2017 Updated Multi-Jurisdictional Hazard Mitigation Plan for Grundy County, Iowa




Adopted By:

Grundy County (06/19/2017) City of Beaman (10/11/2017), City of Conrad (10/12/2017), City of Dike (10/11/2017), City of Grundy Center (09/18/2017), City of Holland (10/03/2017), City of Morrison (10/09/2017), City of Reinbeck (10/02/2017), City of Stout (10/02/2017), City of Wellsburg (10/02/2017), and Grundy Center Community School District (10/18/2017)

Approved by FEMA: October 17, 2017
FEMA Approval Expiration: October 17, 2022

Funded by:
Federal Emergency Management Agency (FEMA) Pre-Disaster Mitigation Program
Iowa Homeland Security and Emergency Management Department (HSEMD)
Grundy County

Prepared by:
Iowa Northland Regional Council of Governments (INRCOG)

INRCOG

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U.S. Department of Homeland Security
FEMA Region VII
9221 Ward Parkway, Ste. 300
Kansas City, MO 64114-3323

FEMA

October 17, 2017

Mark Schouten, Director
Iowa Homeland Security & Emergency Management Division
7900 Hickman Road, Suite 500
Windsor Heights, IA 50324

Subject: Review of the Grundy County, Iowa Hazard Mitigation Plan

Dear Mr. Schouten:

The purpose of this letter is to provide the status of the above referenced Local Hazard Mitigation Plan, pursuant to the requirements of 44 CFR Part 201 - Mitigation Planning and the Local Multi-Hazard Mitigation Planning Guidance. The Local Hazard Mitigation Plan Review Tool documents the Region's review and the plan compliance with all required elements of 44 CFR Part 201.6. The Plan Review Tool also identifies the jurisdictions participating in the planning process. FEMA's approval will be for a period of five years effective starting with the approval date indicated below.

Prior to the expiration of the plan the community will be required to review and revise their plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval in order to continue to be eligible for mitigation project grant funding.

Plan Name	Date Submitted	Date Approved	Date of Plan Adoption	Date of Plan Expiration	Review Status
Grundy County	September 7, 2017	October 17, 2017	June 19, 2017	October 17, 2022	Approved

If you have any questions or concerns, please contact Joe Chandler, Planning Team Lead, at (816) 283-7071.

Sincerely,

MICHAEL R SCOTT Digitally signed by MICHAEL R SCOTT Date: 2017.10.17 15:41:59 -05'00'

Michael Scott
FEMA Region VII
Acting Deputy Administrator

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ACKNOWLEDGEMENTS

HAZARD MITIGATION PLANNING COMMITTEE

Over the course of the planning process a number of individuals donated their time and efforts toward providing information, attending meetings, and providing input for the successful completion of the plan. The following is a list of people who participated in the development of this Grundy County Multi-Jurisdictional Hazard Mitigation Plan, in no particular order:

Grundy County
Zach Tripp

City of Beaman
LaVonne Sternhagen

City of Conrad
Jeff Martin
Lori Stansberry

City of Dike
Chris Heerkes
Chad Cutsforth
Lindsay Nielsen
Michael Soppe

City of Grundy Center
Dan Bangasser

City of Holland
Kristy Sawyer

City of Morrison
Peggy Hussmann

City of Reinbeck
Julie Wilkerson

City of Stout
Celane Hauser

City of Wellsburg
Wendy Lage

Grundy Center School District
Jerry Schutz

INRCOG Planning Team Leads
Brian Schoon, AICP, Director of Development
Jacob Tjaden, Community Planner
Ryan McKinley, Community Planner

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SECTION 1 – INTRODUCTION

INTRODUCTION

Natural hazards have the potential to cause property loss, loss of life, economic hardship, and threats to public health and safety. While an important aspect of emergency management deals with disaster recovery – those actions that a community must take to repair damages, and make itself whole in the wake of a natural disaster – an equally important aspect of emergency management involves hazard mitigation. Hazard mitigation measures are efforts taken before a disaster happens to lessen the impact that future disasters of that type will have on people and property in the community. They are things you do today to be more protected in the future. Hazard mitigation actions taken in advance of a hazard event are essential to breaking the typical disaster cycle of damage, reconstruction, and repeated damage. With careful selection, hazard mitigation actions can be long-term, cost-effective means of reducing the risk of loss and help create a more disaster-resistant and sustainable community. The Grundy County Multi-Jurisdictional Hazard Mitigation Plan (M-J HMP) was developed to assist in making the entire planning area (Grundy County unincorporated and incorporated areas) less susceptible to these hazards. The City of Dike was the only community with a previous (single-jurisdictional) hazard mitigation plan; therefore, this M-J HMP is intended to replace that individual hazard mitigation plan and create one plan for the entire planning area.

What is a Hazard Mitigation Plan?

Generally, the first question asked when communities begin the process of preparing a Hazard Mitigation Plan (HMP) is very simply "What is a Hazard Mitigation Plan and what is it intended purpose?" First, it is imperative to define what precisely the term mitigation entails. One definition of the term is stated most effectively by the Federal Emergency Management Agency (FEMA) and is as follows: *"Mitigation is defined as any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event. Mitigation, also known as prevention (when done before a disaster), encourages long-term reduction of hazard vulnerability. The goal of mitigation is to decrease the need for response as opposed to simply increasing the response capability." (www.fema.gov).*

A hazard mitigation plan is developed by local government(s) before a disaster strikes. The plan identifies local community policies, actions, and tools for on-going, short-, mid-, and long-term implementation to reduce risk and potential future losses of property and lives.

Purposes of Hazard Mitigation Planning

The following list identifies reasons to conduct hazard mitigation planning:

- To facilitate the protection of the health, safety and economic security of residents, workers, visitors and property owners by mitigating the impacts of natural and manmade hazards.
- Influence decision making in both the public and private sectors.

- Fulfill statutory requirements of the Disaster Mitigation Act of 2000 – as of November 1, 2004 a community must have a FEMA-approved hazard mitigation plan in order to be eligible for FEMA project grant monies under programs such as the Flood Mitigation Assistance Grant program (FMA), Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation Grant program (PDM), Severe Repetitive Loss Grant program (SRL), Repetitive Flood Claims Grant program (RFC), and certain categories of aid under the Public Assistance Grant program (PA).

Requirement §201.6(b): In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning shall include: 1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval; 2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have authority to regulate development, as well as businesses, academia and other private non-profit interests to be involved in the planning process; and 3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

Requirement §201.6(c)(1): [The plan shall document} the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

- Fulfill contractual obligations under the Hazard Mitigation Grant Program (HMGP).
- Receive credit under the Community Rating System (CRS).

WHAT IS A MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN?

A multi-jurisdictional hazard mitigation plan is a plan jointly prepared by more than one local government or jurisdiction. Local jurisdictions have the option to participate in a multi-jurisdictional hazard mitigation plan under the Disaster Mitigation Action of 2000 (DMA 2000). A local government is defined by Title 44 Part 201 Mitigation Planning in the Code of Federal Regulations (CFR) as *"any county, municipality, city, town, township, public authority, school district, special district, intrastate district, council of governments (regardless of whether the council of governments is incorporated as a nonprofit corporation under State law), regional or interstate government entity, or agency or instrumentality of a local government; any Indian tribe or authorized tribal organization, or Alaska Native village or organization; and any rural community, unincorporated town or village, or other public entity."*

Requirement §201.6(a)(3): Multi-jurisdictional plans (e.g., watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process…Statewide plans will not be accepted as multi-jurisdictional plans.

The Grundy County Multi-Jurisdictional Hazard Mitigation Plan planning area including the following local governments that participated in the planning process:

- Unincorporated Grundy County
- City of Beaman
- City of Conrad
- City of Dike
- City of Grundy Center
- City of Holland
- City of Morrison
- City of Reinbeck
- City of Stout
- City of Wellsburg

Benefits of Multi-Jurisdictional Mitigation Planning

The following bulleted statements identify the many benefits for jurisdictions that participate in the multi-jurisdictional mitigation planning.

- Enables comprehensive approaches to mitigation of hazards that affect multiple jurisdictions;
- Allows economies of scale by leveraging individual capabilities and sharing costs and resources;
- Avoids duplication of efforts; and
- Imposes an external discipline on the process.

PLANNING PROCESS

With support of the Grundy County Board of Supervisors and local City Councils, Grundy County applied for, and received, a FEMA PDM Grant for the development of this HMP.

The planning process for this HMP involved a variety of local decision makers and stakeholders within the planning area. The planning leaders were able to customize the process to meeting the needs of the municipalities as well as the County. The process was developed around the requirements laid out in FEMA's *Local Hazard Mitigation Crosswalk*, as well has FEMA's State and Local Mitigation Planning How-to Guide series of documents (FEMA 386-8 in particular). Figure 1 illustrates the key steps in the hazard mitigation planning process and the specifics of each planning step are provided below.

Figure 1: Hazard Mitigation Planning Process

Step One: Organize Resources

The first step in developing the Multi-Jurisdictional HMP was to bring together a group of people with a variety of knowledge and backgrounds from all jurisdictions within the planning area, including the County itself, yet all having some connection to the goal of hazard mitigation.

Multi-Jurisdictional Planning Participation

Working in conjunction with the planning agency, Iowa Northland Regional Council of Governments (INRCOG), Grundy County and the communities of Beaman, Conrad, Dike, Grundy Center, Holland, Morrison, Reinbeck, Stout and Wellsburg developed a list of departments and positions they determined would best represent the knowledge base required to begin the planning process. The idea was to first establish a base committee and then invite other organizations and/or individuals as necessary. One such example was the Grundy Center School District, which became interested in the process when the district notified INRCOG of their interest in applying for tornado safe room funding. They were advised to attend the planning meetings and provide input into the process, which they did.

TABLE 1: GRUNDY COUNTY MJ-HMP PLANNING COMMITTEE MEMBERS

Name	Jurisdiction	Position	Name	Jurisdiction	Position
Camie Nederhoff	Wellsburg	Mayor	Larry Hunt	Dike-New Hartford Schools	School Superintendent
Celane Hauser	Stout	City Clerk	LaVonne Sternhagen	Beaman	City Clerk
Chris Heerkes	Dike	Fire Chief	Lindsay Nielsen	Dike	City Clerk
Chad Cutsforth	Dike	City Council	Lori Stansberry	Conrad	City Clerk
Dan Bangasser	Grundy Center	Public Works Director	Michael Soppe	Dike	Mayor
Jeff Martin	Conrad	Mayor	Peggy Husmann	Morrison	City Clerk
Jerry Schutz	Grundy Center Community Schools	School Superintendent	Wendy Lage	Wellsburg	City Clerk
Julie Wilkerson	Reinbeck	City Administrator	Zach Tripp	Grundy County	EMA Coordinator
Kristy Sawyer	Holland	City Clerk			

This initial group of people encompassed individuals representing local government, law enforcement, fire and rescue, local emergency management, public utilities, local schools, local non-profits and service providers, area employers, railroads, insurance, real estate, and citizen volunteers. Others invited to the meetings were State officials from the Iowa Homeland Security and Emergency Management office and an official from FEMA Region 7. Once established, this assembly was considered the Hazard Mitigation Planning Committee. Table 1 lists the Hazard Mitigation Planning Committee individuals.

Beyond this core group of individuals, public notices for all committee meetings were published in three newspapers, within the planning area, to inform neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties and residents of the planning process and to invite all interested parties to attend and contribute to the development of the plan. Prior to the adoption of the MJ HMP, each jurisdiction advertised and held public hearings. Public notices and public involvement materials can be found in Appendix K.

INRCOG organized the meetings in conjunction with the Grundy County Emergency Management Coordinator. INRCOG was also responsible for compiling information and writing the final document.

At each committee meeting, each jurisdiction was tasked with reviewing their previous HMP information (if applicable), updating/developing/providing new community fact information, updating/identifying/rescoring hazards, and reviewing/discussing and updating their previous mitigation activities (if applicable) and reprioritizing the activities. All activities that were completed from the previous plans were marked as such and determined if they were to be omitted from the plan update or continued. If a jurisdiction wasn't present at a meeting, meeting materials were mailed/emailed and completed by said jurisdiction and sent back to INRCOG for placement in the document.

Committee Meetings

Three public meetings were held at the County Courthouse and Grundy Center Fire Station, on various dates, during the HMP planning process. Each meeting was open to all residents and stakeholders in the planning area, as well as neighboring communities. As mentioned previously, these meetings were advertised in newspapers. Attendance for each meeting was documented and can be found in Appendix K. Table 2 provides a list of the public meetings.

TABLE 2: MEETINGS SUMMARY

Location	Group	Date	Topic
Grundy Center Fire Station	Planning Committee	4/06/16	Introductions; Planning Process/Purpose of HMP; Review and Update Community Profile; Review and Update Status of Existing Mitigation Action Steps
Grundy Center Fire Station	Planning Committee	4/27/16	Review and Update Status of Mitigation Action Steps; Introduce Hazards; Hazard Analysis/Risk Assessment
Grundy Center Fire Station	Planning Committee	5/11/16	Review and Update Status of Mitigation Action Steps; Review and Update Community Profiles
Individual Jurisdictions	City Councils, School Boards, Board of Supervisors	Various	Adoptions

Multi-Jurisdictional Plan Adoption

Once the Committee's feedback was addressed, a final draft HMP was prepared and sent to the County Board of Supervisors along with a resolution for adoption. Upon County adoption, the final draft HMP was submitted to Iowa Homeland Security and FEMA for their review and feedback; at which time the draft was presented to local City Councils for their adoption as well. Resolutions can be found in Appendix K.

Requirement §201.6(c)(5): For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.

Current & Previous Planning Documents Used

In addition to information obtained through the series of Committee Meetings, the INRCOG also investigated other previously prepared documents in order to garner supplementary relevant information and contacted each jurisdiction for relevant information. These documents and data include:

- Grundy County Emergency Response Plan;
- Grundy County Comprehensive Countywide Emergency Operations Plan;
- Previous Hazard Mitigation and Comprehensive Land Use Plans;
- 2010 Iowa Hazard Mitigation Plan and Comprehensive Emergency Plan;
- Plans, studies, reports, maps and technical information that were not available five years ago, including updated Flood Insurance Rate Maps and data;
- Documentation of communities' current status in the National Flood Insurance Program (NFIP) and Community Rating System (CRS);
- Repetitive Loss Properties and /or Severe Repetitive Loss Properties information;
- Reports of disaster and other hazard events that occurred within the past 5 years;

- Documentation of changes in the communities that impact vulnerability of structures and populations; and
- Documentation of mitigation projects and activities undertaken over the past 5 years.

Step Two: Identify & Assess Hazards

Identify and Profile Hazards

Through the planning process the hazards that pose a risk to the entire planning area, as well as unique hazards for each jurisdiction, were reviewed and updated. The identified hazards in this plan update have changed slightly from the 2012 plan. The committee elected to use the same set of hazards as identified in the State of Iowa's 2013 Hazard Mitigation Plan. Second, an updated assessment of the hazards was conducted that took into account historic occurrence, the number of people that would be or were impacted, the area of the planning area that was or would be affected, potential costs that the planning area, individuals, and organization have or may incur, the likelihood of future occurrence, and the amount of warning time before an event occurs. An updated composite score for each hazard was developed based on these factors. This process used information from previous and current hazard mitigation plans within the planning area, as well as the State of Iowa's hazard mitigation plan.

Vulnerability Assessment

An updated vulnerability assessment was conducted to identify: repetitive loss structures and repetitive loss properties and population located in the identified hazard areas; inventory of existing and proposed buildings, infrastructure, and critical facilities located within identified hazard area boundaries; estimating potential losses; and analysis of development trends.

Step Three: Establish Mitigation Goals & Actions (Action Plan)

Once Step Two was completed, a capability assessment was conducted on the planning area's existing policies, practices, programs, regulations, and activities that either increase or decrease the planning area vulnerability to the identified hazards. Through this assessment, areas that can be improved upon were identified and developed into "action steps". Early in the planning process meeting attendees identify broad goals that briefly stated what the plan should attempt to accomplish. Every action step should, if implemented, work toward one or more of the goals of the plan. An action step may suggest continuing a current mitigation effort or propose a new project altogether.

Many of the identified action steps were projects that the local jurisdictions could independently accomplish. Other identified projects included efforts that either require the cooperation of two or more jurisdictions, or would not include the local jurisdiction at all. The intention is that each action step is considered at least on an annual basis. In order to increase the likelihood that the entire planning area implements the plan, each action step identifies the parties that would most likely be responsible for completing an annual review of that step.

During this step, the previous hazard mitigation plan for the planning area was consulted as a starting point in identifying goals and action steps.

Step Four: Implement the Plan and Monitor its Progress

Finally, once the hazards have been assessed, mitigation steps identified, and the action steps have been prioritized the plan makes some suggestions for implementation and makes estimates as to the costs of implementation. Some proposed projects are small in scope and thus relatively low cost. However, other projects are broad in nature and would require more funding than the one jurisdiction can reasonably provide. Therefore, the final piece of the plan suggests methods to implement the plan, how to keep the public involved, and what steps should be taken by the planning area to ensure that the concept of hazard mitigation is always a priority.

When implemented appropriately, mitigation projects can save lives, reduce property damage, is cost-effective, and environmentally sound. This, in turn, can reduce the enormous cost of disasters to property owners and all levels of government. In addition, mitigation can protect critical community facilities, reduce exposure to liability, and minimize community disruption.

SECTION 2 – COMPOSITE COMMUNITY PROFILE

PHYSICAL ATTRIBUTES

Location of Grundy County

Grundy County is located in the Northeastern quadrant of the State of Iowa. The county includes a number of incorporated cities including, in alphabetical order: Beaman, Conrad, Dike, Grundy Center, Holland, Morrison, Reinbeck, Stout and Wellsburg. Grundy County is divided into fourteen townships including, in alphabetical order: Beaver, Black Hawk, Clay, Colfax, Fairfield, Felix, German, Grant, Lincoln, Melrose, Palermo, Pleasant Valley, Shiloh and Washington. The County itself encompasses a total area of approximately 503 square miles. The population is the sixty-fourth largest in the state with 12,453 residents (2010 Census). Grundy Center is the county seat. It is near the center of the county, at the junction of State Highways 14 and 175. Please refer to *Attachment #1: Location Map of the County*, which includes the locations of the aforementioned communities.

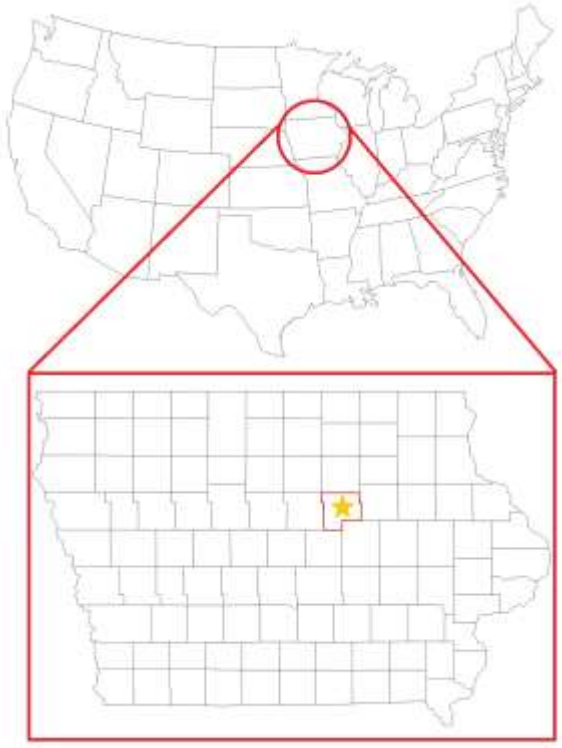


Figure 3: Grundy County Location with Reference to the State of Iowa and the United States.

Grundy County, Iowa
Current Supervisor Districts

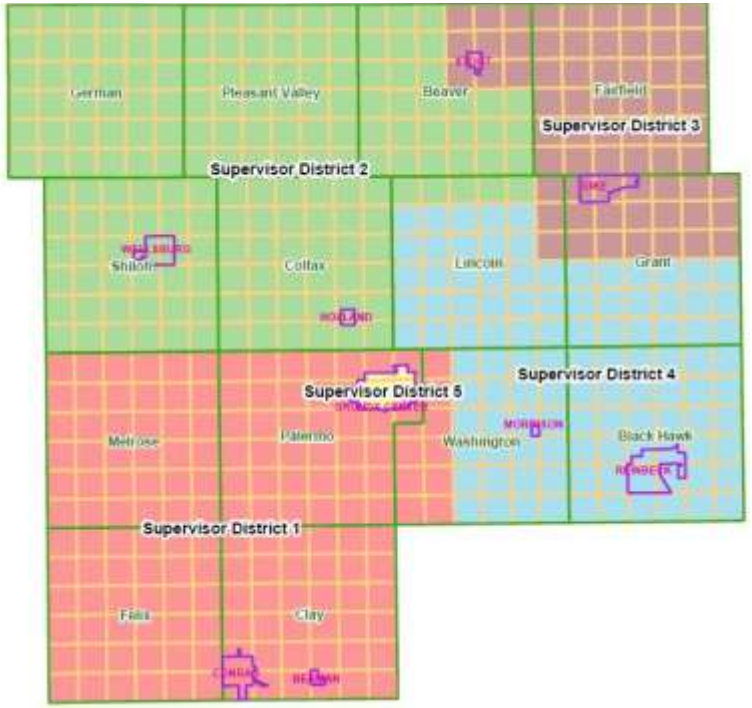


Figure 2: Grundy County Board of Supervisors District Map
Courtesy of Grundy County website (http://www.grundycounty.org)

HISTORY

Grundy County was formed on January 15, 1851, and became self-governing in 1856. It was named after Felix Grundy of Tennessee, a statesman, Senator, member of the House of Representatives and Attorney General under President James K. Polk.

The first courthouse was built in 1857. The wooden, two-story building contained a courtroom, but was used for other purposes, including housing the office of the sheriff, county treasurer, the judge, as well as a chamber for the jury. The cornerstone for a second courthouse was laid on November 11, 1891. It was listed on the National Register of Historic Places in 1981 as a part of the County Courthouses in Iowa Thematic Resource. The courthouse is the second building the county has used for court functions and county administration.

The first courthouse in Grundy County was built in 1857; the year after the county was organized. It was known as the "Old Cheese Box" and was the only octagon shaped courthouse in Iowa. It served as the county courthouse for forty years and was replaced by the current courthouse in 1891. The Romanesque Revival structure was designed by Kramer & Zoll. The building was built for $45,532.48.

Government Structure

Grundy County is governed by a 5-member Board of Supervisors. Each member represents a district: District 1 includes Clay, Felix, Melrose, Palermo and Washington (portion) townships; District 2 includes Beaver (portion), Colfax, German, Lincoln (portion), Pleasant Valley and Shiloh townships; District 3 includes Fairfield township and portions of Beaver, Grant and Lincoln townships; District 4 includes Black Hawk township and portions of Grant, Lincoln and Washington townships; District 5 encompasses the City of Grundy Center. Figure 2 illustrates these districts. Each of Grundy County's municipalities has a Mayor-Council government structure.

NATURAL ENVIRONMENT

The planning area's terrain is generally a flat to rolling slope topography that characterizes the agricultural areas of northeast Iowa. There are several areas of steeper than normal slope with these being dispersed throughout the county adjacent to watercourses. The highest elevation in the county, at 1,151 feet above mean sea level, is near the central-western border with Franklin County, and the lowest elevation, 885 feet above mean sea level, is found in the northwestern corner of the county.

The most visible geographic feature within the county is Beaver Creek and Black Hawk Creek. Beaver Creek does not flow through any cities and Black Hawk Creek flows through Grundy Center, Morrison, Reinbeck and Dike. See *Attachment 3: Topographic Map of the County*.

Soils

Seventy-five (75) percent of the planning area has soils with slopes of 5 percent or less. The planning area is abundantly supplied with a variety of soils other than productive agricultural soils. There are seven soil classifications for the planning area according to the United States Department of Agriculture:

- *Marshan-Coland-Flagler:* Nearly level to moderately sloping, poorly drained and somewhat excessively drained soils that formed in loamy sediment underlain by loamy, sandy, or gravelly alluvial sediment; on stream benches and bottom lands.
- *Cresco-Kenyon-Clyde*: Nearly level to strongly sloping, moderately well drained and poorly drained soils that formed in loamy sediment and the underlying glacial till; on uplands.
- *Dickinson-Sparta:* Nearly level to strongly sloping, well drained to excessively drained soils that formed in loamy and sandy material; on uplands.
- *Dinsdale-Klinger-Maxfield*: Nearly level to moderately sloping, well drained, somewhat poorly drained, and poorly drained soils that formed in loess and the underlying glacial till; on uplands.
- *Mt. Carroll-Downs-Garwin*: Nearly level to steep, well drained and poorly drained soils that formed in loess; on uplands.
- *Kenyon-Clyde-Floyd:* Nearly level to stronger sloping, moderately well drained to poorly drained soils that formed in loamy sediment and the underlying glacial till; on

uplands.

- *Rockton-Ostrander*: Nearly level to moderately sloping, well drained soils that formed in loamy sediment and the underlying glacial till and limestone residuum; on uplands.

Climate

The climate is identified as having cold snowy winters with humid hot summers. The climate is located in the polar front zone, the battleground of polar and tropical air masses. Being far removed from moderating influences of a large body of water, seasonal contrasts are quite distinctive and weather highly variable. Ample precipitation throughout the year is increased in the summer by invading maritime tropical air masses from the Gulf of Mexico. Cold winters are dominated by continental polar masses from the arctic regions.

The annual precipitation average is 33.64 inches. Approximately 73 percent of a year's precipitation falls during the months of April to September. Precipitation can be expected to exceed one-half inch or more 20 days per year, or one-tenth inch or more 56 days a year. Precipitation can occur in amounts of multiple inches within one hour or less during intense rainstorms. These storms, usually associated with extreme humidity, are capable of causing extensive damage to infrastructure. Often times it is the intensity of these rainstorms that are as telling as the frequency or duration. An extremely intense rainfall can render detention basins and small streams useless due to the extreme speed of onset of surface flow.

The annual temperature range is large, typical of a continental climate, with January, the coldest month, averaging 16.4 degrees Fahrenheit. July is the warmest month averaging 73.4 degrees Fahrenheit.

Vegetation

The vast majority of rural Grundy County is planted or sowed for corn and soybeans. Grass and brush are present in uncultivated and undeveloped areas of the county. Trees and grasses are often incorporated with otherwise urbanized areas in the county for aesthetics, shade, or erosion control.

There are problems associated with cultivation methods used in the rural areas of the county. The high percentage of cultivated land and the relatively low percentage of conservation methods used in farming cause excessive runoff to occur during rain events. This can lead to problems that are discussed later in this plan, specifically erosion and silting in and around bridges and drainage ditches.

Surface Water Systems

There are three watersheds that fall within the planning area borders. These watersheds, as defined by the United States Geological Survey, include the following:

- **Middle Cedar Watershed** – The majority of Grundy County is covered by the Middle Cedar Watershed
- **Upper Iowa Watershed** – The Upper Iowa Watershed covers the southwestern edge of Grundy County.
- **Middle Iowa Watershed** – A very small portion of southwest Grundy County is covered by the Middle Iowa Watershed.

INFRASTRUCTURE

Transportation Systems

Grundy County has within its boundaries a variety of transportation systems. These systems include highways, gravel roads, blacktop roads, railway systems & transit. Access to bike and pedestrian trails for transportation is becoming more prevalent in the planning area. Additional, efforts are being made to plan and extend recreational trails throughout the area.

U.S. Highway 20 crosses the northern half of the county and serves as a major route for truck and commuter traffic. State Highways present in Grundy County include: Iowa 14, 57, and 175. In addition to the State Highway systems, the Secondary Road Department is in charge of construction and maintenance for all county roadways and bridges. This does not include roads on the State system such as IA14, IA175, and 4-lane US Hwy 20. Grundy County roads include 195 miles paved, 650 miles granular surfaced and 15 miles of dirt roadway. There is a total of 223 bridges over 20 ft. in length and 110 bridges less than 20 ft. in length within the county that are inspected and maintained. All bridges are inspected every 2 years.

Air travel is an important form of transportation and one airport is available in the county, which is the Grundy Center Municipal Airport. The airport provides service to private aircraft only.

There are no rail lines, freight or passenger, located within the county.

The Iowa Northland Regional Transit Commission (RTC) offers limited transit service to residents of Grundy County. Currently, the county is served by RTC on a case-by-case basis depending on space and service timing considerations.

Potable Water Systems

Water service in the planning area is typically provided by private, individual or common wells. The wells tap rechargeable groundwater aquifers for water. In terms of need, the county does not foresee the need for a common or public water system. However, the county does want to protect the groundwater from depletion or contamination in order to maintain its supply of potable water.

Although not thoroughly developed, large rural water mains and storage facilities have the potential to supply water for purposes of firefighting. It is estimated that the water line would need to be at least six inches in order to supply effective pressure for actual firefighting. Smaller lines could serve as potential fill locations for tanker trucks. Further information for each community system can be in the Appendices.

Wastewater Treatment Facility and Collection System

The primary means of disposing of sewage in the county is by individual, on-site septic systems. These on-site systems include tanks and septic fields for disposal of household sewage. As with water service, the county does not envision the need for a common public sewage system. The County, however, does regulate on-site systems through ordinances, inspections and its Board of Health. Further information for each system can be in the Appendices.

Storm Water Systems

There are no established storm water systems in the planning area.

Other Utilities

The planning area is serviced by numerous utilities. Table 3 lists the utility providers for each jurisdiction.

TABLE 3: PRIMARY PROVIDERS FOR COMMUNITY UTILITIES WITHIN GRUNDY COUNTY

Community	Electric	Natural Gas	Telephone/ Internet	Cable TV	Water	Sewer	Sanitation
City of Beaman, IA	Alliant Energy	Alliant Energy	Heart of Iowa Communications	Heart of Iowa Communications	Central Iowa Rural Water Association	City	Private Contractor
City of Conrad, IA	Alliant Energy	Alliant Energy	Heart of Iowa Communications/ Mediacom	Heart of Iowa Communications/ Mediacom	City	City	Private Contractor
City of Dike, IA	City	Black Hills Energy	Qwest/Mediacom	Mediacom	City	City	Private Contractor
City of Grundy Center, IA	Grundy Center Municipal Utilities	Black Hills Energy	Grundy Center Municipal Utilities/ Windstream	Grundy Center Municipal Utilities	City	City	City
City of Holland, IA	REC/ Alliant Energy	Alliant Energy	Windstream/ T&T Communications	N/A	Central Iowa Rural Water Association	City	City
City of Morrison, IA	Alliant Energy	Heartland Co-op	Windstream	N/A	Central Iowa Rural Water Association	Central Iowa Rural Water Association	Central Iowa Rural Water Association
City of Reinbeck, IA	Alliant Energy	Alliant Energy	Reinbeck Telecommunications/ Mediacom/ Windstream	Reinbeck Telecommunications/ Mediacom/ Windstream	City	City	City
City of Stout, IA	Mid-American Energy	Mid-American Energy	CenturyLink/ Rise/ Unggoy/ Windstream	CenturyLink/ Rise/ Unggoy/ Windstream	City	City	Private Contractor
City of Wellsburg, IA	Alliant Energy	Alliant Energy	Windstream	N/A	Central Iowa Rural Water Association	City	City
Grundy County (unincorporated), IA	Alliant Energy/ Grundy County REC/ Mid-American Energy/ Cedar Falls Utilities/ Midland Power	Alliant Energy/ Mid-American Energy/ Black Hills Energy	Windstream/ Heart of Iowa/ Mediacom/ Tyson Communications/ Grundy Center Utilities	Heart of Iowa/ Windstream/ Mediacom/ Grundy Center Utilities	Central Iowa Rural Water Association/ Private Wells	Individual Septic	Grundy County Landfill/ Black Hawk County Landfill/ Hardin County Landfill/ Private, Individual

Source: Communities

Communication

Websites

Grundy County provides a public website (http://www.grundycounty.org) to provide the public with information. The communities also have websites to convey information to their residents: Beaman (http://www.cityofbeaman.com), Conrad (http://www.conrad.govoffice.com/), Dike (http://www.dikeia.com) , Grundy Center (http://www.grundycenter.com), Holland (N/A), Morrison (N/A), Reinbeck (http://www.reinbeck.org), Stout (http://www.stoutiowa.com) and Wellsburg (http://www.wellsburgiowa.com).

Newspapers

Residents in Grundy County rely on the following newspapers for local news and announcements:

- Conrad Record
- Grundy Center Register
- Reinbeck Courier

DEMOGRAPHICS

Population

Table 4 illustrates the population trends for Grundy County, its incorporated communities, and the State of Iowa for the past 30 years. As is evident in the table, the planning area has seen an overall decrease in population since 1980.

TABLE 4: POPULATION TRENDS FOR SELECTED COMMUNITIES

Community	1990 Population	2000 Population	2010 Population	% Change 2000-2010
City of Beaman, IA	183	210	191	-9.0
City of Conrad, IA	964	1,055	1,108	5.0
City of Dike, IA	875	944	1,209	28.1
City of Grundy Center, IA	2,491	2,596	2,706	4.2
City of Holland, IA	215	250	282	12.8
City of Morrison, IA	125	97	94	-3.1
City of Reinbeck, IA	1,605	1,751	1,664	-4.9
City of Stout, IA	192	217	224	3.2
City of Wellsburg, IA	682	716	707	-1.3
Grundy County (Uninc. Area)	4,697	4,533	4,268	-5.8
Grundy County(total)	12,029	12,369	12,453	0.7
State of Iowa	2,776,755	2,926,324	3,046,355	4.1

Source: U.S. Census Bureau and Iowa Data Center

Population Projections

Projections are only estimates of future population, and many factors have an effect on the future population, such as employment, housing, and educational opportunities. While some projections use some of this data in order to estimate future population, they cannot plan for unknown events, such as drastic changes in employment opportunities or the perilous effects of natural disasters.

Table 5: Historic Population Changes for Grundy County, IA

Year	Population	Change
1950	13,722	-
1960	14,132	2.90%
1970	14,119	-0.09%
1980	14,366	1.72%
1990	12,029	-19.43%
2000	12,369	2.75%
2010	12,453	0.67%

Source: U.S. Census Bureau and Iowa Data Center

The following projections are provided by the Washington D.C based firm, Woods & Poole Economics, whose methodology for county projections is based upon several factors: population trends, income levels, employment by industry, earning by industry, inflation rates and net migration rates. Table 6 shows the actual number change and the percentage change rate for each decade based on the Woods & Poole estimates.

TABLE 6: POPULATION PROJECTIONS FOR GRUNDY COUNTY, IA

Year	Grundy County	Percent Change
2020	12,812	2.9%
2030	13,395	4.6%
2040	13,993	4.5%

Source: U.S. Census Bureau, Iowa Data Center, and Woods & Poole Economics

Given the planning area's population trends, it is projected the area will continue to experience an increase in population over the next twenty years. It is important to note that these projections are just estimates based on past trends and other factors that could vary in the future. Many variables can affect an area's growth and/or decline in population. Nevertheless, projecting population can give some idea as to how to plan for the future. Many variables can affect a county's growth and/or decline in population. Nevertheless, projecting population can give some idea as to how to plan for the future.

Housing and Development Trends

According to 2010 Census data, there are 5,530 total housing units in the county (Table 7). Of these housing units, 4,213 are owner-occupied, 918 are renter-occupied, and 399 are vacant. Mobile homes make up 3.4 percent of the county's housing units. This is slightly less than the State's, 3.5 percent. Besides the unincorporated area, the communities of Conrad, Grundy Center and Reinbeck have a large number of mobile homes within their jurisdiction (Table 8). Grundy County's total household population for Grundy County is 12,453. The average household size for Grundy County is 2.42 persons.

TABLE 7: TOTAL HOUSING UNITS IN SELECTED COMMUNITIES

Community	1990	2000	2010
City of Beaman, IA	87	88	85
City of Conrad, IA	438	483	507
City of Dike, IA	355	393	497
City of Grundy Center, IA	1,138	1,176	1,256
City of Holland, IA	102	109	113
City of Morrison, IA	44	47	40
City of Reinbeck, IA	727	769	802
City of Stout, IA	72	77	84
City of Wellsburg, IA	366	363	367
Grundy County (Uninc. Area)	1,829	1,799	1,779
Grundy County(total)	5,158	5,304	5,530
State of Iowa	1,143,669	1,232,511	1,336,417

Source: U.S. Census Bureau

Age of Housing

Approximately 37 percent of the housing units in Grundy County were built in 1939 or earlier. In the years following 1940, the largest numbers of housing units were built in between 1960 through 1979. The 1980's and 1990's witnessed a dramatic decline in the number of houses being built. Table 9 shows the number of structures built in each time period since 1939 and the number built before that time. The numbers represented in the following table encompass all houses within the county, including incorporated areas.

