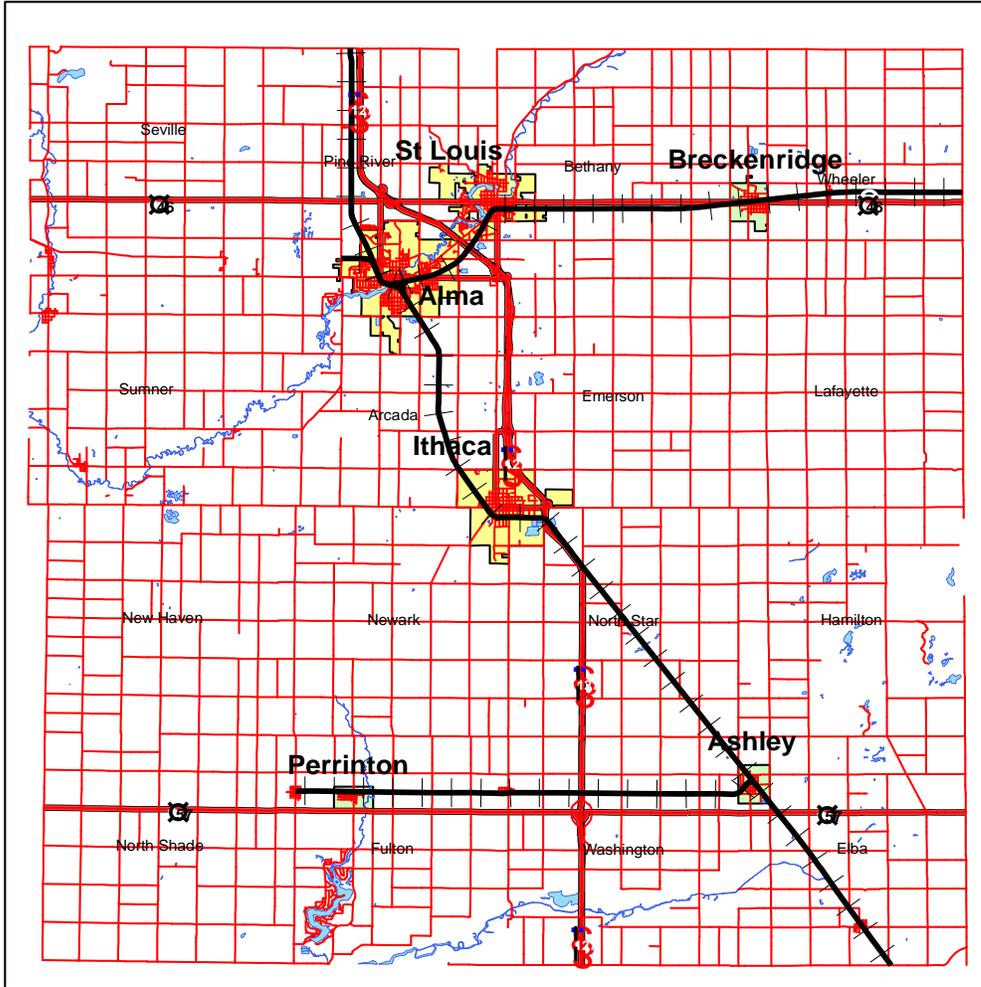
Gratiot County Population Centers

Legend

- +— RR
- Local Roads
- Highways
- Water
- Cities
- Villages
- Township Lines



Map 5. Transportation



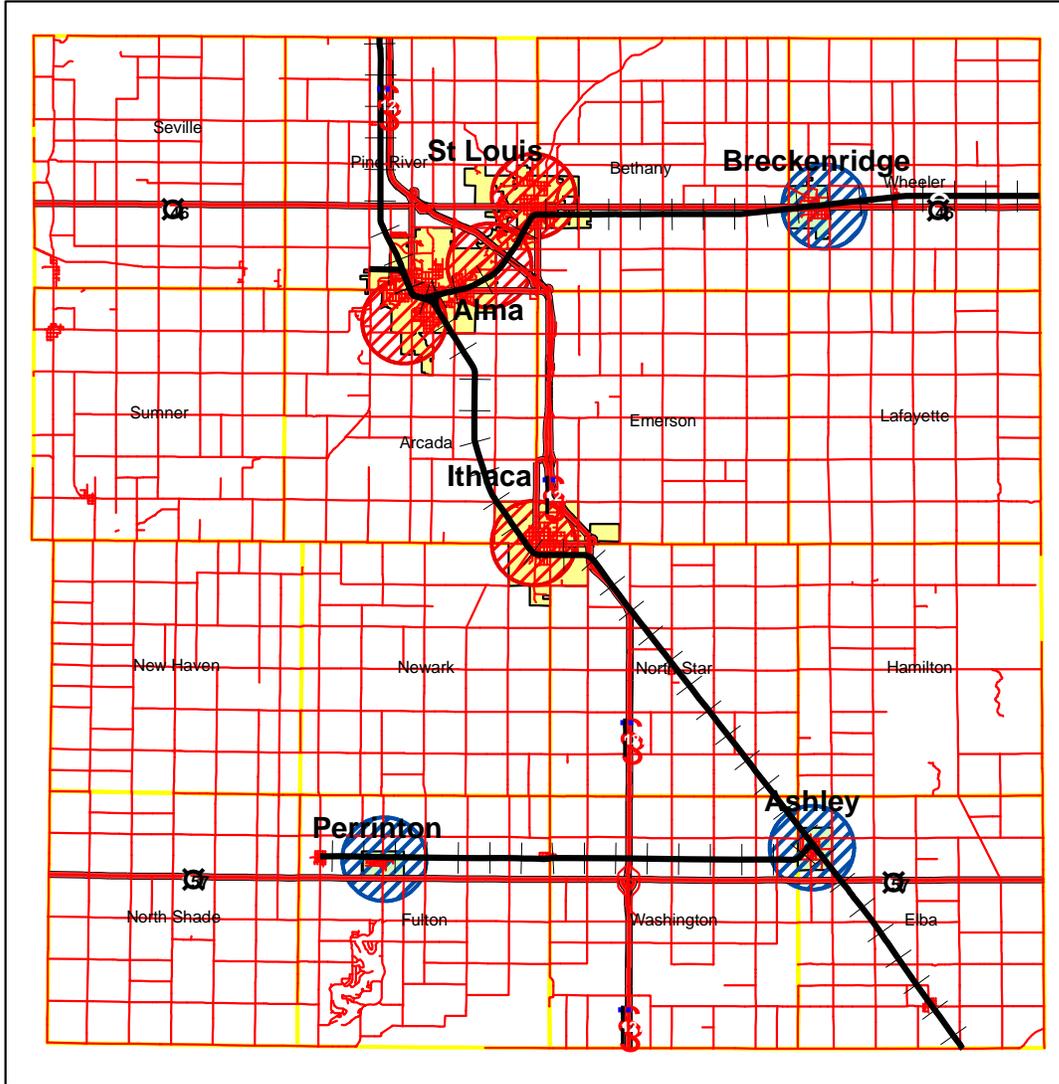
Gratiot County Transportation

Legend

- | | | |
|--|--|----------|
| | | Water |
| | | Cities |
| | | Villages |



Map 6. Warning Sirens



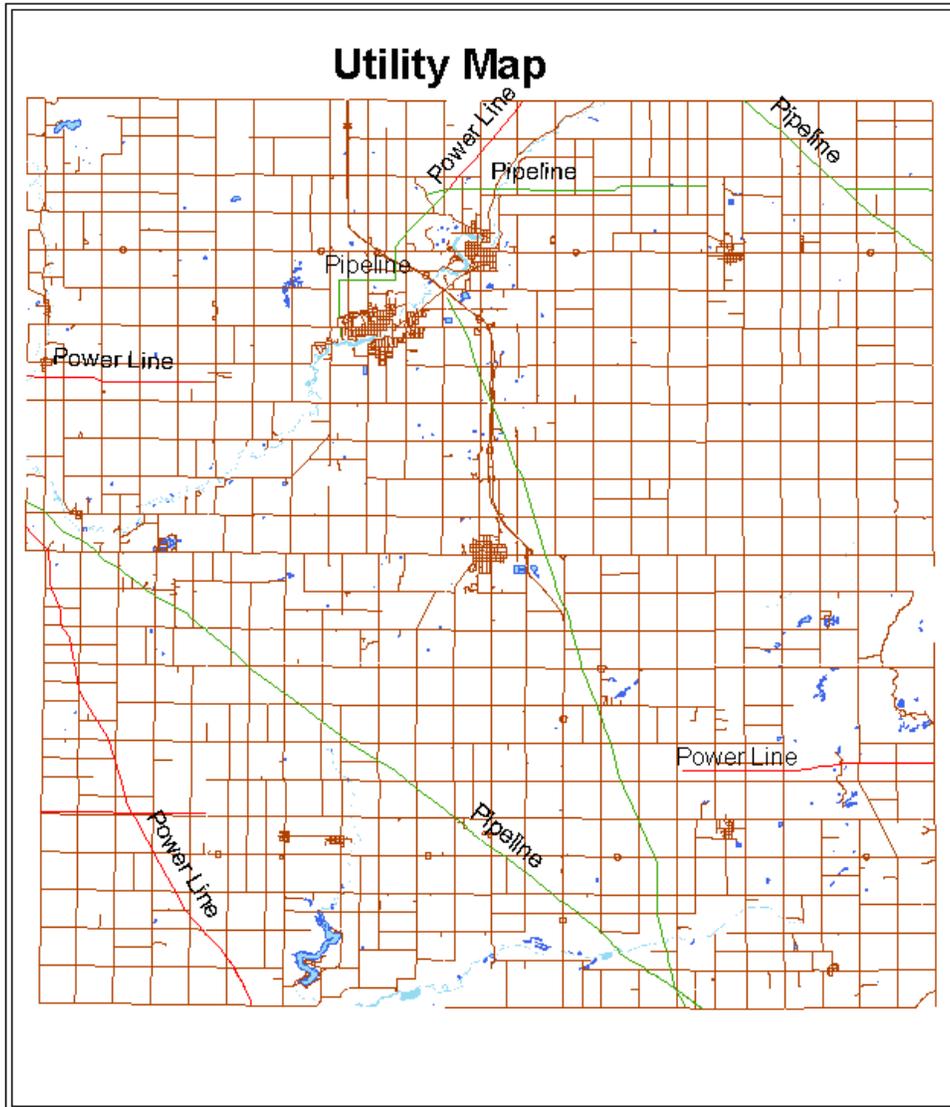
Gratiot County Warning Sirens

Legend

-  911 or Manually Operated
-  Manually Operated



Map 7. Utilities



Legend

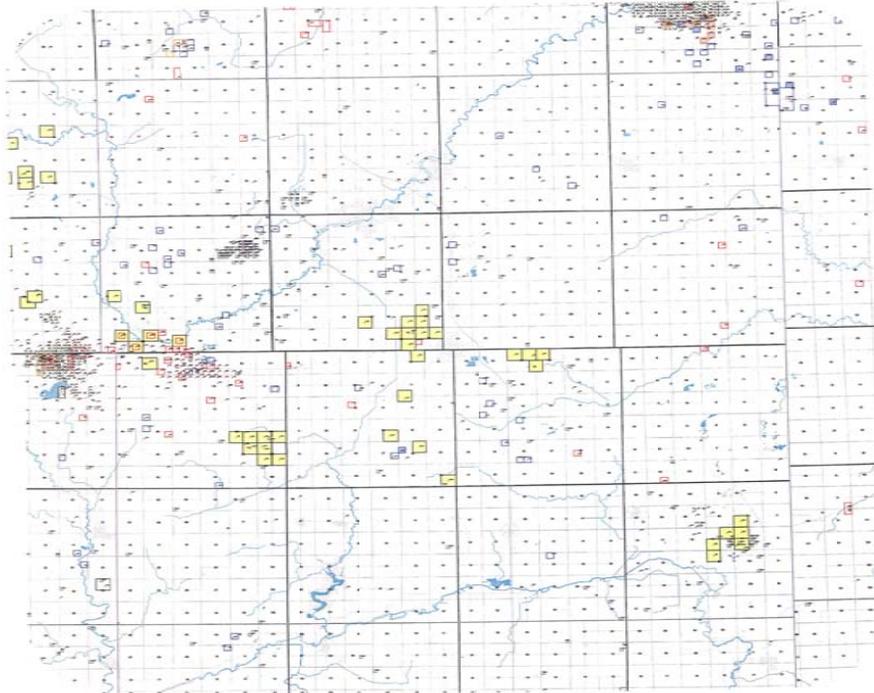
TYPE

- Natural Gas Pipeline
- High Voltage Power Line



Map 10. Oil and Gas Wells

GRATIOT COUNTY DRILLING UNITS



LEGEND:

FIELD UNITS		DRILLING UNIT TYPES:	
INACTIVE	ACTIVE	160-ACRE GAS ACT	ACTIVE
GENERAL RULE 10-ACRE	ACTIVE	INACTIVE	ACTIVE
INACTIVE	ACTIVE	VOLUNTARILY POOLED (PRE RME)	ACTIVE
INACTIVE	ACTIVE	R. 363 SPACING EXCEPTION	ACTIVE
SUPERVISORS ORDER 1-73 (98-ACRES)	ACTIVE	INACTIVE	ACTIVE
SUPERVISORS ORDER 1-88 (648-ACRES)	ACTIVE	SUPERVISORS ORDER 12-4-75 (98-ACRES)	ACTIVE
INACTIVE	ACTIVE	INACTIVE	ACTIVE
20-ACRE ALBION (2070) (5.0, 9-7-64)	ACTIVE	SUPERVISORS ORDER 18-3007 (48-ACRES)	ACTIVE
INACTIVE	ACTIVE	INACTIVE	ACTIVE



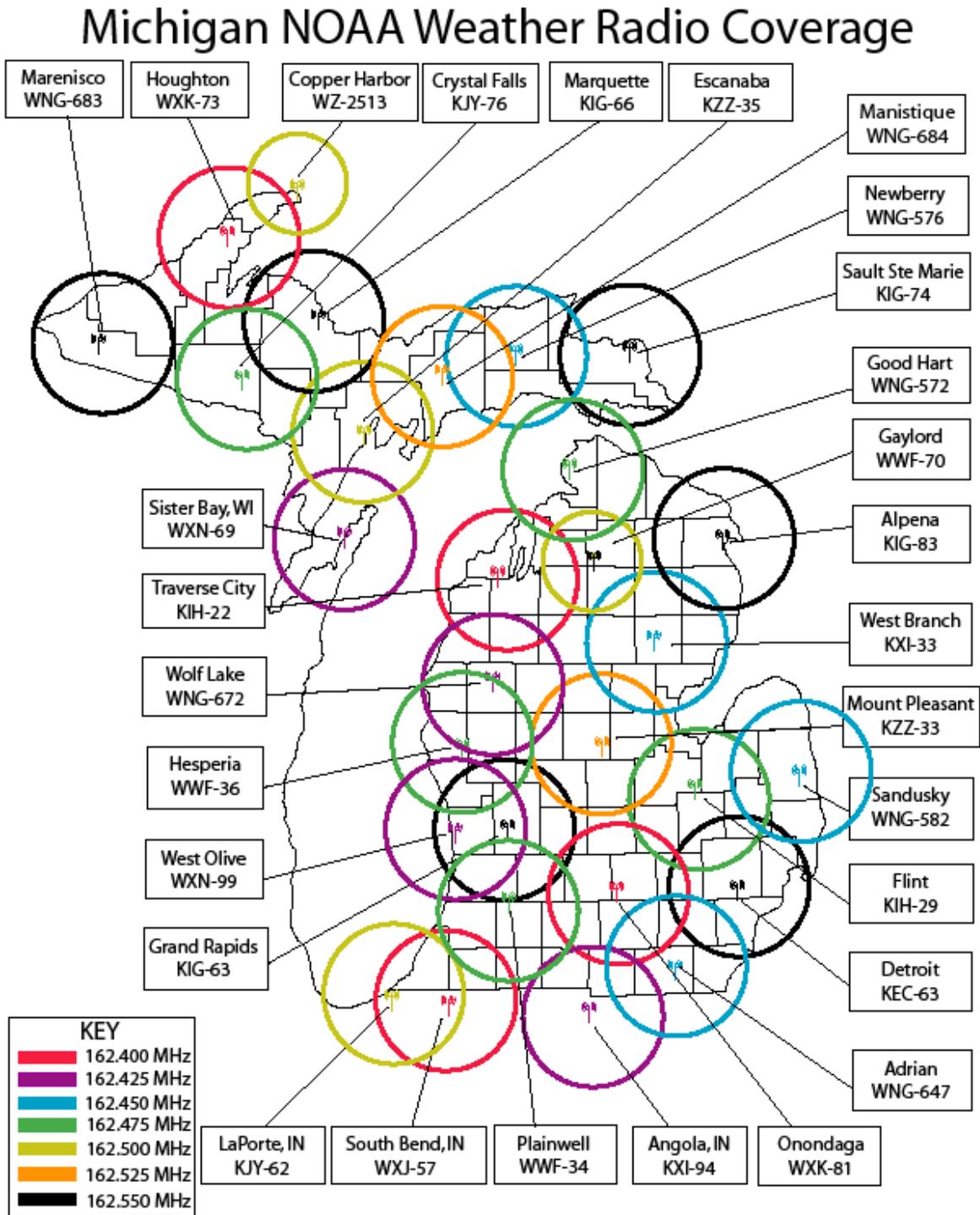
WELL TYPES

OIL	LOCATION (UNBILLED)	DRY HOLE
GAS	GAS/BRINE DISPOSAL	PLUGGED WELL
GAS CONDENSATE	GAS STORAGE	SLANT
OTHER	WATER INJECTION	SURFACE LOCATION
NEW	WATER INJECTION	DIRECTIONAL
	OTHER INJECTION	HORIZONTAL

Information provided herein is accurate to the best of our knowledge and is subject to change on a regular basis, without notice. While the Department of Environmental Quality - Office of Geological Survey (DEQ-OGS) makes every effort to provide useful and accurate information, we do not warrant the information to be authoritative, complete, factual, or timely. It is suggested that this information be combined with secondary sources as a means of verification. Information is provided on an "as is" and "as available" basis. The State of Michigan disclaims any liability, loss, injury, or damage incurred as a consequence, directly or indirectly, resulting from the use, interpretation and application of any of this information.