TABLE 8: TOTAL MOBILE HOMES IN SELECTED COMMUNITIES

Community	2010
City of Beaman, IA	6
City of Conrad, IA	33
City of Dike, IA	8
City of Grundy Center, IA	27
City of Holland, IA	2
City of Morrison, IA	2
City of Reinbeck, IA	8
City of Stout, IA	3
City of Wellsburg, IA	0
Grundy County (Unincorporated Area)	131
Grundy County(total)	220

Source: U.S. Census Bureau

TABLE 9: AGE OF HOUSING UNITS IN GRUNDY COUNTY, 2010

Year Built	Grundy County	Iowa %	Year Built
	Number	Percent (%)	
2000 or earlier	366	6.6	10.0
1990-1999	363	6.6	10.9
1980-1989	255	4.6	7.5
1960-1979	1,398	25.2	25.9
1940-1959	1,116	20.1	17.4
1939 or earlier	2,039	36.8	28.3
Total	5,537	100.0	100.0
2000 or earlier	366	6.6	10.0
Total	5,537	100.0	100.0

Source: U.S. Census Bureau

Value of Housing

Housing value within Grundy County has dramatically increased since that of the previous decennial census. According to 2015 American Community Survey, the median value household for an owner-occupied unit in the county was $125,700.00.

While gaining ground since the previous census the planning area still remains below compared to State averages for owner occupied housing units. The State of Iowa had a median housing value of $129,200 according to Table 10.

Table 11 provides a list of median gross rent for each community. Grundy County's median gross rent is $68 less than the State's. Of Grundy County's jurisdictions, Grundy Center has the cheapest median gross rent, at $481. Morrison, at the time of the survey, did not have anyone renting so there is no gross rent value for Morrison in Table 11.

Table 12 provides a listing of the number and types of building permits that were issued in 2010-2015. The county issued 103 building permits in a five-year span, most recently Grundy County issued 20 building permits in 2015 for a total construction cost of $4,448,274.

TABLE 12: TOTAL BUILDING PERMITS ISSUED (FOR 2010-2015)

Community	Permits Issued
City of Beaman, IA	1
City of Conrad, IA	4
City of Dike, IA	35
City of Grundy Center, IA	29
City of Holland, IA	0
City of Morrison, IA	0
City of Reinbeck, IA	8
City of Stout, IA	0
City of Wellsburg, IA	4
Grundy County Unincorporated	22
Grundy County, Iowa (Total)	103

Source: U. S. Census Bureau.
Numbers reflect only County Issued Zoning Certificates

TABLE 10: MEDIAN VALUE OF A SPECIFIED OWNER-OCCUPIED UNITS

Community	2000	2010*	2015**
City of Beaman, IA	$ 43,200	$82,500	$73,500
City of Conrad, IA	81,200	120,600	121,900
City of Dike, IA	95,200	152,300	165,100
City of Grundy Center, IA	73,600	95,600	104,300
City of Holland, IA	46,300	69,200	70,600
City of Morrison, IA	36,000	60,000	68,800
City of Reinbeck, IA	68,600	103,400	107,400
City of Stout, IA	54,100	84,300	88,500
City of Wellsburg, IA	37,600	69,600	76,300
Grundy County, IA (total)	72,500	111,000	125,700
State of Iowa	82,500	119,200	129,200

Source: U.S. Census Bureau
**2010 housing value was provided by the 2010 ACS*
***2015 housing value was provided by the 2015 ACS*

TABLE 11: MEDIAN GROSS RENT

Community	2000	2010*	2015**
City of Beaman, IA	$513	$525	$629
City of Conrad, IA	302	462	615
City of Dike, IA	370	534	550
City of Grundy Center, IA	343	553	481
City of Holland, IA	431	647	675
City of Morrison, IA	275	-	-
City of Reinbeck, IA	409	583	518
City of Stout, IA	517	608	788
City of Wellsburg, IA	281	483	555
Grundy County(total)	470	617	567
State of Iowa	$513	$525	697

Source: U.S. Census Bureau
**2010 housing value was provided by the 2010 ACS*
***2015 housing value was provided by the 2015 ACS*

Economy

Income

The per capita and median household income for the county and its communities are listed in Table 13. The county, as a whole, has a per capita income in 2015 dollars of $27,950. The median household income for the entire county, in 2015 dollars, is $56,750. The City of Stout has the smallest per capita income, $23,085; while Conrad has the smallest median household income, $45,313.

TABLE 13: PER CAPITA & MEDIAN HOUSEHOLD INCOME

Community	Per Capita Income		Median Household Income	
	2010*	2015**	2010*	2015**
City of Beaman, IA	$17,281	$25,753	$35,625	$53,750
City of Conrad, IA	30,565	23,790	49,583	45,313
City of Dike, IA	36,157	39,594	67,097	67,500
City of Grundy Center, IA	25,079	27,805	54,955	50,000
City of Holland, IA	18,279	24,280	43,750	54,375
City of Morrison, IA	24,991	24,090	48,125	56,250
City of Reinbeck, IA	27,550	32,414	51,290	50,563
City of Stout, IA	19,215	23,085	53,500	57,750
City of Wellsburg, IA	27,576	25,053	50,875	47,019
Grundy County, IA (total)	26,916	31,076	56,184	56,750
State of Iowa	25,335	27,950	48,872	53,183

*Source: U.S. Census Bureau *2010 housing value was provided by the 2010 ACS*
**2010 housing value was provided by the 2010 ACS*
***2015 housing value was provided by the 2015 ACS*

TABLE 14: EMPLOYMENT SECTORS/INDUSTRIES FOR GRUNDY COUNTY 2015*

Industry	Grundy County		State of Iowa	
	#	%	#	%
Agriculture, Forestry, Fishing & Hunting, and Mining	564	9.1	62,617	3.9
Construction	547	8.9	97,457	6.2
Manufacturing	951	15.4	239,613	15.2
Wholesale Trade	252	4.1	44,824	2.8
Retail Trade	763	12.4	184,108	11.7
Transportation & Warehousing, and Utilities	254	4.1	72,148	4.6
Information	84	1.4	27,694	1.8
Finance, Insurance, Real Estate, and Rental & Leasing	389	6.3	117,133	7.4
Professional, Scientific, Management, Administrative, and Waste Management Services	232	3.8	112,752	7.2
Education, Health and Social Services	1,427	23.2	382,209	24.3
Arts, Entertainment, Recreation, Accommodations and Food Services	258	4.2	117,422	7.5
Other Services (except public administration)	303	4.9	66,559	4.2
Public Administration	140	2.3	49,974	3.2

Source: U.S. Census Bureau
**2015 housing value was provided by the 2015 ACS*

Employment Sectors

As Table 14 reveals, Grundy County has a large percentage of its residents employed in the education, health and social services (23.2%), similarly to the State of Iowa (24.3%). Manufacturing is the second highest industry to employ 15.4% of the county. The agricultural, forestry, fishing and hunting, and mining industry is the biggest difference between Grundy County and the State of Iowa, Grundy County has 5.2% difference in this industry.

Major Employers

Grundy County Memorial Hospital is the largest employer in Grundy County. The company is located in Grundy Center. Richelieu Foods, Green Products Company, Pioneer Hybrid, and Total Source Molders are also major employers within the county.

Grundy County has seven public school districts providing K-12 education and employment. These districts include: Aplington-Parkersburg Community Schools, AGWSR Community Schools, BCLUW Community School, Dike-New Hartford Community School, Eldora-New Providence Community Schools, Gladbrook-Reinbeck Community School, and Grundy Center Community School.

SECTION 3 –RISK ASSESSMENT

This updated risk assessment process identifies and profiles relevant hazards and assesses the exposure of lives, property, and infrastructure to these hazards. The goal of the risk assessment is to estimate the potential loss in Grundy County, including loss of life, personal injury, property damage, and economic loss, from a hazard event. The risk assessment process allows the community to better understand their potential risk to various hazards and provides a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events.

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

Requirement §201.6(c)(2)(iii): For multi-jurisdictional plans, the risk assessment must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

The risk assessment follows the methodology described in the FEMA publication 386-2, *Understanding Your Risks: Identifying Hazards and Estimating Losses* (2002), which includes a four-step process:

Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the type…of all natural hazards that can affect the jurisdiction.

- Identify Hazards
- Profile Hazard Events
- Inventory Assets
- Estimate Losses

This section is divided into three parts: hazard identification, hazard profiles, and vulnerability assessment:

- **Hazard Identification** identifies the hazards that threaten the planning area and describes why some hazards have been omitted from further consideration.
- **Hazard Profiles** discusses the threat to the planning area and describes previous occurrences of hazard events and the probability of future occurrence.
- **Vulnerability Assessment** assesses the total exposure to natural hazards, considering critical facilities and other community assets at risk, and assessing growth and development trends. Hazards that vary geographically across the planning area are addressed in greater detail.

HAZARD IDENTIFICATION

In order to properly identify mitigation strategies and projects, the hazards that may affect the planning area must be identified and/or updated. The following section lists the potential hazards to the planning area that were identified by the Planning Committee. This section also discusses previous occurrences of the hazards, the areas of the planning area most at risk from each hazard, and the populations most at risk. By identifying the hazards and quantifying the risks, the planning area can better assess current mitigation strategies, develop future mitigation strategies and identify needed mitigation projects.

The hazard analysis identifies potential hazards that could affect the planning area for the purposes of mitigation planning. It is important to note that the focus of mitigation is on reducing long-term risks of damage or threats to public health and safety caused by hazards and their effects. Thus, in some cases the hazards identified for mitigation will not include all of or the same hazards identified for preparedness, response or recovery.

Table 15: Grundy County Hazard List

Natural	Technological
Animal/Plant/Crop Disease	HAZMAT Incident
Drought	Infrastructure Failure
Earthquake	Levee/Dam Failure
Expansive Soils	Radiological Incident
Extreme Heat	Transportation Incident
Flash Flood	
Grass/Wild Land Fire	**Human Caused**
Human Disease	Terrorism
Landslide	
Transportation Incident	
River Flooding	
Severe Winter Storm	
Sinkholes	
Thunderstorm/Lighting/Hail	
Tornado/Windstorm	

The Committee reviewed the hazards mentioned in their current hazard mitigation plans, the 2010 Iowa Hazard Mitigation Plan, and the contractual agreement between the County and FEMA. After review, the committee elected to use the same list of hazards as those identified in the 2013 Iowa Hazard Mitigation Plan. The terminology of these hazards varied slightly from the County's 2012 plan, but the committee believed the list used by the state covered all the hazards the planning area could anticipate a need to address.

The Iowa 2013 Hazards List has three categories of hazards: Natural, Technological, and Human Caused. The planning committee used the hazards identified in the Iowa plan, as well as evaluating the planning area to see if there were any circumstances that called for additional hazards to be identified. No additional hazards were identified.

Hazards identified for Grundy County and its communities are listed in Table 16.

TABLE 16: HAZARDS IDENTIFIED BY JURISDICTION										
Hazards	**Beaman**	**Conrad**	**Dike**	**Grundy Center**	**Holland**	**Morrison**	**Reinbeck**	**Stout**	**Wellsburg**	**Grundy County (Unincorporated)**
Animal/Plant/Crop Disease	X	X	X	X	X	X	X	X	X	X
Drought	X	X	X	X	X	X	X	X	X	X
Earthquake	X	X	X	X	X	X	X	X	X	X
Expansive Soils	X	X	X	X	X	X	X	X	X	X
Extreme Heat	X	X	X	X	X	X	X	X	X	X
Flash Flood	X	X	X	X	X	X	X	X	X	X
Grass/Wild Land Fire	X	X	X	X	X	X	X	X	X	X
HAZMAT Incident	X	X	X	X	X	X	X	X	X	X
Human Disease	X	X	X	X	X	X	X	X	X	X
Infrastructure Failure	X	X	X	X	X	X	X	X	X	X
Landslides	X	X	X	X	X	X	X	X	X	X
Levee/Dam Failure	X	X	X	X	X	X	X	X	X	X
Radiological Incident	X	X	X	X	X	X	X	X	X	X
River Flood	X	X	X	X	X	X	X	X	X	X
Severe Winter Storm	X	X	X	X	X	X	X	X	X	X
Sinkholes	X	X	X	X	X	X	X	X	X	X
Terrorism	X	X	X	X	X	X	X	X	X	X
Thunderstorm/Lightning/Hail	X	X	X	X	X	X	X	X	X	X
Tornado/Windstorm	X	X	X	X	X	X	X	X	X	X
Transportation Incident	X	X	X	X	X	X	X	X	X	X

Disaster Declaration History

One method used by the planning committee to identify hazards was to examine events that triggered federal and/or state disaster declarations. Federal and/or state declarations may be granted when the severity and magnitude of an event surpasses the ability of the local government to respond and recover. Disaster assistance is supplemental and sequential. When the local government's capacity has been surpassed, a state disaster declaration may be issued, allowing for the provision of state assistance. Should the disaster be so severe that both the local and state governments' capacities are exceeded; a federal emergency or disaster declaration may be issued allowing for the provision of federal assistance.

The federal government may issue a disaster declaration through FEMA, the U.S. Department of Agriculture (USDA), and/or the Small Business Administration (SBA). FEMA also issues emergency declarations, which are more limited in scope and without the long-term federal recovery programs of major disaster declarations. The quantity and types of damage are the determining factors.

Table 17 lists state and federal disaster declarations received by Grundy County. Many of the disaster events were regional or statewide; therefore, reported costs are not accurate reflections of losses to Grundy County and its jurisdictions. Governor's Disaster Proclamations are also listed in Table 18, showing from the year 2008 until current.

TABLE 17: PRESIDENTIAL DISASTER DECLARATION HISTORY FOR GRUNDY COUNTY

Declared Date	Type	Declaration #
July 1991	Severe Weather	DR-911-IA
April 1993	Flooding	DR-986-IA
June 1993	Flooding	DR-996-IA
July 1998	Severe Weather	DR-1230-IA
July 1999	Flooding	DR-1282-IA
May 25, 2004	Severe Storms, Tornadoes & Flooding	DR-1518
September 2005	Hurricane Katrina	EM-3239
March 14, 2007	Severe Winter Storms	DR-1688
May 27, 2008	Severe Storms, Tornadoes, and Flooding	DR-1763
August 20, 2013	Severe Storms, Tornadoes, and Flooding	DR-4135

TABLE 18: GOVERNOR'S DISASTER PROCLAMATION HISTORY FOR GRUNDY COUNTY (2008-PRESENT)

Declared Date	Type	Proclamation #
April 30, 2008	Severe Storms	2008-04
June 12, 2008	Severe Storms	2008-22
May 29, 2013	Severe Storms & Flooding	2013-07
July 9, 2014	Severe Storms	2014-16

Source: Iowa Homeland Security

Methodology

The risk assessment identifies how people, properties, and structures could be damaged by the event. If the hazard can harm people or damage their homes and other structures, they are vulnerable. Finding the weak points in the system, for example, identifying building types that are vulnerable to damage and anticipating the loss in high risk areas, will help the community decide what mitigation measure should be undertaken and how to implement the activities they select.

The Hazard Mitigation Planning Committee used the following updated factors in determining the hazard risk assessment (as used by the State of Iowa in their HMP Update). The Planning Committee considered the following for each identified hazard:

- Probability
- Magnitude / Severity
- Warning Time
- Duration

(Probability x.45) + (Magnitude/Severity x .30) + (Warning Time x .15) + (Duration x .10)
= Final Hazard Assessment Score

Each hazard identified in this section is profiled individually. The level of information presented in the profiles varies by hazard based on the information available. With each update of this plan, new information will be incorporated to provide for better evaluation and prioritization of the hazards that affect the planning area.

The sources used to collect information for these profiles included previous and current hazard mitigation plan, available data from the National Climatic Data Center, the State of Iowa updated HMP and other available data from the County and incorporated communities. Detailed profiles for each of the identified hazards include information categorized as follows.

Probability

The probability score reflects the likelihood of the hazard occurring again in the future, considering both the hazard's historical occurrence and the projected likelihood of the hazard occurring in any given year. Many times, the historical occurrence can be extrapolated into the future using best available data, but others, due to the nature

TABLE 19: PROBABILITY

Score	Description	
1	Unlikely	Less than 10% probability in any given year (up to 1 in 10 chances of occurring), history of events is less than 10% likely or the event is unlikely but there is a possibility of its occurrence.
2	Occasional	Between 10% and 20% probability in any given year (up to 1 in 5 chances of occurring), history of events is greater than 10% but less than 20% or the event could possibly occur.
3	Likely	Between 20% and 33% probability in any given year (up to 1 in 3 chances of occurring), history of events if greater than 20% but less than 33% or the event is likely to occur.
4	Highly Likely	More than 33% probability in any given year (event has up to a 1 in 1 chance of occurring), history of events is greater than 33% likely or the event is highly likely to occur.

of the hazard are more difficult to estimate the probability of future occurrence. If a hazard or its impacts have been planned for, the probability of future occurrences decreases. Conversely, hazards that have not occurred in the past may present themselves to the community in the future. Table 19 shows the probability scoring criteria.

Magnitude / Severity

The impact severity of a hazard event (past and perceived) is related to the vulnerability. Relevant factors include when the event occurs (year-round, seasonal), the location affected, community resilience, and the effectiveness of the emergency response and disaster recovery efforts. Quantifying impact severity is difficult to address at multiple levels simultaneously. Table 20 shows the Magnitude / Severity scoring criteria.

TABLE 20: MAGNITUDE / SEVERITY

Rating	Description	
1	Negligible	Less than 10% of property severely damaged, shutdown of facilities and services for less than 24hours, and/or injuries/illnesses treatable with first aid
2	Occasional	10% to 25% of property severely damaged, shutdown of facilities and service for more than a week, and/or injuries/illnesses that do not result in permanent disability.
3	Critical	25% to 50% of property severely damaged, shutdown of facilities and services for at least two weeks, and/or injuries/illnesses that result in permanent disability.
4	Catastrophic	More than 50% of property severely damaged, shutdown of facilities and services for more than 30 days, and/or multiple deaths.

Warning Time

The speed of onset is the amount of warning time available before the hazard occurs. This should be taken as an average warning time. For many of the atmospheric natural hazards there is a considerable amount of warning time as opposed to the human caused accidental hazards that occur instantaneously or without any significant warning time. Table 21 shows the warning time criteria.

TABLE 21: WARNING TIME

Score	Description
1	More than 24 hours warning time.
2	12 to 24 hours warning time.
3	6 to 12 hours warning time
4	Minimal or no warning time (up to 6 hours warning)

Duration

This consists of the typical amount of time that the jurisdiction is impacted by the hazard. As an example, a snowstorm will likely last several hours, whereas a lightning strike would last less than a second. Table 22 shows the duration scoring criteria.

TABLE 22: DURATION

Score	Description
1	Less than 6 hours
2	Less than 1 day
3	Less than 1 week
4	More than 1 week

Hazard Analysis Summary

Table 23 lists the average scores for all jurisdictions in the planning area, including unincorporated Grundy County, incorporated cities, and school districts. Individual assessment scores for each jurisdiction can be found in their respective appendix. Table 24 shows the hazard analysis for the unincorporated areas of Grundy County. Certain hazard rankings are different depending upon the jurisdiction affected, due to different topography, historical occurrences, vulnerability, severity of impact, and probability to that community.

The identified hazards are discussed at length on the following pages, in alphabetical order. The discussion will include known historical occurrence, probability, magnitude/severity, warning time, and duration.

TABLE 23: GRUNDY COUNTY HAZARD ANALYSIS SCORES (ALL JURISDICTIONS –AVERAGED)

Hazards	Probability	Magnitude/Severity	Warning Time	Duration	Total
Tornado/Windstorm	2.90	2.11	3.50	1.80	**2.85**
Thunderstorm/Lightning/Hail	3.00	1.78	3.70	1.40	**2.58**
Flash Flood	3.00	1.78	3.00	2.50	**2.51**
HAZMAT Incident	2.30	1.67	3.50	2.40	**2.33**
Severe Winter Storm	2.40	1.56	2.30	2.20	**2.28**
Grass/Wild Land Fire	2.50	1.67	2.80	1.70	**2.26**
Animal/Plant/Crop Disease	2.60	1.89	1.60	2.80	**2.23**
Extreme Heat	2.70	1.78	1.40	3.10	**2.21**
River Flood	1.90	1.33	2.50	2.00	**2.12**
Terrorism	1.50	2.22	3.80	2.60	**2.03**
Infrastructure Failure	1.90	1.67	3.00	3.20	**2.01**
Drought	2.00	1.78	1.50	3.30	**1.91**
Radiological Incident	1.20	1.56	3.00	2.60	**1.87**
Landslides	1.50	1.33	2.50	1.40	**1.83**
Earthquake	1.00	1.78	3.20	1.90	**1.65**
Sinkholes	1.60	1.11	2.70	1.50	**1.67**
Human Disease	1.40	1.67	1.90	3.20	**1.64**
Transportation Incident	1.56	1.25	3.00	1.44	**1.56**
Expansive Soils	1.90	1.33	1.50	2.10	**1.44**
Levee/Dam Failure	1.00	1.50	2.56	2.00	**1.44**

TABLE 24: GRUNDY COUNTY HAZARD ANALYSIS SCORES (UNINCORPORATED AREA ONLY)					
Hazards	**Probability**	**Magnitude/Severity**	**Warning Time**	**Duration**	**Total**
Tornado/Windstorm	3	3	4	1	**2.95**
Animal/Plant/Crop Disease	2	3	4	4	**2.8**
Thunderstorm/Lightning/Hail	4	2	2	1	**2.8**
Transportation Incident	4	1	4	1	**2.8**
Flash Flood	3	2	3	3	**2.7**
Infrastructure Failure	2	2	4	3	**2.4**
Landslides	2	2	4	3	**2.4**
Severe Winter Storm	3	2	1	3	**2.4**
Drought	2	3	1	4	**2.35**
Human Disease	1	3	4	4	**2.35**
Expansive Soils	2	2	4	2	**2.3**
Radiological Incident	1	3	4	3	**2.25**
Extreme Heat	3	1	1	3	**2.1**
HAZMAT Incident	2	1	4	2	**2**
Earthquake	1	2	4	3	**1.95**
Grass/Wild Land Fire	2	1	4	1	**1.9**
River Flood	1	2	2	3	**1.65**
Sinkholes	1	1	4	3	**1.65**
Levee/Dam Failure	1	1	4	2	**1.55**
Terrorism	1	1	4	2	**1.55**

HAZARD PROFILES

Animal / Plant / Crop Disease

Definition and Description

Disease is any impairment of normal physiological function affecting all or part of an organism, esp. a specific pathological change caused by infection, stress, etc., producing characteristic symptoms; illness or sickness in general *(Collins).* Also, it is any medical, health, or sanitation threat to plants, wildlife, domestic animals. For purposes of this discussion the topic will be contained to only communicable diseases and will largely deal with generalities.

Communicable diseases can have devastating effects on a health of the population of a community, the health of wild and domestic animals, and on the wide variety of plant life that is present in and around the community. Some of these diseases are considered to be a greater risk to the community than others. Some diseases that affect livestock may include (but not limited to) West Nile Virus, Equine Infectious Anemia, Johne's Disease, Foot Rot, Coccidiosis, Pinkeye, Anaplasmosis, Anthrax, Bluetongue, Brucellosis, Trichomoniasis, Tuberculosis, Pseudorabies, Brucellosis, Porcine Reproductive Respiratory Syndrome, Brucella ovis, Ovine Progressive Pneumonia, Scrapie, Micoplasma, Newcastle, Vesicular Stomatitis, Chronic Wasting Disease (CWD), Exotic Newcastle Disease and Rabit calicivirus disease.

Some common plant diseases include cedar-apple and related rusts, anthracnose, oak wilt, Verticillium wilt, ash decline, Sphaeropsis blight of pine, Rhizosphaera of spruce, Cytospora of spruce, black knot of plum, and environmental or abiotic disease, and Dutch Elm disease among others.

Lastly, though not technically a disease, the threat from the Emerald Ash Borer poses an ever-increasing threat to ash trees in Grundy County. According to the Iowa Department of Natural Resources, Bremer County and Black Hawk County, which both are close in proximity to Grundy County, have confirmed Emerald Ash Borer infestations. The damage caused by this invasive species is comparable to diseases such as Dutch elm disease. The State has implemented a state-wide quarantine as of 2014.

Historical Occurrence

Instances of plant, crop, or animal disease are common across Iowa and Grundy County. However, according to available data and input, there have been no widespread recorded occurrences of plant, crop, or animal diseases having a significant impact in the planning area.

Probability

Due to the lack of widespread diseases in the past, it is unlikely that a major animal, plant, or crop disease will develop in the future. That being the case, there is a much greater likelihood of complications, such as foodborne illness in humans, resulting from bacteria and viruses originating in livestock and crops. In addition, the presence of pests, weeds, and fungi poses another threat because organisms have the potential to develop resistances against chemical sprays (e.g. pesticides, herbicides, fungicides) which, in turn, could result in widespread crop damage. The Iowa Hazard Mitigation Plan determined that though it would

have a high impact, the probability of this hazard occurring is low. The composite score (Table 23) determined the probability of this hazard event to be between occasional and likely (up to 1 in 3 chances occurring).

Magnitude / Severity

As discussed earlier in the profile, agriculture, primarily corn, soybeans, and livestock, is a major contributor to Grundy County's economy. An USDA study determined that in 2012, agriculture attributed over $308 million in economic output and employed provided 684 jobs in Grundy County.

The severity of a plant, crop, or animal disease depends largely on the disease itself. Effects from a widespread crop disease in Grundy County or the state could result in unprecedented crop damage. The same is true for livestock. This damage to plants, crops, and livestock could have devastating effects on the local and state-wide economy.

Warning Time

It is unlikely that there would be any warning before a plant, crop, or animal disease develops. However, it is possible that a small, localized discovery of a new disease could prevent the spread of that disease if properly contained and managed.

Duration

The duration of a plant, crop, or animal disease is likely to last weeks, months, or even years. This is because of the time required to first discover the disease and then develop methods to treat the disease and prevent it from spreading.

Drought

Definition and Description

A drought is defined as a period of prolonged abnormally low precipitation producing severe dry conditions. There are four (4) types of drought conditions relevant to Iowa:

- Meteorological drought, which refers to precipitation deficiency;
- Hydrological drought, which refers to declining surface and groundwater supplies;
- Agricultural drought, which refers to soil moisture deficiencies; and
- Socioeconomic drought, which refers to when physical water shortages begin to affect people.

The highest occurrences of drought conditions with recorded events in Iowa are associated with agricultural and meteorological drought as a result of either low soil moisture or a decline in recorded precipitation.

Droughts can be spotty or widespread and last from a few weeks to a period of years. A prolonged drought can have a serious impact on a community's water supply and economy. Increased demand for water and electricity may result in shortages of resources. Moreover, food shortages may occur if agricultural production is damaged or destroyed by a loss of crops or livestock. While droughts are generally associated with extreme heat, droughts can and do occur during cooler months.

Historical Occurrence

National Climatic Data Center has recorded droughts since 1996. In that time, there have been three years with a recorded drought. These drought events were in August 2001, August 2003, as well as a registered drought July-October 2012. There was also a drought in 1995 affecting the whole state. A brief summary of these droughts is below.

August 1995 - This particular drought affected the entire state of Iowa. Precipitation was confined to widely scattered thunderstorm activity, which produced a wide variation of monthly rainfall amounts. The highest of these was 9.23 inches at Bondurant in central Iowa (details on that below) to .29 inches at Dubuque for the 4th driest August on record at Dubuque. Statewide rainfall distribution was highest over northwest and north central Iowa, and lowest over the south central counties. The dry weather conditions combined with well above normal temperatures translated to the warmest month recorded in Iowa since July 1988 and the 4th warmest August of record. The summer months of June through August of 1995 ranked 14th warmest in the 123 years data has been collected. The dry conditions resulted in deterioration of Iowa's corn and soybean crops. Yield losses were greatest over southern Iowa where plantings were delayed by excessive spring rainfall. Reports indicate losses in the corn of between five and 25 bushels per acre with the greatest over the south. Soybean losses were not that great and were generally 5% or less. In dollars this translates to about $420 million in corn and $116 million in soybeans.

August 2001 - Beginning on August 1, 2001 through August 23, 2001, a portion of Iowa (including Grundy County and 50 additional counties) experienced a record drought. In what became a rather tough growing season, drought developed in Iowa during the month of July, and became serious in August. During the early part of the growing season, excessive rainfall caused significant planting delays across the state. Once the crop was planted, cool and cloudy weather settled into the state slowing crop maturation. Once the warm weather finally arrived, rainfall tailed off significantly. Very little rainfall was reported during the month of July; however, crops flourished with the moisture that was available. During the last half of July, temperatures began to soar into the 90s quite regularly. Temperatures were in the 90s to around 100 for most of the first 10 to 12 days of August with virtually no rainfall. Moisture reserves ran out during the critical time of pod filling for the soybeans and at the tasseling for the corn. Another factor that complicated the situation was the soil moisture profile over central and southwest Iowa. After two years of drought, rain began falling during the last fall of 2000 and continued into the spring of 2001. Though soil moisture was replenished in part, a layer of dry soil remained below the moistened layer, preventing root development below the moist layer. Reports indicate losses estimated between one third and one half in parts of central and southwest Iowa. A few locations had verifiable corn crop losses approaching 80%. Overall, losses for the season were closer to the 15% range. Damage to the corn crop was a little over $350 million, with about $225 million in losses to the soybean crop, and about a two million dollar loss to the oat crop.

August 2003 - Dry weather settled again over Iowa and Grundy County during August 2003. The last widespread rain occurred on July 9th. An extended period of heat and humidity from the 15th to 25th saw highs into the 90s to over 100 degrees Fahrenheit (F) in some areas. By month's end drought indices had worsened to severe to extreme drought across south central Iowa (52 counties) and at least moderate drought over the remainder of the state. Waterloo had its driest

August on record, Des Moines its 3rd driest and Ottumwa its 8th driest. A cold front brought only a brief respite from the intense heat, as temperatures rebounded into the 90s to near 100 degrees F. on the 24-26th. Des Moines Airport reached the century mark for the first time since July 29, reaching 100 F. on the 24th and 101 F. on the 25th. This was followed by a slow cool down as several pushes of cooler air traversed the state. Unfortunately, there was only widely scattered convection across the state on the 27th and 28th, providing little significant drought relief. Light to moderate rainfall on the 31st fell across primarily the southern one half of the state, with the heaviest amounts in the southeast. The end of the month saw numerous records approached or established for an all-time record dry August. In Waterloo, the 0.08" broke the previous dry August record of 0.37" set in 1955, while Des Moines had its 3rd driest August ever with 0.31" (driest 0.14" in 1909). Many stations had from 10 to 25 percent of normal rainfall. The drought in south central Iowa as shown by the Palmer Drought Index reached the Extreme category (-4.09) for the first time in this event by August 30th. Statewide NWS Cooperative station data compiled by the Iowa State Climatologist's office showed August temperatures averaged 74.3 F. or 3.0 degrees above the 30-year (1971-2000) mean, ranking as the 18th warmest in 131 years. Precipitation statewide was 0.96" or 3.23" below than normal, ranking as the driest August on record. June through August was the 65th warmest (72.0 F. or 0.4 degrees above normal) and the 18th driest (9.55" or 1.93" below normal) months. The dry conditions caused deterioration in the states crops. Estimates place yield reductions of about 10% on the corn crop, or a loss of about $210 million. Losses on the soybean crop were around 30%, or a loss of about $435 million.

July-October 2012 – Very warm and dry weather that began in the spring continued into the summer. Temperatures warmed sharply the last few days of June. The heat persisted into July. Temperatures for the month of July were a month the warmest on record. Much of the state recorded less than 50% of normal rainfall for the month, with a few locations under 10% of normal. In addition, extended periods of temperatures above 95 F resulted in problems with pollination of the crops. The rapid deterioration of the corn and soybean crop that took place in July slowed as much of the damage had already occurred in July. By the end of the month, officials estimated that 15% of the soybean crop and 20% of the corn crop yield had been lost to the drought. At the current price, the loss total was in excess of $2.6 billion. For the month of September, temperature averaged fairly close to normal. Rainfall was in short supply across the state. Much of the state recorded less than 50% of normal rainfall for the month, with a few locations under 25% of normal. No significant damage occurred in September in spite of the dry conditions and early freeze of much of the state on the 23rd. Harvest activities were more than 2 weeks ahead of normal. Indications were that yields of the corn crop were around 140 bu/ac and 43/5 bu/ac for the bean crop. Temperatures cooled in October with the month averaging near to a little below normal. It was the first cooler than normal month in 13 months across the CWA. More widespread rainfall began by the middle of the month with fairly widespread even on the 13th. The rapid detrition of the corn and soybean crop that took place in July slowed as much of the damage had already occurred. No significant damage occurred in September in spite of the dry conditions and early freeze across much of the state on the 23rd. In the four months of recorded drought, there was a total estimated $96 million in crop damage.

Table 27 displays drought events in Grundy County from 2001-2014 as recorded by the National Climatic Data Center.

Probability

From 2001-2015, there have been three years where droughts have occurred spanning a total of six months. Based on the historical occurrences, the probability of a drought in a given year is occasional.

TABLE 25: GRUNDY COUNTY DROUGHT EVENTS, 2001-2014

Month/Year of Declaration	Deaths	Injuries	Property Damage	Crop Damage
August 2001	0	0	12.65M	107.350M
August 2003	0	0	0	11.35M
July 2012	0	0	0	90M
August 2012	0	0	0	6M
September 2012	0	0	0	0
October 2012	0	0	0	0

Source: National Climatic Data Center, retrieved 11/2016
Note: Damage amount includes areas outside Grundy County

Magnitude / Severity

While the entire planning area would be affected by a drought, those dependent (persons, animals, and crops) on rain would be the most vulnerable. This means that agriculture, agribusiness, and consumers (if the drought lasted long enough or impacted a large area) would be impacted. A drought limits the ability to produce goods and provide services. Because the jurisdictions and rural residents draw their drinking water from groundwater sources, a prolonged severe drought may impact all 14,867 persons if there were to be a dramatic drop in the stream flow coupled with the drop in the water table. In addition, while a drought may not cause structural damage to properties, a drought could cause damage to the city utilities, especially the water and well system. Fire suppression can also become a problem due to the dryness of the vegetation and possible lack of water.

A drought in Grundy County would likely also be affecting most of Iowa if not the Midwest as a whole. Because of the dependence on precipitation and water, the agricultural community would be impacted the most. The agricultural areas would be most adversely impacted, but the entire state would likely feel at least some impact.

Drought in the U.S. seldom results directly in the loss of life. Deaths associated with drought are usually related to a heat wave. Drought more directly affects agricultural crops, livestock, natural vegetation, wildlife, and stream flows (fish and aquatic vegetation). Impacts are costly economically, environmentally, and socially. Due to Grundy County's strong agriculture based economy, including row crops and livestock, the impact of a drought could be critical.

Warning Time

Drought warning is based on a complex interaction of many different variables, water uses, and consumer needs. Drought warning is directly related to the ability to predict the occurrence of atmospheric conditions that produce the physical aspects of drought, primarily precipitation and temperature. There are so many variables that can affect the outcome of climatic interactions, and it is difficult to predict a drought in advance. In fact, an area may already be in a drought before it is even recognized. While the warning of the drought may not come until the drought is already occurring, the secondary effects of a drought may be predicted and warned against weeks in advance. Warning time is not a concern with a drought as the onset of drought can take weeks, months, and sometimes even years to feel the effects.

Duration

The duration of a drought can affect the planning area for days and weeks, months, or longer.

Earthquake

Definition and Description

An earthquake is any shaking or vibration of the earth caused by the sudden release of energy that may impose a direct threat on life and property. Ground shaking from earthquakes can collapse buildings and bridges; disrupt gas, electric, and phone service; and sometimes trigger flash floods and fires. Buildings with foundations resting on unconsolidated landfill and other unstable soil, and trailers and homes not tied to their foundations are at risk because they can be shaken off their mountings during an earthquake.

Earthquakes are generally associated with plate tectonics or volcanic activity, but a third type includes artificial earthquakes. In other words, a large explosion can cause the earth to quake resulting in substantial damage.

According to the Iowa Geological Survey, Plum Creek River Fault Zone and Structural and Stratigraphic Framework of Eastern Iowa study volume Number 13, printed in 1985, there are several areas with faults in Iowa. The two that appear to be closest and could affect the community in this plan are the Plum River Fault Zone and the Fayette Structural Zone. The Fayette Structural Zone runs through the planning area starting north of the City of Waterloo, through the very southeast tip of Grundy County and into Fayette County towards the City of Oelwein, at a diagonal from the southwest to the northeast. The Plum River Fault Zone can be found south of Cedar Rapids and running east towards Rockford, Illinois.

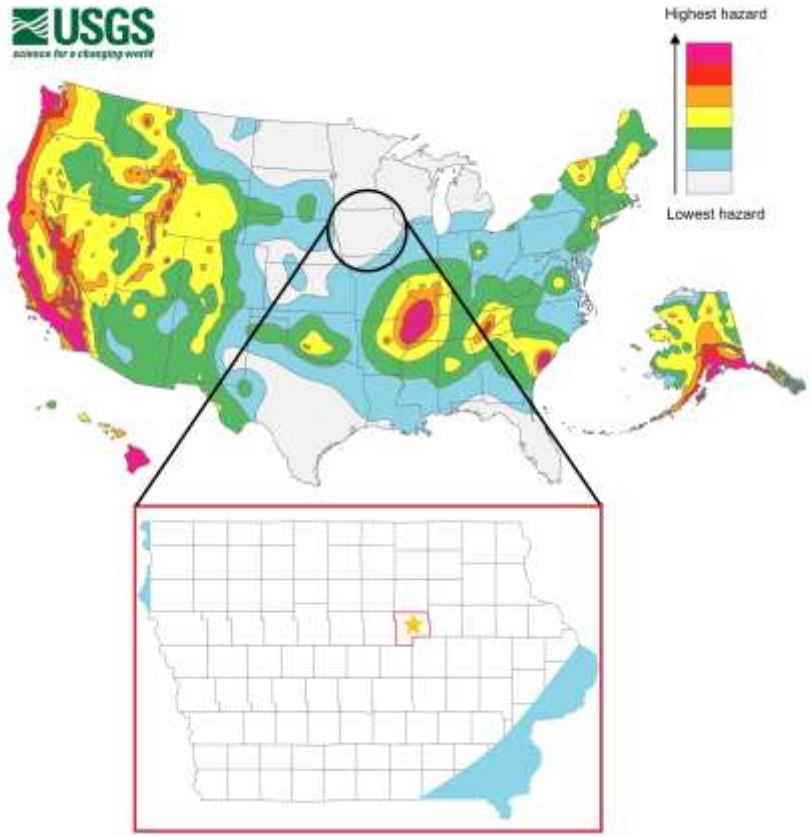


Figure 4: Simplified 2014 Hazard Map Magnified to Iowa with Grundy County Marked

Source: USGS Earthquake Hazard Program

Historical Occurrence

Iowa as a whole has experienced the effects of only a few earthquakes in the past 175 years. The epicenters of 12 earthquakes have been located in the state. The first known occurrence was in 1867 near Sidney in southwest Iowa; the most recent occurrence was in 2004 near Shenandoah in southwest Iowa. The largest Iowa earthquake (Mercalli magnitude VI) occurred near Davenport in southeast Iowa in 1934. None of these events were instrumentally recorded.