DATE: 11/18/2010

Map 11.National Weather Radios Coverage (Michigan)



Appendix B

Risk Assessment Data

Hazard Aspects

	Always very important	Usually important	Sometimes important	Rarely of importance	Not worth considering		Average
Hazard Aspects V	4	3	2	1	0	n	
Likelihood of occurrence	6	3					9 3.666667 2
Property damage potential	4	3	2				9 3.222222 4
Size of affected area		1	7	1			9 2.13
Speed of onset		3	6				9 2.333333 9
Percent of population affected		5	3	1			9 2.444444 7
Potential for casualties	9						9 4 1
Potential economic impact	1		7	1			9 2.111111 12
Duration of threat from hazard		4	4	1			9 2.333333 9
Seasonal risk pattern			5	4			9 1.555556 14
Environmental impact potential		5	4				9 2.555556 6
Predictability of hazard	4	3	2				9 3.222222 4
Ability to mitigate hazard	5	3	1				9 3.444444 3
Availability of warning systems	2		7				9 2.444444 7
Public awareness of hazard			3	6			9 1.333333 15
Ability to cause other hazards	1	2	4	2			9 2.222222 11

Hazard Rating Table

Hazard Aspects > Hazard List V, Weight>	Likely Casualties	Likelihood of occurrence	Ability to mitigate	Property damage potential	Predictability	Environmental impact	TOTAL
	23%	20%	18%	15%	15%	9%	100%
Winter weather hazards	2.7	4.2	3.1	3.1	3.6	2.1	3.213
Tornados	3.8	2.3	2.6	4.7	2.8	2.9	3.188
Severe Winds	2.7	3.4	2.8	4.3	2.9	2.7	3.128
Fires - major structural	3.8	1.4	3.7	4.5	2.3	2.8	3.092
Lightning/thunderstorms	2.3	4.1	3.1	3.3	3.3	2	3.077
Flood - river	2.6	2.7	3	3.6	3.2	3.5	3.013
Transportation							
accid:major	3.9	2.7	3	3.2	1.8	2.8	2.979
Haz Mat - fixed site	3.1	2.4	3.2	3.4	2.2	3.8	2.951
Haz Mat - transportation	3.4	2.5	3	3	2	4.2	2.95
Public health emergency	4	2.8	3.2	1.4	2.5	2	2.821
Well contamination	2.9	2.2	3.1	2.2	2.3	4.1	2.709
Pipeline accident - oil, gas	3	2	3	3.2	1.6	3.8	2.692
Infrastructure Failures	2.5	2.5	3.1	3.1	2.2	2.5	2.653
Extreme Temperatures	2.6	2.5	2.9	1.8	3	2.5	2.565
Terrorism/sabotage	3.3	1.6	2.5	3.2	1.6	3	2.519
Fires - wildfires	2.2	2.2	2.7	3.2	2	2.9	2.473
Flood - dam failure	2.2	1.5	3.1	3.1	2.3	3.2	2.462
Oil and gas well accidents	2.5	1.8	2.9	2.6	2	3.5	2.462
Civil unrest	2.5	1.4	2.6	3	1.8	1.8	2.205
Drought	1.6	2.4	2.2	2.3	2.3	2.8	2.186

. Summary of Multi and Single Jurisdiction Risk Assessment Outcomes – Risks of Particular Concern

	HAZMAT (fixed site)	DAM FAILURE	DROUGHT	EARTHQUAKE	EPIDEMIC	EXTREME TEMPERATURES	FLOOD	HAZMAT (in transit)	HURRICANE	ICE STORM	LANDSLIDE	SEVERE STORM	STRUCTURAL COLLAPSE	TORNADO	EXPLOSION (including grain elevators)	UTILITY FAILURE	WATER SUPPLY CONTAMINATION	WINTER STORM (severe)	CIVIL UNREST	FIRE
City of St Louis	✓	✓			✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
City of Ithaca	✓		✓		✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓
City of Alma	✓	✓	✓		✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Arcada Township	✓	✓	✓		✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Bethany Township																				
Elba Township	✓		✓		✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Emerson Township	✓		✓		✓	✓	✓	✓		✓		✓		✓	✓	✓	✓	✓		✓
Fulton Township			✓					✓		✓		✓		✓		✓		✓		
Hamilton Township			✓		✓		✓			✓		✓		✓		✓	✓	✓		
Lafayette Township			✓		✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓		✓
Newark Township																				
New Haven Township	✓		✓		✓		✓	✓		✓		✓		✓	✓	✓	✓	✓		
North Shade Township	✓		✓		✓			✓		✓		✓	✓	✓	✓	✓	✓	✓		✓
North Star Township			✓		✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Pine River Township	✓	✓	✓		✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Seville Township	✓		✓		✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Sumner Township			✓		✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Washington Township	✓		✓				✓	✓		✓		✓		✓	✓	✓	✓	✓		✓
Wheeler Township	✓				✓			✓		✓			✓	✓	✓	✓		✓		✓
Village of Ashley	✓		✓		✓			✓		✓			✓	✓	✓	✓	✓	✓	✓	✓
Village of Breckenridge	✓		✓		✓			✓		✓			✓	✓	✓	✓	✓	✓	✓	✓
Village of Perrinton	✓				✓		✓	✓		✓		✓		✓	✓	✓	✓	✓		✓

Appendix C

Meeting Minutes and Sign-in

Work on the Plan began in the late summer of 2003. The following timeline is a brief summary of the activities that took place and the chronological order in which they were performed.

- October 2003 Contacted all local municipalities within Gratiot County regarding the upcoming planning process. See Resolutions Section for information regarding these municipalities.
- November 2003 Reviewed the Sample Plan provided by the State of Michigan.
- November 2003 Requested the Risk Assessment Software from FEMA. This software called HAZUS was intended to create location specific data that could be utilized in the Hazard Mitigation Plan. This software would have been a great asset if it had worked as intended. Unfortunately, the software was found to be incompatible even after making several contacts with FEMA and ESRI. Ultimately it cost a great deal of time and effort that could have been focused on a more detailed analysis of existing data.
- December 2003 Held public hearing to obtain input from the local jurisdictions and the Community.
- Dale Sherman, City of Ithaca*
Alfred Silhavy, Arcada Township
Dennis Fitzpatrick, Fulton Township
Lowell Bebow, Planning Commission
Mari A Layman, City of St Louis
Dale Price, Gratiot County
Chad R Doyle, Gratiot County
Terri Boyle, Gratiot County
- December 2003 Worked on software conflict issues with the Hazus software.
- December 2003 Meeting with Pipeline Group was held to discuss disclosure of electronic mapping information.
- January 2004 Gathered demographic information regarding Gratiot County's population centers.
- January 2004 Held the second Public Hearing meeting.
- February 2004 Began collecting GIS information.