On January 26, 1925 an earthquake occurred with a reported epicenter near Waterloo, Iowa (within an adjacent county). The event registered a magnitude of II (2) on the Mercalli Scale. Modified Mercalli Intensity Scale is commonly used in the United States by seismologists seeking information on the severity of

earthquake effects. Intensity ratings are expressed as Roman numerals between I, at the low end, and XII at the high end. According to FEMA when a Mercalli magnitude II earthquake occurs only a few people might notice movement if they are at rest and/or on the upper floors of tall buildings.

While no other earthquakes with epicenters in Iowa have been recorded, earthquakes with far away epicenters can have minor effects on the region. For example, in 2002 an earthquake with an epicenter in Alaska caused temporary "black water" to occur in local wells.

Probability

Historic seismicity in the planning area in relation to the regional structural geology from 1800 to present has been slight. Assuming historic trends remain unchanged the likelihood of an earthquake causing any substantial damage to Grundy County and its jurisdictions is unlikely. Figure 4 illustrates the probability of an earthquake occurring in Iowa and the planning area. The committee determined the probability of an earthquake in Iowa to be unlikely.

Magnitude / Severity

Even though most of Iowa is in Seismic Zone 0, the lowest risk zone in the country, if an earthquake were to occur, the entire planning area, 12,453 persons; 9,878 parcels; and over $1.5 billion in land, building, and dwelling values (See Table 28) would be vulnerable to damage. The structures most at risk for damage would be those structures built on poor soil, such as a floodplain. It is expected that if an earthquake were to occur, the damage would be limited to the shifting of buildings off of their foundations, cracked plaster on walls and ceilings, and perhaps some bowed walls. Underground utilities would be at greater risk of damage during the winter season if the ground were frozen to depths of four feet or greater.

The damages associated with an earthquake would likely be relatively low. However, when considering the highly unlikely worst-case scenario, a larger earthquake would have catastrophic effects on the planning area should it occur.

TABLE 26: ASSESSED VALUES FOR GRUNDY COUNTY

Agriculture	
Agriculture Land	$757,997,436
Agriculture Buildings	$43,134,910
Agriculture Dwellings	$160,956,442
Residential	
Rural Land and Dwellings	$41,723,900
Urban Land and Dwellings	$416,421,096
Multi-Residential	
Rural Land and Dwellings	$678,171
Urban Land and Dwellings	$11,416,824
Commercial	
Rural Land and Dwellings	$10,267,566
Urban Land and Dwellings	$62,856,539
Industrial	
Rural Land and Dwellings	$8,029,550
Urban Land and Dwellings	$20,428,730
Total Value for Grundy County	**$1,533,911,164**

Source: Grundy County Assessor

Warning Time

Earthquake prediction is an inexact science. Even in areas that are well monitored with instruments, such as California's San Andreas Fault Zone, scientists only very rarely predict earthquakes. There would be little warning time if an earthquake were to take place.

Duration

The duration of an earthquake would be minutes; however, if the earthquake was large enough, the planning area would feel aftershocks for hours – even days later.

Expansive Soils

Definition and Description

As defined in the State of Iowa Hazard Mitigation Plan, expansive soils are soils and soft rock that tend to swell or shrink excessively due to changes in moisture content. The effects of expansive soils are most prevalent in regions of moderate to high precipitation, where prolonged periods of drought are followed by long periods of rainfall. The hazard occurs in many parts of the Southern Central, and Western United States. Recent estimates put the annual damage from expansive soils as high as $7 billion. However, because the hazard develops gradually and seldom presents a threat to life, expansive soils have received limited attention, despite their costly effects.

Historical Occurrence

Historical records of damage due to expansive soils are not kept on a county-wide scale. Likewise, there are no historical records for the planning area for major expansive soil events.

Probability

Given the historical occurrences of severe winter storms and the annual spring thaw cycle in the planning area, the probability of minor expansive soil events that affect roads and sidewalks is high. Probability of a large expansive soil event, affecting buildings and major infrastructure, was determined to be occasional for the planning area. Expansive soils occur slowly over time.

Magnitude / Severity

The availability of data on expansive soils varies greatly. In our near metropolitan area and at dam sites, abundant information on the amount of clay generally is available. However, little information is reported other than field observations of the physical characteristics of clay.

Expansive soils have little if any direct human impacts. Impacts commonly involve swelling clays beneath areas covered by buildings and slabs of concrete and asphalt, such as those used in construction of highways, walkways, and airport runways. Expansive soils can also contribute to or cause damage to roadways, bridges, pipelines, and other infrastructure. Local jurisdictions are burden with the responsibility to repair the damage to roadways.

Houses and one-story commercial buildings are more apt to be damaged by the expansion of swelling than are multi-story buildings, which usually are heavy enough to counter swelling pressures. The most obvious manifestations of damage to buildings are sticking doors, uneven floors, and cracked foundations, floors, walls, ceilings, and windows.

Warning Time

The speed of onset is very slow, and is consistent with other geological hazards that occur over time. However, there are few warning signs of expansive soils until after structural damage becomes apparent, and that structural damage may occur slowly or extremely quickly.

Duration

The duration of an expansive soil event can be over within hours, days, or weeks depending up on the severity and location of the occurrence. Recovery is also depending upon the impact area.

Extreme Heat

Definition and Description

Extreme Heat happens when summertime weather is substantially hotter and/or more humid than average for a given location at that time of the year. This includes temperatures (including heat index) in excess of 100 degrees Fahrenheit or at least three successive days of 90+ degrees Fahrenheit.

A heat advisory is issued when temperatures reach 105 degrees and a warning is issued at 115 degrees. When these extreme heat events occur, and even more so when they are prolonged, people, livestock, pets, wild animals and plant life are all affected to some degree.

In humans, extreme heat events make individuals much more susceptible to such heat related illnesses as heat cramps, heat exhaustion, heat rash, and heat stroke. Several factors affect the body's ability to cool itself during extremely hot weather. When the humidity is high, sweat will not evaporate as quickly, preventing the body from releasing heat quickly. Other conditions related to risk include age (the elderly and young children), obesity, fever, dehydration, heart disease, mental illness, poor circulation, sunburn, and prescription drug use and alcohol use.

Many similar physical reactions occur in animals during extreme heat events, but can go unnoticed by an unobservant caretaker. The susceptibility to heat varies on the type of animal and whether or not they have access to water to avoid dehydration.

Plant life can also suffer substantially during prolonged heat waves, especially if they occur in conjunction with moderately dry conditions or even drought. This is of substantial concern to the community as the area is surrounded by primarily agricultural uses. Any negative effects on the surrounding farm economy would undoubtedly have some impact on the communities' well-being.

Historical Occurrence

Heat kills by taxing the human body beyond its abilities. In a normal year, about 175 Americans succumb to the demands of summer heat. Among the large continental family of natural hazards, only the cold of winter -- not lightning, hurricanes, tornadoes, floods, or earthquakes -- takes a greater toll. In the 40-year period from 1936 through 1975, nearly 20,000 people were killed in the United States by the effects of heat and solar radiation. In the disastrous heat wave of 1980, more than 1,250 people died (Source: NOAA).

The State of Iowa was impacted by a significant heat wave that occurred in the summer of 1995. In July of that year temperatures and dew point soared to new record levels across the State. The heat wave took a dramatic toll on the State as well as three human fatalities were attributed to the event. A significant loss occurred in livestock. Statewide figures indicate that there were property losses of approximately $3.8 million. Losses included 4,000 head of cattle, 370 hogs, 1,250,000 chickens, and 250,000 turkeys. On one farm alone 250,000 laying hens perished on the 2nd day of the heat. Another egg producer had 1.5 million laying hens on two farms. They reported a loss of at least 500,000 hens. Disposal became a serious problem as rendering plants were overwhelmed. In addition to problems caused to humans and livestock, there were numerous heat buckles reported on streets and highways around the state (Source: NCDC).

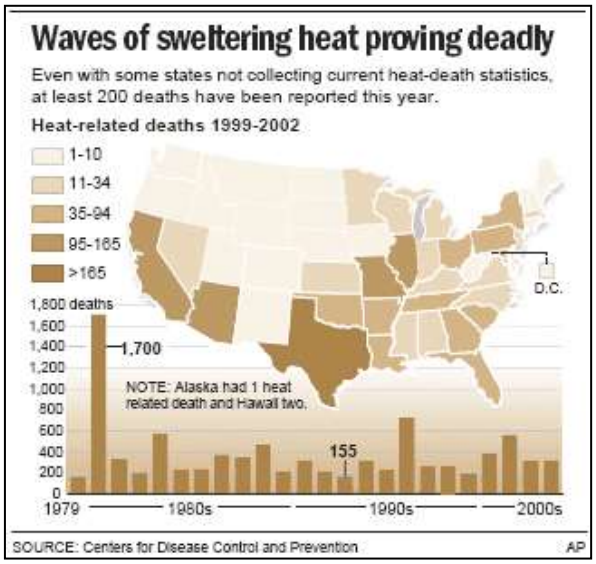


Figure 5: Heat Related Deaths -2002

The National Climatic Data Center Storm Events Database indicates only one recorded Excessive Heat event in Grundy County since 1996; an extreme heat event was recorded beginning on July 15, 2011 and ending July 28, 2011. No injuries or deaths as a result, but there was an estimated $135,000 worth of property damage across several Iowa counties. In mid-July, a high-pressure system developed that placed temperatures above 90 degrees Fahrenheit for several days. Most nightly lows did not fall below the mid-70s. These conditions caused considerable stress on livestock. Since 2009, there have been 15 days with an Excessive Heat event in Iowa.

Probability

Based on historical Excessive Heat events that were recorded, the probability of another heat wave affecting the planning area is relatively low. However, temperatures and heat index can still have an effect without reaching the threshold to be recognized as an event by NOAA. Because of this and that extreme heat can affect some members of communities more than others, some jurisdictions considered extreme heat to be likely despite few historical occurrences. However, based on NOAA criteria, the probability is unlikely.

Magnitude / Severity

Everyone (12,453 persons), in the planning area is susceptible to the impacts of a heat wave/extreme heat event. Those who have an elevated risk include the elderly, young children, chronic invalids, those on certain medications or drugs, persons who are over their recommended weight, alcoholics, and individuals who work outdoors or in confined spaces without air conditioning. Furthermore, class can figure into the vulnerability. Those individuals or families who cannot

afford air conditioning or do not have access to air conditioning are also more susceptible to the effects of elevated temperatures. Unfortunately, it is unknown how many of Grundy County's population would fall into this category.

The amount of vulnerability can be greatly reduced by taking certain precautionary measures. Such measure includes, but are not limited to drinking plenty of water to stay hydrated, staying in air-conditioned areas, using sun block, reducing the amount of physical exertion normally expended, etc.

The impacts of extreme heat events have historically been known to cause death. This possibility remains today. The severity of a heat wave event would likely be multiplied if it occurred in conjunction with other events such as a drought or a power failure. If the air were extremely dry this would increase the rate of dehydration among plants and animals. If a power failure were to occur, air conditioners, fans, freezers, and refrigerators would cease to operate. As these are items used to alleviate the stresses of heat waves, their loss would contribute to the severity of the disaster.

Within the planning area, it is anticipated that the actual impacts of a heat or excessive heat event would be less severe than what could potentially happen. More likely, a heat wave would likely result in increased energy consumption as a result of more air conditioning units operating. Increased numbers of people at public places such as malls, movie theaters, and swimming pools is also anticipated. Companies and organizations that rely on outdoor labor would likely see a reduction in productivity. Plant life would suffer severe stress possibly stunting growth, hurting crop yields, and thereby affecting the local economy.

Costs to the planning area directly may occur if roads, sidewalks, and foundations expanded enough to cause structural damage.

Warning Time

Heat waves are generally well forecasted; therefore, the onset speed is at least 24 hours. When temperatures or heat indices rise to dangerous levels, the National Weather Service will initiate alert procedures.

Duration

Extreme heat conditions have been known to last days and even weeks with little to no relief.

Flash Flood

Definition and Description

A flash flood is an event that occurs with little or no warning where water levels rise at an extremely fast rate. Flash flooding results from intense rainfall over a brief period, sometimes combined with rapid snowmelt, ice jam release, frozen ground, saturated soil, or impermeable surfaces. Most flash flooding is caused by slow-moving thunderstorms or thunderstorms repeatedly moving over the same area. Even with information on soil saturation and predicted rainfalls flash floods can still catch people by surprise. Flash flooding is an extremely dangerous form of flooding which can reach full peak in only a few minutes and allows little or no time for protective measures to be taken by those in its path. Flash flood waters move at very fast speeds and can move boulders, tear out trees,

scour channels, destroy buildings, and obliterate bridges. Flash flooding often results in higher loss of life, both human and animal, than slower developing river and stream flooding.

Historical Occurrence

According to data from the National Climatic Data Center (NCDC) there have been 21 reported flash floods in Grundy County from 1996 through 2015. These floods caused an estimated $2.13 million in property damage and $678,000 in crop damage.

It should be noted that there can be several flood events that go unrecorded for several reasons. Either they do not cause substantial damage to houses or structures or they may occur around the same time of a larger, more publicized event. Nevertheless, these events do result in flood costs that the county taxpayers and individual property owners must finance.

TABLE 27: HISTORICAL OCCURRENCES OF FLASH FLOODING IN GRUNDY COUNTY, 1996-2015

Location	Date	Time	Deaths/Injuries	Property Damage	Crop Damage
Grundy Center	6/20/1998	16:15	0	$50,000	$5,000
Grundy Center	6/24/1998	01:00	0	$30,000	$3,000
Grundy Center	6/27/1998	22:30	0	$50,000	$10,000
Wellsburg	6/8/1999	20:00	0	$500,000	$50,000
Stout	7/2/1999	21:30	0	$75,000	$100,000
Countywide	7/10/2000	00:30	1	$200,000	$250,000
South Portion	5/10/2001	16:30	0	$75,000	$0
Northwest Portion	8/16/2004	19:55	0	$10,000	$10,000
Grundy Center	6/22/2007	17:15	0	$100,000	$250,000
Reinbeck	4/25/2008	05:00	0	$10,000	$0
Wellsburg	4/25/2008	08:50	0	$10,000	$0
Fern	8/10/2010	23:55	0	$25,000	$0
Fern	8/10/2010	23:55	0	$10,000	$0
Ivester	5/26/2013	10:00	0	$50,000	$0
Wellsburg	5/26/2013	10:00	0	$25,000	$0
Holland	5/29/2013	15:29	0	$450,000	$0
Wellsburg	6/24/2013	11:55	0	$200,000	$0
Reinbeck	6/29/2014	21:15	0	$50,000	$0
Beaman Thurman Arpt	6/30/2014	14:49	0	$100,000	$0
Wellsburg	8/28/2015	15:06	0	$100,000	$0
Wellsburg	8/28/2015	18:31	0	$10,000	$0
Total			1	$2,130,000	$678,000

Source: National Climatic Data Center, retrieved 11/2016
Note: Damage amount includes areas outside Grundy County

Probability

Considering the historical occurrences of flash flood events, the probability of future flooding events is highly likely in the next five years. Flooding is an annual problem throughout the planning area. While the planning area can experience some degree of flooding throughout the year, the threat of flash flooding is compounded in the late winter and early spring months, as melting snow can overflow streams, rivers, and tributaries. As part of three watersheds (Middle Cedar, Upper Iowa, and Middle Iowa), areas adjacent to the rivers and creeks, and its main tributaries are at significantly higher risk than those areas located away from these features. However, flash flooding can also happen in developed areas that do not have proper drainage systems to carry the melted snow and rainfall away from homes and businesses. The committee determined the probability of a flash flooding event in the planning area to be likely.

Magnitude / Severity

Flash flooding in the incorporated areas can vary substantially. Homes, businesses, and infrastructure that remain near or in the floodway and 100-year floodplain will be flooded again. In addition to those low-lying areas in each jurisdiction can be vulnerable to flooding. All incorporated jurisdictions are vulnerable to flash flooding. The jurisdictions of Beaman, Conrad, Dike, Grundy Center, Holland, Morrison, Reinbeck, and Wellsburg have a higher risk of flash flooding due to their proximity to rivers and creeks. Based on data from 2005 (see Table 51) the incorporated areas have 1,752 parcels of land within the 1% floodplain (previously known as the 100- floodplain). Total property values (2016) for these parcels are approximately $334,578,956. This figure includes building, dwelling, and land value. There are an estimated 1,574 parcels in the unincorporated areas of Grundy County within the 1% floodplain (100-year floodplain). The land, building, and dwelling values of these areas are estimated to be 316,307,614.

Warning Time

Flash flood warnings are disseminated from the National Weather Service, IAWAS, and local officials, who then, in turn, distribute warnings to the affected areas using established procedures. People in the path of flash floods may have time to take appropriate actions to limit harm to themselves and their property. Floods may occur in the form of flash flooding which can occur in a matter of tens of minutes.

Duration

The duration of flash flooding is dependent on the severity of the flooding event. The duration of a flash flooding event would likely be under one day. However, damage, and cleanup from an event may take several days to recover from.

Grass/Wild Land Fire

Definition and Description

A grass or wild land fire is an uncontrolled fire that threatens life and property in a rural or a wooded area. Grass and wild-land fires are more likely to occur when conditions are favorable, such as during periods of drought when natural vegetation is drier and more combustible.

Historical Occurrence

The committee did not relate any information regarding specific fire events that have occurred in the rural areas of the county; however, they did acknowledge that fire departments, located in incorporated communities, have responded to numerous events in rural areas of the county.
According to the communities, the National Climatic Data Center and 2013 Iowa Hazard Mitigation plan, there have been no events with significant impact that have been reported. According to data from the National Interagency Fire Center, there were 533 wildland fires affecting 14,558 acres and 431 prescribed burns affecting 29,719 acres in Iowa in 2015.

Probability

Although much effort has been put into fire prevention in the community, based on historical occurrence, it is highly likely that numerous fires will occur in the community in the next year. Despite no major grass or wildland fires being recorded, it is still highly likely the county will face smaller grass and wildfires. Probability for grass or wild land fires increase during the dry seasons or when the area is experiencing a drought. Controlled burns, that have the potential of becoming out of control, pose a threat as well. Given the historical occurrence of grass or wildfires in Grundy County and the state, it is likely that the county will face threat of additional fires in the future, from both grass and wildland fires. The committee determined this to be occasional on the basis of historical occurrences.

Magnitude / Severity

Grass and wildfires spread quickly; therefore, they require immediate attention from first responders. Those most vulnerable include residents in housing structures near these fields and grasses, typically lying just outside or on the out rim of the community.

Combustible building materials obviously are more vulnerable than structures constructed of steel or concrete. Structures without early detection devices are more likely to be completely destroyed before containment by response agencies. Structures in areas served by older, smaller, or otherwise inadequate water distribution infrastructure such as water mains and hydrants are also at significant risk. Problems vary from region to region, often as a result of climate, poverty, education, and demographics, but Iowa has about 13.4 fire related deaths per million annually.

The severity of impact would largely depend on how quickly the emergency agencies, fire, police, and ambulance, became aware that a fire had occurred. The worst-case scenario would occur if the responsive agencies had a delayed response or was not aware of the fire until it had spread to a larger area. A fire of this magnitude could cause drastic losses to crops and potentially rural homesteads. According to the USDA National Agricultural Statistics Service, Grundy County has 318,047 acres in farmland, which totals to over 98% of the area of the county. 285,500 of those acres were dedicated to row crop production.

Warning Time

Wildland and grass provides little warning before their onset. In addition, fire spreads very rapidly especially in dry, hot, and windy conditions. However, all communities in Grundy County have mutual aid agreements to assist if the need arises.

Duration

The area immediately impacted by a grass or wildland fire will be impacted during the duration of the fire. Based on previous experience of fires, likely hours, but depending on size could be days.

HAZMAT Incident

Definition and Description

A HAZMAT (hazardous materials) incident is the accidental release of chemical substances or mixtures which presents a danger to the public health or safety during production or handling at a fixed facility. Fixed hazardous material incidents usually affect a localized area, and the use of planning and zoning can minimize the area of impact.

This hazard includes fixed hazardous materials, pipeline transportation, and transportation of hazardous materials. A HAZMAT or Radiological Transportation Incident is the accidental release of chemical substances or mixtures that presents danger to the public health or safety during transportation. A hazardous substance is one that may cause damage to persons, property, or the environment when released to soil, water, or air. Chemicals are manufactured and used in ever increasing types and quantities. As many as 500,000 products pose physical or health hazards and can be defined as "hazardous chemicals." Each year, over 1,000 new synthetic chemicals are introduced and transported across the county via semi-truck and train. Hazardous substances are categorized as toxic, corrosive, flammable, irritant, or explosive. Hazardous materials incidents generally affect a localized area, and the use of planning and zoning can minimize the area of impact.

A pipeline transportation incident occurs when a break in a pipeline creates the potential for an explosion or leak of a dangerous substance (oil, gas, etc.) possibly requiring evacuation. A pipeline incident can be caused by environmental disruption, accidental damage, or sabotage. Incidents can range from a small slow leak to a large rupture where an explosion is possible. Inspection and maintenance of the pipeline system along with marked gas line locations and an early warning and response procedure can lessen the risk to those near to the pipelines.

Figure 5 shows the Iowa Hazardous Materials Teams of Iowa.

FIGURE 6: IOWA HAZARDOUS MATERIALS TEAMS
Courtesy of Iowa Homeland Security

Table 28: HAZARD SPILLS BY TYPE
January 1, 2000 – January 1, 2016

Type of Spill	Quantity
Acids/Bases	2
Ammonia	12
Animal/Vegetable Product	1
Chlorine	1
Fertilizer/Pesticide	19
Inorganic Chemical	10
Manure	9
Organic Chemical	1
Petroleum	27
Propoane/LPG/Natural Gas	2
Transformer oil/PCB	11
Total	**96**

Source: Iowa DNR Hazerdous Material Release Database

Historical Occurrence

According to data from the Iowa Department of Natural Resources Hazardous Material Release Database, there have been 95 hazardous material spills or incidents in Grundy County from January 1, 2000 through January 1, 2016. Table 28 shows hazardous spill by type. The most frequent types of spills were petroleum (27) and fertilizer/pesticides (19). Table 29 displays how each spill occurred based on data from the Iowa DNR Hazardous Material Release Database. The two most popular modes of spilling

were from Handling and Storage (35) and Manure (23).

Probability

Grundy County averaged about six hazardous spill incidents per year from 2000 through 2015.

Hazardous materials are transported by roadways and railways, both common sites for the release of hazardous materials. The Department of Transportation regulates routes and speed limits used by carriers and monitor the types of hazardous materials crossing state lines. Despite increasing safeguards, more and more potentially hazardous materials are being used in commercial, agriculture, and domestic uses and are being transported on neighboring roads.

Table 29: HAZARD SPILLS BY MODE
January 1, 2000 – January 1, 2016

Mode of Spill	Quantity
Handling and Storage	35
Manure	23
Other	1
Pipeline	2
Theft	7
Transformer	11
Transportation	16
Total	**95**

Source: Iowa DNR Hazerdous Material Release Database

The Environmental Protection Agency manages a Toxics Release Inventory (TRI) dataset for communities to learn about toxic chemicals that industrial facilities are using and releasing into the environment. TRI database tracks the management of certain toxic chemicals that may pose a threat to human health and the environment. According to the EPA's 2013 National Analysis dataset, there are 440 TRI facilities in Iowa and 21,930 TRI sites across the United States. Grundy County does have 2 TRI facilities, one located north of Conrad and one east of Dike.

Due to the historical data and the planning area's diverse array of industrial and agricultural activities, the probability of a HAZMAT incident occurring is highly likely.

Magnitude/Severity

Most of the hazardous materials incidents are localized and are quickly contained or stabilized by the highly trained fire departments and hazardous materials teams. Depending on the characteristic of the hazardous material or the volume of product involved, the affected area can be as small as a room in a building or as large as five square miles or more. Many times, additional regions outside the immediately affected area are evacuated for precautionary reasons. More widespread effects occur when the product contaminates the municipal water supply or water system such as a river, lake, or aquifer.

A hazardous materials accident can occur almost anywhere, so any area is considered vulnerable to an accident. People, pets, livestock, and vegetation within approximately 3-4 blocks of facilities producing, storing, or transporting hazardous substances are at higher risk. Populations downstream, downwind, and downhill of a released substance are particularly vulnerable.

Depending on the characteristics of the substance released, a larger area may be in danger from explosion, absorption, injection, ingestion, or inhalation. Occupants of areas previously contaminated by a persistent material may also be harmed either directly or through consumption of contaminated food and water.

Facilities are required to have an off-site consequence plan that addresses the population of the surrounding area. Responding personnel are required to be

trained to HAZMAT Operations Level to respond to the scene, and those personnel that come into direct contact with the substances released are required to have HAZMAT Technician level training.

The close proximity and continued mutual aid agreement with the Northeast Iowa Response Group, located in northern Waterloo, will improve the likelihood of a quick response. The 20 Iowa Hazardous Materials Teams can be located in Figure 6.

Warning Time

When managed properly under current regulations, hazardous materials pose little risk. However, when handled improperly or in the event of an accident, hazardous materials can pose a significant risk to the population. HAZMAT incidents usually occur very rapidly with little or no warning. Even if reported immediately, people in the area of the release have very little time. The AlertIowa system the County has recently implemented would alert affected populations.

Duration

The duration of a HAZMAT incident is dependent upon the amount, type of hazardous material, and location of the release. A small release of gasoline or agricultural chemical on a roadway could close the road for a few hours to clean up. However, a large spill in a populated area or near a body of water would impact that area and possible the area downstream for days or weeks – depending on several factors of the type of release.

Human Disease

Definition and Description

Disease is any impairment of normal physiological function affecting all or part of an organism, esp. a specific pathological change caused by infection, stress, etc., producing characteristic symptoms; illness or sickness in general *(Collins).* Also, it is any medical, health, or sanitation threat to humans, plants, wildlife, domestic animals. For purposes of this discussion the topic will be contained to only communicable diseases and will largely with generalities.

According to the Iowa Department of Public Health website there are fourteen "Reportable Communicable Disease and Infectious Conditions" that are to be reported by telephone immediately should they be detected. These diseases and infectious conditions include Anthrax, Botulism, Cholera, Diphtheria, Haemophilus influenza type b invasive disease, Measles, Meningococcal invasive disease, Plague, Poliomyelitis, Rabies (human), Severe Acute Respiratory Syndrome (SARS), Smallpox, Vancomycin-resistant Staph aureus, and Yellow fever. Other events that should be immediately reported by telephone include outbreaks of any kind, unusual syndromes, uncommon diseases, or agents of bioterrorism including (but not limited to) anthrax, mustard gas, sarin gas, ricin, tularemia, and smallpox.

Other diseases of recent concern include Monkey pox and West Nile Virus. Also, there are a variety of sexually transmitted diseases that are monitored and treated by the medical community. These diseases include chlamydia, syphilis, gonorrhea, and HIV/AIDS. In the most recent years, Ebola and the Zika Virus have both become concerning public health threats. Currently, the Iowa Department of Public Health's Center for Acute Disease Epidemiology

monitors over 45 diseases as well as unusual occurrences of disease outbreaks.

Historical Occurrences

The historical occurrence of the outbreak of communicable diseases in the planning area is difficult to determine. There were no known historical occurrences of the outbreak of communicable diseases in Grundy County. However, there are the typical seasonal episodes of influenza, also known as the flu, within the county. Influenza is spread or transmitted, when a person who has the flu coughs, sneezes, or speaks and sends flu virus into the air, and other people inhale the virus. The virus enters the nose, throat, or lungs of a person and begins to multiply, causing symptoms of influenza. Influenza may, less often, be spread when a person touches a surface that has flu viruses on it – a door handle, for instance – and then touches his or her nose or mouth.

According to the Center for Disease Control (CDC), West Nile Virus has been found in the state for several years, including confirmed cases in Grundy County, along with the neighboring counties of Black Hawk and Buchanan. First reported in the United States in 1999, the virus is most often transmitted to humans via mosquitoes. The CDC recommends taking preventative measures, including insect repellant ant and protective clothing. Less than 1 percent of infected individuals develop serious, potentially fatal, neurologic illness from the virus.

Probability

It is highly likely human disease as defined will affect Grundy County residents on an annual basis. However, there is a far less likely probability of a human disease event making a severe impact on the county-wide level. Many safeguards from the Department of Public Health and other agencies are in place that mitigates the occurrence of a human disease epidemic. Grundy County Memorial Hospital is the main service provider for the area, but there are numerous hospitals and clinics in the surrounding areas that are available to provide care as well. Balancing the array of type of disease and impact, the probability has determined to be unlikely.

Magnitude / Severity

The severity of a human disease outbreak depends entirely on the disease itself. There are numerous safeguards that have been put into place to help deter an event before it begins, respond to an event once it does occur, and recover from an event as quickly as possible. Examples of such precautions include measures by service agencies (i.e. American Red Cross), government agencies (i.e. Grundy County EMA, State Veterinarian, USDA, etc.), and private medical facilities (i.e. hospitals and clinics) to detect and respond to an event before it becomes an epidemic.

Warning Time

Warning time for a human disease event ranges from just a few days to no time at all. The onset of a regional or county-wide epidemic could provide minimal or no warning time due to the nature of human diseases in our globalized society. Because of air travel, a disease that spawns in another part of the world could easily reach Grundy County in a matter of days.

Duration

The duration of a human disease incident in the planning area would be dependent on the type of disease, notification and containment of said disease, and treatment.

Infrastructure Failure

Definition and Description

This hazard includes communication failure, energy failure, structural failure, and structural fire.

Energy Failure or disruption is the loss of power as a result of a natural, man-made, or technological disaster or failure. Energy, for purposes of this plan, can also be described as a loss of power. For example, electricity is lost because a power line was accidentally cut; there was a malfunction at the power plant, etc. Another scenario would include the loss of natural gas, a fuel used by most in the community for purposes of heating and occasionally cooking.

Communication failure is the widespread breakdown or disruption of normal communication capabilities. This could include major telephone outages, loss of local government radio facilities, and long-term interruption of electronic broadcast services, language barriers, and unfamiliarity with common emergency response terminology. AlertIowa, law enforcement, fire, emergency medical services, public works, and emergency warning systems are just a few of the vital services which rely on communication systems to effectively protect citizens. Businesses and industry also rely heavily on various communication media. Mechanical failure, traffic accidents, power failure, line severance, and weather can affect communication systems and disrupt service. Disruptions and failure can range from localized and temporary to widespread and long-term. If switching stations are affected, outage could be more widespread. Communications failure can also be realized when individuals who speak different languages try to communicate, or when people use unfamiliar terminology. These types of communications failure are exacerbated during times of disaster.

Structural Failure is the collapse (part or all) of any public or private structure including roads, bridges, towers, and buildings. A road, bridge, or building may collapse due to the failure of the structural components or because the structure was overloaded. Natural events such as heavy snow may cause a roof of a building to collapse under the weight of the snow. Heavy rains and flooding can undercut and washout a road or bridge. The age of the structure is sometimes independent of the cause of the failure.

Enforcement of building codes can better guarantee that structures are designed to hold up under normal conditions. Routine inspection of older structures may alert inspectors to “weak” points. The level of damage and severity of the failure is dependent on factors such as the size of the building or bridge, the number of occupants of the building, the time of day, day of week, amount of traffic on the road or bridge, and the type and amount of products stored in the structure.

For this profile, fire is an uncontrolled fire in populated area that threatens life and property and is beyond normal day-to-day response capabilities. Structural fires present a far greater threat to life and property and the potential for much larger economic losses. Modern fire codes and fire suppression requirements in new construction and building renovations, coupled with improved firefighting equipment, training, and techniques, lessen the chance and impact of a major urban fire. Most structural fire occur in residential structures, but the occurrence of a fire in a commercial or industrial facility could affect more people and pose a greater threat to those near the fire or fighting the fire because the volume or type of the material involved.

According to the National Fire Protection Association (NFPA), eighty-five percent of fire deaths occur in the home (one-or two-family dwellings, apartments or manufactured housing). 72% of all fire deaths result from fires in one- and two-family dwellings, including manufactured homes.

Most fires occur as a result of natural causes (i.e. lightning), accidents (i.e. gas leaks), carelessness (i.e. smoking in close proximity to combustibles), or criminal (i.e. arson) reasons. According to statistics obtained from the NFPA Iowa ranked 13th out of the 50 states in the number of deaths per million in 1999.

Cooking is the leading cause of home fires in the U.S. It is also the leading cause of home fire injuries. Cooking fires often result from unattended cooking and human error, rather than mechanical failure of stoves or ovens. Careless smoking is the leading cause of fire deaths. Smoke alarms and smolder-resistant bedding and upholstered furniture are significant fire deterrents. Arson is both the second leading cause of residential fires and residential fire deaths. In commercial properties, arson is the major cause of deaths, injuries and dollar loss. Heating is the third leading cause of residential fires. Heating fires are a larger problem in single-family homes than in apartments. Unlike apartments, the heating systems in single-family homes are often not professionally maintained.

Historical Occurrences

On numerous occasions there has been localized loss of telephone service, generally due to some type of weather phenomenon (e.g. high winds, ice). There have also been short-term instances of power failure, most commonly occurring during thunderstorm and high wind events. In addition, winter ice events have caused power failures in communities in the past.

There are not any recorded instances of structural failure in Grundy County, nor are there any known instances of energy shortages. However, there have been a number of structural fire events in the county, typically house fires.

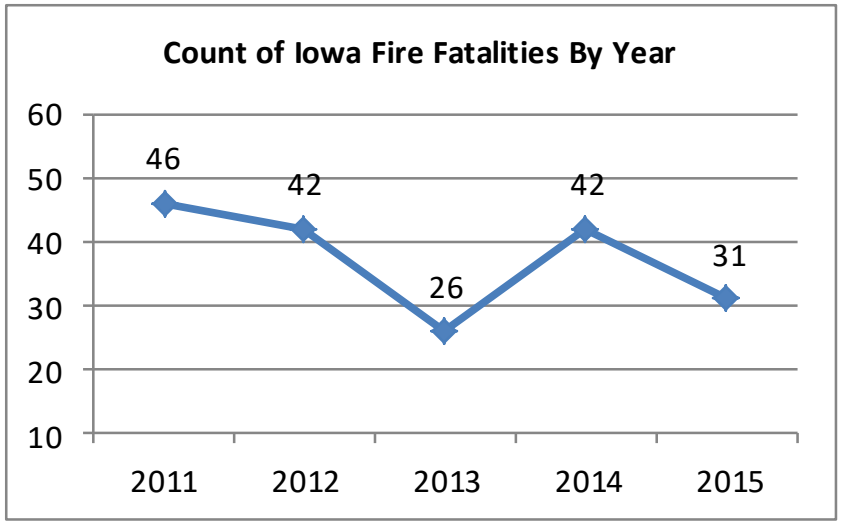


Figure 7: The historic data of deaths caused by fires throughout the entire State of Iowa
Source: Iowa Department of Public Safety, State Fire Marshal Division

Probability

Although much effort has been put into fire prevention in the community, based on historical occurrence, it is highly likely that numerous fires will occur in the county and its jurisdictions in the next year. An overall evaluation of potential infrastructure failures by the Planning Committee determined the probability to be occasional.

Magnitude / Severity

The magnitude and severity of an infrastructure failure ranges from trivial to catastrophic. Regarding events that are most likely to take place, such as a brief power outage caused by a thunderstorm, the effects would be relatively insignificant. However, if a major structural failure event occurred, such as a building or bridge collapse, the magnitude of such an event would be unprecedented considering the

scope of the property damage, personal injury, and likely fatalities that would ensue.

Warning Time

The warning time for the conditions that bring about infrastructure failures, such as a severe thunderstorm which could potentially cause a power outage, is relatively long and could be longer than a day. However, the warning time for the event itself, rather than the conditions that could cause an event, is very little to nonexistent. For example, structural engineers might know that a structure is in critical condition for months. However, it's impossible to predict at what time that structure would ultimately fail.

Duration

Just as the magnitude of an infrastructure failure can vary from trivial to catastrophic, the duration of such an event can also vary tremendously depending on the type of event.

Landslides

Definition and Description

A landslide is a downward and outward movement of slope-forming materials reacting under the force of gravity. Landslides occur when masses of rock, earth, or debris move down a slope. Although gravity acting on an over-steepened slope is the primary reason for a landslide, there are other contributing factors:

- Erosion by rivers, glaciers, or ocean waves create over steepened slopes
- Rock and soil slopes are weakened through saturation by snowmelt or heavy rains
- Earthquakes create stresses that make weak slopes fail
- Earthquakes of magnitude 4.0 and greater have been known to trigger landslides
- Volcanic eruptions produce loose ash deposits, heavy rain, and debris flows
- Excess weight from accumulation of rain or snow, stockpiling of rock or ore, from waste piles, or from man-made structures may stress weak slopes to failure and other structures

Slope material that becomes saturated with water may develop a debris flow or mud flow. The resulting slurry of rock and mud may pick up trees, houses, and cars, thus blocking bridges and tributaries causing flooding along its path (USGS). Landslides commonly occur in connection with other major natural disasters such as earthquakes, volcanoes, wildfires, and floods. (USGS)

Historical Occurrence

According to the National Climatic Data Center, there have been no reported landslide events in Grundy County between 1996 and 2014. It is possible that

landslides have occurred before 1996 or occurred and were not reported; however, there is no data available to determine this.

Probability

Based on the lack of reported landslides in the past, the probability of a landslides occurring in Grundy County is unlikely. Steep sloping areas, especially along waterways as well as areas that have been cleared of shrubbery or timber may have an increased probability. The topography of the planning area, shown in Attachment 2: Topographic Map of the County, provides locations of sloping areas along waterways.

Magnitude / Severity

Maximum threat exists to those property owners located at the top or bottom of steep sloping areas without trees or shrubbery to absorb excessive amount of moisture. For structures located at the top or bottom of a landslide the severity of impact could be devastating. Earth giving way from underneath a structure could result in the structure giving way also. All ground that does give way will then topple onto the anything located below.

Landslides can damage structures and disrupted electricity, water service, communications, and transportation routes in some areas along river banks or in areas where impair development has occurred. Injuries and deaths are very unlikely except in the case of undetected slope failure warning signs in structures overlooking steep slopes.

Warning Time

Great amounts of precipitation and moisture over time will greatly increase the warning time of a landslide event; however, there is no official warning system in place, thus the warning time would be short.

Duration

Landslides are typically over within hours of occurring.

Levee/Dam Failure

Definition and Description

A dam is defined as an artificial barrier with the ability to impound water, wastewater, or any liquid-borne material, for the purpose of storage or control of water. Dams are constructed for a variety of uses, including flood control, erosion control, water supply impoundment, hydroelectric power generation, and recreation. A dam failure is a break in, or imposed threat from, any water retention fixture which may endanger population downstream of the containment area

A levee is a man-made low ridge or embankment built along the edge of a stream or river channel to prevent flooding of the adjacent land. Artificial levees are typically needed to control the flow of rivers meandering through broad, flat floodplains. Levees are usually embankments of dirt built wide enough so that they

will not collapse or be eroded when saturated with moisture from rivers running at usually high levels. Grass or some other dense vegetation is planted on the top of the levee's bank so erosion is kept to a minimum.

According to the Federal Emergency Management Agency, dams can fail for one or a combination of the following reason: Overtopping caused by floods that exceed the dam capacity; Deliberate acts of sabotage; Structural failure of materials used in dam construction; Movement and/or failure of the foundation supporting the dam; Settlement and cracking of concrete or embankment dams; Piping and internal erosion of soil in embankment dams; and Inadequate maintenance and upkeep.

A levee failure is the loss of structural integrity of a wall, dike, berm, or elevated soil by erosion, piping, saturation, or under seepage causing water to inundate normally dry areas.

Levees constructed of compacted clay with a high plasticity tend to crack during cycles of long dry spells. During heavy rainfalls that follow the dry spells, water fills the cracks and fissures. In addition to increasing the hydrostatics forces, the water is slowly absorbed by the clay. The effect of the absorbed water is an increase in the unit weight of the clay as well as a decrease in its shear strength. This results in a simultaneous increase of the slide (driving) forces and a decrease of the resisting (shear strength) forces. Furthermore, the cyclic shrink / swell behavior of the cracked clay zone results in a progressive reduction of the shear strength of the clay, perhaps approaching its residual strength. It also results in deepening of the cracked clay zone, which may eventually reach a depth of 9 ft. or more, especially for clays with a plasticity index greater than 40. The end result may be a sloughing failure following a heavy rainfall. It is believed that fast removal of the runoff water from the interconnected network of cracks could alleviate this surface instability problem.

The Iowa Department of Natural Resources tracks all dams in the state of Iowa with a height of at least 25 feet or a total storage of at least 50 acre feet of water. The inventory excludes all dams less than six feet high regardless of storage capacity and dams less than 15 acre feet of storage regardless of height.

The Army Corps of Engineers classify dams into three categories based on the potential risk to people and property should a failure occur. Table 30 shows these classifications.

The classification may change over time because of development downstream from the dam since its construction. Older dams may not have been built to the standards of its new classification. Dam hazard potential classifications have nothing to do with the material condition of a dam, only the potential for death or destruction due to the size of the dam, the size of the impoundment, and the characteristics of the area downstream of the dam.

TABLE 30: DAM HAZARD POTENTIAL CLASSIFICATION

High Hazard Potential	Dams assigned the high hazard potential classification are those where failure or mis-operation will probably cause loss of human life.
Significant Hazard Potential	Dams assigned the significant hazard potential classification are those dams where failure or mis-operation results in no probable loss of human life but can cause economic loss, environment damage, disruption of lifeline facilities, or impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure
Low Hazard Potential	Dams where failure or mis-operation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

Source: Army Corps of Engineers National Inventory of Dams

According to the National Inventory of Dams, there are five dams in the planning area, and it is classified as low-hazard (see definition in Table 30). Table 31 is a chart of the dam's information. See Attachment 6y for a map of the location of the dams. According to information available from the Army Corps of Engineers National Levee Database, there are no levees within the planning area.

TABLE 31: DAM INVENTORY

Dam Name	NIDID	River	Closest City	Owner Name	NID Height (Ft.)	NID Storage	Type/Primary Purpose	Hazard Potential
Holland Marsh Dam	Ia03126	Tr- Holland Creek	Holland	Grundy County Conservation Board	11	53	Earth/Recreation	Low
Grundy Center Ford	-	Blackhawk Creek	Grundy Center	-	3	56	-	Low
Morrison Rock Dam	-	Blackhawk Creek	Morrison	Grundy County Conservation Board	1	90	-	Low
Reinbeck Rock Dam	-	Blackhawk Creek	Reinbeck	City of Reinbeck	2	135	-	Low
Lower North Fork Rock Dam	-	North Fork Blackhawk Creek	Dike	-	-	87	-	Low

Source: Army Corps of Engineers National Inventory of Dams & Iowa DNR

Historical Occurrence

Grundy County has no documented dam or levee failures in the planning area.

Probability

For dams, with the increased attention to sound design, quality construction, and continued maintenance and inspection, dam failure probability is low across the planning area. The probability of a dam failure due to a breach in the structural integrity of the system is also minimal. For the county overall, the hazard risk for all dams in Grundy County is considered unlikely.

Given the fact that none of the known levees and berms in the planning area is listed in the Army Corps of Engineers database is an indication that the probability of failure is likely, especially the unknown number of ones built by landowners and farmers. However, proper inspection, maintenance, design, and construction can limit the probability of a levee failure in the future.

The probability of a catastrophic levee or dam failure is unlikely.

Magnitude Severity

Dams are classified into three categories based on the potential risk to people and property should a failure occur; High, Significant, and Low, see Table 25. As Table 26 indicates, the only dams in the planning area are defined as a low-hazard dams. The planning area's vulnerability and severity of a dam/levee failure is considered low.

Of the inventoried dams in the planning area, the severity of damage would be no more than minor crop damage.

Water bursting through a narrow levee breach is moving much faster than the floodwaters in the main channel. The breaking out of this front of water and its fast flow can cause more destruction to structures behind the levee than floodwaters in the main channel would have caused. A failed levee continues to cause damage long after it breaks. The breach allows large volumes of water to enter formerly dry areas, forming temporary lakes. Such lakes do not go away immediately, because the lake is blocked from returning to the main channel by levee segments that were not destroyed. Consequently, the water level drops along the main river days before it drops behind breached levees. Often, pumps behind the levees are needed to remove floodwaters that breach the levees. This alleviates some of the impacts associated with levee failures. This alleviates some of the impacts associated with levee failures. Sudden failure in an urban setting could cause a catastrophe. In an urban setting the severity and duration may be important for health reasons, but in an agricultural area for economic reasons. Impacts would be similar to those experienced during a river or flash flood.

Warning Time

A dam failure can be immediate, leaving little or no time to warn those downstream of the imminent hazard. The conditions that may bring about a dam failure, i.e. heavy rains and river flooding, can be forecasted days in advance. However, there is no real way to predict at which point a dam will fail until just before the event occurs.

The amount of warning time depends on the type of levee failure. Local flood warning systems can help in determining the maximum water surface and the timing of a flood situation. Hours or days of warning may be available for high water that may overtop levees, but this does not provide complete security from a rupture in the levee itself. A sudden failure of a portion of the levee may send floodwaters gushing from this break within seconds. Normally, occupants of the floodplain can be warned about potential levee breaches or breaks when high water encroaches upon the levee.

Duration

The length of time that a dam or levee failure would impact the surrounding area depends largely on the amount of water the specific dam or levee held back. The duration of a failure's impact could feasibly range from hours to months.

Radiological Incident

Definition and Description

A radiological incident is an occurrence resulting in a release of radiological material at a fixed facility or in transit. An incident resulting in a release of radiological material at a fixed facility includes, but is not limited to, power plants, hospitals, and laboratories. Although the term "nuclear accident" has no strict technical definition, it generally refers to events involving the release of significant levels of radiation. Most commercial nuclear facilities in the United States were developed in the mid-1960s and are designed to withstand an aircraft attack. Therefore, they should withstand most hazards even though they may not have been designed for those particular forces.

"Radioactive materials are composed of atoms that are unstable. An unstable atom gives off its excess energy until it becomes stable. The energy emitted is radiation. Each of us is exposed to radiation daily from natural sources, including the Sun and the Earth. Small traces of radiation are present in food and water. Radiation also is released from man-made sources such as X-ray machines, television sets and microwave ovens. Radiation has a cumulative effect. The longer a person is exposed to radiation, the greater the effect. A high exposure to radiation can cause serious illness or death"[1]

The United States Nuclear Regulatory Commission (NRC) identifies four types of emergency classifications for nuclear power plants. Table 32 provides a brief description of these types of emergencies.

Historical Occurrence

There is only one nuclear power plant in the state of Iowa, the Duane Arnold Energy Center, which is located 9 miles northwest of Cedar Rapids. The plant began construction in 1970 and became operational in 1974. From 1990 through 2014, the Duane Arnold Energy Center has had 7 Unusual Events, one Alert, no Site

TABLE 32: UN NRC EMERGENCY CLASSIFICATIONS

Unusual Event	Events are in progress or have occurred which indicate potential degradation of the level of safety of the plant or indicate security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety system occurs,
Alert	Events are in the progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life-threatening risk to site personnel or damage to site equipment because of Hostile Action. Any releases are expected to be limited to small fraction of the EPA protection action guides (PAGs)
Site Area Emergency	Events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or hostile action that resulted in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure or; 2) that prevent effective access to, equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA PAG exposure levels beyond the site boundary.
General Emergency	Events are in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or hostile action that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA PAG exposure levels offsite for more than the immediate site area.

Source: US Nuclear Regulatory Commission, "Emergency Classification"

[1] https://www.ready.gov/nuclear-power-plants

Area Emergencies and no General Emergencies.

Transportation of radiological materials is licensed and regulated by the federal government. Since 1990 there have been no rail transportation related radiological incidents in Iowa.

Probability

Operators of facilities that use radioactive materials and transporters of radioactive waste are circumspect in the packaging, handling, and shipment of the radioactive waste; and are closely regulated by a variety of federal, state, and local organizations. Based on the minimal history of radiological incidents affecting the planning area, the probability of an incident is unlikely. A radiological incident may be trigged by one of other identified hazards, including: terrorism, earthquake, or structural failure.

Magnitude / Severity

One nuclear facility is located in Iowa, and three are located near the Iowa boarder. The Duane Arnold Energy Center is located in Palo, Iowa northwest of Cedar Rapids. The out of state facilities are the Ft. Calhoun Nuclear Power Plant located north of Omaha, NE. The Cooper Nuclear Power Plant south of Nebraska City, NE, and across the Mississippi River at the Quad Cities Nuclear Power Plant.

Time, distance, and shielding minimize radiation exposure to the body. Nuclear radiation above normal levels could be a health and safety consideration because of its ability to damage human cells biologically as well as its long-lasting effect on the environment. Depending on the level of exposure, radiation can cause loss of life, long- and short-term health effects, and property damage from contamination, and disruption of business because of potential evacuations. Therefore, multiple deaths could occur, thereby affecting the operation of essential facilities throughout the community, at least temporarily.

According to Ready.gov there are, “two ‘emergency planning zones.’ One zone covers an area within a 10-mile radius of the plant, where it is possible that people could be harmed by direct radiation exposures. The second zone covers a broader area, usually up to a 50-mile radius from the plant, where radioactive materials could contaminate water supplies, food crops, and livestock”

The 50-mile radius from the nuclear plant in Palo covers the southeastern portions of Grundy County, including Dike, Morrison, Reinbeck and their surrounding areas.

Radiation exposure can happen two different ways, including: exposure from a release of radioactive material from the plant, such as a plume of radioactive gases and particles. However, the greatest risk to people in the area around a plume is the body’s radiation exposure from the cloud and particles deposited on the ground, inhalation of radioactive material, and ingestion of radioactive materials.

Although it is determined that the probability of an event was limited, it is recognized that if an event were to occur in, or in close proximity, to the community that the entire area would be vulnerable to the radiation.

Warning Time

Ionizing radiation cannot be seen, smelled, heard, or detected with human senses. Detection instruments are needed to indicate the existence of dangerous radiation. Distance from the incident would dictate the amount of time needed to avoid exposure from damaging radiation. Protective actions directed by state and county officials, will depend upon weather conditions and developments at the power plant. In an actual emergency, the public can turn to their local Emergency Alert System Station, NOAA Weather Radios, or through AlertIowa notifications.

Duration

Depending upon the severity of a radiological event, the planning area would be impacted from a few hours to possibility a day or two. In a worst-case scenario event, the duration of the ensuring fallout could last decades.

River Flood

Definition and Description

River flooding is a rising or overflowing of a tributary or body of water that covers adjacent land not usually covered by water when the volume of water in a stream exceeds the channel's capacity.

River floods are the most common and widespread of all-natural disasters, except fire. Most communities in the U.S. can experience some kind of flooding after spring rains, heavy thunderstorms, winter storm thaws, waterway obstructions, or levee or dam failures. Often it is a combination of these elements that causes damaging floods. Floodwaters can be extremely dangerous. The force of six inches of swiftly moving water can knock people off their feet and two feet of water can float of car. Floods can be slow-, or fast-rising but generally develop over a period of days. Flooding is a natural and expected phenomenon that occurs annually, usually restricted to specific streams, rivers or watershed areas.

Historical Occurrence

According to the National Climatic Data Center (NCDC), there have been 31 various recorded flood events involving the planning area from 1996-2015. Table 33 displays the date, general location, and impact of these floods. Since 1996, floods have caused nearly $22.4 million in property and crop damage in the area. No deaths or injuries have been reported due to flooding in the area. The following is not intended to be complete historical records of every flood event to have occurred within the planning area, but rather a brief summary of some of the more severe events that have taken place.

Floods of 1993 – Following a record winter snow accumulation and temperatures above normal, a major flooding event occurred in Iowa. Flood warnings were issued for a large part of the Iowa and Cedar River Basins. On March 30th and 31st, widespread 0.5 to 1 inch rains blanketed the state. To add insult to injury, thunderstorms dropped a large area of 1 to 2 inch rainfall over the area that needed it the least, upper portions of the Iowa and Cedar River Basins. By early May, eight counties had received the federal disaster declaration from the late March and early April flooding. These counties were Black Hawk, Butler, Linn, and Muscatine in the Cedar River basin; Tama and Benton in the Iowa River basin, Buchanan in the Wapsipinicon River basin, and Webster County in the Des Moines

River basin. A record crest was observed on the Iowa River at Marshalltown, and initial indications were that Beaver Creek at New Hartford tied the record crest.

Several state highways were closed by high water as well as countless county roads. Many of the rivers in the state crested as much as 4 to 8 feet over flood stage. Damage was quite extensive; however, it will be some time before assessments are completed. A few towns became isolated and were only accessible by boat. For example, water flooded the downtown areas of Algona, Chelsea, and New Hartford. Governor Branstad declared 11 Iowa counties disaster areas and several received federal disaster declaration. Property damages totaled over $50 million, with crop damage totaling over $10 million.

Table 33 shows the recorded flooding events in Grundy County over a ten-year span, from January 1, 1996 through December 31, 2015.

Probability

While the planning area can experience some degree of flooding throughout the year, the threat of river flooding is compounded in the late winter and early spring months, as melting snow can overflow streams, rivers, and tributaries. As part of three watersheds (Middle Cedar, Upper Iowa, and Middle Iowa), areas adjacent to the rivers and creeks, and its main tributaries are at significantly higher risk than those areas located away from these features. There are a number of cities and unincorporated areas along smaller creeks and streams that have the possibility of flooding. The probability of some part of the planning area flooding was determined by the definition as highly likely.

Considering the historical occurrence of flooding events and the number of creeks and streams located in planning area, the probability of future river flooding highly likely. Flooding is an

TABLE 33: RIVER FLOODING EVENTS IN GRUNDY COUNTY, 1996-2015

Location	Date	Time	Death or Injuries	Property Damage	Crop Damage
GRUNDY (ZONE)	6/17/1996	3:00	0	0.00K	0.00K
GRUNDY (ZONE)	2/18/1997	18:00	0	0.00K	0.00K
GRUNDY (ZONE)	3/9/1997	6:00	0	0.00K	0.00K
GRUNDY (ZONE)	3/19/1997	12:00	0	0.00K	0.00K
GRUNDY (ZONE)	6/21/1997	15:00	0	0.00K	0.00K
GRUNDY CENTER	6/20/1998	16:15	0	50.00K	5.00K
GRUNDY CENTER	6/24/1998	1:00	0	30.00K	3.00K
GRUNDY CENTER	6/27/1998	22:30	0	50.00K	10.00K
GRUNDY (ZONE)	7/6/1998	3:00	0	50.00K	100.00K
GRUNDY (ZONE)	5/16/1999	21:00	0	200.00K	25.00K
GRUNDY (ZONE)	5/21/1999	15:00	0	50.00K	10.00K
GRUNDY (ZONE)	6/9/1999	6:00	0	50.00K	75.00K
GRUNDY (ZONE)	6/23/1999	2:00	0	5.00K	5.00K
GRUNDY (ZONE)	6/1/2000	6:00	0	10.00K	5.00K
GRUNDY (ZONE)	6/9/2000	18:00	0	25.00K	25.00K
GRUNDY (ZONE)	6/13/2000	15:00	0	20.00K	50.00K
GRUNDY (ZONE)	6/24/2000	3:00	0	50.00K	75.00K
GRUNDY (ZONE)	7/10/2000	6:00	0	50.00K	25.00K
GRUNDY (ZONE)	3/23/2001	18:00	0	7.50K	0.00K
GRUNDY (ZONE)	5/1/2001	0:00	0	75.00K	0.00K
GRUNDY (ZONE)	6/12/2001	15:00	0	25.00K	50.00K
GRUNDY (ZONE)	7/5/2003	12:00	0	10.00K	25.00K
GRUNDY (ZONE)	5/22/2004	18:00	0	100.00K	298.04K
GRUNDY (ZONE)	6/26/2005	0:00	0	74.07K	50.00K
GRUNDY (ZONE)	7/26/2005	21:00	0	10.00K	30.00K
HOLLAND	3/2/2008	17:57	0	25.00K	0.00K
WELLSBURG	4/25/2008	10:00	0	150.00K	0.00K
WELLSBURG	6/12/2010	12:00	0	0.00K	20.000M
MORRISON	5/29/2013	20:51	0	250.00K	0.00K
WELLSBURG	8/28/2015	19:36	0	100.00K	0.00K
WELLSBURG	12/14/2015	12:30	0	100.00K	0.00K
Totals:			**0**	**1.567M**	**20.866M**

Source: National Climatic Data Center, retrieved 12/2016

annual problem throughout some of the planning area. However, unlike other hazards, the probability and impact of flooding varies greatly among the member jurisdictions. The probability of flooding in each jurisdiction is discussed below.

***Grundy County** (unincorporated)*

The probability of river flooding is considered likely. As can be seen in Table 51, approximately 29.1 percent of the unincorporated areas of Grundy County have a 1.0% annual chance of flooding (100-year flood).

Beaman

The likelihood of river flooding in Beaman is considered unlikely. Wolf Creek travels through the southernmost part of the community, but has no immediate dangers of flooding. There are only 6 parcels that would be impacted in the 1.0% annual chance of flooding (100-year flood). No river travels through the city limits and there are only two parcels of land in a floodplain.

Conrad

The probability of river flooding in Conrad is considered unlikely. Wolf Creek travels through the southern portion and western edge of the city. Only 49 parcels, or 9% of the city's parcels, are within the floodplain.

Dike

The city determined the probability of river flooding to be unlikely. The main threat to flooding for Dike is the Grundy County Lake to the southwest of the community, and North Black Hawk Creek that is located just south of the community. With only 4.8% of the parcels that would be affected by a 1.0% annual chance of flooding (100-year flood), it is considered unlikely.

Grundy Center

Grundy Center has two creeks, Minnehaha Creek and Black Hawk Creek that run to the north and south of the community that pose the greatest threat for the area. With only 2.5% of parcels prone to be affected by a 1.0% annual chance of flooding (100-year flood), it is considered unlikely of a flooding event.

Holland

The probability of river flooding in Holland was determined to be occasional. The Holland Creek flows to the south and east of the city limits, with a portion of the river cutting through the western quadrant of the city limits. With about 10.2% of parcels that would be affected by a 1.0% annual chance of flooding (100-year flood), it is considered occasional.

Morrison

The committee determined the probability of river flooding to be unlikely. Black Hawk Creek flows to the north of the community, but it only affects 4 parcels, which results in only 5% of parcels affected by a 1.0% annual chance of flooding (100-year flood).

Reinbeck

The probability of river flooding in Reinbeck is unlikely with only 19 parcels being affected by flooding. This means that only 2% of the parcels in Reinbeck would be affected by a 1.0% annual chance of flooding (100-year flood). Black Hawk Creek runs to the north of the community, but mostly in undeveloped areas.

Stout

The committee determined the probability of river flooding to be unlikely. Zero parcels are affected by a 1.0% annual chance of flooding (100-year flood) due to the lack of creeks, streams, or other waterbodies in the area.

Wellsburg

The probability of river flooding in Wellsburg is unlikely with only 19 parcels being affected by flooding. This means that only 3.9% of the parcels in Reinbeck would be affected by a 1.0% annual chance of flooding (100-year flood). Small creeks or water run offs run to the south of the community, but mostly in undeveloped areas.

Dike, Dike-New Hartford Community School District

River flooding was determined to be unlikely for Dike. Only 5% of the city is located in the 100-year floodplain. The Dike-New Hartford School District also determined the probability of river flooding to be likely, but that was due to 95% of New Hartford being located in the floodplain. The school that is in Dike is not located in the floodplain.

Magnitude / Severity

While there are substantial areas of floodplain (See Attachment 3a: Floodplain Map of the County and Attachment 3b--4K, flood scenario maps of each city) in the planning area, as a percentage of the entire county, these areas are considered to be limited. As mentioned previously, areas along rivers, creeks, and other tributaries are vulnerable to flooding, as well as developed jurisdictions that do not have proper drainage systems. Fortunately, the unincorporated area is mainly agricultural land with sporadic residential land use.

Potential flooding impacts range from very low to catastrophic depending on the type and location of flooding. Flooding impacts include loss of life; property damage and destruction; damage and disruption of communications, transportation, electric service, and community services; crop and livestock damage and loss and interruption of business. Risks of fire, health and transportation accidents, and contamination of water supplies are increased during flooding situations

Table 34 displays the value of land, buildings, and dwellings in the 1.0% (100-year) floodplain for the combined incorporated areas and the unincorporated areas

of county. The parcel information is current as of 01/25/2016. The FEMA Digital FIRM data for Grundy County was completed on 10/19/2005. The incorporated boundaries are current as of 8/30/2016. Individual floodplain land, building, and dwelling values for each jurisdiction can be found in their respective appendices.

TABLE 34: FLOODPLAIN VALUES OF BOTH INCORPORATED AND UNINCORPORATED OF GRUNDY COUNTY

	# of Parcels	Land Value	Building Value	Dwelling Value	Total Value
INCORPORATED 1.0% Annual Chance Floodplain Values	178	$4,995,237	$6,900,718	$6,375,387	$18,271,342
UNINCORPORATED 1.0% Annual Chance Floodplain Values	1,574	$274,850,124	$11,362,860	$30,094,630	$316,307,614
Total Floodplain Value	1,752	$279,845,361	$18,263,578	$36,470,017	$334,578,956
Total Incorporated Value	9,878	$833,905,374	$107,369,363	$522,623,328	$1,463,898,065

Figures calculated using data from Grundy County GIS Department; Parcel data current as of 01/25/2016

Warning Time

People in the path of river floods may have time to take appropriate actions to limit harm to themselves and their property. River flooding can be forecasted to allow for several hours, perhaps even days notification.

Duration

The duration of a flooding event varies based on the severity and location of the flooding event. Duration can range from a few hours to several days or longer.

Severe Winter Storm

Definition and Description

Severe winter storms are weather conditions that affect day-to-day activities. A brief description of various types of severe winter storms is described in Table 35. Winter storms are common during the winter months of October through April. The various types of extreme winter weather cause considerable damage. Heavy snows cause immobilized transportation systems, downed trees and power lines, collapsed buildings, and loss of livestock and wildlife. Loose snow begins to drift when the wind speed reaches 9 to 10 mph under freezing conditions. The potential for some drifting is substantially higher in open country than in urban areas where buildings, trees, and other features obstruct the wind. Frigid temperatures and wind chills are dangerous to people, particularly the elderly and the very young. Dangers include frostbite or hypothermia. Water pipes, livestock, fish and wildlife, and pets are also at risk from extreme cold and severe winter

weather.

TABLE 35: SEVERE WINTER STORM TERMS

Storm Event Type	Description
Blizzard	A winter storm last at least 3 hours which produces sustained winds or frequent guests 35 mph or greater and falling and/or blowing snow reducing visibility to less than ¼ mile
Cold/wind Chill	A period of low temperatures or wind chill temperatures reaching or exceeding locally/regionally defined advisory (typically value is -18®F or colder).
Heavy Snow	Snow accumulation meeting or exceeding the locally/regionally defined 12 and 24 hours warning criteria
Ice Storm	Ice accretion meeting or exceeding locally/regionally defined warning criteria (typical value is ¼ or ½ inch or more)
Winter Storm	A weather event which contains more than one significant hazard (i.e. heavy snow and blowing snow; snow and ice; snow and sleet) and meets or exceeds the locally/regionally defined 12 and/or 24 warning criteria

Source: "National Weather Service Instruction 10-1605" courtesy of the National Climatic Data Center

Historical Occurrence

The planning area has experienced winter storms of some type every winter on record. According to the National Climatic Data Center, from 1996 through 2016 there were 75 winter storm events, including: Blizzard (17), Cold/Wind Chill (8), Heavy Snow (20), Ice Storm (13), and Winter Storm (17). According to this data, there have been no fatalities or injuries resulting in from these hazard events. However, it is estimated that these 75 winter storm events have caused a nearly $1.5 million in property and crop damage.

Table 36 displays the reported storm events in Grundy County, according to the National Climatic Data Center for reported Blizzards, Cold/Wind Chill, Heavy Snow, Ice Storms, and Winter Weather. The timeframe covered by the data is from January 1, 1996 through December 7, 2016.

December of 2000 remains one of the worst months on record for the accumulation of snowfall. 33.3 inches of snow fell during this month, easily surpassing the previous one-month record for snowfall in the community. The previous record for snowfall in one month was 24.3 inches and occurred in January 1962. What was somewhat unusual about the December 2000 event was that there were no extreme winter storm events, but rather a number of less severe snowfall events combined with ongoing below freezing temperatures and strong winds. This resulted in an increasingly difficult job for snow removal crews, as there was less and less area to push snow with each event.

TABLE 36: WINTER STORM EVENTS IN GRUNDY COUNTY, 1996-2016

Date	Type	Dth/Inj	PrD	CrD	Date	Type	Dth/Inj	PrD	CrD
1/18/1996	Cold/wind Chill	0	0.00K	0.00K	1/14/2007	Heavy Snow	0	0.00K	0.00K
1/18/1996	Blizzard	0	0.00K	0.00K	1/20/2007	Heavy Snow	0	0.00K	0.00K
1/26/1996	Heavy Snow	0	0.00K	0.00K	2/24/2007	Winter Storm	0	250.00K	0.00K
1/26/1996	Blizzard	0	0.00K	0.00K	12/1/2007	Ice Storm	0	10.00K	0.00K
1/28/1996	Blizzard	0	0.00K	0.00K	12/11/2007	Ice Storm	0	75.00K	0.00K
2/1/1996	Cold/wind Chill	0	0.00K	0.00K	2/10/2008	Cold/wind Chill	0	0.00K	0.00K
3/24/1996	Blizzard	0	0.00K	0.00K	12/8/2008	Winter Storm	0	10.00K	0.00K
5/1/1996	Cold/wind Chill	0	0.00K	0.00K	12/18/2008	Winter Storm	0	5.00K	0.00K
11/14/1996	Ice Storm	0	0.00K	0.00K	12/20/2008	Blizzard	0	0.00K	0.00K
12/25/1996	Heavy Snow	0	0.00K	0.00K	12/27/2008	Ice Storm	0	5.00K	0.00K
1/9/1997	Cold/wind Chill	0	0.00K	0.00K	1/9/2009	Heavy Snow	0	0.00K	0.00K
1/15/1997	Cold/wind Chill	0	0.00K	0.00K	1/13/2009	Heavy Snow	0	0.00K	0.00K
2/3/1997	Heavy Snow	0	0.00K	0.00K	4/5/2009	Winter Storm	0	20.00K	0.00K
11/14/1997	Heavy Snow	0	4.55K	0.00K	12/8/2009	Heavy Snow	0	10.00K	0.00K
12/21/1997	Ice Storm	0	2.05K	0.00K	12/9/2009	Blizzard	0	50.00K	0.00K
1/4/1998	Ice Storm	0	20.40K	0.00K	1/6/2010	Winter Storm	0	25.00K	0.00K
1/20/1998	Heavy Snow	0	10.45K	0.00K	1/20/2010	Ice Storm	0	100.00K	0.00K
3/7/1998	Heavy Snow	0	50.00K	0.00K	1/25/2010	Blizzard	0	75.00K	0.00K
3/17/1998	Ice Storm	0	5.88K	0.00K	12/11/2010	Blizzard	0	75.00K	0.00K
1/1/1999	Winter Storm	1	10.00K	0.00K	12/23/2010	Heavy Snow	0	0.00K	0.00K
2/11/1999	Ice Storm	0	5.00K	0.00K	2/1/2011	Blizzard	0	25.00K	0.00K
9/21/1999	Cold/wind Chill	0	0.00K	294.12K	1/20/2012	Heavy Snow	0	0.00K	0.00K
1/19/2000	Winter Storm	0	1.00K	0.00K	12/19/2012	Winter Storm	0	25.00K	0.00K
2/17/2000	Winter Storm	0	10.00K	0.00K	12/20/2012	Blizzard	0	100.0K	0.00K
12/10/2000	Winter Storm	0	24.90K	0.00K	1/27/2013	Ice Storm	0	25.00K	0.00K
12/18/2000	Blizzard	0	25.00K	0.00K	1/30/2013	Winter Storm	0	25.00K	0.00K
12/21/2000	Blizzard	0	20.00K	0.00K	2/26/2013	Heavy Snow	0	5.00K	0.00K
12/28/2000	Heavy Snow	0	5.00K	0.00K	1/26/2014	Blizzard	0	10.00K	0.00K
2/8/2001	Winter Storm	0	50.00K	0.00K	2/20/2014	Blizzard	0	25.00K	0.00K
2/8/2001	Ice Storm	0	75.00K	0.00K	1/5/2015	Heavy Snow	0	0.00K	0.00K
3/1/2002	Heavy Snow	0	5.00K	0.00K	2/1/2015	Winter Storm	0	50.00K	0.00K
3/9/2002	Blizzard	0	5.00K	0.00K	2/25/2015	Heavy Snow	0	0.00K	0.00K
3/4/2003	Heavy Snow	0	1.00K	0.00K	11/20/2015	Winter Storm	0	0.00K	0.00K
4/4/2003	Ice Storm	0	5.00K	0.00K	12/28/2015	Winter Storm	0	0.00K	0.00K
4/6/2003	Winter Storm	0	5.00K	0.00K	2/2/2016	Winter Storm	0	0.00K	0.00K
1/1/2005	Ice Storm	0	5.00K	0.00K	2/7/2016	Blizzard	0	0.00K	0.00K
1/4/2005	Heavy Snow	0	10.00K	0.00K	12/18/2016	Cold/wind Chill	0	0.00K	0.00K
1/22/2005	Blizzard	0	5.00K	0.00K	**TOTALS:**	**75 Events**	**1**	**$1,360,230**	**$294,120**

Source: National Climatic Data Center, retrieved 12/2016; PrD: Property Damage; CrD: Crop Damage; Dth/Inj: Reported death or Injury; Note: Damage estimates include areas outside of Grundy County

Probability

Since 1996 there have been 75 recorded storm events in Grundy County. This includes 46 days with an event resulting in property damage and one day with an event resulting in crop damage. The frequency and impact of severe winter storm events varies from year to year. Grundy County did not record any events in 2004 and 2006. However, based on historical occurrences it is highly likely a severe winter storm will affect Grundy County on an annual basis, likely multiple times in a year. As can be seen in Table 37, in the past 20 years Grundy County has averaged over three winter storm events per year.

TABLE 37: Annual Average of Winter Storm Events in Grundy County, 1996-2016

Storm Event	Total Number of Events	Average Number of Events Per Year
Blizzard	17	0.85
Cold/wind Chill	8	0.4
Heavy Snow	20	1.0
Ice Storm	13	0.65
Winter Storm	17	0.85
Total	**75**	**3.75**

Source: National Climatic Data Center, retrieved 12/2016

Magnitude/Severity

Those most vulnerable to the effects of a winter storm are those who cannot fend for themselves in times of severe weather. The planning area's elderly, youth, and disabled populations who rely on outside entities for delivery of food or medicine are highly vulnerable to winter storms. People, such as farmers, who work outdoors, are also at greater risk of being affected by wind chill, extreme low temperature, and wet winter conditions. Unfortunately, based on the large area that these storms can cover and the cascading effects that can accompany them, the entire population and planning area are vulnerable to some type of impact from a winter storm. The committee recognized this as fact and scored it accordingly.

Although the developments in technology have been very beneficial in reducing the long-term negative effects of winter storms, certain dangers still exist. The maximum threat of winter conditions would be realized if it was accompanied by power outages and elimination of travel due to hampered road conditions. This could result in the inability for some of the population to maintain temperatures necessary for the body. In addition, long winter events that eliminate communication could result in the reduction of adequate medical response time.

Warning Time

The National Weather Service has developed effective weather advisories, which are promptly and widely distributed. Radio, TV, and Weather Alert Radios provide the most immediate means to do this. Accurate information is made available to public officials and the public up to days in advance. Again, weather prediction capabilities have made significant improvements in the past few years. There are several notifications made by the National Weather Service. These include winter storm watch, winter storm warning, blizzard warning, winter weather advisory, and a frost/freeze advisory. Despite the advancements in technology, there have been several instances where the actual winter storm event was much more severe than what was actually forecasted to occur.

Duration

Depending on the type, duration, and the size of the event the entire population could feel the effect of a winter storm. Generally, due to existing snow removal services and other community services the effects of winter storms on incorporated communities in Grundy County are short term; however, the more rural,

unincorporated areas tend to be impacted longer due to rural nature of the county. Although more of an inconvenience, and somewhat more dangerous, travel and communication are usually an option in less than 24 hours of any given event.

Sinkholes

Definition and Description

A sinkhole is the loss of surface elevation due to the removal of subsurface support. Sinkholes range from broad, regional lowering of the land surface to abrupt localized collapse. The primary causes of most subsidence are human activities such as underground mining of coal, groundwater/petroleum withdraw, or drainage of organic soils. Sinkholes can aggravate flooding potential, collapse of an abandoned mine may destroy buildings, roads and utilities.

Sinkholes are common where the rock below the land surface is limestone, carbonate rock, salt beds, or rocks that can naturally be dissolved by ground water circulating through them. As the rock dissolves, spaces and caverns develop underground. Sinkholes are dramatic because the land usually stays intact for a while until the underground spaces just get too big. If there is not enough support for the land above the spaces then a sudden collapse of the land surface can occur. New sinkholes have been correlated to land-use practices, especially from ground-water pumping and from construction and development practices. Sinkholes can also form when natural water-drainage patterns are changed and new water-diversion systems are developed. Some sinkholes form when the land surface is changed, such as when industrial and runoff-storage ponds are created. The substantial weight of the new material can trigger an underground collapse of supporting material, thus causing a sinkhole.