March 2004	Began Assembling Plan.
June 2004	Began researching alternative risk assessments due to HAZUS problems.
June 2004	Began creating maps to show local demographics.
July 2004	Researched Gratiot County Master Plan.
July 2004	Held meeting with Drain Commissioner employee to solve some of the GIS issues.
September 2004	Collected mitigation activity data.
October 2004	Assembled text, graphics and maps for final draft of Plan.
November 2008	Public hearing for the hazard mitigation plan held.
October 2009	<p>After a change in county administration, the county planners refocus attention on the hazard mitigation plan. The plan is reviewed and an outline for improvement is created. A new planning team is formed consisting of</p> <p><i>David Walsh, Phil Moore, Ron Turner, Barb Gager, Dave Ringle, Matt Schooley, Dan Stasa, Brian Dancer -City of Alma</i></p> <p><i>Roy Miller-Fulton Township</i></p> <p><i>Mark Knowles, Nicole Frost, John Aten, Dave Witherall, Earl Hunt-Gratiot County</i></p> <p><i>Pat Herblet, Kurt Giles-City of St Louis</i></p> <p><i>Dave Nelson, Chelsey Foster, Steven Lytle-City of Ithaca</i></p> <p><i>Doug Merchant-Arcada Township</i></p> <p><i>Mike Sobocinski-MSP EMHSD</i></p>
November 2009	Task assignment and committees established.
December 2009	Risk assessment and hazard analysis developed.
January 2010	Hazard priorities established.
February 2010	Goals and objectives established.

March 2010	Mitigation strategies developed.
March 2010	Mitigation strategies reviewed. Draft plan reviewed.
April 2010	Draft plan posted on county website for public review and comment.
April 2010	Draft plan reviewed at board of commission meeting. Plan submitted to state for review.
May 2010	Initial review of draft completed and plan updated.

Minutes of the 11/25/2008 Meeting

Members present: Sparks, Harkness, Fitzpatrick, Swanson

Members absent: Loenshal, Timmons

Others present: L. Roslund, T. Sparks, C. Griffith

Meeting called to order by Chairman Swanson

Motion by Harkness, support by Fitzpatrick to approve the Minutes of the 11/18/2008 Meeting

Vote – all ayes

Motion carried

Public Hearing

Public Hearing for Special Land Use application submitted by Tom & Shawyn Sparks called to order by Chair at 7:05 p.m.

Presentation by Chuck Griffith

Motion by Harkness, support by Fitzpatrick to approve the application

Vote – all ayes

Motion carried / Special Land Use approved

Shawn Sparks abstained from voting

Public Hearing closed by Chair at 7:10 p.m.

Public Hearing

Gratiot County Hazard Mitigation Public Hearing called to order by Chair at 7:15 p.m.

Discussion

Motion by Sparks, support by Harkness to approve the Hazard Mitigation Plan

Vote – all ayes

Motion carried / Gratiot County Hazard Mitigation Plan approved

Public Hearing closed by Chair at 7:20 p.m.

PA 116

Two PA 116 applications submitted by Larry & Diana Mallory of Seville Township

Motion by Sparks, support by Harkness to deny approval of the two applications due to the incompleteness of #'s 15 & 17, the properties are also in trusts.

Vote – all ayes

Motion carried / Applications denied

Old Business

Update on Wind Turbine Ordinance by Chad Doyle

Motion by Fitzpatrick, support by Harkness to adjourn

Vote – all ayes

Motion carried

HAZARD MITIGATION
PLAN MEETING

Please sign in

OCT. 19, 2009
PINE RIVER TWP. HALL

Name	Jurisdiction	E-mail	Phone
DAVID WALSH	ALMA	dwalsh@ci.alma.mi.us	989-463-5717
Phillip M... ..	ALMA	pm...@ci.alma.mi.us	989-463-5336
Paul Gager	Alma	bgager@ci.alma.mi.us	463-8336
Bob Turner	Alma	rtturner@ci.alma.mi.us	463-5346
Roy Miller	Alma		236-7772
DAVE BLOOM	CITY OF ALMA	dbloom@ci.alma.mi.us	463-8346
Matt Spring	ALMA	mspring@ci.alma.mi.us	463-8317
DAN STASA	CITY OF ALMA	dstasa@ci.alma.mi.us	463-8356
BRIAN DANCER	CITY OF ALMA	bdancer@ci.alma.mi.us	463-8356
MARK KNOWLES	GRATIOT CITY	mknwls@gratiotmi.com	463-4653
John P... ..	GRATIOT CO.	jp...@gratiotmi.us	875-5172
David W... ..	GRATIOT CO.		
EARL HUNT	GRATIOT S.D.	ehunt@gratiotmi.us	972-3234
PAT Herb... ..	S.L.P.D.	pherb...@slpd.com	869-5785
BOB NELSON	Illwaco Fire	chief@illwaco.net	
Doug Merchant	Arcaula	dmerchant@pineriver.org	257-7420
STEVE LYCC	ITHACA PD	lthacpd@emsi.com	875-2029
Chelsea Foster	City of Ithaca	cfoster@ci.ithaca.ny.us	875-3720/763-105
NICOLE FROST	GRATIOT CO.	nfrost@co.gratiot.mi.us	370-5282
MIKE SOBOLINSKI	STATE POLICE EMHSD	sobolinski@michigan.gov	(517) 336-2053

Hazard Mitigation Plan Meeting

October 19, 2009

10am

Pine River Township Hall

Present: Phillip Moore, City Manager, City of Alma; Dave Walsh, City of Alma Police Department; Ron Turner, City of Alma; Barb Gager, City of Alma; Roy Miller, Fulton Township; Dave Ringle, City of Alma; Matt Schooley, City of Alma Police Department; Dan Stasa, City of Alma; Brian Dancer, City of Alma; Mark Knowles, Gratiot County; John Aten, Gratiot County Emergency Management; David Witherall, Gratiot Emergency Management; Earl Hunt, Gratiot County Sheriff Dept.; Pat Herblet, St. Louis Police Department; Dave Nelson, City of Ithaca Fire Department; Doug Merchant, Arcada Township; Steve Lytle, City of Ithaca Police Department; Chelsey Foster, City of Ithaca; Nicole Frost, Gratiot County; Mike Sobocinski, Michigan State Police.

Phillip Moore, Alma City Manager provided a brief overview of the Hazard Mitigation Plan. Local units of government are required to have a Hazard Mitigation Plan (HMP) in order to qualify for hazard mitigation grants from FEMA in the event of an emergency. The plan needs to be updated every five years.

Gratiot County submitted an HMP in 2004 as part of a multijurisdictional effort. It was recently discovered that the plan was never approved by the Michigan State Police and consequently, under current guidelines, jurisdictions in Gratiot County would not be eligible for FEMA mitigation project funds in the event of a disaster. The plan submitted by Gratiot County can be used as a starting point for the new plan, but many updates and changes need to be made. Mr. Moore advised that the City of Alma is committed to submitting a plan, and is willing to work with other jurisdictions, but all have to contribute to the plan and the plan needs to be completed in a timely fashion. Mr. Moore went on to advise that he has a copy of an approved plan by the City of Saline and would like to model Gratiot County's after that plan. He advised that the purpose of this meeting was to determine what jurisdictions want to be a part of this process and set meeting times to complete the process.