Historical Occurrence

Most of Iowa's sinkholes occur in rural areas where their main impact is rendering some land unsuitable for row-crop agriculture. Sinkholes have also resulted in the failure of farm and other types of ponds, roads, and one sewage-treatment lagoon. As sinkholes sometimes allow surface runoff to directly enter bedrock aquifers, their presence has implications for groundwater quality.

According to the Iowa Department of Natural Resource's Natural Resources Geographic Information Systems Library, there are zero sinkholes in Grundy County. There are also no abandoned coal mines in Grundy County, according to the Iowa Department of Natural Resource's Natural Resources Coal Mines Map.

Probability

Since there are no known sinkholes in Grundy County, the probability of an occurrence is highly unlikely. Sinkhole probability varies by jurisdiction. Cumulatively, the committee determined the probability of a major sinkhole event to be unlikely.

Magnitude / Severity

The planning area's vulnerability to property damage, injury and loss of life as a result of a sink hole is small. Sinkhole damage is usually contained to a structure. The onset of sink holes is typically slow and can resemble the normal settling of a structure. However, failure to identify a sink hole could increase the

homeowner's vulnerability. Building near and or around soils that have the potential to cause sinkholes is highly discouraged to limit future vulnerability.

Maximum threat exists to those property owners located at the top of bottom of steep sloping areas without trees or shrubbery to absorb excessive amounts of moisture. For structures located at the top or bottom of a landslide the severity of impact could be devastating. Earth giving way from underneath a structure could result in the structure giving away also. All ground that does give way will then topple onto anything located below.

Unknown sink holes on property located near and around a structure could have a significant impact on the structures in the area if the sink hole were to collapse. Personal property located near the sink hole would also be consumed in the event of a collapse.

Warning time

Sink holes growing in mass is a slow yet gradual process. Land use practices in the area, soil type in addition to a number of other factors will impact the speed of onset. By identifying these areas city agencies and property owners will be able to implement the necessary precautions to slow and potentially eliminate the development of a sink hole. Catastrophic sinkholes can provide little visible warning, setting in in as little as a few minutes.

Duration

A sinkhole can affect the location in which it occurred for weeks.

Terrorism

Definition and Description

Terrorism is the 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 or social objectives *(Federal Bureau of Investigation).* The Federal Bureau of Investigation (FBI) categorizes terrorism in the United States as one of two types--domestic terrorism or international terrorism. Domestic terrorism involves groups or individuals whose terrorist activities are directed at elements of our government or population without foreign direction.

International terrorism involves groups or individuals whose terrorist activities are foreign-based and/or directed by countries or groups outside the United States or whose activities transcend national boundaries. A terrorist attack can take several forms, depending on the technological means available to the terrorist, the nature of the political issue motivating the attack, and the points of weakness of the terrorist's target. Bombings have been the most frequently used terrorist method in the United States. Other possibilities include an attack at transportation facilities, an attack against utilities or other public services or an incident involving chemical or biological agents.

Historical Occurrences

To date, there have been no known or reported instances of any terrorist attacks having been perpetrated in the planning area.

Probability

The probability of any type of terrorism occurring in the planning area is unlikely.

Magnitude / Severity

Potential vulnerabilities for terrorist attacks may include: danger to the water supply, bio-terrorism, and an attack on a nearby nuclear facility. The severity of impact would largely depend on how quickly the planning area became aware that an event had occurred. The worst-case scenario would occur if the public had no knowledge until all or most of the population had been contaminated or poisoned before a proper response could be made. This could result in widespread sickness and potentially death.

Warning Time

Depending on the type of event to occur the speed of onset could vary from immediate (no time) to days, weeks, even years (poisoned water, poisoned food, financial impacts).

Duration

The duration of an incident on the planning area would be dependent upon the type and size of the event. A small, remote/isolated incident would have a smaller duration than a large, urban-centered incident which could last for days or even weeks.

Thunderstorm / Lightning / Hail

Definition and Description

Thunderstorms are common in Iowa and can occur singly, in clusters, or in lines. Thunderstorms can result in heavy rains, high winds (reaching or exceeding 58 mph), tornados, or hail. Thunderstorms are created from a combination of moisture, rapidly raising warm air, and the lifting mechanism such as that caused when warm and cold air masses collide. The SHMT chose to combine previously separated hazards of Thunderstorm/Lightning and Hail. The combined hazard was then scored with lower of the two values for magnitude as well as warning time. The magnitude reduction was due to the fact that a majority of thunderstorms don't cause state level response, and tracking and prediction of thunderstorms is quite sophisticated.

Associated hazards related to thunderstorms are discussed further as individual hazards (tornado/windstorm and various kinds of flooding). Most thunderstorms produce thunder, lightning, and rain. Severe storms can also produce tornadoes, straight-line winds with microburst above 58 mph, hailstorms, and flooding. The National Weather Service (NWS) considers a thunderstorm severe if it produces hail at least 1-inch in diameter, wind 58 mph or higher, or tornadoes.

Straight-line winds that exceed 60 mph are often mistaken for tornadoes.

Lightning is an electrical discharge that results from the buildup of positive and negative charges within a thunderstorm. When the buildup becomes strong enough, lightning appears as a "bolt" or flash of light that occurs within the clouds or between the clouds and the ground. A bolt of lightning reaches temperatures approaching 50,000 degrees Fahrenheit in a split second. This rapid heating, expansion, and cooling of air near the lightning bolt creates thunder.

Hailstorms are a product of a severe thunderstorm in which pellets or lumps of ice (of most concern when greater than 1 inch in diameter) fall with rain. Hail is produced in many strong thunderstorms by strong rising currents of air carrying water droplets to a height where freezing occurs, the ice particles grow in size until they are too heavy to be supported by the updraft and fall back to earth. Hail can be smaller than a pea or as large as a softball and can be very destructive to plants and crops. Pets and livestock are particularly vulnerable to hail. Table 38 outlines the different sizes of hail and Table 39 describes the categories used to classify hailstorms.

TABLE 38: HAILSTONE SIZE CODES

Size Code	Maximum Diameter mm	Description
0	5-9	Pea
1	10-15	Mothball
2	16-20	Marble, grape
3	21-30	Walnut
4	31-40	Pigeon's egg, squash ball
5	41-50	Golf ball, pullet's egg
6	51-60	Hen's egg
7	61-75	Tennis ball, cricket ball
8	76-90	Large orange, soft ball
9	91-100	Grapefruit
10	>100	Melon

Source: The Tornado and Storm Research Organization

TABLE 39: TORRO HAILSTORM INTENSITY SCALE

Intensity Category	Intensity Category Code	Typical Hail Diameter (mm)	Typical Damage Impacts
Hard Hail	**H0**	5	No damage
Potentially Damaging	**H1**	5-15	Slight general damage to plants, crops
Significant	**H2**	10-20	Significant damage to fruit, crops, vegetation
Severe	**H3**	20-30	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
Severe	**H4**	25-40	Widespread glass damage, vehicle bodywork damage
Destructive	**H5**	30-50	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
Destructive	**H6**	40-60	Bodywork of grounded aircraft dented, brick walls pitted
Destructive	**H7**	50-75	Severe roof damage, risk of serious injuries
Destructive	**H8**	60-90	(Severest recorded in the British Isles) Severe damage to aircraft bodywork
Super Hailstorms	**H9**	75-100	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
Super Hailstorms	**H10**	>100	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

Source: The Tornado and Storm Research Organization

Historical Occurrence

Thunderstorms are common events in Grundy County. Each spring and summer bring many thunderstorms, often accompanied by rain, lightning, high winds, hail, funnel clouds, and tornadoes. This document discusses hazards of Tornadoes / Windstorms, River Flooding, and Flash Flooding in their respective sections.

Table 40 depicts the historical occurrences of Thunderstorm Wind events, as recorded by the National Climatic Data Center, for the past thirty-six years, from 9/6/1980 – 7/17/2016. While this is far from a comprehensive list of all thunderstorms in the planning area, and does cross over with

Tornado / Windstorm hazard, the data provides an indication of the frequency and impact that can be associated with thunderstorms. A Thunderstorm Wind event is defined by the National Weather Service as: "Winds, arising from convection (occurring within 30 minutes of lighting being observed or detected), with speeds of at least 50 knots (58 mph) or winds of any speed producing a fatality, injury, or damage…" NOAA reports that between 1980 and 2016 83 historic thunderstorm wind events to occur. Based on these numbers, Grundy County should expect Thunderstorm Wind Events an average of just over twice per year.

TABLE 40: HISTORIC THUNDERSTORM WIND EVENTS IN GRUNDY COUNTY. 2006-2015

Location	Date	Wind Speed (knots)	PrD	CrD	Location	Date	Wind Speed (knots)	PrD	CrD
GRUNDY CO.	9/6/1980	61 kts.	0.00K	0.00K	GRUNDY CENTER	3/30/2006	57 kts. EG	5.00K	0.00K
GRUNDY CO.	6/14/1981	0 kts.	0.00K	0.00K	WELLSBURG	7/18/2007	61 kts. EG	5.00K	10.00K
GRUNDY CO.	7/1/1983	0 kts.	0.00K	0.00K	HOLLAND	7/18/2007	50 kts. EG	5.00K	0.00K
GRUNDY CO.	6/17/1984	52 kts.	0.00K	0.00K	GRUNDY CENTER	7/18/2007	57 kts. EG	20.00K	0.00K
GRUNDY CO.	6/22/1984	0 kts.	0.00K	0.00K	REINBECK	7/18/2007	52 kts. EG	5.00K	0.00K
GRUNDY CO.	6/11/1987	50 kts.	0.00K	0.00K	MORRISON	7/18/2007	61 kts. EG	20.00K	5.00K
GRUNDY CO.	5/24/1989	50 kts.	0.00K	0.00K	GRUNDY CENTER	8/20/2007	52 kts. EG	2.00K	0.00K
GRUNDY CO.	6/13/1990	75 kts.	0.00K	0.00K	CONRAD	5/25/2008	52 kts. EG	5.00K	0.00K
GRUNDY CO.	6/28/1990	50 kts.	0.00K	0.00K	WELLSBURG	6/6/2008	61 kts. EG	5.00K	0.00K
GRUNDY CO.	6/28/1990	54 kts.	0.00K	0.00K	DIKE	6/6/2008	65 kts. EG	100.00K	0.00K
GRUNDY CO.	6/28/1990	50 kts.	0.00K	0.00K	GRUNDY CENTER	6/15/2008	52 kts. EG	10.00K	0.00K
GRUNDY CO.	3/22/1991	70 kts.	0.00K	0.00K	CONRAD	6/15/2008	53 kts. EG	10.00K	0.00K
GRUNDY CO.	3/22/1991	50 kts.	0.00K	0.00K	GRUNDY CENTER	7/7/2008	50 kts. EG	2.00K	0.00K
GRUNDY CO.	8/10/1992	50 kts.	0.00K	0.00K	BEAMAN	7/27/2008	52 kts. EG	3.00K	0.00K
Conrad	8/16/1993	50 kts.	50.00K	5.00K	WELLSBURG	6/21/2009	52 kts. EG	5.00K	0.00K
Conrad	4/14/1994	60 kts.	50.00K	0.00K	HOLLAND	6/21/2009	52 kts. EG	3.00K	0.00K
Conrad	4/14/1994	60 kts.	50.00K	0.00K	WELLSBURG	6/21/2009	52 kts. EG	3.00K	0.00K
Conrad	6/12/1994	50 kts.	5.00K	0.05K	WELLSBURG	8/9/2009	77 kts. EG	250.00K	25.00K
Reinbeck	7/4/1995	50 kts.	40.00K	2.00K	GRUNDY CENTER	8/9/2009	57 kts. EG	10.00K	0.00K
Conrad	7/19/1995	50 kts.	5.00K	1.00K	GRUNDY CENTER	8/9/2009	50 kts. EG	2.00K	5.00K
GRUNDY CENTER	6/20/1997	50 kts.	3.00K	0.00K	HOLLAND	8/9/2009	61 kts. EG	50.00K	75.00K
DIKE	6/20/1997	80 kts.	500.00K	50.00K	WELLSBURG	6/25/2010	61 kts. EG	3.00K	0.00K
DIKE	8/23/1997	52 kts.	5.00K	1.00K	WELLSBURG	7/1/2011	52 kts. EG	5.00K	0.00K
WELLSBURG	5/15/1998	50 kts.	10.00K	0.00K	DIKE	9/2/2011	61 kts. EG	10.00K	0.00K
GRUNDY CENTER	5/28/1998	61 kts.	25.00K	1.00K	REINBECK	5/2/2012	57 kts. EG	5.00K	0.00K
BEAMAN	6/18/1998	50 kts.	2.00K	0.00K	CONRAD	7/25/2012	52 kts. EG	2.00K	0.00K
REINBECK	6/27/1998	52 kts.	1.00K	0.00K	DIKE	5/19/2013	52 kts. EG	10.00K	0.00K
CONRAD	6/29/1998	61 kts.	40.00K	5.00K	IVESTER	5/20/2013	61 kts. EG	5.00K	0.00K
BEAMAN	6/29/1998	61 kts.	10.00K	1.00K	WELLSBURG	6/24/2013	56 kts. EG	40.00K	0.00K
WELLSBURG	5/16/1999	65 kts.	50.00K	0.00K	WELLSBURG	6/24/2013	61 kts. EG	200.00K	50.00K
CONRAD	6/13/2000	50 kts. E	10.00K	0.00K	FERN	6/24/2013	50 kts. EG	5.00K	0.00K
WELLSBURG	4/21/2001	52 kts. E	3.00K	0.00K	DIKE	7/22/2013	61 kts. EG	25.00K	10.00K

REINBECK	6/14/2001	52 kts. E	15.00K	0.00K	WELLSBURG	8/1/2013	52 kts. EG	2.00K	0.00K
GRUNDY CENTER	6/19/2002	52 kts. E	5.00K	0.00K	BEAMAN	6/16/2014	52 kts. EG	0.00K	0.00K
GRUNDY CENTER	7/4/2003	57 kts. E	15.00K	3.00K	BEAMAN	6/30/2014	52 kts. EG	10.00K	0.00K
GRUNDY CENTER	7/4/2003	52 kts. E	3.00K	0.00K	GRUNDY CENTER	6/30/2014	61 kts. EG	20.00K	10.00K
GRUNDY CENTER	7/5/2003	74 kts. EG	30.00K	10.00K	WELLSBURG	8/31/2014	56 kts. EG	5.00K	0.00K
WELLSBURG	8/3/2004	56 kts. EG	5.00K	0.00K	WELLSBURG	8/31/2014	60 kts. EG	5.00K	0.00K
DIKE	8/3/2004	50 kts. EG	5.00K	0.00K	HOLLAND	8/31/2014	61 kts. EG	100.00K	25.00K
GRUNDY CENTER	3/30/2005	52 kts. EG	2.00K	0.00K	REINBECK	5/26/2016	56 kts. EG	10.00K	0.00K
BEAMAN	6/8/2005	61 kts. EG	25.00K	10.00K	GRUNDY CENTER	7/17/2016	56 kts. EG	5.00K	0.00K
STOUT	6/29/2005	52 kts. EG	50.00K	0.00K	**Totals:**		**54 kts. Avg.**	**2.004M**	**304.05K**

Source: NOAA Storm Events Database

The National Climatic Data Center reports that there has been one recorded lighting strike in Grundy County. In 2004, lighting struck the Sheriff's Office and destroyed a significant amount of office equipment; the damages reported were around $100,000.

Data from NOAA, compiled using National Lighting Detection Network, found that the state of Iowa averaged 645,685 cloud-to-ground lighting flashes between 1997 and 2011; equating to an average of 11.4 flashes per square mile. Therefore, Grundy County, which is approximately 502 square miles, should anticipate 5,723 lighting flashes annually.

Table 41 shows the recorded hailstorm events in Grundy County from 1960-2015. In the previous 10 years, 20 hail events have been recorded over the course of 30 days. From 1960-2015 there were 49 days which in hailed in Grundy County. Of these days, there were a reported 45 separate accounts of property damage and 27 accounts of reported crop damage. The largest hail size recorded in the previous 55 years was 3.0 inches in magnitude, which occurred on May 31, 1971.

TABLE 41: HISTORIC HAILSTORMS IN GRUNDY COUNTY, 2006-2015

City/Township	Date	Magnitude (inches)	PrD	CrD	City/Township	Date	Magnitude (inches)	PrD	CrD
GRUNDY CO.	9/21/1960	0.75 in.	0.00K	0.00K	DIKE	5/21/2004	1.00 in.	3.00K	5.00K
GRUNDY CO.	5/31/1971	3.00 in.	0.00K	0.00K	GRUNDY CENTER	5/21/2004	1.75 in.	10.00K	5.00K
GRUNDY CO.	7/3/1973	2.00 in.	0.00K	0.00K	GRUNDY CENTER	5/21/2004	0.75 in.	0.00K	5.00K
GRUNDY CO.	6/14/1974	0.75 in.	0.00K	0.00K	GRUNDY CENTER	5/21/2004	1.75 in.	10.00K	5.00K
GRUNDY CO.	6/14/1974	0.75 in.	0.00K	0.00K	WELLSBURG	8/3/2004	1.75 in.	5.00K	5.00K
GRUNDY CO.	8/7/1977	1.75 in.	0.00K	0.00K	WELLSBURG	8/16/2004	1.75 in.	5.00K	5.00K
GRUNDY CO.	6/4/1979	1.75 in.	0.00K	0.00K	REINBECK	4/19/2005	0.75 in.	0.00K	0.00K
GRUNDY CO.	6/6/1980	1.50 in.	0.00K	0.00K	GRUNDY CENTER	4/13/2006	0.88 in.	2.00K	0.00K
GRUNDY CO.	6/7/1981	1.75 in.	0.00K	0.00K	WELLSBURG	4/13/2006	0.75 in.	0.00K	0.00K
GRUNDY CO.	7/1/1983	1.75 in.	0.00K	0.00K	GRUNDY CENTER	4/13/2006	0.88 in.	2.00K	0.00K
GRUNDY CO.	6/17/1984	2.00 in.	0.00K	0.00K	CONRAD	4/13/2006	1.50 in.	15.00K	0.00K
GRUNDY CO.	5/14/1991	1.50 in.	0.00K	0.00K	GRUNDY CENTER	4/13/2006	0.75 in.	0.00K	0.00K
GRUNDY CO.	5/14/1991	0.75 in.	0.00K	0.00K	CONRAD	4/13/2006	1.75 in.	20.00K	0.00K

Grundy

GRUNDY CO.	5/17/1991	0.75 in.	0.00K	0.00K	CONRAD	4/13/2006	1.50 in.	15.00K	0.00K
GRUNDY CO.	8/11/1991	0.75 in.	0.00K	0.00K	GRUNDY CENTER	4/13/2006	0.88 in.	2.00K	0.00K
GRUNDY CO.	7/2/1992	0.75 in.	0.00K	0.00K	GRUNDY CENTER	4/13/2006	0.88 in.	2.00K	0.00K
Conrad	4/14/1994	1.25 in.	50.00K	0.00K	WELLSBURG	6/14/2006	0.75 in.	0.00K	5.00K
Grundy Center	4/14/1994	1.75 in.	50.00K	0.00K	WELLSBURG	4/3/2007	0.88 in.	1.00K	0.00K
Conrad	4/25/1994	0.75 in.	5.00K	0.00K	BEAMAN	4/10/2008	0.88 in.	1.00K	0.00K
Wellsburg	6/26/1994	0.75 in.	5.00K	50.00K	BEAMAN	5/25/2008	0.88 in.	3.00K	0.00K
Grundy Center	7/19/1995	0.75 in.	1.00K	5.00K	CONRAD	6/14/2008	1.00 in.	3.00K	5.00K
WELLSBURG	4/8/1999	0.75 in.	1.00K	0.00K	BEAMAN	6/14/2008	0.75 in.	0.00K	5.00K
CONRAD	5/18/2000	0.88 in.	1.00K	5.00K	CONRAD	6/15/2008	0.88 in.	1.00K	5.00K
GRUNDY CENTER	5/30/2000	1.75 in.	8.00K	5.00K	WELLSBURG	8/9/2009	2.50 in.	250.00K	1.000M
HOLLAND	5/30/2000	0.75 in.	0.00K	5.00K	GRUNDY CENTER	8/9/2009	1.00 in.	3.00K	15.000M
CONRAD	5/31/2000	1.00 in.	5.00K	5.00K	DIKE	8/10/2009	1.00 in.	1.00K	5.00K
DIKE	6/13/2000	1.00 in.	5.00K	5.00K	DIKE	4/6/2010	1.00 in.	5.00K	0.00K
CONRAD	5/9/2001	1.00 in.	5.00K	0.00K	DIKE	4/6/2010	1.75 in.	10.00K	0.00K
CONRAD	5/10/2001	2.00 in.	30.00K	0.00K	ZANETA	5/12/2010	0.75 in.	0.00K	0.00K
BEAMAN	5/10/2001	2.00 in.	20.00K	0.00K	CONRAD	6/18/2010	1.00 in.	2.00K	5.00K
IVESTER	5/10/2001	1.00 in.	3.00K	0.00K	REINBECK	6/8/2011	0.88 in.	0.00K	0.00K
GRUNDY CENTER	5/10/2001	1.75 in.	10.00K	0.00K	DIKE	4/9/2013	0.88 in.	0.00K	0.00K
STOUT	6/19/2002	0.75 in.	0.00K	5.00K	FREDSVILLE	4/9/2013	1.00 in.	1.00K	0.00K
GRUNDY CENTER	5/14/2003	0.88 in.	2.00K	0.00K	WELLSBURG	4/29/2013	0.88 in.	0.00K	0.00K
GRUNDY CENTER	5/21/2004	1.00 in.	2.00K	5.00K	FERN	4/29/2013	0.88 in.	0.00K	0.00K
DIKE	5/21/2004	0.88 in.	2.00K	5.00K	FERN	4/29/2013	1.00 in.	5.00K	0.00K
DIKE	5/21/2004	1.75 in.	5.00K	5.00K	GRUNDY CENTER	6/30/2014	0.88 in.	0.00K	5.00K
GRUNDY CENTER	5/21/2004	0.88 in.	2.00K	5.00K	WELLSBURG	5/4/2015	0.88 in.	0.00K	0.00K
					Totals:			**589.00K**	**16.170M**

Source: National Climatic Data Center, retrieved 12/2016; PrD = Property Damage; CrD = Crop Damage

County

experienced 76 hail events over 49 days from September 1960 to May 2015. These 76 events resulted in no deaths or injuries and caused $589,000 thousand in property damage in $16.17 million in crop damage. The storm that produced the largest diameter of hail, 3.0", occurred on May 31, 1971. This storm's damage report was not recorded. The most recorded crop damaging storm came on August 9, 2009 when Grundy Center was hit with $15 million in crop damage and $3,000 in property damage. That same storm did $250,000 worth of property damage to Wellsburg, and $1 million in crop damage. There have been 6 hail events each causing over $20,000 of property damage and 3 hail events have caused $50,000 or more worth of crop damage.

Probability

The probability of a thunderstorm occurring in the planning area and having an impact on some property in the next five years is high. Based off of data from the last 10 years, it is estimated that the planning area will experience approximately 2.5 thunderstorms per year that result in wind damage. Thunderstorms

without measureable impacts are likely to occur as well. This conclusion is based on the historical occurrences of thunderstorms in the area and the fact that the climate in the area is very conducive to the development of thunderstorms. The climate in the area is of humid continental variety and therefore there is generally enough moisture to form clouds and rain, relatively warm and unstable air that can rise quickly, and fluctuating weather fronts that work to cause uplift in air masses.

As previously mentioned, based on Iowa's 1997-2011 average of cloud-to-ground lighting flashes of 645,685 flashes per year, Grundy County should anticipate approximately 5,723 lighting flashes annually. However, reported lighting strikes have a low probability.

There is a high probability of hailstorms affecting part or all of the planning area. Based on the historical occurrence of hail events from 2006-2015, the entire planning area can expect to average approximately two to three hail events per year. However, many of these hail events occurred on the same day as a result of the same storm. The 18 hail events in the past 10 years have occurred over the course of twenty-six days. From 1960-2015, 55 years, there were 49 days of hail falling in the county. Therefore, based on historic data, Grundy County should anticipate multiple hail events (4-5) occurring one day a year.

Magnitude / Impact

It is anticipated that a severe thunderstorm could impact 100% of the population (currently 12,453 persons) in the planning area. Those individuals most at risk would include:

1. People in automobiles (unable to determine),
2. People in mobile homes: (172 persons)
3. People in group quarters (154 persons),
4. Persons who speak English less than "very well" (27)
5. Elderly persons 65 years or older (2,342) and young persons, less than 18 years old (2,965)

Other persons at risk include those people outdoors, either working or camping. Pets and livestock are particularly vulnerable to hail. The incorporated jurisdictions are also impacted by a hailstorm since they are burdened with hail damage to trees and branches that have fallen. Critical infrastructure, power lines, is also vulnerable to hail damage.

According to available data from the county, there are approximately 9,878 parcels of land within the planning area. The total value (land, building, and dwelling) of these parcels is approximately $1.46 billion. The dollar amount for just buildings is $107,369,363 and dwellings account for $522,623,328. Because of the elements involved with a thunderstorm (tornados, hail, high wind, lightning, heavy rain) those vulnerable are very similar to what was identified in the tornado event analysis (see Tornado/Windstorm Hazard Profile).

Thunderstorms affect relatively small areas when compared to winter storms. The typical thunderstorm is 15 miles in diameter and lasts an average of 20 to 30 minutes. Of the estimated 100,000 thunderstorms that occur each year in the United States, only about 10% are classified as severe. Despite their relatively

small size, thunderstorms are large enough to impact the entire community. The severity of the storm would likely determine the extent of any associated damage.

Thunderstorms may occur singly, in clusters, or in lines. Some of the most severe weather occurs when a single thunderstorm affects one location for an extended time. Lightning is a major threat during a thunderstorm. It is the lightning that produces thunder in a thunderstorm. Lightning is very unpredictable, which increases the risk to individuals and property.

In the United States, 75 to 100 people are killed each year by lightning, although most lightning victims do survive. Persons struck by lightning often report a variety of long-term, debilitating symptoms, including memory loss, attention deficits, sleep disorders, numbness, dizziness, stiffness in joints, irritability, fatigue, weakness, muscle spasms, depression, and an inability to sit for long periods. It is a myth that lightning never strikes the same place twice. In fact, lightning will strike several times in the same place in the course of one discharge.

The most severe impacts with a thunderstorm would be realized when cascading events occurred as a result of the storm. For example, multiple lightning strikes may result in death, fire, destruction of infrastructure, loss of power, communications failure, etc.

The severity of a hailstorm depends on the size and amount of hail. Hail several inches in diameter can cause severe damage to an urbanized area (broken windows, down trees and power lines, and automobile damage). Hail as small as 0.5-inch diameter can cause damage to crops and other plants.

Warning Time

The National Weather Service has developed effective weather advisories, which are promptly and widely distributed. Radio, TV, and Weather Alert Radios provide the most immediate means to do this. Accurate information is made available to public officials and the public in advance of the storm. Again, weather prediction capabilities have made significant improvements in the past few years. There are several notifications made by the National Weather Service. These include severe thunderstorm watch, severe thunderstorm warning, tornado watch, tornado warning, flash flood watch, and flash flood warning.

Despite these advancements in technology, the potential for a storm to form quickly and without warning still exists. Therefore, the committee staggered the score for the speed of onset. This allowed for the possibility if minimal or no warning time, but also acknowledged that there is generally some warning time before an event occurs.

The National Weather Service has developed effective weather advisories, which are promptly and widely distributed. Radio, TV, and Weather Alert Radios provide the most immediate means to do this. Accurate information is made available to public officials and the public in advance of the storm. The count's use of the state-wide Alert Iowa program also provides an additional way to notify the public of warnings.

Duration

Thunderstorm, lighting, and hail storms stay in a given area a relatively short time, depending on wind speeds. The duration of an event in one location is likely less than 6 hours.

Tornado / Windstorm

Definition and Description

A tornado is a violent whirling wind characteristically accompanied by a funnel shaped cloud extending down from a cumulonimbus cloud that progress in a narrow, erratic path. Rotating wind speeds can exceed 300 mph and travel across the ground at average speeds of 25-30 mph. A tornado can be a few yards to around a mile wide where it touches the ground. An average tornado is a few hundred yards wide. A tornado can move over land for distances ranging from short hops to many miles, causing damage and destruction wherever it descends. The funnel is made visible by the dust sucked up and condensation of water droplets in the center of the funnel.

The tornado funnel is made visible by the dust sucked up and by condensation of water droplets in the center of the funnel. The rating scale used to rate tornado intensity is the Fujita Scale. The Fajita Scale categorizes tornado severity based on observed damage, the six-step scale ranges from F0 (light damage) to F5 (incredible damage). As of February 2007, the National Weather Service uses the Enhanced Fujita Scale (EF Scale). This new scale ranges from EF0-EF5 and is shown in Table 42.

Windstorms are extreme winds associated with severe winter storms, severe thunderstorms, downbursts, and very steep pressure gradients. Windstorms, other than tornados, are experienced in all regions of the United States. It is difficult to separate the various wind components that cause damage from other wind-related natural events that often occur with or generate windstorms. Although Iowa does not experience direct impacts from hurricanes, the state is no stranger to strong,

TABLE 42: ENHANCED FUJITA SCALES FOR TORNADOS

Fujita Scale		Enhanced Fujita Scale		Type of Tornado	Description of Damage
Scale	**3-Second Gust Speed (mph)**	**Scale**	**3-Second Gust Speed (mph)**		
F0	45-78	EF0	65-85	Gale	Some damage to chimneys, broken tree branches, push over shallow rooted trees, damage to sign boards
F1	79-117	EF1	86-109	Moderate	The lower limit is the beginning of hurricane wind speed, peel surface off roofs, mobile homes pushed off foundations or overturned, moving automobiles pushed off roads
F2	118-161	EF2	110-137	Significant	Considerable damage: roofs torn off frame homes, mobile homes demolished, boxcars pushed over, large trees snapped or uprooted, light object missiles generated
F3	162-209	EF3	138-167	Severe	Severe damage: roofs and some walls torn off well-constructed houses, trains overturned, most trees in forest uprooted, heavy cars lifted off ground and thrown
F4	210-261	EF4	168-199	Devastating	Devastating damage: well-constructed houses leveled, structure with weak foundation blown off some distance, cars thrown and large missiles generated
F5	262-317	EF5	200-234	Incredible	Incredible damage: strong frame houses lifted off foundations and carried considerable distance to disintegrate, automobile sized missiles fly through the air in excess of 100 yards, trees debarked, incredible phenomena will occur.

damaging winds. Unlike tornadoes, windstorms may have a destructive path that is miles wide and duration of the event could range from hours to days. These events can produce straight line winds in excess of 64 knots (73 mph) causing power outages, property damage, impaired visibility, and crop damage. It is often difficult to separate windstorms and tornado damage when winds get above 64 knots.

Historical Occurrence

Since 1960 there have been 33 recorded occurrences of tornado events in the planning area. The estimated total of property damage from these tornadoes is $6.732 million while crop damage totals to $71,000. The recorded tornado events for the entire planning area can be referenced for detail in Table 43. The first column in Table 43 indicates the location where the tornado touched down, it does not include the communities impacted or where it ended. Data used in this table was collected from the National Climatic Data Center and the private website TornadoProject.com. The data gathered indicates reported tornados only, and does not account for unreported or misreported information. Accordingly, this information is intended for reference only, and not as a true and accurate historical account. A graphic representation of historic tornado events and the rough path they traveled can be seen in Attachment 5A.

TABLE 43: HISTORICAL OCCURRENCES OF TORNADOES IN GRUNDY COUNTY, 1960-2015					
Touch Down Location	**Date**	**Dth/Inj**	**PrD**	**CrD**	**Fujita Scale**
GRUNDY CO.	4/16/1960	0	250.00K	0.00K	F3
GRUNDY CO.	4/19/1966	0	25.00K	0.00K	F2
GRUNDY CO.	10/14/1966	0	2.50K	0.00K	F2
GRUNDY CO.	5/31/1971	0	0.00K	0.00K	F1
GRUNDY CO.	5/31/1971	0	0.00K	0.00K	F1
GRUNDY CO.	7/2/1973	0	25.00K	0.00K	F1
GRUNDY CO.	11/9/1975	0	250.00K	0.00K	F1
GRUNDY CO.	7/6/1977	0	25.00K	0.00K	F1
GRUNDY CO.	7/7/1978	0	25.00K	0.00K	-
GRUNDY CO.	7/14/1987	0	0.25K	0.00K	F1
GRUNDY CO.	5/30/1989	0	2.500M	0.00K	F4
GRUNDY CO.	6/28/1990	0	2.500M	0.00K	F1
GRUNDY CO.	3/22/1991	0	250.00K	0.00K	F2
STOUT	7/2/1999	0	75.00K	3.00K	F2
DIKE	5/11/2000	0	0.00K	0.10K	F0
CONRAD	5/10/2001	0	150.00K	0.00K	F2
BEAMAN	5/10/2001	0	35.00K	0.00K	F2
CONRAD	5/10/2001	0	50.00K	0.00K	F1
DIKE	4/18/2002	0	1.00K	0.00K	F0
HOLLAND	5/21/2004	0	0.00K	0.00K	F0
GRUNDY CENTER	5/21/2004	0	2.00K	3.00K	F1
DIKE	5/21/2004	0	0.00K	0.00K	F0
GRUNDY CENTER	5/21/2004	0	0.00K	0.00K	F0
GRUNDY CENTER	5/21/2004	0	0.00K	0.00K	F0
FERN	5/25/2008	0	300.00K	2.00K	EF2
STOUT	5/25/2008	0	1.00K	1.00K	EF0
WELLSBURG	6/21/2009	0	0.00K	1.00K	EF0
DIKE	6/21/2009	0	25.00K	2.00K	EF1
WELLSBURG	6/21/2009	0	10.00K	5.00K	EF1
MORRISON	6/29/2014	0	30.00K	2.00K	EF1
REINBECK	7/6/2014	0	200.00K	50.00K	EF1
REINBECK	7/6/2014	0	0.00K	0.00K	EF0
WELLSBURG	8/31/2014	0	0.00K	2.00K	EF0
Totals:	**33 Tornadoes**	**0**	**6.732M**	**71.10K**	**-**

Windstorms occur in the planning area on an annual basis. High winds are often associated with thunderstorms, but can be produced during severe snow storms or tornados. According to the National Climatic Data Center, the County has had 31 Thunderstorm Wind events from 1/17/1996-2/19/2016 resulting in an estimated $1.04 million in property damage and $30,100 in crop damage. Table 44 shows the historical occurrences for solely high winds only, while Table 37, in the Thunderstorm / Lighting / Hail hazard section includes a table of historical Thunderstorm Wind events.

TABLE 44: HISTORICAL OCCURRENCES OF HIGH WINDS IN GRUNDY COUNTY, 1960-2015

Location	Date	Dth/Inj	PrD	CrD	Wind Speed (Knots)	Location	Date	Dth/Inj	PrD	CrD	Wind Speed (Knots)
Grundy Co.	1/17/1996	0	0.00K	0.00K	55 kts.	Grundy Co.	3/7/2004	0	10.00K	0.00K	36 kts.
Grundy Co.	2/10/1996	0	0.00K	0.00K	56 kts.	Grundy Co.	4/18/2004	0	80.00K	0.00K	56 kts.
Grundy Co.	3/24/1996	0	0.00K	0.00K	54 kts.	Grundy Co.	4/27/2004	0	75.11K	0.00K	55 kts.
Grundy Co.	4/25/1996	0	0.00K	0.00K	52 kts.	Grundy Co.	5/24/2004	0	25.00K	0.00K	40 kts.
Grundy Co.	10/29/1996	0	0.00K	0.00K	57 kts.	Grundy Co.	12/12/2004	0	50.00K	0.00K	35 kts.
Grundy Co.	4/6/1997	0	0.00K	0.00K	55 kts.	Grundy Co.	1/22/2005	0	10.00K	0.00K	56 kts.
Grundy Co.	5/5/1997	0	0.00K	0.00K	52 kts.	Grundy Co.	5/12/2005	0	10.00K	0.00K	35 kts.
Grundy Co.	4/12/1998	0	50.00K	0.00K	-	Grundy Co.	6/8/2005	0	20.00K	0.00K	50 kts.
Grundy Co.	11/10/1998	0	300.00K	5.10K	61 kts.	Grundy Co.	11/12/2005	0	50.00K	0.00K	35 kts.
Grundy Co.	3/17/1999	0	30.00K	0.00K	50 kts.	Grundy Co.	11/15/2005	0	30.00K	0.00K	35 kts.
Grundy Co.	3/8/2000	0	10.00K	0.00K	50 kts.	Grundy Co.	1/24/2006	0	10.00K	0.00K	37 kts.
Grundy Co.	4/7/2001	0	50.00K	0.00K	50 kts.	Grundy Co.	10/26/2008	0	25.00K	25.00K	35 kts.
Grundy Co.	3/9/2002	0	50.00K	0.00K	-	Grundy Co.	10/27/2010	0	25.00K	0.00K	35 kts.
Grundy Co.	5/11/2002	0	75.00K	0.00K	51 kts.	Grundy Co.	11/11/2015	0	0.00K	0.00K	35 kts.
Grundy Co.	2/11/2003	0	5.00K	0.00K	50 kts.	Grundy Co.	2/19/2016	0	0.00K	0.00K	35 kts.
Grundy Co.	11/12/2003	0	50.00K	0.00K	50 kts.	**Totals:**	**31 Events**	**0**	**1.040M**	**30.10K**	**46.65 kts Avg.**

Beaman

Two tornadoes have passed within 5 miles of the city since 1975, one being a F1 and the other being a F2 magnitude.

Conrad

Three tornadoes have passed within 5 miles of Conrad since 1989, one being a F1, another a F2, and the one in 1989 was a F4. The F4 tornado caused $2.5 million worth of property damage to the surrounding area. This tornado was on the ground for approximately 2 miles, reaching about 200 yards in width.

Dike

Nine tornadoes have passed within 5 miles of Dike. Of those nine tornadoes, 3 have been F0s, 5 have been F1s, and 1 has been a F2. These tornadoes have caused about $80,000 worth of combined property and crop damage to the area surrounding Dike.

Fern

Fern is an unincorporated town in Grundy County that was the location of a F2 tornado; this was the same storm cell that produced the F5 tornado that damaged Parkersburg, Iowa on May 25, 2008.

Grundy Center

Since 1973, Grundy Center has had 5 tornados come within 5 miles of the city. Two of these tornadoes were F0s and three being of the F1 magnitude.

Holland

Five tornadoes have been within 5 miles of Holland since 1971, these tornadoes varied in magnitude, one being a F0, three being F1s, and one a F2.

Morrison

Morrison has had a F0 and F1 tornado come within 5 miles of the city since 1978. These tornadoes have caused approximately $57,000 worth of combined property and crop damage to the surrounding areas of Morrison.

Reinbeck

Four tornadoes have passed within 5 miles of Reinbeck since 1960, one being a F0, two others being a F1, and the one in 1960 was a F3. The F4 tornado caused $250,000 worth of property damage to the surrounding area. This tornado was on the ground for approximately 2.3 miles, reaching about 800 yards in width.

Stout

Two tornadoes have passed within 5 miles of the city of Stout since 1999, one being a F0 and the other being a F2 magnitude.

Wellsburg

Wellsburg has seen 6 tornadoes pass within 5 miles of the city since 1966, two have been F2 tornadoes, three have been F1s and one has reached a F2 magnitude level.

Probability

There have been 33 recorded tornados in the planning area since 1960. That averages, roughly, to a tornado every 2 years. Because tornadoes are sporadic, there cannot be a reliable long-term prediction made as to when or if they may occur. In the last 10 years, 2005-2014, Grundy County has experienced five tornadoes, affecting a total of 9 incorporated cities in Grundy County. By definition, the probability of a Tornado/Windstorm event in the planning area is highly likely.

If this 10-year average holds, it is highly likely the planning area will likely experience two to three tornados within the next five years. Also, given the historical paths of tornadoes (Attachment 5a) in the planning area, it is likely that future events could impact the same areas. As discussed previously, the most damaging event was the F4 that was about 5 miles west of Conrad and traveled north towards 2 miles towards Whitten before it dissipated. This individual did a reported $2.5 million worth of damage. The tornado that happened near Fern was an EF2, but became part of the EF5 tornado that devastated the City of Parkersburg on May 25, 2008. This storm system did a reported total of approximately $100 million worth of property and crop damage

The probability of a windstorm occurring in the planning area and having an impact on said area in the next year is highly likely. This conclusion is based on the historical occurrences of winds associated with thunderstorms in the area and the fact that the climate in the county is very conducive to the development of thunderstorms and high winds. The climate in the area is of humid continental variety and therefore there is generally enough moisture to form clouds and rain, relatively warm and unstable air that can rise quickly, and fluctuating weather fronts that work to cause uplift in air masses.

Magnitude / Severity

Tornadoes consist of strong, often destructive, winds. The winds in the strongest tornadoes are the fastest winds experienced anywhere on Earth, with rotation velocities up to 300 mph. Generally, the damage associated with a tornado is greatest within several hundred feet of the column. The maximum threat of a tornado occurs when a tornado stays on the ground for an extended period of time. The risk becomes even greater when the tornado event is accompanied by hail, heavy rain, and lightning.

The maximum threat of a windstorm is usually several hundred or thousand feet wide, as they are often associated with large thunderstorm cells. Much of the damage incurred during a windstorm event is often due to the accompanying hail, lightning, and wind shear.

The severity of a tornado event would likely be determined by five primary components: 1) the size of the tornado (see Table 18), with an EF5 posing the most severe risk to the community; 2) the time the tornado stayed in or around the community; 3) the time of day would be a major factor; 4) the density of the population at the point of impact; and 5) the area of the community that was directly impacted (i.e. a mobile home park or an undeveloped portion of the community). The worst case scenario would be an EF5 through one or more incorporated jurisdictions in the planning area.

Historically, there have been only 0 reported injuries and 0 deaths that occurred as a result of tornados in the planning area. While there haven't been any deaths or injuries in Grundy County, there have been a startling number in surrounding counties. In addition, another tornado could potentially be dramatically greater than what has been historically experienced in the planning area.

In the event of a tornado, the entire planning area has an extensive network of outdoor warning sirens that, given enough time, allow people to search for suitable shelter. All jurisdictions in the planning area have been active in upgrading these sirens, as many of them are old and unreliable. Grundy County Emergency Management Agency tests the sirens on a monthly basis.

For windstorms, Impacts can vary from broken tree limbs, broken corn stocks, to the total destruction of buildings and other structures depending upon the built environment and the speed of the winds.

Using available data, a tornado scenario was developed for each city and one complete county summary (see Attachment 5b through Attachment 5w for hypothetical tornado scenario maps). Estimates of potential damage were based on an EF0 through EF tornado impacting each city. Table 45A through Table 45J show the estimated damage values of a hypothetical tornado scenario for each city in the planning area. Parcel values are current as of 7/25/2011. The incorporated boundaries are current as of 2/19/2015. The damage estimates show a realistic damage level to buildings and land; these were calculated using the following percentages:

- EF0, EF1: 25% damage to affected buildings and land
- EF2, EF3: 50% damage to affected buildings and land
- EF4, EF5: 100% damage to affected buildings and land

TABLE 45A: TORNADO SCENARIO FOR BEAMAN

Scale	Tornado Width	# of Parcels	Damaged Value	% of City Damaged
EF0	50 Meters	28	$4,843,540	14.35%
EF1	150 Meters	49	$5,752,210	17.04%
EF2	250 Meters	67	$6,638,980	39.34%
EF3	500 Meters	110	$8,178,450	48.47%
EF4	900 Meters	121	$8,437,420	100.00%
EF5	1100 Meters	121	$8,437,420	100.00%

TABLE 45B: TORNADO SCENARIO FOR CONRAD

Scale	Tornado Width	# of Parcels	Damaged Value	% of City Damaged
EF0	50 Meters	38	$6,149,400	2.98%
EF1	150 Meters	71	$9,861,510	4.78%
EF2	250 Meters	102	$13,125,780	12.73%
EF3	500 Meters	233	$25,129,290	24.36%
EF4	900 Meters	412	$38,567,640	74.79%
EF5	1100 Meters	453	$44,069,470	85.46%

TABLE 45C: TORNADO SCENARIO FOR DIKE

Scale	Tornado Width	# of Parcels	Damaged Value	% of City Damaged
EF0	50 Meters	75	$9,322,270	11.60%
EF1	150 Meters	131	$15,259,150	18.98%
EF2	250 Meters	176	$20,461,640	25.45%
EF3	500 Meters	295	$35,770,760	44.50%
EF4	900 Meters	457	$56,027,990	69.70%
EF5	1100 Meters	500	$61,942,460	77.05%

TABLE 45D: TORNADO SCENARIO FOR GRUNDY CENTER

Scale	Tornado Width	# of Parcels	Damaged Value	% of City Damaged
EF0	50 Meters	109	$7,333,880	1.52%
EF1	150 Meters	195	$14,347,255	2.98%
EF2	250 Meters	296	$22,604,435	9.40%
EF3	500 Meters	557	$40,873,183	17.00%
EF4	900 Meters	986	$78,792,238	65.52%
EF5	1100 Meters	1127	$90,477,208	75.24%

TABLE 45E: TORNADO SCENARIO FOR HOLLAND

Scale	Tornado Width	# of Parcels	Damaged Value	% of City Damaged
EF0	50 Meters	31	$1,866,400	5.72%
EF1	150 Meters	72	$3,644,270	11.17%
EF2	250 Meters	89	$4,288,910	26.28%
EF3	500 Meters	126	$6,248,610	38.29%
EF4	900 Meters	157	$8,159,380	100.00%
EF5	1100 Meters	157	$8,159,380	100.00%

TABLE 45F: TORNADO SCENARIO FOR MORRISON

Scale	Tornado Width	# of Parcels	Damaged Value	% of City Damaged
EF0	50 Meters	16	$605,200	5.09%
EF1	150 Meters	31	$1,105,960	9.30%
EF2	250 Meters	43	$1,474,840	24.80%
EF3	500 Meters	71	$2,533,290	42.60%
EF4	900 Meters	80	$2,973,230	100.00%
EF5	1100 Meters	80	$2,973,230	100.00%

TABLE 45G: TORNADO SCENARIO FOR REINBECK

Scale	Tornado Width	# of Parcels	Damaged Value	% of City Damaged
EF0	50 Meters	79	$6,702,710	2.10%
EF1	150 Meters	148	$10,907,450	3.41%
EF2	250 Meters	221	$21,634,760	13.54%
EF3	500 Meters	409	$32,454,400	20.30%
EF4	900 Meters	652	$46,562,620	58.26%
EF5	1100 Meters	729	$54,268,020	67.90%

TABLE 45H: TORNADO SCENARIO FOR STOUT

Scale	Tornado Width	# of Parcels	Damaged Value	% of City Damaged
EF0	50 Meters	30	$1,839,680	7.31%
EF1	150 Meters	58	$3,140,310	12.47%
EF2	250 Meters	74	$4,107,120	32.62%
EF3	500 Meters	85	$4,516,730	35.87%
EF4	900 Meters	96	$5,174,710	82.20%
EF5	1100 Meters	101	$5,391,460	85.64%

TABLE 45I: TORNADO SCENARIO FOR WELLSBURG

Scale	Tornado Width	# of Parcels	Damaged Value	% of City Damaged
EF0	50 Meters	65	$5,013,460	4.62%
EF1	150 Meters	132	$7,941,910	7.32%
EF2	250 Meters	188	$10,944,340	20.17%
EF3	500 Meters	294	$16,429,650	30.28%
EF4	900 Meters	402	$22,073,455	81.37%
EF5	1100 Meters	427	$23,519,925	86.70%

TABLE 45J: TORNADO SCENARIO FOR GRUNDY COUNTY (ALL PROPERTIES)

Scale	Tornado Width	# of Parcels	Damaged Value	% of City Damaged
EF0	50 Meters	533	$45,862,590	1.82%
EF1	150 Meters	965	$74,685,315	2.96%
EF2	250 Meters	1350	$108,176,205	8.59%
EF3	500 Meters	2335	$177,439,413	14.08%
EF4	900 Meters	3589	$277,185,313	44.00%
EF5	1100 Meters	3961	$313,065,813	49.69%

Warning Time

Although the advancement in radar and forecasting has improved and continues to improve it cannot predict when and where a tornado may strike. They can however inform a community of when the conditions are right for an event to occur. In fact, it is estimated that approximately 95 percent of all tornadoes occur in areas where a tornado watch has been issued. Nevertheless, the five percent of the time that they do not accurately predict, or someone is simply uninformed can result in an almost immediate onset, with little or no warning time.

Tornado and thunderstorm watches can warn of likely conditions hours in advance of an upcoming storm. Although significant advances in meteorological technology has allowed for more effective forecasting, it is impossible to predict, in advance, when and where a windstorm will strike. A windstorm's rapid change in direction makes it difficult to say with certainty, the path the windstorm will continue on after it has been identified. Therefore, warning time is often very short or occasionally non-existent.

Duration

Duration of the actual event of a tornado or windstorm can range from a few minutes to several hours. However, considering the resulting damage, and the threat this damage poses, some jurisdictions deemed the duration could last up to a week or longer in the case of major infrastructure damage.

Transportation Incident

Definition and Description

This hazard includes all modes of transportation - air, highway, railway, and waterway. Thus, transportation includes any incident involving a military, commercial, or private aircraft; single-multi-vehicle incident which requires responses exceeding normal day-to-day capabilities; derailment or a train accident which directly threatens life or property, or which adversely impacts a community's capabilities to provide emergency services; and an event involving any vessel that threatens life or which adversely impacts a community's capability to provide emergency services.

An air transportation incident may involve a military, commercial, or private aircraft. Airplanes, helicopters, and other modes of air transportation are used to transport passengers for business and recreation as well as thousands of tons of cargo. A variety of circumstances can result in an air transportation incident including mechanical failure, pilot error, weather conditions, or an on-board fire could all lead to an incident at or near the airport. Air transportation incidents can occur in remote unpopulated areas, residential areas, or downtown business districts, incidents involving military, commercial, or private locations. An aircraft incident can also occur while the aircraft is on the ground.

A highway transportation incident can be single or multi-vehicle requiring responses exceeding normal day-to-day capabilities. An extensive surface transportation network exists in Iowa; local residents, travelers, business, and industry rely on this network on a daily basis. Thousands of trips a day are made on the streets, roads, highways, and interstates of the county. If the designed capacity of the roadway is exceeded, the potential for a major highway incident increases. Weather conditions play a major factor in the ability of traffic to flow safely in and through the state as does the time of day and week. Incidents involving buses and other high-occupancy vehicles could trigger a response that exceeds the normal day-to-day capabilities of response agencies.

A waterway incident is an accident involving any water vessel that threatens life, property, or adversely affects a community's capability to provide emergency services. Waterway incidents primarily involve pleasure craft on rivers and lakes. In the event of an incident involving a water vessel, the greatest threat would be drowning, fuel spillage, and/or property damage. Water rescue events are largely handled by first responding agencies. Waterway incidents may also include events in which a person, persons, or object falls through the ice on partially frozen bodies of water.

TABLE 46: GRUNDY COUNTY CRASH HISTORY, 2007-2011

Year	Number of Crashes	Total Fatalities	Total Injuries
2007	213	5	32
2008	242	1	46
2009	214	1	20
2010	211	2	39
2011	163	4	12
5-year Total:	**1,043**	**13**	**149**
Annual Averages	**208.6**	**2.6**	**29.8**

Source: Iowa Department of Transportation

Historical Occurrence

Traffic accidents are fairly common occurrences in the county. According to the Iowa Department of Transportation, rural Grundy County saw 1,043 various types of vehicular crashes from 2007 to 2011. Of these accidents 330 were related to icy, snowy or slushy surface conditions.

The planning area has not experienced any reported boating, rail, or air transportation events.

Probability

Based of historic crash data shown in Table 46, the County can expect several crashes each year, though likely fewer than 250. Probability of an air transportation event is unlikely. Due to having no railroads or navigable streams passing through the county, the probability of either of these events occurring are unlikely.

Magnitude / Severity

Due to the large volume of roadway and intersections located in the planning area, there is a chance of a traffic accident, especially with large farm equipment entering and leaving agricultural lands. Persons driving on major thoroughfares are more vulnerable to traffic accidents due to the increase number of drivers on these roads and the corresponding speed limits. However, motorists on the county's rural roadways are also vulnerable to traffic incidents with farm equipment and just the rural nature of the roadway.

All residents of the planning area have the potential to be vulnerable to an air traffic event. Most at risk to air traffic events are those who live or work in flight paths originating from the Grundy Center Municipal Airport, Koch Field, or Waterloo Regional Airport or those near farms that use crop duster airplanes. Although this hazard is high, the number of people and amount of property directly affected is relatively low.

The exact areas that will be affected by a traffic event will likely be small, concentrated, and have a minimal impact on the residents as a whole, unless a large or extremely dangerous hazardous material spill should result from the event. An air disaster may impact a larger portion of the county, depending on where the impact occurred and what type of aircraft actually wrecked. But for the most part, due to the planning area's rural environment, impact would be minimal.

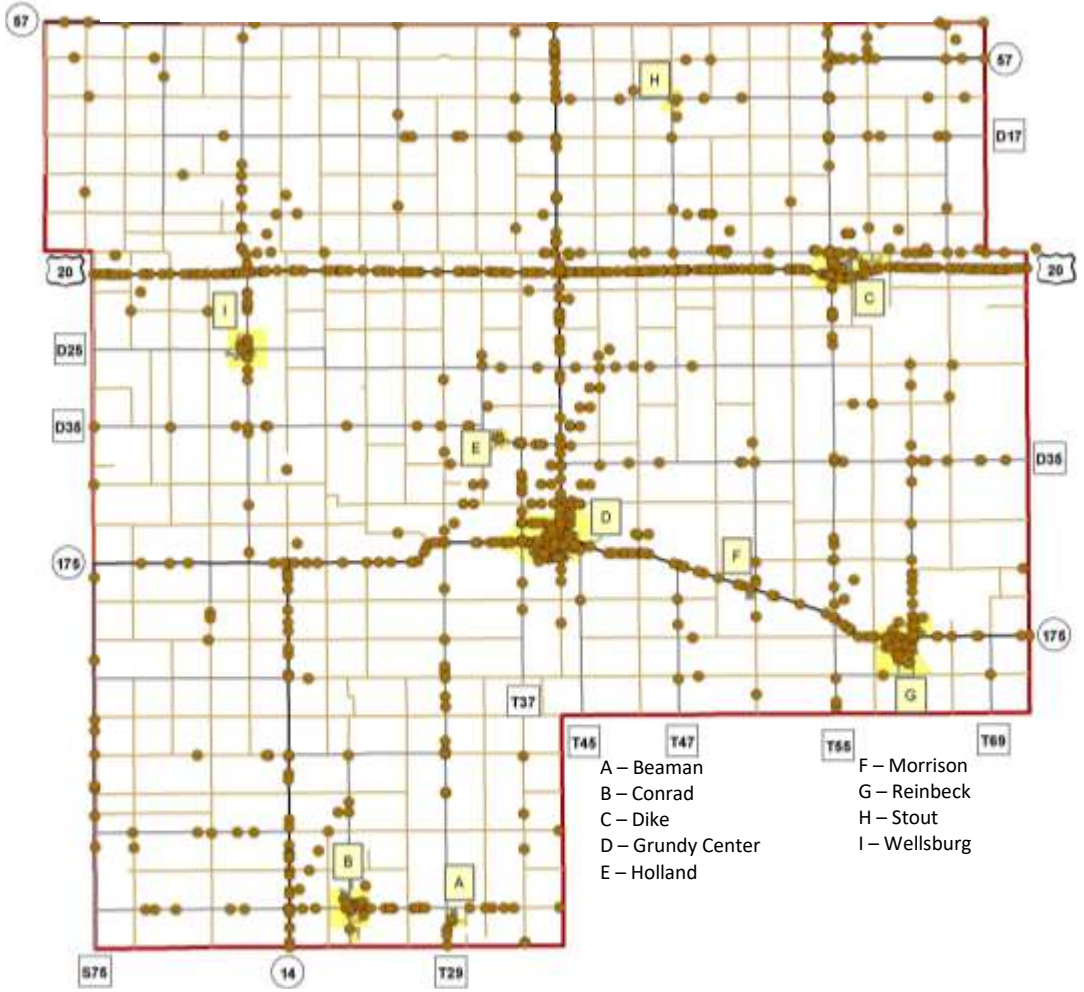
Warning Time

Transportation incidents occur within seconds; therefore, there is no time to warn those in the pathway of the harmful effects.

Duration

The duration of time a transportation incident would impact the planning area is dependent upon the type and severity of the incident.

FIGURE 8: GRUNDY COUNTY CRASH LOCATIONS, 2007-2011



Source: Iowa Department of Transportation

VULNERABILITY ASSESSMENT

Vulnerability –Critical Facilities

This section will describe the vulnerability for existing and future buildings, infrastructure, and critical facilities in those areas that can be impacted by the prioritized hazards. Since the majority of the hazards have an undefined hazard area (i.e., affecting an entire community or larger area) the following vulnerability assessment will only address those hazards that affect a specified area – flooding (river and flash). Due to the county's historical occurrences of tornadoes, this hazard was added to the assessment. The following discussion only considers the assets in the unincorporated areas of the county. An assessment was conducted for each municipality, and can be found in their respective appendix.

TABLE 47: CRITICAL FACILITIES AND DESIGNATED SHELTERS IN GRUNDY COUNTY

Critical Facilities		
Grundy County Engineer Office	Conrad - Water Tower	Holland - Wastewater Facility
Grundy County Secondary Road Shed	Conrad - Lift Station	Morrison - Public Works Garage
Central Iowa Rural Water Tower	Conrad - City Hall	Morrison - Electrical Substation (Outside of City Limits)
Grundy County Courthouse	Conrad - Library	Morrison - Warning Siren
Grundy County Conservation	Conrad - School	Morrison - Lift Station (Outside of City Limits)
Grundy County Secondary Road Shed	Dike - Wastewater Facility	Reinbeck - Water Plan
Grundy County Sheriff's Office	Dike - Water Tower	Reinbeck - West View
Grundy County Secondary Road Shed	Dike - Schools	Reinbeck - Daycare Facilities
Grundy County Secondary Road Shed	Dike - City Hall	Reinbeck - Fire Station
Central Iowa Rural Water Tower	Dike - Library	Reinbeck - Sewer Plant
Grundy County Annex Building	Dike - Wells	Reinbeck - Park View
Grundy County Secondary Rod Shed	Dike - Fire Station	Reinbeck - Schools
Grundy County Landfill	Grundy Center - Schools	Stout - City Hall
Beaman - City Hall/Library	Grundy Center - Wastewater Facility	Stout - Wastewater Treatment Plant
Beaman - Memorial Hall	Grundy Center - Water Tower	Stout - Fire Station
Beaman - Water Well	Grundy Center - Hospital	Wellsburg - City Hall
Beaman - Fire Department	Grundy Center - City Hall	Wellsburg - School
Beaman - Wastewater Facility	Grundy Center - Library	Wellsburg - Wastewater Facility
Beaman - Water Tower	Grundy Center - Courthouse	Wellsburg - Library
Beaman - Hospital	Grundy Center - Fire Station	Wellsburg - Fire Station/EMT
Beaman - Schools	Holland - City Hall	Wellsburg - Lift Stations
Conrad - Fire Station	Holland - Fire Department	Wellsburg - Memorial Building
Conrad - Wastewater Facility	Holland - Heartland Co-op	Wellsburg - Electric Sub-Station (located outside of city limits)
Shelters		
Dike - Fire Station	Grundy Center – Tornado Safe Room	Wellsburg – Memorial Building
Dike - Community Center	Reinbeck – School	Wellsburg – Fire Station
Grundy Center – Community Center	Reinbeck – Memorial Building	

Source: Community

Identifying the location of critical facilities and designated shelters (see Table 47) in the planning are is important in order to assess their vulnerability to hazards, in addition to, them being important to the operation of a community and the economic sector. For instance, high-density residential or commercial development, schools, police stations, government buildings, hospitals and care facilities, airports, gas stations, hardware stores, grocery stores, and water supply systems. It is important to know the threats each hazard poses to these facilities. Attachments 6A – 6K illustrate the location of identified critical facilities throughout the county and within the municipalities. As shown on the attached maps, the rural county area has little critical facilities besides roadways and bridges. As shown, many of the county's critical facilities (minus

bridges and roadways) and designated shelters are located within municipalities.

According to Section 2, Grundy County's population is predicted to slightly increase over the next thirty years. Because of the only slight increase in population, the need for more critical facilities should be closely monitored these next 5-years and readdressed when this HMP is updated.

River and Flash Flooding

A facility's vulnerability to a flooding event is normally low, since these structures are rarely constructed within the 100-year floodplain. According to the information provided, bridges and roadways would be impacted by flooding. This disruption in the transportation infrastructure would create a longer time period to receive and provide services and supplies to an area if a bridge was washed away due to flooding.

Table 48 lists the number properties in the entire planning area that are located within the 100-year floodplain. According to the data provided by INRCOG and Grundy County, there are 1,752 parcels of land with a total value of $334,578,956 located within the 100-year floodplain. See Attachment 3a for a map of the county's floodplain and Attachment 4a for a map of parcels impacted by the floodplain.

Table 49 shows the total value of assets in the unincorporated areas of the county is $316,307,614. $274,850,124 of this value is in land value. Table 50 displays the incorporated areas land, building, and dwelling values of the county within the 100-year floodplain, which are valued at $18,271,342.

The flood plain properties and values for individual cities can be found in Table 31A through Table 31k. Floodplain maps and floodplain scenario maps for each city are included in Attachment 3b through Attachment 4k.

Tornado / Wind Storms

As stated on the FEMA website, mobile homes are highly vulnerable to tornadoes. Even mobile homes that are tied down, offer little protection from tornadoes.

According to data from the 2015 ACS, there are 107 mobile homes in the county. According to the data suggest a recent decrease in the number of manufactured homes in the area, 220 in 2010 compared to 107 in 2015. This decrease in popularity has the potential to decrease the potential risk of damage to people and property in the community. Currently, Grundy Center Community School District is the only place where there is a FEMA certified tornado safe room that is known to exist in the planning area.

Based on national data on circumstance of tornado fatalities between 1985 and 1997, it was found that 38% of fatalities were occupants of mobile or manufactured homes, 27% were in permanent homes, 11% in vehicles, 9% outdoors (open), 4% in businesses, 4% in structures with long-span roofs, and 2% in schools. These data highlight the high exposure of occupants of mobile and manufactured homes (*AR State Hazard Mitigation Plan)*. According to available data, the 5,408 parcels within the unincorporated area are vulnerable to tornadoes – land, structures and dwelling total $1,009,283,448 (2016 dollar values). The total 4,471 parcels in the incorporated areas of the county have an estimated land, building, and dwelling value of $454,614,617 (2016 dollar values) vulnerable to tornado or windstorms.

Table 48: Entire Planning Area 100-Year Floodplain Properties

Number of Parcels	1,752
Land Value	$279,845,361
Building Value	$18,263,578
Dwelling Value	$36,470,017
Building and Dwelling Value	$54,733,595
Total Value	$334,578,956

Source: INRCOG & Grundy County Assessor
2016 dollar values

Table 49: Grundy County Unincorporated Areas 100-Year Floodplain Properties

Number of Parcels	1,574
Land Value	$274,850,124
Building Value	$11,362,860
Dwelling Value	$30,094,630
Building and Dwelling Value	$41,457,490
Total Value	$316,307,614

Source: INRCOG & Grundy County Assessor
2016 dollar values

Table 50: Grundy County Incorporated Areas 100-Year Floodplain Properties

Number of Parcels	178
Land Value	$4,995,237
Building Value	$6,900,718
Dwelling Value	$6,375,387
Building and Dwelling Value	$13,276,105
Total Value	$18,271,342

Source: INRCOG & Grundy County Assessor
2016 dollar values

Nursing homes or skilled living centers are also highly vulnerable to tornadoes. These facilities are designed for caring for the elderly population, majority of which use wheelchairs or other assistance devices, limiting mobility. Also, the majority of nursing homes are constructed as a single-level building with or without basements. Therefore, additional attention needs to be taken to ensure the safety of the residents and employees before, during, and after a tornado event. Table 47 shows there is an estimated 242 persons living in group quarters throughout the county.

Requirement §201.6(c)(2)(ii)(A): The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas…

Vulnerability – Social Assets

The social vulnerability assessment identified how the hazards affect the population of Grundy County and it is assumed that the identified populations are more likely to require assistance during times of disaster; therefore, are considered, generally speaking, more "at-risk" than the remaining population.

The "at-risk" population must be identified and targeted in successful mitigation efforts. Table 47 presents an overview of the at-risk population in Grundy County according to information retrieved from the 2010 U.S. Census and the 2015 American Community Survey (ACS).

Elderly populations can be more susceptible to some hazard events. An estimated 19.4% of residents are 65 years or older. Persons under the age of 18 are also at higher risk during some disasters. This is mostly due to the fact that young persons are often not aware of the proper actions to take in the event of a disaster. In addition, very young children would be more susceptible to a disaster such as a disease epidemic simply due to their age. In 2010, 24.1% of the county's total population was under the age of 18.

According to the ACS 5-year estimate there are 1,289 persons residing in the county with a disability. Of these persons, 62 are under the age of 18; 534 are between the ages of 18 and 64; and 693 are 65 years of age or older.

TABLE 51: "AT-RISK" POPULATION FOR PLANNING AREA

Total Population, 2015	12,407
Elderly (65 yrs. and older), 2015	2,410
Youth (17 yrs. and under), 2015	2,988
Householder Living Alone, 2015	1,390
Population Living in Poverty, 2015	784
Non-English Speaking Population (speak English less than 'very well')	27
Population in Multi-Family Structures*, 2015 (507 units)	1,217
Population in Mobile Homes, 2015* (114 units)	274
Group Quarters Population, 2010	242
Persons with Disabilities, 2015	1,289

Source: 2010 U.S. Census, 2015 American Community Survey
**Based on total number of units multiplied by the 2010 U.S. Census Grundy County average household size of 2.39 persons*

In addition, persons living in mobile homes, also known as manufactured housing may also be at risk from tornadoes or high winds. According to the 2015 ACS, there were 114 mobile homes in the county. Based on the county wide average persons per household (2.40), there is an estimated 274 persons living in these housing units.

Attachment 6o identifies the nursing homes within the planning area. Cities with nursing homes include: Conrad, Grundy Center, and Reinbeck. As shown in Table 51, approximately 242 county residents live in group quarters.

River and Flash Flooding

Flooding significance in the planning area is considered moderate. The primary locations for flooding are along Beaver and Black Hawk Creeks in the mapped

floodplain. Floodwaters are normally slow rising, shallow (less than 3 feet) and low velocity. Limited "flash" flooding (flooding with less than 12 hours warning time) occurs along the mapped floodplain. Other areas that may flood in the planning area are specified areas that are low-lying and have poor drainage. There is no storm sewer infrastructure for the Grundy County unincorporated areas. Because flash flooding is infrequent, it also primarily occurs within the mapped floodplain, and results in minimal damage to agricultural land, the committee decided to incorporate flash flooding into their evaluation of River Flooding.

A facility's vulnerability to a flooding event is normally low, since these structures are rarely constructed within the 100-year floodplain. According to the information provided, bridges and roadways would be impacted by flooding. This disruption in the transportation infrastructure would create a longer time period to receive and provide services and supplies to an area if a bridge was washed away due to flooding.

The Grundy County maps have approximately 1,752 parcels of land located within the 100-year floodplain in the rural, unincorporated area of the county. There are approximately 178 parcels of land in the 100-year floodplain throughout the nine incorporated cities. Tables displaying the number of parcels, acres, value of land, buildings, dwellings, and total value can be found in Table 34 for Grundy County.

Using the Census's household size for Grundy County (2.40) and assuming all those parcels have one residential structure on it, approximately 4,205 persons would be vulnerable to a flooding event, 427 persons of which are in incorporated cities alone.

Vulnerability – Estimating Potential Property Losses

Valuations are an important component of hazard mitigation planning in so much as it provides measurable data that can be used to form some type of estimate as to the potential losses a community could face in the event of a catastrophic disaster.

The valuations for Grundy County are available from the County Assessors and Auditors offices. It should be noted however that these dollar amounts do not include gas and electric utility valuations or infrastructure.

Table 52 lists the values of structures in Grundy County for the unincorporated area, the combined totals of the incorporated areas, and the total unincorporated and incorporated areas combined. This data, and data for each city, was considered in the vulnerability discussion in each of the Hazard Profiles

Requirement §201.6(c)(2)(ii)(B):[The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerability structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate.

TABLE 52: VALUE BY STRUCTURE TYPE IN GRUNDY COUNTY

Type of Structure	Incorporated Areas			Unincorporated Area			Total		
	Number of Dwellings/ Units	Value of Buildings/ Structures/Dwellings ($)	Land Value ($)	Number of Dwellings/ Units	Value of Buildings/ Structures/Dwellings ($)	Land Value ($)	Number of Dwellings/ Units	Value of Buildings/ Structures/Dwellings ($)	Land Value ($)
Residential	3,354	333,773,052	55,456,449	242	32,360,184	10,175,207	3,596	366,133,236	65,631,656
Commercial	358	47,501,866	7,222,951	40	9,027,560	1,424,353	398	56,529,426	8,647,304
Industrial	18	11,687,780	1,157,810	14	18,740,480	1,164,420	32	30,428,260	2,322,230
Agriculture	12	1,569,760	6,340,454	1,406	206,085,182	752,027,945	1,418	88,613,100	802,493,159
Total	3,742	394,532,458	70,177,664	1,702	266,213,406	764,791,925	5,444	541,704,022	879,094,349

Source: Grundy County Assessor; Values as of 08/10/2016

Future Development

Future development within identified hazard areas can change the threat level of an area by placing critical facilities, businesses, transportation networks, utilities, and populations within vulnerable areas. While it can be difficult to curb development in the planning area, it is the jurisdiction's advantage to be aware of development trends in order to successfully mitigation future hazards as risks increase. However, continued conformity with the State Building Codes and local land use ordinances and regulations (zoning, subdivision, floodplain management, etc.) will help to mitigate the effects hazards have on new and future development.

Repetitive Loss Properties

FEMA defines a repetitive loss property as an insurable building that has experienced two losses in a 10-year period in which each loss is $1,000 or more. There are no repetitive loss properties in the unincorporated portions of Grundy County.

Grundy County HMP attempts to reduce loss by identifying potential natural hazards. As a result of many natural and manmade hazards, repairs and reconstruction area often completed in a way that returns the structure to pre-disaster condition yet does little to prevent a reoccurrence of damage. Replication of the pre-disaster conditions allows for the repetitive cycle of property damage, reconstruction, and re-damage. Hazard mitigation is needed to ensure that such cycles are broken, that post-disaster repairs and reconstruction are analyzed, and sound, less vulnerable conditions are produced. Additionally, other mitigation strategies may be considered, such as voluntary property buy-outs.

Grundy County and eight of its nine cities participate in the National Flood Insurance Program (NFIP). Table 53 shows which communities participate in NFIP and details to the extent of their participation. The City of Stout does not participate. As of 10/31/2016 there were nine NFIP policies in place in the county.

TABLE 53: NFIP STATISTICS IN GRUNDY COUNTY

Community	Participates in NFIP?	CID #	# of NFIP Policies	NFIP Insurance in Force ($)	Total Paid Losses #	Total Payments Made ($)
Beaman	Yes	190400	-	-	-	-
Conrad	Yes	190401	-	-	1	7,361.43
Dike	Yes	190402	1	350,000	2	1.926.35
Grundy Center	Yes	190403	1	18,400	1	0.00
Holland	Yes	190404	1	181,000	-	-
Morrison	Yes	190953	-	-	-	-
Reinbeck	Yes	190646	1	350,000	-	-
Stout	No	-	-	-	-	-
Wellsburg	Yes	190680	-	-	-	-
Grundy County (Unincorporated)	Yes	190870	7	497,000	8	22,107.24
TOTAL	**-**	**-**	**11**	**1,396,400**	**12**	**29,468.67**

Source: Federal Emergency Management Agency (FEMA); Data as of 10/31/2016

Table 54 displays the values of properties in the 100-Year floodplain.

TABLE 54: ASSET INVENTORY – ESTIMATED POTENTIAL PROPERTY LOSSES RESULTING FROM FLOODING IN GRUNDY COUNTY

	# OF PARCELS	LAND VALUE	BUILDING VALUE	DWELLING VALUE	TOTAL VALUE	PERCENT OF PARCELS IN RESPECTIVE AREA
Incorporated Area 100-Year Floodplain	178	$4,995,237	$6,900,718	$6,375,387	$18,271,342	4.02%
Incorporated Area Total	**4,470**	**$69,494,918**	**$53,779,217**	**$191,282,846**	**$454,614,617**	**100.0%**
Unincorporated Area 100-Year Floodplain	1,574	$274,850,124	$11,362,860	$30,094,630	$316,307,614	31.34%
Unincorporated Area Total	**5,408**	**$764,410,456**	**$53,590,146**	**$331,340,482**	**$1,009,283,448**	**100.0%**
Total Area in 100-Year Floodplain	1,752	$279,845,361	$18,263,578	$36,094,630	$334,578,956	35.36%
County Area Total	**5,408**	**$833,905,374**	**$107,369,363**	**$522,623,328**	**$1,463,898,065**	**100.0%**

Parcel value information current as of 1/25/16. The source is the Grundy County GIS Department; This is FEMA's Digital DFIRM data for Grundy County, Iowa. It was completed on 10/19/2005; The incorporated boundaries were current as of 08/30/2016; For actual determination if a location is within the floodplain contact your local floodplain administrator.

SECTION 4 – MITIGATION STRATEGY

HAZARD MITIGATION PLAN GOALS FOR PLANNING AREA

The Committee reviewed the County's Hazard Mitigation Plan Goals from the 2012 plan. The Committee elected to continue forward with the same set of goals in the plan update. These broad-based goals were developed to address a multitude of hazards and encompass a variety of mitigation activities. The updated multi-jurisdictional hazard mitigation plan goals for Grundy County are:

1. Minimize to the greatest possible extent the number of injuries and/or loss of life associated with all identified hazards.
2. Reduce or eliminate property damage due to the occurrence of disasters.
3. Identify ways that response operations, in the event of a disaster, can be improved.
4. Return the community to either pre-disaster or improved conditions in a timely manner in the wake of a disaster.
5. Develop strategies that can be used to reduce the community's overall risk to the negative effects of natural, technological, and man-made disasters.
6. Reconvene the planning committee on an annual basis to review the plan document, check for compliance with the plan goals, and track progress in achieving the mitigation strategies.
7. Maintain the Countywide Multi-Jurisdictional format for future plan updates.