Mike Sobocinski, Michigan State Police advised that he was in the process of reviewing the Gratiot County plan and has found that it is approximately 50% compliant. This is a definite foundation to build upon. He reviewed some of the deficiencies, but reiterated that he had not completed a thorough review of the plan.

Members of the audience all agreed that a plan needs to be in place and that it would be best to work together on the plan.

Mr. Sobocinski suggested a committee of different stakeholders; the requirements are flexible; there is no standard template based upon the contents of the plan. He suggested that each community have members on the committee that represent utilities, zoning, and safety. These appointees will represent the core group that will work on the plan.

John Aten, Gratiot County Emergency Planning, suggested that each community adopt a cost recovery ordinance to aid in recouping costs after an emergency.

Mr. Sobocinski advised that each jurisdiction has to show participation in the plan development. The plan needs an overview of the hazards; an assessment of the impacts the hazards would have; and prioritizations to address the hazards. It may be necessary to include specific projects in the plan in order to get funding for that plan.

Mr. Sobocinski advised that he planned to complete his review of the current plan by the end of the week and at that time, he would send out his recommendations. The group would put together their core group; it would not be necessary to have formal meetings all the time; email and phone calls would serve as well as a scheduled meeting. Public input into the development of the plan is important. Once the plan is completed, a public hearing is needed to allow people to review the plan and comment. The plan can be posted on line and email comments can be accepted. The final plan would need to be adopted by the County Commission after the public comment period and can be done at a regular meeting.

The HMP is a mitigation plan; not a response plan. The plan should be coordinated with the Master Planning Committee to foresee any problems (i.e.: constructing a building in a flood plain). Mr. Sobocinski will serve in an advisory capacity and act as a go-between to assist the committee in refining the plan so that it can pass FEMA review.

Members appointed staff to the core group and the next meeting was set for November 4, 2009 at 10:00 a.m. at the Gratiot County Emergency Operations Center in Ithaca.

Respectfully submitted,

Barbara A. Gager, City Clerk
City of Alma

HAZARD MITIGATION PLAN MEETING
Proposed Minutes
November 4, 2009
10:30 a.m.
EMERGENCY MANAGEMENT CENTER

Call to Order

The meeting was called to order at 10:30 a.m. by Nicole Frost, Gratiot County Administrator. Each participant in the meeting stated their name and jurisdiction.

Present: Nicole Frost, Gratiot County Administrator, Mike Sobocinski, Michigan State Police, Philip Moore, City Manager, City of Alma, Kurt Giles, City of St. Louis, Dan Stasa, City of Alma, Matt Schooley, City of Alma Police Department, Aaron Hubbard, Gratiot County IT, David Walsh, City of Alma Police Department, Ron Turner, City of Alma, Steve Lytle, City of Ithaca Police Department, Mark Knowles, Gratiot County Chairman of the Board, Chelsey Foster, City Manager, City of Ithaca, Earl Hunt, Gratiot County Undersheriff Dave Nelson, City of Ithaca Fire Department, David Witherell, Asst to EM Coordinator, Rose Hubbard, Gratiot County

Organizational Issues

Project Chair

Nicole Frost, Gratiot County Administrator, will be the Project Chair being this is a County wide project

Recording Secretary

Rose Hubbard, Gratiot County Administration, will be the recording secretary

Gather contact information

A sign in sheet was passed around for each member to sign stating their name, jurisdiction and contact information.

Staffing

Nicole Frost will do the editing
Rose Hubbard will take the minutes

Working Committees will be created which will produce a large portion of the plan. Committees will take their completed portion of the plan to Ms. Frost to edit and enter into the County wide plan.

PowerPoint presentation from Mike Sobocinski

Mike Sobocinski, Local Hazard Mitigation Specialist, Emergency Management Division, Michigan State Police presented a PowerPoint presentation on Hazard Mitigation Planning.

Plan Participating Jurisdictions

The base group was formed with members present. After the Risk Assessment is complete, fire districts, which representatives from each township attend their board meetings, should be met with. If areas are not interested in participating after being given the opportunity to, Mike Sobocinski stated that would be fine and not to worry about their participation. A fire district map needs to be acquired to determine each district. Meetings with the fire districts should take place January - February 2010.

Timeline

Phillip Moore stated flooding and windstorms begin around April each year and it would be nice to have a completed plan before these occur.

Complete by April 1, 2010

Deadline for completion is April 1, 2010

Hazard Prioritization

Mike Sobocinski, Local Hazard Mitigation Specialist, stated he has found enough new information that should be considered before prioritization of hazards. This will be reviewed at the next meeting.

Assignment of Tasks

Phillip Moore, City of Alma, discussed a list he has created for identification of hazards They are:

1. High Winds, Tornados, Straight Line Winds
2. Floods
3. Infrastructure failures
4. Severe Winter Weather
5. Hazardous Materials - Transportation

6. Hazardous Materials - Fixes sites
7. Lightning and Thunderstorms
8. Dam Failures
9. Drought
10. Extreme Temperatures
11. Petroleum and natural gas pipeline accidents
12. Contamination of wells
13. Public Health emergencies
14. Sabotage and terrorism
15. Structural fires
16. Civil Unrest

Added to list

17. Wildfires
18. Major Transportation Accidents
19. Oil and Gas Wells

Unlikely Hazards

1. Earthquakes
2. Subsidence
3. Hurricanes
4. Volcanoes
5. Nuclear Attack
6. Nuclear power plant accidents
7. Mud slides

Mike Sobocinski, Local Hazard Mitigation Specialist, states the major aspect of hazards to include are:

Risk Location
 Magnitude of impact of Risk
 Future Probability for Risk
 Consider Perspective of each Jurisdiction

Remember to site the source of the information.

Create subcommittees

Mike Sobocinski, Local Hazard Mitigation Specialist created the following Sub Committees using Mr. Moore's Identification of Hazards list.