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

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

Requirement §201.6(c)(3)(iv): For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.

CURRENT HAZARD MITIGATION ACTIONS

Mitigation actions are grouped into six broad categories: prevention, property protection, public education and awareness, natural resource protection, emergency services, and structural projects. The text box to the right provides clarification on these categories. Detailed information for each incorporated community can be found in their respective appendix.

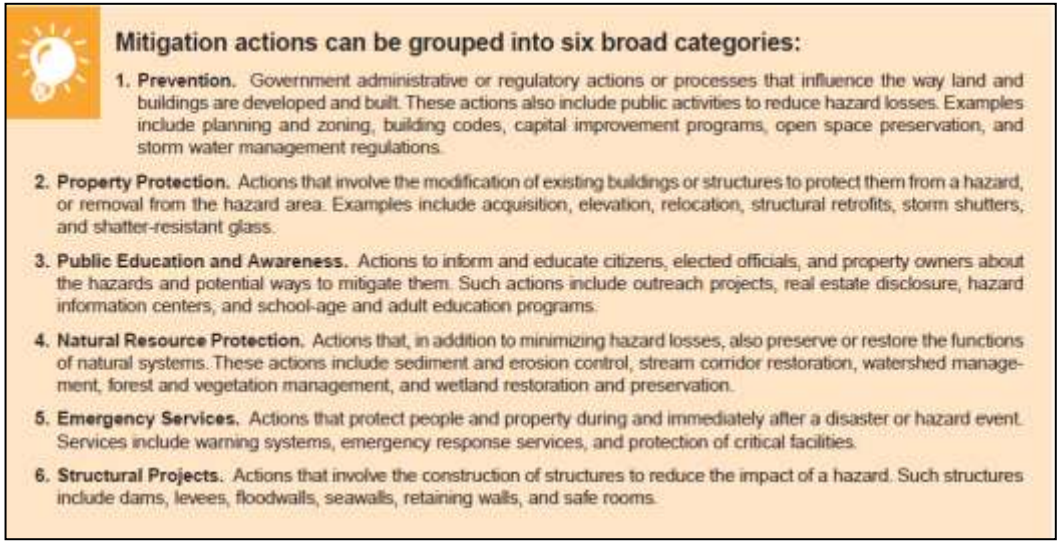


Figure 9: Six Broad Categories for Mitigation Actions
Source: FEMA

Prevention Mitigation Actions

Grundy County currently has a Floodplain Management Ordinance which is administered by the County Zoning Administrator. All inquiries pertaining to construction areas in a floodplain are directed to the Administrator's Office and follow NFIP guidelines. The Federal Government completed new FIRM maps, as of October 19, 2005, for Grundy County. Grundy County has and enforces Zoning Ordinances. They issue building permits for the unincorporated areas only. The County does issue Zoning Certificates for land areas under 35 acres. The Zoning and Subdivision Ordinance was adopted by the Grundy County Board of Supervisors in 1997 (updated 2009) and is administrated by the County Zoning Administrator.

The cities in Grundy County also use a number of zoning and ordinance tools. Table 55 provides a compilation of the current planning regulatory documents in place for each city in Grundy County.

TABLE 55: CURRENT PLANNING AND REGULATORY DOCUMENTS FOR SELECTED COMMUNITIES

Community	Previous HMP	Comprehensive Plan	Building Code	Zoning Ordinance	Subdivision Regulations	Floodplain Management Ordinance	Tree-Trimming Ordinance	Storm Water Ordinance	Snow Removal Ordinance
City of Beaman	Yes	No	No	No	No	Yes	Yes	Yes	Yes
City of Conrad	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
City of Dike	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
City of Grundy Center	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
City of Holland	Yes	No	No	No	No	Yes	No	No	Yes
City of Morrison	Yes	No	No	No	No	Yes	No	No	No
City of Reinbeck	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
City of Stout	Yes	No	No	No	No	No	No	No	Yes
City of Wellsburg	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No
Grundy County	Yes	Yes	No	Yes	Yes	Yes	No	No	No

Source: Communities

Property Protection Mitigation Actions

Numerous flood studies have been conducted within the planning area. Nine cities and the county participate in the National Flood Insurance Program. The county's FIRM was updated in October 2005. There have been no buyouts within the planning area.

Floodplain Management

On July 16th, 1990 Grundy County became active members in the National Flood Insurance Program (NFIP) by adopting its initial floodplain ordinance. The Federal Insurance Administration manages the insurance component of the NFIP, and works closely with FEMA's Mitigation Directorate, which oversees the floodplain management aspect of the program.

Public Education and Awareness Mitigation Actions

Information regarding how to protect one's self in the event of a tornado is largely publicized in the form of flyers, radio, newspaper, and television announcements. The County provides basic safety information for various hazard events (i.e., tornados) and what to do before, during, and after an event. Grundy County uses the AlertIowa notification system to notify users in case of an emergency.

Emergency Services Mitigation Actions

Grundy County's Emergency Management Coordinator is based out of the City of Grundy Center, the county seat. The Emergency Management Coordinator works in conjunction with local fire, rescue, police, and government officials to draft and implement workable emergency action plans in the community. The current Emergency Management Coordinator is Zach Tripp and current contact information is as follows: Grundy County Emergency Management Agency, 705 8th Street, Grundy Center, Iowa 50638, (319) 824-6933, email: ztripp@grundysheriff.org

Law Enforcement

The Grundy County Sheriff's Office provides law enforcement for all of the unincorporated areas of the County along with providing assistance to the cities that have their own police force. The Grundy County Sheriff's Office has service contracts to provide law enforcement patrols with the communities of Beaman, Holland, Morrison, and Stout.

Fire Protection

Grundy County is divided into Fire Districts with 8 Fire Departments having coverage for every square mile of the County. Fire Departments serving Grundy County are Beaman, Conrad, Dike, Grundy Center, Holland, Reinbeck, Stout and Wellsburg.

Ambulance

Much like the Fire Departments, the entire county is divided into Ambulance Districts. The entire county is covered just like with fire districts. Ambulance providers for Grundy County are: Grundy Center, Beaman, Conrad, Wellsburg, Dike and Reinbeck. The County also receives Mutual Aid from Paramedic/Ambulance services from: Covenant Medical Center Ambulance Service and Sartori Ambulance Service are available in Waterloo and Cedar Falls, respectively.

Medical Facilities

Grundy County has only one hospital within its boundaries – Grundy County Memorial Hospital in Grundy Center; otherwise, residents go to neighboring counties for medical attention. Area hospitals include: Waverly Municipal Hospital, Waverly; Franklin General Hospital, Hampton; Floyd county Memorial Hospital, Charles City; Covenant Medical Center, Waterloo; and Mercy Medical Center North Iowa, Mason City.

HAZMAT

All Grundy County jurisdictions contracts with Northeast Iowa Response Group for response to hazardous material spills. The Northeast Iowa Response Group is a division of Waterloo Fire Rescue as is the Hazardous Materials Regional Training Center. The Training Center provides training to fire departments and companies from around the state and country. Not only is this a training center it also serves as a hazardous materials quick response unit to Black Hawk County, surrounding counties, and many municipalities in a ten-county region. The Unit provides local fire departments with hazard materials emergency procedures thus reducing additional contamination. An evacuation plan is also in place in conjunction with the activities with the local department. Contact information for the facility is as follows: Hazardous Materials Regional Training Center, 1925 Newell Street, Waterloo, Iowa 50707, Phone: (319) 291-4275, Toll Free: (800) 291-4682, Fax: (319) 291-4285

The jurisdictions also partner the Northeast Iowa Response Group for assistance in responding to any methamphetamine labs located in the city limits. The Response Group assists the Police Departments in containment of the site and disposal of the hazardous chemicals.

<u>County Engineer and Secondary Roads Department</u>

The Grundy County Engineer's Office is tasked with the maintenance of all roads within Grundy County. It is managed by Gary Mauer, County Engineer. The Department has 27 employees with 22 assigned to the Maintenance Division and 5 to the Engineering Division. The Code of Iowa requires that the Board of Supervisors appoint a Registered Professional Engineer as department head. The Engineer, along with the Assistant to the Engineer and Technician, Road Superintendent and Office Manager, directs both the construction and maintenance activities.

Warning Systems

Grundy County uses the AlertIowa notification system that is utilized statewide. The program is funded by the State of Iowa and administered through Iowa Homeland Security and Emergency Management Office. AlertIowa will be administered through Grundy County Emergency Management Agency and will be available to all county cities and school districts.

AlertIowa will allow for emergency notifications at all times via landline telephones, cell phones, email, text message, and social media. The County will use their emergency notification network for all of the following events: blizzards, flash flooding, severe thunderstorms, and tornadoes. There is an optional way to receive the same alert for events such as: excessive heat warnings, hazardous materials warnings, heavy snow warning, high wind warnings, ice storm warnings, law enforcement warnings, shelter in place warnings, sleet warnings, wind chill warnings, and winter storm warnings.

Natural Resource Protection Mitigation Actions

Grundy County has been trying to acquire and restore wetlands, along with improving the watershed management areas in the county. Greenbelts are being developed along the north fork of Black Hawk Creek and the south fork of Beaver Creek. Other projects the county has been working on is invasive species removal of the Honeysuckle, along with the preventative removal of ash trees to try to prevent an Emerald Ash Borer invasion.

Structural Projects Mitigation Actions

Beginning in September 2014 and completing in May of 2015, a safe room was added to the Grundy Center secondary school. This saferoom can hold upyto483 people and withstand winds of 260 mile per hour.

FUTURE HAZARD MITIGATION ACTIVITIES

While the existing mitigation activities discussed above detail the comprehensive efforts to mitigate hazards when possible and to respond to hazards in a timely and efficient manner, the Committee also recognizes that there are many more mitigation activities and projects that would benefit community residents. Thus, the Committee developed an updated list (Action Plan – Table 54) of future hazard mitigation activities that, if accomplished, would serve to further reduce the risk of hazards to the community. The action plan may include a combination of projects the Committee feels the community should try to accomplish and mitigation efforts that are ongoing that the Committee view as vital to the continued well-being of the public. Below is the action plan for Grundy County Unincorporated area. Action Plans for each participating jurisdiction can be found in their respective appendix.

Action Plan

Priority

The Committee analyzed the identified mitigation activities that are either new or carried over from previous/current plans. This analysis included a discussion of the potential benefits of implementing the activity, some hurdles that the community may face in implementing the action step, and the drawbacks of implementation. The analysis utilized the STAPLEE feasibility criteria.

The STAPLEE technique is a FEMA suggested method of evaluation. The STAPLEE approach assesses both positive and negative impacts on the following aspects: **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental (see Table 53 for definitions).

The Committee was asked to discuss the STAPLEE elements and determine each element's ranking (High -H, Medium -M,

TABLE 56: STAPLEE ELEMENTS

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

Low-L) for each identified future mitigation activity. Afterwards, the average priority for each migration activity was recorded as the overall priority ranking for that particular future mitigation activity.

Timeline

The Committee identified the time period each of the proposed mitigation activity will occur. For instance, if the activity happens regularly (either daily, weekly, monthly, or annually) it was identified as On-Going; if it will occur within the next 1-5 years it was identified as Short-Term; if the activity would take 5-10 years to occur it was labeled as Mid-Term; and all activities that would take 10 or more years to occur were identified as Long-Term.

Estimated Cost

Although in the long-term hazard mitigation actions will save money by avoiding the loss of lives or property damages, in the short-term each action will have an associated cost. The local community will rely heavily on local funding sources to fulfill most of the plan obligations; however, they will also seek funds from State and Federal agencies for both pre- and post-disaster mitigation activities. In addition, private property owner expenses will be necessary to implement some activities.

The estimated cost(s) for each mitigation action, program, or project is either: Minimal, Low, Moderate, or High depending upon various factors.

- Minimal: Cost estimate is $10,000 or less based on using current staff, time commitment, continuous of current duties, proposed action/program/ project, and funding sources.
- Low: Cost estimate for project range from $10,001 - $99,999 based on existing proposed treatment, time commitment, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.).
- Moderate: Cost estimate for project range from $100,000 - $299,999 based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.), and funding sources.
- High: Cost estimate for project range is $300,000 or higher based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, project components (permits, acquisition, coordination, etc.), and funding sources.

Requirement §201.6(c)(3)(iii): [The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

TABLE 57: FUTURE HAZARD MITIGATION ACTIVITIES- GRUNDY COUNTY

Priority	Mitigation Action/Program/Project	Associated Hazard(s)	Agencies Responsible for Implementation * - Denotes primary agency	Timeline	Est. Cost	Goal(s)
High	Establish & Conduct a Public Awareness & Education Program (Notices, Newsletters, Brochures, Website, Warnings, Shelter Information, Importance of Vaccinations, Hazard Information, At-Home Improvements - plant trees, rain barrels, etc.)	Drought, Extreme heat, Flash Flood, Grass/Wild Fire, Human Disease, River Flooding, Severe Winter Storm, Thunderstorm/Lighting/Hail, Tornado/Windstorm, HAZMAT Incident, Infrastructure Failure, Levee/Dam Failure	County EMA* and Public Health	Active	Minimal	1, 2, 6, 7
High	Establish an Emergency Notification System and Conduct Drills	All	County EMA*	Active	Minimal	1,2,3, 5, 7
Low	Maintain Mutual Aid Agreement with Surrounding Communities and IMAC	All	County EMA*	Active	Low	4
Medium	Complete and Maintain Secondary Off-Site Dispatch Center	All	Grundy County Sheriff*	Active	Low	1, 4, 5
Medium	Develop and Maintain an Emergency Response Plan	All	County EMA*	Active; updated annually	Minimal	1, 2, 4, 5, 6
High	Develop and Maintain Continuity of Operations Plan (COOP)	Human Disease, Thunderstorm / Lightning / Hail, Tornado/Windstorm, HAZMAT Incident, Terrorism	Board of Supervisors*	Active	High	4, 6
High	Develop and Maintain Command Procedures & Center	All	County EMA*	Active	Minimal	1, 5
High	Develop Plan / Procedures to Assist At-Risk Populations during an Event (Transport to Shelters, Home Visits, etc.)	Extreme Heat, Flash Flood, River Flooding, Severe Winter Storm, Thunderstorm/ Lighting/ Hail, Tornado/ Windstorm, HAZMAT Incident, Levee/Dam Failure	County EMA* and Public Health	Active	Minimal	1, 5
High	Maintain Well-Trained Personnel (Fire, First Responders, Police, EMS, Weather Spotters, and other Critical Services – includes Multi-Jurisdictional Training and Cooperation for all Hazards)	Flash Flood, River Flooding, Thunderstorm/ Lighting/ Hail, Tornado/ Windstorm, HAZMAT Incident, Terrorism	Individual Departments*; County EMA, Ambulance Service, Police Departments, Sheriff	Active; updated annually	Minimal	1, 2, 3, 4, 5, 7
High	Ensure Schools and Other Buildings / Structures with Large Populations have Evacuation Plans	Flash Flood, River Flooding, Thunderstorm/ Lighting/ Hail, Tornado/ Windstorm, HAZMAT Incident, Terrorism	County EMA*	Active	Minimal	1, 2
High	Provide Off-Site Backup of Essential Data	All	Board of Supervisors*	Active	High	4, 5
Low	NOAA Weather Radio Awareness Program	All	County EMA*	Active, repetitive	Minimal	1, 2, 5, 6, 7

Priority	Mitigation Action/Program/Project	Associated Hazard(s)	Agencies Responsible for Implementation * - Denotes primary agency	Timeline	Est. Cost	Goal(s)
Medium	Identify & Maintain Relationships with Users of Hazardous Materials/Chemicals & Radiological or Nuclear Substances	HAZMAT Incident, Radiological Incident, Transportation Incident	County EMA*	Active, annually	Minimal	1, 2, 5
Medium	Continue Agreement with NE Iowa Response Group	HAZMAT Incident, Radiological Incident, Transportation Incident	Board of Supervisors*	Active, annually	Minimal	3, 5
Medium	Ensure Tier II Reports are Completed and Reported per Applicable Laws	HAZMAT Incident, Radiological Incident, Transportation Incident	County EMA*	Active, annually	Minimal	3, 5
High	Provide an Adequate Number of Safe Rooms/Tornado Rooms for General Public Use	Thunderstorm/ Lighting/ Hail, Tornado/ Windstorm, Terrorism	Board of Supervisors*	Active	Minimal	1
High	Maintain Membership of National Flood Insurance Program	Flash Flood, River Flooding	Board of Supervisors*	Active, repetitive	Minimal	5
High	Maintain Wellness Clinics and Public Health Department	Human Disease	County Public Health*	Active, repetitive	Minimal	1
High	Develop a Clean Up/Recovery Procedure / Plan	Flash Flood, River Flooding, Sever Winter Storm, Thunderstorm/ Lighting/ Hail, Tornado/ Windstorm, HAZMAT Incident, Levee/Dam Failure, Terrorism	County EMA*	Active, updated annually	Minimal	4
High	Install Signage at Critical Transportation Sites (i.e., RR, Dangerous Intersections, etc.)	Flash Flood, Grass/ Wild Fire, River Flooding, Severe Winter Storm, Thunderstorm/ Lighting/ Hail, Tornado/ Windstorm, HAZMAT Incident, Levee/ Dam Failure, Transportation Incident	County Engineer*	Active	Minimal	1, 5
High	Maintain a Community-Wide Household Hazardous Waste Disposal Site or Event	HAZMAT Incident, Human Disease	Board of Supervisors*	Active	Moderate	4
High	Develop Groundwater Protection Plan or Drinkable Water Distribution Plan (inspections, testing, security, etc.)	Drought, Flash Flood, Human Disease, River Flooding, HAZMAT Incident, Transportation Incident, Terrorism,	County Environmental Health*	Active	Minimal	1, 5
Low	Maintain and Update Bioterrorism Response Plan	Human Disease, Terrorism	County EMA*	Active	Minimal	1, 2, 4, 5
High	Identify and Improve Security at Critical Facilities	Terrorism	Board of Supervisors*	Active	Low	1, 5
Medium	Maintain Bulk Supply and Storage of Critical Elements (Fuels, Water, Nonperishable Food, etc.)	Extreme Heat, Flash Flood, River Flooding, Severe Winter Storm, Thunderstorm/ Lighting/ Hail, Tornado/ Windstorm, Levee/Dam Failure, Terrorism	Board of Supervisors, County EMA*	Active	Moderate	4, 5

Priority	Mitigation Action/Program/Project	Associated Hazard(s)	Agencies Responsible for Implementation * - Denotes primary agency	Timeline	Est. Cost	Goal(s)
Low	Either Purchase & Remove Structures in 100-YR Floodplain or Elevate Structures to at Least 1-FT Above 100-YR Floodplain, or Both	Flash Flood, River Flooding, Levee/ Dam Failure	County EMA, Board of Supervisors	Active	Moderate	1, 2, 5
Low	Flood Proof Critical Facilities	Flash Flood, River Flooding, Levee/ Dam Failure	Board of Supervisors	Short-Term	Low	2
Low	Develop & Enforce an Inspection & Repair Program for Public Infrastructure	Earthquake, Extreme Heat, Flash Flood, River Flooding, Tornado/ Windstorm, Levee/ Dam Failure	County Engineer	Active	Medium	1, 2, 5
Low	Develop a Water Rationing Plan	Drought	County EMA and Public Health	Short-Term	Low	4
Low	Maintain Roadside Vegetation Management Program	Landslide	County Engineer	Active	Low	5
Low	Conduct necessary Studies, Engineering, Construction, etc. on Existing Infrastructure that are in Need (i.e., Ridge Road, T55 Bridge, etc.)	Earthquake, Extreme Heat, Flash Flood, River Flooding, Tornado/ Windstorm, Levee/Dam Failure	County Engineer and EMA	Short-Term	Medium	1, 2, 5

SECTION 5 – PLAN MAINTENANCE

MONITORING, EVALUATING, AND UPDATING THE PLAN

Requirement §201.6(c)(4)(i): [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

Requirement §201.6(c)(4)(ii): [The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive plans or capital improvement plans, when appropriate.

Requirement §201.6(c)(4)(ii): [The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.

Amendment

This is an updated five-year hazard mitigation plan, commencing upon FEMA Certification, and any future amendments to the plan shall occur only after an official Public Notice has been posted in a local publication announcing a Public Hearing on the matter.

After the public has had the opportunity to review the proposed amendments the City Council, School Board, and/or Board of Supervisors may, by resolution, choose to accept any amendment to the plan. Once a City Council and/or Board of Supervisors has adopted the amendment, the remaining elected board of each participating municipality shall hold a public hearing to receive public input on the amendment prior to local adoption.

Any and all amendments made to this plan should be shared with each participating jurisdiction, the Grundy County Emergency Management Agency and the Iowa Department of Homeland Security and Emergency Management Division. At a minimum, this Plan will be evaluated for consistency with FEMA and IHSEMD requirements and formally updated every five (5) years. However, it is strongly encouraged the mitigation strategies for each community be reviewed and revised (if necessary) following disasters to determine if the recommended actions are still appropriate given the impacts of an event.

Phasing & Funding

Phasing is a process by which the completion of a project occurs over several budget cycles. It is recommended that this updated hazard mitigation plan be incorporated into the City's or County's annual Capital Improvements Program update procedure. For projects that require a local match commitment, the Council or Board of Supervisors should begin setting aside appropriate resources to meet their match liability. In addition, the projects defined herein may be prioritized for funding through the jurisdictions' budgeting process. Finally, the information presented in the Plan may be used as documentation for grant and/or loan programs, including the Hazard Mitigation Grant Program (HMGP).

Evaluation & Review Process

Ultimately, the Grundy County Emergency Management Coordinator and governing boards from all jurisdictions are responsible for the Hazard Mitigation Plan and implementation of the goals and actions contained herein, and they may seek assistance from other city or county staff, Council of Governments, and consultants in order to accomplish mitigation projects. To assist in the review process, the Hazard Mitigation Committee (as mentioned in Section 1) may reconvene annually upon the request of the Grundy County Emergency Management Coordinator. As mentioned in Section 1, said Committee will be comprised

of representatives from each participating jurisdiction as well as from neighboring communities, schools, businesses, nonprofits, agencies, academia, and other interested parties and together they will be charged with reviewing and evaluating implementation progress of the mitigation plan. In addition, a public notice will be posted at all city and county government buildings and in the local newspapers inviting the general public to participate as members of the Committee and/or to review the Plan and provide comments. The plan should be reviewed annually to determine program effectiveness or at a minimum, shall be reviewed and updated within five years of the FEMA approval date. Following the Committee's completion of the annual review process, the findings of the review and recommended changes, if applicable, will be presented during a City Council and Board of Supervisors meeting, which is a public meeting Evaluation forms to assist in the review, evaluation, and updating process can be found in Attachment 11.

Attachment 9 details the progress each jurisdiction, who had been in the previous plan, has made since the adoption of the previous plan. All participating jurisdictions were members of the 2012 Grundy County MJ-HMP. Since many activities fall under the normal duties of most city governments (e.g. funding and maintaining emergency services), not many activities were deleted. A number of communities in Grundy County are limited both in size and capacity to implement mitigation programs. Under the confines of these limited resources, some jurisdictions chose to drop a variety of previously defined mitigation actions, as they were determined to longer be a priority or were not feasible.

Continued Public Participation

In order to ensure that the public remains involved in the future implementation of this Plan, it shall remain available at all participating city halls, school districts, and the county courthouse. An electronic copy will be posted on the Iowa Northland Regional Council of Government's website as well, at www.inrcog.org/pub. This Plan shall be made available to any party who requests to see it. In the event the Hazard Mitigation Committee is reconvened by the County Emergency Management Coordinator, the process of which has been previously discussed, the public will be notified and provided an opportunity to participate in planning meetings and submit comments. The public will be notified in accordance with Iowa's Open Meeting and Records Laws (Iowa Code Chapters 21 and 22), said meetings will be open to the public and all records shall be available for inspection. The coordinator will continue to work with each participating jurisdiction in ensuring the plan goals are followed and that these jurisdictions are properly prepared for any disaster that may come.

Integrating Plan into other Planning Documents

Each jurisdiction should consider the findings from this document when updating or writing new planning documents. As deemed appropriate by the community government, this plan should be incorporated into existing or proposed development of Comprehensive Plans, Land-Use Plans and other appropriate plans or programs. Each jurisdiction should integrate and consider their goals as well as their current and future mitigation action steps with existing and future jurisdictional plans. Additional examples of planning documents that would benefit from information provided in this Plan include, but are not limited to existing and future Zoning and Subdivision Ordinances as well as Building Codes.

APPENDIX A: CITY OF BEAMAN

COMMUNITY PROFILE

Location

Beaman is located in the south-central portion of Grundy County. The town's coordinates are 42.2197° N and 92.8235° W. Wolf Creek travels through the southernmost part of the City.

History

H.H. Beaman was the land owner where the City of Beaman was originally located. The City was originally platted and recorded to Grundy County in October 1875. According to "Beaman's First 100 Years" prior to the City of Beaman, there were a couple smaller unincorporated settlements located around the now present location of Beaman, Wadeloupe was the closest, located just south of the City. Jerusalem was also another settlement located about one mile south of present Beaman. The town came into existence when the old narrow-gauge road from Liscomb made its terminus. The first train rolled into Beaman on Christmas Eve in 1875. The road suspended business in 1876. The road was built by the Farmers Union and for 6 months the trains were transported by steam engines. These were abandoned as too expensive and horses were substituted. The town was incorporated in 1884.

Transportation

According to an Iowa Department of Transportation's traffic study done in 2013, Beaman experiences most of its traffic to the south and west of town. T29 entering Beaman from the south sees a daily average of 1,540 cars and trucks. 330th St. to the west of town has a daily average of 1,340 cars and trucks.

Grundy County's only airport is located in Grundy Center, approximately 11 miles north of Beaman. Grundy Center Muni Airport-6K7 is a public airport located southwest of Grundy Center.

The closest major airport is the Waterloo Regional Airport (ALO), which is located approximately 40 miles northeast of Beaman. This public airport is owned and operated by the City of Waterloo and overseen by an Airport Commission appointed by the Mayor. The primary runway is 8,400 foot long, 150 foot wide, and has a grooved asphalt surface. The airport is classified as a non-hub primary commercial service airport, offering general aviation and commercial service.

Community Services

Because of high levels of nitrates, the city is hooked up with the Central Iowa Rural Water Association; the water tower is located on the north side of town. The water tower has an elevated storage capacity of 8,700,000 gallons. The average consumption is 3.5 million gallons per day (mgd) with a rated capacity of 6.5 mgd. The peak consumption is 5 mgd.

A primary sewer treatment plant serves Beaman. The city maintains a sewage treatment facility southwest of town, consisting of a 3-cell lagoon system. Average load is 10,000 (gpd) with a peak load of 41,000 (gpd). The rated capacity of the system is 115,200 gpd so the city has plenty of sewer capacity for additional development.

TABLE A1: BEAMAN UTILITY PROVIDERS

Electric	Natural Gas	Water	Sewer	Sanitation	Telephone	Internet	Cable
Alliant Energy	Alliant Energy	Central Iowa Rural Water	City	Private/Contract	Heart of Iowa Communications/Mediacom	Heart of Iowa Communications/Mediacom	Heart of Iowa Communications/Mediacom

Demographics

Table A2 provides an overview of Beaman's demographics. From 2000 to 2010, the City experienced a 9.0% decrease in population, from 210 to 191 persons.

TABLE A2: CITY OF BEAMAN DEMOGRAPHICS

Government Framework	Mayor – City Council		
General Population, 2010 Census		***Economics Characteristics, 2010 Census***	
Total Population (2010)	191	Total Population 16 yrs. and over	142
Total Males (2010)	103	Population in Labor Force (16 yrs. and over)	111
Total Females (2010)	88	Persons in Civilian Labor Force	110
Median Age (2010)	38.3	Persons Employed	107
At-Risk Population, <18 Yrs.	58	Persons Unemployed	3
At-Risk Population, >64 Yrs.	24	Persons in Armed Forces	1
One Race-White	185	Mean Travel Time to Work in Minutes (16 yrs. & over)	19.9
Asian	1	Persons Employed in Management, Professional, or Related Occupations	28
Native Hawaiian and Other Pacific Islander	4	Persons Employed in Service Occupations	18
Two or More Races	1	Persons Employed in Sales and Office Occupations	29
Hispanic or Latino (of any race)	2	Persons Employed in Farming, Fishing, or Forestry Occupations	2
Not Hispanic or Latino	189	Persons Employed in Construction, Extraction, or Maintenance Occupations	4
Total Household Population	191	Persons Employed in Production, Transportation, or Material Moving Occupations	26
Total Population in Group Quarters	0	Median Household Income	$45,750
Persons in Group Quarters – Correctional Institutions	0	Median Family Income	$46,500
Persons in Group Quarters – Nursing Homes	0	Per Capita Personal Income	$18,960
Housing Characteristics, 2010 Census		Families below Poverty Level	0
Total Housing Units	85	Individuals below Poverty Level	1
Total Owner-Occupied Housing Units	63	Unemployment Rate	2.7%
Total Renter-Occupied Housing Units	15	***Social Characteristics, 2010 Census***	
Total Vacant Housing Units	7	School Enrollment (3 yrs. and over)	58
Total 1-Unit Detached and Attached Structures	73	Nursery School, Preschool	5
Total 2, 3, and 4-Unit Structures	12	Kindergarten and Elementary School (grades 1-8)	30
Total 5 to 19-Unit Structures	2	High School (grades 9-12)	15
Total Mobile Homes	0	College or Graduate School	8
Year Majority of Housing Units were Built	1959 or Earlier (73.5%)	Education Attainment: Population 25 Years and Over	145
Average Household Size	2.45	Persons with Less than 9th Grade	4
Average Family Size	2.98	Persons with 9th to 12th Grade, No Diploma	17
Specified Renter-Occupied Units	29	Persons with High School Degree or Equivalency	55
Median Gross Rent	$513	Persons with Some College, No Degree	42
Specified Owner-Occupied Units	51	Persons with Associate Degree	9
Median Housing Value, Owner-Occupied	$43,200	Persons with Bachelor's Degree	13
Method of Heating Household	Utility Gas (60.0%)	Persons with Graduate or Higher Degree	5
Households with No Telephone Service	2	Persons with a Disability (5 yrs. and over)	32

HAZARDS & RISK ASSESSMENT

Hazard Analysis

Section 3 identified and profiled the hazards for the entire planning area. However, each community analyzed their own vulnerability to those hazards applicable to their jurisdiction. Using the methodology outlined in Section 3 (Vulnerability Assessment), the City of Beaman evaluated the risk associated with a specific hazard, defined by probability and frequency of occurrence, magnitude, severity, exposures, and consequences. Beaman's vulnerability assessment provides in-depth knowledge of the hazards and vulnerabilities that affect the community. This analysis provides an all-hazard approach when evaluating the hazards of that affect the city, and the associated risks and impacts each hazard presents.

As mentioned previously in Section 3, the vulnerability assessment requires a five-year review with periodic updates, as needed. Potential future hazards and impacts may result from changing technology, new critical facilities, infrastructures, and development patterns, as well as demographic and socioeconomic changes that occur within or outside the area.

Disaster frequency and its effects or severity are important as a basis for planning emergency response and mitigation. Natural hazards tend to reoccur on a predictable seasonal basis, whereas manmade or technological events tend to change over time with advancement in technology and methods of operation. Five criteria were used by the Committee to assure a systematic and comprehensive approach to hazard analysis for their individual jurisdictions included: Historical Occurrence, Probability, Vulnerability, Maximum Geographic Extent, Severity of Impact, and Speed of Onset. Due to recent disasters and events that have impacted the planning area, Beaman determined that even though the historical occurrences were low for certain hazards, the probability ranking for future occurrences should be higher.

The Committee assessed the defined hazards relevant to potential impact on the city. Using the scoring criteria previously defined (Tables 19-22) the city assessed each of the identified hazards based on probability, magnitude/severity, warning time, and duration. The scores for each of the factors were weighted using the formula below to develop the final hazard assessment score.

(Probability x.45) + (Magnitude/Severity x .30) + (Warning Time x .15) + (Duration x .10)

= Final Hazard Assessment Score

Table A3 is the analysis scores for the City of Beaman. As seen in table, the top three hazards were identified as River Flooding, Thunderstorm/Lightning/Hail, and Tornado/Windstorm.

Table A3: Hazard Risk Assessment for Beaman						
Hazard Rank	**Hazard**	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**Final Score**
1	River Flooding	4	3	4	3	**3.6**
2	Thunderstorm/Lighting/Hail	4	2	4	1	**3.1**
2	Tornado/Windstorm	4	2	4	1	**3.1**
4	Animal/Plant/Crop Disease	3	2	1	4	**2.5**
5	Severe Winter Storm	3	2	2	2	**2.45**
6	Extreme Heat	2	2	2	2	**2**
6	HAZMAT Incident	2	1	4	2	**2**
6	Infrastructure Failure	2	1	4	2	**2**
9	Transportation Incident	2	1	4	1	**1.9**
10	Flash Flood	1	2	3	3	**1.8**
11	Levee/Dam Failure	1	1	4	4	**1.75**
11	Drought	2	1	1	4	**1.75**
11	Human Disease	1	1	4	4	**1.75**
11	Radiological Incident	1	1	4	4	**1.75**
11	Grass/Wild Fire	2	2	1	1	**1.75**
16	Sinkholes	1	1	4	3	**1.65**
17	Earthquake	1	1	4	1	**1.45**
17	Landslide	1	1	4	1	**1.45**
17	Terrorism	1	1	4	1	**1.45**
20	Expansive Soils	1	1	1	4	**1.3**

Vulnerability – Identifying Assets (Critical Facilities)

This section will describe the vulnerability for existing and future buildings, infrastructure, and critical facilities in those areas that can be impacted by the prioritized hazards. Since the majority of the hazards have an undefined hazard area (i.e., affecting an entire community or larger area) the following vulnerability assessment will only address those hazards that affect a specified area – flooding (river and flash). However, due to the community's historical occurrences of tornadoes and the ability of them to result from the community's top natural hazards (thunderstorms and lightning), this hazard was added to the assessment. The following discussion only considers the assets in the community of Beaman.

Critical Facilities

Identifying the location of critical facilities (see Table A3) in Beaman is important in order to assess their vulnerability to hazards since these facilities are important to the community's operations, quality of life, and are key components of the economic sector. For instance, high-density residential or commercial development, schools, police stations, government buildings, hospitals and care facilities, airports, gas stations, hardware stores, grocery stores, and water supply systems. It is important to know the threats each hazard poses to these facilities. *Attachment 6B* illustrates the location of identified critical facilities throughout Beaman.

TABLE A4: CRITICAL FACILITIES AND DESIGNATED SHELTERS IN BEAMAN

Critical Facilities	
City Hall/Library	Wastewater Facility
Memorial Hall	Water Tower
Water Well	Hospital
Fire Department	Schools
Shelters	
None	

Source: Community

According to the available data sources, Beaman is projected to see a decrease in population over the next thirty years. This population decrease will most likely result in a lesser need for additional critical facilities, but currently the population is satisfied with the facilities that are located throughout the City. However, the need for more or less critical facilities should be closely monitored these next 5-years and readdressed when this HMP is updated.

Homes in Hazardous Areas

A facility's vulnerability to a flooding event is normally low, since these structures are rarely constructed within the 100-year floodplain. According to the information provided, bridges and roadways was being impacted by flooding. This disruption in the transportation infrastructure would create a longer time period to receive and provide services and supplies to an area if a bridge was washed away due to flooding.

TABLE A5: CITY OF BEAMAN 100-YEAR FLOODPLAIN PROPERTIES

Total Dwellings	1
Total Buildings	21
Total Structures	22
Total Value of all Structures	$1,653,370

Source: INRCOG & Grundy County Assessor

Table A5 lists the number properties in Beaman that are located within the 100-year floodplain. According to data provided by FEMA, Beaman has 1 dwelling within the flood hazard area. According to the data provided by INRCOG and Grundy County, there are 6 parcels located within the 100-year floodplain; some of this land is undeveloped, but the majority has some sort of structure and use. See *Attachment 5D: Flood Scenario Map of the City* and Table A5.

Tornadoes and windstorms are events that can cause harm to all structures and populations in the area. As part of a vulnerability assessment, a hypothetical tornado scenario was created for the community. Attachment 5h and Attachment 5j 4k illustrate the impact of a hypothetical tornado event in Beaman. Table

A6 displays the degrees of impact that a hypothetical tornado scenario of various strengths would have on Beaman. As can be seen from the table, a direct hit from an EF4 or EF5 tornado would damage 100 percent of the City.

TABLE A6: TORNADO SCENARIO FOR BEAMAN

Scale	Tornado Width	# of Parcels	Damaged Values	% of City Damaged
EF0	50 Meters	28	$1,210,885.00	14.35%
EF1	150 Meters	49	$1,438,052.50	17.04%
EF2	250 Meters	67	$3,319,490.00	39.34%
EF3	500 Meters	110	$4,089,225.00	48.47%
EF4	900 Meters	121	$8,437,420.00	100.00%
EF5	1100 Meters	121	$8,437,420.00	100.00%

As stated on the FEMA website, mobile homes are highly vulnerable to tornadoes. Even mobile homes that are tied down, offer little protection from tornadoes. However, there are no mobile homes is Beaman so this isn't much of a concern for the community. Multi-family housing units are another type of housing that is considered at-risk during one of these events. There are approximately 15 families residing in multi-family housing units in Beaman according to the U.S. Census.