Natural Hazards

Individuals on this Committee: Ron Turner, City of Alma, Phillip Moore, City of Alma,
Dan Stasa, City of Alma, Kurt Giles, City of St. Louis
(but not limited to)

Weather

1. High Winds, Tornados, Straight Line Winds
4. Severe Winter Weather
7. Lightning and Thunderstorms
10. Extreme Temperatures

Flooding and Drought

2. Floods
8. Dam Failures
9. Drought

Technological Hazards

Individuals on this Committee: Dave Nelson, City of Ithaca Fire, Harold House or Hal
Smith, City of Alma Fire, Earl Hunt, Gratiot County Sheriff
Dept and Steve Lytle, City of Ithaca Police
(but not limited to)

Industrial

15. Structural
17. Wildfires
11. Petroleum and natural gas pipeline accidents
5. Hazardous Materials - Transportation
6. Hazardous Materials - Fixes sites

Infrastructure

Individuals on this Committee Ron Turner, City of Alma, Kurt Giles, City of St Louis
(but not limited to)

3. Infrastructure failures
12. Contamination of wells
18. Major Transportation Accidents
19. Oil and Gas Wells

Human - Related Hazards

Individuals on this Committee
(but not limited to)

Dave Walsh, City of Alma Police Chief

- 13. Public Health emergencies
- 14. Sabotage and terrorism
- 16. Civil Unrest

Distribute hazard information and history

Handouts of additional information provided by Mike Sobocinski, Local Hazard Mitigation Specialist

New Business

No New Business

Schedule next meeting

November 24, 2009 at 10:00 a.m. at the EOC center

Adjournment

Meeting adjourned at 12:10 p.m.

HAZARD MITIGATION PLAN MEETING
Proposed Minutes
December 15, 2009
10:00 a.m.
EMERGENCY MANAGEMENT CENTER

Call to Order

The meeting was called to order at 10:00 a.m. by Nicole Frost, Gratiot County Administrator.

Present: Nicole Frost, Gratiot County Administrator, Mike Sobocinski, Michigan State Police, Philip Moore, City Manager, City of Alma, Kurt Giles, City of St. Louis, Dan Stasa, City of Alma, Mark Knowles, Gratiot County Chairman of the Board, Chelsey Foster, City Manager, City of Ithaca, Glenn Feldhauser, Emergency Services, Rose Hubbard, Gratiot County, Bill Burnham, Fulton Township, David Walsh, Alma City Police Department, Ron Turner, City of Alma

Approval of Agenda

Motion by Chelsey Foster, second by Philip Moore to accept the agenda as presented.

Approval of Minutes from November 24, 2009

Motion by Dan Stasa, second by Mark Knowles to approve the November 24, 2009 Hazard Mitigation Plan Minutes as presented.

Vote: All Ayes. Motion carried.

Review of Committee Progress

Weather Hazards

Philip Moore stated the Weather Hazards are complete and were included in the past minutes

Hydrological Hazards

Dan Stasa stated this was in rough draft form and should be complete by the next meeting.

Industrial

Chelsey Foster presented a hand out (attachment A) for Fixed Site Hazards for Brownfield sites and Hazardous Material Handlers. He stated this was just a start of their part. Dave Nelson stated he is working on the Wild fire portion but has not started on the Hazardous Materials – Transportation.

Infrastructure

Ron Turner stated they have addressed the Infrastructure Failures and the Contamination of Wells but have not started on Major Transportation Accidents yet.

Human-Related Hazards

Dave Walsh stated he has met with Chief Herblet and more meetings are necessary.

Hazard Prioritization Exercise – Mike Sobocinski

Continuation of the Hazard Prioritization Exercise was conducted by Mike Sobocinski. Philip Moore stated he has completed a Hazard Assessment survey (attachment B) and this could be used to revise the exercise chart. Revised Hazard Prioritization Exercise spreadsheet attached (attachment C)

Committee Assignments

Mitigation Strategies

Gratiot County Townships have to participate in some way before plan can be approved. The plan will need to include documented proof of participation in planning for each Township. Townships covered by Gratiot County Planning and Zoning would be covered under the County section of the plan.

New Business

No new business

Schedule next meeting

January 19, 2010 at 10:00 a.m. is the next Hazard Mitigation Planning meeting

Adjournment

Meeting adjourned at 11:30 p.m.

HAZARD MITIGATION PLAN MEETING
Proposed Minutes
January 19, 2010
10:00 a.m.
EMERGENCY MANAGEMENT CENTER

Call to Order

The meeting was called to order at 10:04 a.m. by Nicole Frost, Gratiot County Administrator

Present: Nicole Frost, Gratiot County Administrator, Mike Sobocinski, Phillip Moore, Alma City Manager, Glenn Feldhauser, Gratiot EMD, Dave Nelson, Gratiot County Fire Chief, Mark Knowles, Gratiot County Chairman of the Board, Dan Stasa, City of Alma, Kurt Giles, City of St Louis, Ron Turner, City of Alma, Chelsea Foster, Ithaca City Manager

Approval of Agenda

Motion by Dave Nelson, second by Phillip Moore to accept the agenda as presented.

Approval of Minutes from December 15, 2009

Motion by Phillip Moore, second by Ron Turner to approve the December 15, 2009 Hazard Mitigation Plan Minutes as presented.

Vote: All ayes. Motion carried.

Review of Committee Progress

Weather Hazards

Phillip Moore stated there were no additions.

Hydrological Hazards

Dan Stasa passed out data on flooding and dam failures.

Industrial Hazards

Brownfield material was passed out last meeting. Steve Lytle is working on the GIS. Dave Nelson requested information from fire departments on their numbers regarding large fires but has not received that documentation yet.

Infrastructure Hazards

Ron Turner stated the maps are complete but no copies have been made yet. Utilities which included public water systems, catastrophic breaks historically have occurred at a rate of approximately .16 per year, and sanitary sewer .03 per year. There are 138 bridges owned by local authority, 23 are substandard, all are tested biannually. There are 58 active oil and gas wells, 438 unplugged and terminated. Water well contamination normally happens in Brownfield sites, the expected rate is .03 per year.

Human Related Hazards

Civil unrest is fairly low. Prison breaks are the highest risk.

Hazard Mitigation Strategy Options by Jurisdiction

Possible Mitigation Strategies – By Hazard handout by Mike Sobocinski

There are different funding sources for different hazards. Declared disasters would be federal funding. Pre Disaster Mitigation Programs would handle sirens, etc.

Winter Weather Hazards

Substantial Strategies:

- a. Increased coverage and use of NOAA Weather Radio
- b. Tree trimming and maintenance to prevent limb breakage and safeguard nearby utility lines
- c. Establishing heating centers/shelters for vulnerable populations
- d. Encourage residents to develop a Family Disaster Plan

Snowstorms

- a. Maintaining adequate road and debris clearing capabilities (can be crossed with land use)

Severe Winds and Tornadoes

- a. Establishing safe and appropriate locations for temporary debris disposal sites
- b. Construction of concrete safe rooms in homes and shelter areas in mobile home parks, fairgrounds, shopping malls or other vulnerable public areas.

Committee Assignments

Flood Plains – Phillip Moore

Fire Boards – Dave Nelson, Kurt Giles

New Business

No new business

Schedule Next Meeting

February 2, 2010 at 10:00 a.m. is the next Hazard Mitigation Planning Meeting

Adjournment

Meeting adjourned at 11:56 a.m.

HAZARD MITIGATION PLAN MEETING
Proposed Minutes
March 2, 2010
10:00 a.m.
EMERGENCY MANAGEMENT CENTER

Call to Order

The meeting was called to order at 10:00 a.m. by Nicole Frost, Gratiot County Administrator.

Present: Nicole Frost, Gratiot County Administrator, Phillip Moore, City Manager, City of Alma, Kurt Giles, City of St. Louis, Glenn Feldhauser, Emergency Services, Rose Hubbard, Gratiot County, Ron Turner, City of Alma, Dave Nelson, Gratiot County Fire Chiefs Association

Approval of Agenda

Motion by Phillip Moore, second by Dave Nelson to accept the agenda as presented.

Approval of Minutes from February 2, 2010

Dave Nelson stated the minutes needed to be corrected to say Dave Nelson Gratiot County Fire Chiefs Association in the Members Present. He is not the Fire Chief, he represents the Fire Chiefs.

Nicole Frost noted that Mike Sobocinski had suggested a change to the minutes to state that a “community must choose at least one mitigation strategy”, and not “have identifiable hazards”.

Motion by Ron Turner, second by Phillip Moore to approve the February 2, 2010 Hazard Mitigation Plan Minutes with the corrections.

Vote: All Ayes. Motion carried.

Review of Committee Progress

Nicole Frost, County Administrator stated most of the Committees have completed their part of the plan.

Infrastructure

Ron Turner stated he turned his information into Nicole Frost this morning.

Human-Related Hazards

Glen Feldhauser stated he needs information on Transportation Accidents from Dave Walsh.

Define Goals and Objectives

The goals of the Gratiot County Hazard Mitigation Planning Group were created with the best of intentions to provide a safe and prosperous future within the County. It was the general consensus that just as the “Planning Workbook” suggests, the goals would be broad and global in nature with more detail reflected in the Objectives. The Goals that were agreed upon are as follows:

GOALS AND ASSOCIATED OBJECTIVES

1. Minimize the harmful effects of severe weather hazards.
 - a. Increase coverage and use of NOAA weather radio
 - b. Enhance public early warning systems and network
 - c. Enforcement of Building Codes and Property Maintenance
 - d. Increase education regarding the importance of securing all structures as well as taking care of clutter to help eliminate flying debris
2. Improve the efficiency of all local emergency response services
 - a. Establish heating center/shelters for vulnerable populations
 - b. Increase communications interoperability with all emergency responders and support agencies
 - c. Increase capacity for on site de-contamination efforts
 - d. Enhance existing mutual aid agreements with all emergency services
 - e. Enforce NIMS compliance with participating agencies
 - f. Utilize GIS to assist in identifying hazards
3. Reduce the frequency of utility loss
 - a. Promote aggressive tree management for all utilities
 - b. Create a liaison for all utilities to discuss trimming matters as well as partnering for these tasks
4. Reduce flood losses
 - a. Encourage all municipalities to participate in NFIP and adopt FEMA’s floodplain maps
 - b. Identify better data to produce more accurate floodplain maps
 - c. Encourage adoption of zoning ordinances that enhance floodplain management

Mitigation Strategies by Jurisdiction

1. Communication at area fire board meetings.
2. Glenn Feldhauser stated he would send a letter to each Township and Village asking for their participation in the plan.

Committee Assignments

a. Review Draft Document

New Business

NIM's training 300 and 400. You need to take 100, 200, 700 and 800 before you take 300 and 400.

A Transcript from FEMA would show who has completed training.

Schedule next meeting

March 23, 2010 at 10:00 a.m. is the next Hazard Mitigation Planning meeting

Adjournment

Meeting adjourned at 11:10 p.m.

HAZARD MITIGATION PLAN MEETING
Proposed Minutes
March 23, 2010
10:00 a.m.
EMERGENCY MANAGEMENT CENTER

Call to Order

The meeting was called to order at 10:02 a.m. by Nicole Frost, Gratiot County Administrator.

Present: Nicole Frost, Gratiot County Administrator, Kurt Giles, City of St. Louis, Glenn Feldhauser, Emergency Services, Rose Hubbard, Gratiot County, Ron Turner, City of Alma, Dave Nelson, Gratiot County Fire Chiefs Association, Chelsey Foster, City of Ithaca

Approval of Agenda

Motion by Ron Turner, second by Kurt Giles to accept the agenda as presented.

Approval of Minutes from March 2, 2010

Motion by Ron Turner, second by Kurt Giles to approve the March 2, 2010 Hazard Mitigation Plan Minutes

Vote: All Ayes. Motion carried.

Review of Draft Documents Edits

1. Nicole Frost stated she had received an email from Phillip Moore, City of Alma that the documents looked great.
2. Kurt Giles, City of St. Louis stated the document was ok.
3. Chelsey Foster, City of Ithaca stated under Community Profile, Table 8 Principle Employers was a little inaccurate and should be updated using information Greater Gratiot has compiled.
4. Ron Turner, City of Alma had some clean up suggestions that Glenn Feldhauser had already completed before the meeting.

Update on Mitigation Strategies by Jurisdiction

Phillip Moore, City of Alma submitted 2 pages of Mitigation Strategies – Glenn Feldhauser stated that some of those suggestions do not apply and some are repetitive.

Nicole Frost stated to go with the 15 strategies we have, plus add one under Weather Related Hazard: To redesign and reconstruct bridges/culverts to eliminate obstructions of flood way.

Glenn Feldhauser needs to finish the index, then give to Aaron Hubbard, County IT to place on the County Website and send to Mike Sobocinski, Michigan State Police for his review.

New Business

No new business

Schedule next meeting

No meeting scheduled at this time. Will wait for comments from Mike Sobocinski, Michigan State Police.

Adjournment

Motion by Chelsey Foster, second by Dave Nelson to adjourn the meeting.

Vote: All ayes Motion carried