Vulnerability – Social Assets (Populations)

The social vulnerability assessment also identified how the hazards affect the population of Beaman and it is assuming that the identified populations are more likely to require assistance during times of disaster; therefore, are considered, generally speaking, more "at-risk" than the remaining population. The "at-risk" population must be identified and targeted in successful mitigation efforts. Table A7 identifies the various population segments that may consider "at-risk" in the event of a hazard.

TABLE A7: CITY OF BEAMAN "AT-RISK" POPULATION

	2010
Total City Population (2010)	191
Elderly (65 yrs. and older)	24
Youth (under 18 yrs. old)	58
Householder Living Alone	23
Non-English Speaking Population (speaks English less than 'very well'	4
Population Living in Poverty	1
Population in Mobile Homes	0
Group Quarters Population	0
Persons with Disabilities (age 5+)	32
Persons w/Sensory Disability	3
Persons w/Physical Disability	10
Persons w/Mental Disability	5
Persons w/Self-Care Disability	4
Persons w/Go-Outside-Home Disability	5
Persons w/Employment Disability	5

Source: U.S. Census, 2010; Iowa Data Center

The elderly is often listed as an "at risk" population. According to 2010 Census data, Beaman has 24 persons, 12.5% of the population, 65 years or older. 23 of the 78 households are occupied by individuals who are living alone.

Persons under the age of 18 are also at higher risk during some disasters. This is mostly due to the fact that young people often are not aware of the proper actions to take in the event of a disaster. In addition, very young children can be more susceptible to a disaster such as a disease epidemic simply due to their age. In 2010, there were 58 persons, 30% of the population, under the age of 18.

As mentioned, there are no mobile housing units in Beaman. Findings from the U.S. Census indicate there are 15 families living in multi-unit housing units in the city.

No nursing homes are located in Beaman. Nursing homes or skilled living centers are also highly vulnerable to tornadoes. These facilities are designed for caring for the elderly population, majority of which use wheelchairs or other assistance devices, limiting mobility. Also, the majority of nursing homes are constructed as a single-level building with or without basements.

Vulnerability – Estimating Potential Property Losses

Valuations are an important component of hazard mitigation planning, as it provides measurable data that can be used to form some type of estimate as to the potential losses a community could face in the event of a catastrophic disaster. The valuations for the City of Beaman are available from the County Assessor's office. City of Beaman's property valuations are in Table A8.

This information was made available from the Grundy County Assessor's office. It should be noted however that these dollar amounts do not include gas and electric utility valuations nor do the evaluations include exempt properties, including government buildings, infrastructure, and religious/nonprofit properties. These results should be considered preliminary, as a full accounting of assets has not been completed.

TABLE A8: ASSET INVENTORY – VALUE OF STRUCTURES IN BEAMAN

Type of Structure	Lot/Land Value	Value of All Structures	Total Value	Number of Structures
Residential	$722,740	$4,568,627	$5,291,367	74
Commercial	$164,520	$2,120,432	$2,284,952	17
Industrial	$147,420	$1,714,840	$1,862,260	2
Agriculture	$36,953	$80,830	$45,513	N/A
Total	**$1,071,633**	**$8,484,729**	**$9,484,092**	**93**

Source: Grundy County Assessor; Values as of 6/10/2016

Future Development

Future development within identified hazard areas can change the threat level of an area by placing critical facilities, businesses, transportation networks, utilities, and populations within vulnerable areas. While it can be difficult to curb development in the planning area, it is the jurisdiction's advantage to be aware of development trends in order to successfully mitigation future hazards as risks increase. However, continued conformity with the State Building Codes and local land use ordinances and regulations (zoning, subdivision, floodplain management, etc.) will help to mitigate the effects hazards have on new and future development.

Repetitive Loss Properties

FEMA defines a repetitive loss property as an insurable building that has experienced two losses in a 10-year period in which each loss is $1,000 or more. There are no repetitive loss properties in Beaman.

This HMP attempts to reduce loss by identifying potential natural and manmade hazards. As a result of many natural and manmade hazards, repairs and reconstruction area often completed in a way that returns the structure to pre-disaster condition yet does little to prevent a reoccurrence of damage. Replication of the pre-disaster conditions allows for the repetitive cycle of property damage, reconstruction, and re-damage. Hazard mitigation is needed to ensure that such cycles are broken, that post-disaster repairs and reconstruction are analyzed, and sound, less vulnerable conditions are produced. Additionally,

other mitigation strategies may be considered, such as voluntary property buy-outs.

Using GIS spatial data from FIRM maps, in combination with property value data from the Grundy Assessor's office, estimates of value in the floodplain were calculated. Table A9 shows the estimated value of land, buildings, and dwellings, within the city, in a floodplain.

TABLE A9: FLOODPLAIN DATA FOR BEAMAN

	Number of Parcels	Land Value	Building Value	Dwelling Value	Total Value	Percent of City Affected
1% Annual Floodplain	6	$123,216	$1,581,100	$72,270	$1,776,586	18.68%
0.2% Annual Floodplain	-	-	-	-	-	-

Source: Grundy County Assessor's Office; Analysis conducted by INRCOG; Parcel values and FIRM maps as of 10/19/2005

MITIGATION STRATEGY

Hazard Mitigation Plan Goals

The hazard mitigation plan goals were reviewed by the Hazard Mitigation Planning Committee at their second committee meeting. The committee set as a priority the development of broad-based goals that would address a multitude of hazards and encompass a variety of mitigation activities. The hazard mitigation plan goals for the City of Beaman are as follows:

1. Minimize to the greatest possible extent the number of injuries and/or loss of life associated with all identified hazards.
2. Reduce or eliminate property damage due to the occurrence of disasters.
3. Identify ways that response operations, in the event of a disaster, can be improved.
4. Return the community to either pre-disaster or improved conditions in a timely manner in the wake of a disaster.
5. Develop strategies that can be used to reduce the community's overall risk to the negative effects of natural, technological, and man-made disasters.
6. Reconvene the planning committee on an annual basis to review the plan document, check for compliance with the plan goals, and track progress in achieving the mitigation strategies.
7. Maintain the Countywide Multi-Jurisdictional format for future plan updates.

Current Mitigation Actions

Prevention Mitigation Actions

The city has an adopted Floodplain Management Ordinance and is a member of the Flood Insurance Program.

TABLE A10: BEAMAN'S CURRENT PLANNING AND REGULATORY DOCUMENTS								
Previous HMP	**Comprehensive Plan**	**Building Code**	**Zoning Ordinance**	**Subdivision Regulations**	**Floodplain Management Ordinance**	**Tree-Trimming Ordinance**	**Storm Water Ordinance**	**Snow Removal Ordinance**
Yes	No	No	No	No	Yes	Yes	Yes	Yes
Source: Community								

Property Protection Mitigation Actions

Beaman has not participated in any buyout or similar program. No actions or plans of property mitigation are planned under the city's jurisdiction.

Public Education and Awareness Mitigation Actions

Beaman has a backup power generator at the fire station and behind Memorial Hall, which serves as a shelter during winter storms or whenever the electricity is out. The city is actively working towards acquiring a new tornado warning siren. Grundy County uses the AlertIowa notification system to notify users in case of an emergency.

Emergency Services Mitigation Actions

Grundy County Emergency Management Agency

Beaman works with the Grundy County Emergency Management Coordinator, based out of the City of Grundy Center, on various safety and emergency events. The Emergency Management Coordinator works in conjunction with local fire, rescue, police, and government officials to draft and implement workable emergency action plans in the community. The current Emergency Management Coordinator is Zach Tripp and current contact information is as follows: Grundy County Emergency Management Agency, 705 8th Street, Grundy Center, Iowa 50638, (319) 824-6933, email: ztripp@grundysheriff.org

Law Enforcement

Law enforcement is provided through a contract with the Grundy County Sheriff Department. The sheriff's department patrols Beaman during specific times and also handles all calls of criminal activity.

Fire Protection

Fire protection for the City of Beaman and surrounding rural areas is provided by the Beaman Volunteer Fire Department. They have mutual aid with the Conrad Fire Department. The Fire Station, located at 2nd and Wadeloupe Streets, was constructed in 1990 and houses a 1999 Pierce Pumper, 1975 Ford Taker, a 1959 Ford Tanker, a 1954 International Grass Jeep, and an equipment truck. The 17 members of the department meet monthly and take training in fire suppression, hazardous materials, and emergency medical services. Dispatch is provided via a paging system through the Grundy County Sheriff's Department.

Ambulance & First Responders

Emergency Medical Services and Rescue activities are provided by the Beaman-Conrad Emergency Response Team (B-CERT). This group of highly skilled volunteers responds to medical emergencies in the Beaman and Conrad area. The group maintains a large amount of equipment, including a defibrillator, the Jaws of Life, and other tools to effectively respond to emergency situations. Average response time is 6 minutes with up to 60 calls per year. The calls vary from standard medical, accidents, assisting fire fighters and mutual aid with other departments. BCERT does not charge for the service they provide. Ambulance Service is provided by the Marshalltown Area Paramedic Service.

Medical Facilities

There are no medical facilities in Beaman.

HAZMAT

Beaman contracts with Northeast Iowa Response Group for response to hazardous material spills. The Northeast Iowa Response Group is a division of Waterloo Fire Rescue as is the Hazardous Materials Regional Training Center. The Training Center provides training to fire departments and companies from around the state and country. Not only is this a training center it also serves as a hazardous materials quick response unit to Black Hawk County, surrounding counties, and many municipalities in a ten-county region. The Unit provides local fire departments with hazard materials emergency procedures thus reducing additional contamination. An evacuation plan is also in place in conjunction with the activities with the local department. Contact information for the facility is as follows: Hazardous Materials Regional Training Center, 1925 Newell Street, Waterloo, Iowa 50707, Phone: (319) 291-4275, Toll Free: (800) 291-4682, Fax: (319) 291-4285

The jurisdictions also partner the Northeast Iowa Response Group for assistance in responding to any methamphetamine labs located in the city limits. The Response Group assists the Police Departments in containment of the site and disposal of the hazardous chemicals.

Warning Systems

Grundy County uses the AlertIowa notification system that is utilized statewide. The program is funded by the State of Iowa and administered through Iowa Homeland Security and Emergency Management Office. AlertIowa will be administered through Grundy County Emergency Management Agency and will be available to all county cities and school districts.

AlertIowa will allow for emergency notifications at all times via landline telephones, cell phones, email, text message, and social media. The County will use their emergency notification network for all of the following events: blizzards, flash flooding, severe thunderstorms, and tornadoes. There is an optional way to receive the same alert for events such as: excessive heat warnings, hazardous materials warnings, heavy snow warning, high wind warnings, ice storm warnings, law enforcement warnings, shelter in place warnings, sleet warnings, wind chill warnings, and winter storm warnings.

Public Works / Street Department

The street and alley system within the city are maintained throughout the year by the City of Beaman and three part-time employees. Each year, certain streets are seal coated and repaired. Snow removal is provided through the city. All streets within the city limits are seal coated/paved, except for approximately 2 blocks of roads on east Second Street.

Natural Resource Protection Mitigation Actions

Beaman does not have any natural resource protection actions.

Structural Projects Mitigation Actions

Beaman does not have any structural project mitigation actions.

Future Mitigation Actions

While the existing mitigation activities discussed above detail the city's efforts to mitigate hazards when possible and to respond to hazards in a timely and efficient manner, the Committee also recognizes that there are many more mitigation activities and projects that would benefit county residents. Thus, the Committee developed a list of future hazard mitigation activities that, if accomplished, would serve to further reduce the risk of hazards to the community. The list may include a combination of projects the Committee feels the community should try to accomplish and mitigation efforts that are ongoing that the Committee view as vital to the continued well-being of the public.

Priority

The Committee analyzed the potential mitigation activities. This analysis included a discussion of the potential benefits of implementing the activity, some hurdles that the community may face in implementing the action step, and the drawbacks of implementation. The analysis utilized the STAPLEE feasibility criteria. The STAPLEE technique is a FEMA suggested method of evaluation. The STAPLEE approach assesses both positive and negative impacts on the following aspects of a county: **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental.

The Committee was asked to discuss the STAPLEE elements (Table A11) and determine each element's ranking (High -H, Medium -M, Low-L) for each identified future mitigation activity. Afterwards, the average priority for each migration activity was recorded as the overall priority ranking for that particular future mitigation activity.

Timeline

The Committee identified the time period each period each of the proposed mitigation activity will occur. Activities that occur regularly (either daily, weekly,

monthly or annually) were identified as Active. If the action is to occur within the next 1-5 years it was identified as Short-Term, if the activity would take 5-10 years it was labeled as Mid-Term, and any activities that would take 10 or more years were identified as Long-Term.

TABLE A11: STAPLEE ELEMENTS

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

Funding

Although in the long-term hazard mitigation actions will save money by avoiding the loss of lives or property damages, in the short-term each action will have an associated cost. The City will rely heavily on local funding sources to fulfill most of the plan obligations; however, they will also seek funds from State and Federal agencies for both pre- and post-disaster mitigation activities.

The estimated cost(s) for each mitigation action, program, or project is either: Minimal, Low, Moderate, or High depending upon various factors.

- Minimal: Cost estimate is $10,000 or less based on using current staff, time commitment, continuous of current duties, proposed action/program/ project, and funding sources.
- Low: Cost estimate for project range from $10,001 - $99,999 based on existing proposed treatment, time commitment, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.).
- Moderate: Cost estimate for project range from $100,000 - $299,999 based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.), and funding sources.
- High: Cost estimate for project range is $300,000 or higher based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, project components (permits, acquisition, coordination, etc.), and funding sources.

Implementation Strategy

One of the first steps the Committee took was to review the City's existing Hazard Mitigation Activities and provide an update on their status, see Based on each activity's progress, City's chose to continue the activity or drop it from the plan update. Once the Committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. In addition, the Committee identified a time line for each activity, associated hazards, estimated cost, priority, identified the responsible party or parties for each activity, and indicated at least which of the city's goals the action addresses. Table F12is the City of Beaman's Implementation Strategy.

TABLE A12: CITY OF BEAMAN'S IMPLEMENTATION STRATEGY

Priority	Mitigation Action/Program/Project	Associated Hazard	Primary Agency Responsible for Implementation	Date for Completion	Estimated Cost (s)	Funding Source
H	Educate the public	All	Grundy County EMA	To be Implemented	Minimal	Local
H	Continue training and education for fire departments, law enforcement agencies and ambulance crew personnel	All	City Council and Roads Depts.	Active	Moderate	Local, State
H	Maintain and acquire materials and equipment for fire departments, law enforcement agencies and ambulance crew personnel	All	City Council	Active	Minimal	Local, State
H	Provide emergency shelters for evacuees	All	Grundy County EMA	As-needed	Minimal	Local
H	Maintain mutual aid agreements	All	Grundy County EMA, City Council	Active	Minimal	Local
M	Maintain tree trimming program	Severe Winter Storm, Tornado/Windstorm, Thunderstorm/Lightning/Hail/Hail	City Council	On-Going	Low	Local
H	Determine locations for potential heating shelters and volunteer organization	Severe Winter Storm	Grundy County EMA	As-needed	Minimal	Local
M	Encourage utility providers and developers to place all utilities underground	Severe Winter Storm, Infrastructure Failure, Thunderstorm/Lightning/Hail	City Council	On-Going	Moderate	Local
H	Purchase and maintain backup generators	Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado, Emergency Management	Grundy County EMA	As-needed	Minimal	Local
H	Maintain public works equipment	Severe Winter Storm	Public Works	On-Going	Minimal	Local
M	Notify the media on shelter locations	Severe Winter Storm, Extreme Heat, Tornado	Sheriff, EMA	On-Going	Minimal	Local
H	Make sure residents keep sidewalks clear of snow and ice	Severe Winter Storm	Public Works	On-Going	Minimal	Local
L	Maintain use of snow fences in the city/county	Severe Winter Storm	Public Works	Dropped	Minimal	Local
H	Use surge protectors to prevent electrical damage to critical and sensitive equipment	Thunderstorm/Lightning/Hail	Staff	Completed	Minimal	Local
M	Backup all digital data	Thunderstorm/Lightning/Hail	Staff	Completed	Minimal	Local
M	Purchase NOAA weather radios	Thunderstorm/Lightning/Hail, Tornado/Windstorm, Radiological Incident	Grundy County EMA	Completed	Minimal	Local, State
L	Enforce and update building codes, as needed	Thunderstorm/Lightning/Hail, Tornado/Windstorm, Expansive Soils, Earthquake	City Council	Not Completed	Minimal	Local
L	Maintain storm spotter training for local fire	Thunderstorm/Lightning/Hail,	Grundy County EMA	On-Going	Minimal	Local

	departments/deputies and EMS crews	Tornado/Windstorm				
M	Continue enforcement of city sump pump discharge ordinance	Thunderstorm/Lightning/Hail	City Council	Dropped	Minimal	Local
L	Maintain a list of potential storm sewer projects	Thunderstorm/Lightning/Hail	City Council	As-needed	Minimal	Local
M	Make available a cleanup crew for after a storm	Thunderstorm/Lightning/Hail	City Council, EMA	As-needed	Minimal to Low	Local
L	Maintain law enforcement monitoring of large storage supplies	HAZMAT Incident	Sheriff	Completed	Minimal	Local
M	Acquire necessary response and detection equipment for city/county employees	HAZMAT Incident	Grundy County EMA	Completed	Minimal	Local, State
L	Encourage lead based paint and asbestos removal	HAZMAT Incident	City Council	On-Going	Minimal	Local
L	Provide a local hazardous waste drop-off site	HAZMAT Incident	City Council	On-Going	Minimal to Low	Local
H	Maintain mutual aid agreements with the Northeast Iowa response Group	HAZMAT Incident	City Council	On-Going	Minimal	Local
H	Keep HAZMAT manuals/information current and easily accessible	HAZMAT Incident	All Depts.	Active	Minimal	Local
H	Maintain, test, and replace warning sirens	Tornado/Windstorm, Thunderstorm/Lightning/Hail, Infrastructure Failure	Grundy County EMA	On-Going	Minimal to Low	Local, State
H	Install new warning sirens where needed or replace warning sirens with insufficient decibel levels	Tornado/Windstorm	Grundy County EMA	Completed	Moderate	Local, State
M	Encourage and maintain enrollment in emergency notification system	Thunderstorm/Lightning/Hail, Tornado/Windstorm, Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local
H	Construct or designate a safe room or storm shelter	Tornado/Windstorm	Grundy County EMA	Not Completed	High	Local, State, Federal
M	Encourage home owners to keep emergency kits	Tornado/Windstorm	Grundy County EMA	On-Going	Minimal	Local
H	Encourage backup power generation for local telephone systems and cellular operations	Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local
M	Maintain or install GPS units in all emergency service and city/county vehicles	Infrastructure Failure	Staff	On-Going	Minimal	Local
L	Maintain automatic TTY TDD machines for emergency personnel and city/county employees	Infrastructure Failure	Staff	Dropped	Minimal	Local
H	Enhance Standard Operating Procedures for dissemination of information/press releases in the event of a disaster	Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local
M	Continue training and promotion of the Incident Command System	Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local, State
M	Complete continuity of government plan	Infrastructure Failure	City Council	On-Going	Minimal	Local
H	Encourage use of Iowa One call before digging	Infrastructure Failure	City Council	On-Going	Minimal	Local
H	Upgrade radio communications equipment as needed	Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local
H	Regularly review and amend fire and medical HAZMAT response standard operating procedures	Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local
L	Improve standard operating procedures for schools	Infrastructure Failure	Grundy County EMA, Schools	On-Going	Minimal	Local
M	Seek to improve communications with other agencies	Infrastructure Failure, Terrorism	City Council	On-Going	Minimal	Local

L	Keep supply of backup radios and cellphones	Infrastructure Failure	Staff	Not Completed	Minimal to Low	Local
M	Maintain list of county emergency contacts	Infrastructure Failure	Staff	Not Completed	Minimal	Local
M	Keep the county updated on personnel changes	Infrastructure Failure	Staff	On-Going	Minimal to Low	Local
H	Continue cooperation between city roads department and local fire departments during snow emergencies	Severe Winter Storm	Roads Department	On-Going	Minimal	Local
L	Pursue partnership with rural water as the system expands	Grass/Wild Fire	City Council	On-Going	Minimal	Local
L	Encourage residents to keep smoke detectors, sprinkler systems and fire extinguishers maintained in their homes	Grass/Wild Fire	Grundy County EMA	On-Going	Minimal	Local
L	Continue an annual inspection program for commercial and industrial properties	Grass/Wild Fire	Fire Department	Not Completed	Minimal	Local
H	Continue fire prevention program	Grass/Wild Fire	Grundy County EMA	On-Going	Minimal	Local
M	Improve water system to enhance firefighting capacity/ability	Grass/Wild Fire	City Council	Completed	Minimal	Local
H	Maintain membership in the NFIP	Flash Flood, River Flooding	City Council, EMA	On-Going	Minimal	Local
H	Maintain, enforce and update floodplain ordinance	Flash Flood, River Flooding	City Council	On-Going	Minimal	Local
M	Acquire more water pumps	Flash Flood, River Flooding, Dam Failure	Grundy County EMA, Public Works	As-needed	Minimal	Local
L	Continue with improvement to the storm water system	Flash Flood	City Council	On-Going	Low to Moderate	Local, State
H	Prevent inflow and infiltration into the sanitary sewer	Flash Flood, River Flooding	City Council	On-Going	Minimal	Local
L	Educate the public on maintaining their sump pumps	Flash Flood	City Council	On-Going	Minimal	Local
M	Maintain and keep storm drains clear of debris	Flash Flood	Public Works	As-needed	Minimal	Local
M	Stockpile sand and sandbags	Flash Flood, River Flooding	Grundy County EMA	Dropped	Minimal to Low	Local
L	Identify, purchase and remove structures from flood hazard areas	Flash Flood, River Flooding	Grundy County EMA, City Council	Completed	Moderate	Local, Federal
L	Initiate and enforce burn ban in times of drought or as needed	Grass/Wild Fire, Drought	City Council	As-needed	Minimal	Local
L	Maintain and improve signals/signage along roadways and at railroad crossings	Transportation Incident	Roads Department, Sheriff	On-Going	Minimal	Local, State
M	Establish alternative transportation routes should a road need to be closed	Transportation Incident, River Flooding, Flash Flood, Infrastructure Failure	Grundy County EMA, Sheriff	As-needed	Minimal	Local
L	Purchase emergency signs to be used in case of an incident	Transportation Incident	City Council, Sheriff, EMA	As-needed	Minimal	Local
L	Enforce no parking designations at special events	Transportation Incident	Sheriff	As-needed	Low	Local
L	Identify fallout shelter locations	Radiological Incident	City Council	Dropped	Low	Local
L	Keep communication lines open with Nuclear Plant in Palo, IA	Radiological Incident	City Council, EMA	On-Going	Minimal	Local
M	Maintain and/or develop a wellhead protection program	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, Sheriff	Completed	Low	Local, State
M	Monitor wells in areas of identified contamination	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, EMA	Not Completed	Low	Local

H	Monitor the drinking water supply	HAZMAT Incident, Human Disease, Animal/Plant/Crop Disease	City Council	On-Going	Moderate	Local
L	Identify and map areas of past contamination	HAZMAT Incident	City Council	Completed	Low	Local
M	Maintain and/or develop storm water management program	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease, Flash Flood	City Council	As-needed	Low	Local
L	Eliminate and cap private and abandoned wells in the city	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council	Completed	Low	Local
L	Eliminate the use of septic tank systems in the city limits	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council	Completed	Minimal	Local
H	Follow monitoring requirements set forth by the Iowa DNR	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, Engineer	On-Going	Low	Local
M	Carry out conservation measures such as erosion control and work with the following organizations: Extension, NRCS, Farm Bureau, EPA, DNR, and Soil and water Conservation District	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, Engineer	As-needed	Moderate	Local, State, Federal
M	Maintain and update anti-virus software	Terrorism	Staff	Active	Minimal	Local
L	Secure vulnerable targets, as identified by the LEPC and County EMA with alarms, security cameras and fences	Terrorism	Sheriff	On-Going	Minimal	Local
M	Review and update fire codes as necessary	Grass/Wild Fire	Fire Department	Not Completed	Minimal	Local
L	Continue to cooperate with pipeline owners and operators to ensure locations are marked	Grass/Wild Fire	City Council	Dropped	Minimal	Local
M	Purchase a new tanker and/or pumper	Grass/Wild Fire	City Council	Not Completed	Low to Moderate	Local
L	Encourage community to plant shade trees	Extreme Heat	City Council	On-Going	Minimal	Local
L	Provide fans and/or cooling shelter	Extreme Heat	County EMA	Completed	Minimal to Low	Local
M	Maintain air conditioner(s) in community buildings	Extreme Heat	Public Works	Completed	Minimal	Local
L	Keep a supply of drinking water to distribute	Extreme Heat	Grundy County EMA	Completed	Low	Local
L	Encourage the public to receive vaccinations	Human Disease	Grundy County EMA, Health Dept.	On-Going	Minimal	Local
M	Cooperate with any countywide mass vaccination plan	Human Disease	Grundy County EMA	On-Going	Minimal	Local
L	Monitor disease outbreak news from the CDC and Iowa Department of Public Health	Human Disease, Animal/Plant/Crop Disease	Grundy County EMA, Sheriff	On-Going	Low to Moderate	Local
H	Restrict water usage should it be necessary	Drought	City Council	As-needed	Minimal to Low	Local
L	Encourage the use of proper materials and construction techniques	Expansive Soils	City Council	Dropped	Minimal to Low	Local
L	Educate city personnel to identify risk areas	Expansive Soils	City Council	Dropped	Minimal	Local
M	Install tiling to help water move away from structures	Expansive Soils	Public Works	As-needed	Minimal to Low	Local
L	Enforce a curfew	Terrorism	Sheriff	Not Completed	Minimal to Low	Local, State
H	Continue regular bridge inspections	Infrastructure Failure	City Council, Engineer	On-Going	Minimal to Low	Local
M	Place barricades to close dangerous bridges	Infrastructure Failure	City Council, Sheriff	As-needed	Minimal to Low	Local

L	Maintain embargos/weight limits as necessary	Infrastructure Failure	City Council, Engineer	On-Going	Minimal to Low	Local, State
L	Identify and inventory potential sinkhole sites	Sinkholes	Public Works	As-needed	Minimal to Low	Local
L	Educate city personnel to handle a sinkhole situation	Sinkholes	City Council, Engineer	As-needed	Minimal	Local
M	Secure the area (around a sinkhole)	Sinkholes	Public Works	As-needed	Minimal	Local
M	Inspect any utility lines that are near a sinkhole	Sinkholes	Public Works	As-needed	Minimal	Local
L	Enforce the local zoning ordinances	Landslides	City Council	On-Going	Minimal	Local
M	Clear ditches, streams, and waterways on a regular basis	River Flooding	City Council, Public Works	As-needed	Minimal	Local
L	Encourage floodproofing/elevating structures in the floodplain	River Flooding	City Council, EMA	Completed	Minimal	Local
M	Update flood maps/flood studies for areas throughout the county	River Flooding	City Council	On-Going	Minimal	Local
L	Identify bridges and culverts than can cost effectively be reengineered to reduce future flooding	River Flooding	City Council, Engineer	As-needed	Minimal	Local
M	Establish transportation evacuation routes and protocols	River Flooding	City Council, EMA, Sheriff	Dropped	Minimal	Local
M	Develop sandbagging procedures for the community	River Flooding	City Council, EMA	Dropped	Minimal	Local
M	Develop and maintain staging area for dumping during cleanup	River Flooding	City Council, Public Works	On-Going	Minimal	Local
M	Continue cooperation with county in developing flood mitigation efforts	Flash Flood, River Flooding	City Council, EMA	On-Going	Minimal	Local
L	Purchase additional parkland in order to increase greens space and reducing surface flow	River Flooding	City Council	On-Going	Minimal	Local
L	Set a designated number of people to be trained in post-disaster record keeping/damage assessments	Emergency Management*	City Council, EMA	As-needed	Minimal	Local
H	Inform the public of reputable and ill reputable contractors following disasters	Emergency Management*	Building Department	On-Going	Minimal	Local
M	Encourage all communities to participate in their Local Emergency Planning Commission (LEPC)	Emergency Management*	City Council, EMA	On-Going	Minimal	Local
H	Maintain and update emergency response plans	Emergency Management*	City Council, EMA	On-Going	Low to Moderate	Local
H	Maintain lists of personnel and equipment available to use with response plans	Emergency Management*	City Council, Staff	On-Going	Minimal	Local
H	Maintain communication with county contacts	Emergency Management*	City Council, Staff	As-needed	Moderate	Local
H	Maintain NIMS compliance	Emergency Management*	City Council, EMA	As-needed	Moderate	Local, State, Federal

APPENDIX B: CITY OF CONRAD

COMMUNITY PROFILE

Location

Conrad is located in southwestern Grundy County. The town is located at the coordinates of 42.2247° N and 92.8746° W. Wolf Creek travels from the northwest corner of the City through all the way to the southeast corner. BCLUW High School is located in the east part of the City, where just fewer than 200 students are enrolled.

History

J.W. Conrad, Conrad's namesake, settled in southern Grundy County near Wolf Creek in 1853. In the spring of 1880, the Chicago and Northwestern Railroad began work on a rail line running through Wolf Creek Valley; soon after, a plan for the town of Conrad was established. In 1894, a fire broke out and destroyed nearly every downtown building. The town rebuilt immediately, replacing wood frame structures with brick buildings.

Transportation

State Highway 14 travels north / south a little under two miles west of the City. According to the Iowa Department of Transportation's 2013 traffic study, an average of 4,090 cars and trucks travel on the portion south of County Road D67; that same study indicated 2,730 cars and trucks travel north at that same intersection.

County Road D67 travels east / west through the middle of the City. The traffic study mentioned above by the Department of Transportation shows that east of Conrad averages 2,100 cars and trucks daily; County Road D67 west of Conrad averages 1,340 cars and trucks daily.

Another county road that travels through Conrad is Hawk Avenue, which changes to Main Street while in the city limits of Conrad. Hawk Avenue averages 430 cars and trucks daily north of town; while south of Conrad, it averages 470 cars and trucks daily.

Grundy County's only airport is located in Grundy Center, approximately 11 miles north of Conrad. Grundy Center Muni Airport-6K7 is a public airport.

The closest major airport is the Waterloo Regional Airport (ALO), which is located approximately 40 miles northeast of Conrad. This public airport is owned and operated by the City of Waterloo and overseen by an Airport Commission appointed by the Mayor. The primary runway is 8,400 foot long, 150 foot wide, and has a grooved asphalt surface. The airport is classified as a non-hub primary commercial service airport, offering general aviation and commercial service.

Community Services

TABLE B1: CONRAD UTILITY PROVIDERS							
Electric	**Natural Gas**	**Water**	**Sewer**	**Sanitation**	**Telephone**	**Internet**	**Cable**
City	Black Hills Energy	City	City	Private/Contract	Quest/Mediacom	Quest/Mediacom	Mediacom

Demographics

Table B2 provides an overview of Conrad's demographics. From 2000 to 2010, the City experienced a 4.8% increase in population, from 1055 to 1,108 persons.

TABLE B2: CITY OF CONRAD DEMOGRAPHICS			
Government Framework	Mayor – City Council		
General Population, 2010 Census		***Economics Characteristics, 2010 Census***	
Total Population (2010)	1,108	Population 16 years and over	852
Total Males	525	Population in Labor Force (16 yrs. and over)	543
Total Females	583	Persons in Civilian Labor Force	541
Median Age	41.4	Persons Employed	518
At-Risk Population, <18 Yrs.	293	Persons Unemployed	23
At-Risk Population, >64 Yrs.	252	Persons in Armed Forces	2
One Race-White	1,085	Mean Travel Time to Work in Minutes (16 yrs. & over)	16.9
Black or African-American	4	Persons Employed in Management, Professional, or Related Occupations	179
Asian	3	Persons Employed in Service Occupations	85
American Indian or Alaskan Native	2	Persons Employed in Sales and Office Occupations	141
Hispanic or Latino (of any race)	7	Persons Employed in Farming, Fishing, or Forestry Occupations	3
Not Hispanic or Latino	1,101	Persons Employed in Construction, Extraction, or Maintenance Occupations	28
Total Household Population	1,073	Persons Employed in Production, Transportation, or Material Moving Occupations	82
Total Population in Group Quarters	35	Median Household Income	$42,396
Persons in Group Quarters – Correctional Institutions	0	Median Family Income	$52,574
Persons in Group Quarters – Nursing Homes	35	Per Capita Personal Income	$21,220
Housing Characteristics, 2010 Census		Families below Poverty Level	11
Total Housing Units	507	Individuals below Poverty Level	39
Total Owner-Occupied Housing Units	358	Unemployment Rate	4.3%
Total Renter-Occupied Housing Units	106	***Social Characteristics, 2010 Census***	
Total Vacant Housing Units	43	School Enrollment (3 yrs. and over)	263
Total 1-Unit Detached and Attached Structures	382	Nursery School, Preschool	21
Total 2, 3, and 4-Unit Structures	50	Kindergarten and Elementary School (grades 1-8)	122
Total 5 to 19-Unit Structures	23	High School (grades 9-12)	83
Total Mobile Homes	32	College or Graduate School	37
Year Majority of Housing Units were Built	1969-earlier (55.6%)	Education Attainment: Population 25 Years and Over	722
Average Household Size	2.31	Persons with Less than 9th Grade	21
Average Family Size	2.88	Persons with 9th to 12th Grade, No Diploma	52
Specified Renter-Occupied Units	91	Persons with High School Degree or Equivalency	217
Median Gross Rent	$302	Persons with Some College, No Degree	176
Specified Owner-Occupied Homes	313	Persons with Associate Degree	70
Median Housing Value, Owner-Occupied	$81,200	Persons with Bachelor's Degree	125
Method of Heating Household	Utility Gas (81.6%)	Persons with Graduate or Higher Degree	61
Households with No Telephone Service	8	Persons with a Disability (5 yrs. and over)	210

HAZARDS & RISK ASSESSMENT

Hazard Analysis

Section 3 identified and profiled the hazards for the entire planning area. However, each community analyzed their own vulnerability to those hazards applicable to their jurisdiction. Using the methodology outlined in Section 3 (Vulnerability Assessment), the City of Conrad evaluated the risk associated with a specific hazard, defined by probability and frequency of occurrence, magnitude, severity, exposures, and consequences. Conrad's vulnerability assessment provides in-depth knowledge of the hazards and vulnerabilities that affect the community. This analysis provides an all-hazard approach when evaluating the hazards of that affect the city, and the associated risks and impacts each hazard presents.

As mentioned previously in Section 3, the vulnerability assessment requires a five-year review with periodic updates, as needed. Potential future hazards and impacts may result from changing technology, new critical facilities, infrastructures, and development patterns, as well as demographic and socioeconomic changes that occur within or outside the area.

Disaster frequency and its effects or severity are important as a basis for planning emergency response and mitigation. Natural hazards tend to reoccur on a predictable seasonal basis, whereas manmade or technological events tend to change over time with advancement in technology and methods of operation. Five criteria were used by the Committee to assure a systematic and comprehensive approach to hazard analysis for their individual jurisdictions including: Historical Occurrence, Probability, Magnitude or Severity, Warning Time, and Duration.

The Committee assessed the defined hazards relevant to potential impact on the city. Using the scoring criteria previously defined (Tables 19-22) the city assessed each of the identified hazards based on probability, magnitude/severity, warning time, and duration. The scores for each of the factors were weighted using the formula below to develop the final hazard assessment score.

(Probability x .45) + (Magnitude/Severity x .30) + (Warning Time x .15) + (Duration x .10)
= Final Hazard Assessment Score

Table B3 is the analysis scores for the City of Conrad. As seen in table, the top three hazards were identified as Flash Flooding, Grass/Wild Fire, and River Flooding.

Table B3: Hazard Risk Assessment for Conrad						
Hazard Rank	**Hazard**	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**Final Score**
1	Flash Flood	4	2	4	3	3.3
1	Grass/Wild Fire	4	2	4	3	3.3
1	River Flooding	1	1	1	1	3.3
4	Radiological Incident	1	1	4	2	3.2
5	Landslide	1	1	1	2	3
6	Animal/Plant/Crop Disease	4	2	1	4	2.95
7	Severe Winter Storm	4	2	2	3	2.9
7	Tornado/Windstorm	4	2	4	3	2.9
7	HAZMAT Incident	4	1	4	2	2.9
9	Extreme Heat	4	2	1	3	2.85
10	Transportation Incident	4	1	4	2	2
11	Sinkholes	1	1	1	1	1.65
12	Earthquake	1	1	4	2	1.55
12	Thunderstorm/Lighting/Hail	4	2	4	2	1.55
14	Drought	2	1	1	1	1.45
15	Human Disease	1	1	1	1	1.1
16	Infrastructure Failure	2	1	1	3	1
16	Terrorism	2	1	4	2	1
16	Expansive Soils	1	1	1	1	1
16	Levee/Dam Failure	1	1	1	1	1

Vulnerability – Identifying Assets (Critical Facilities)

This section will describe the vulnerability for existing and future buildings, infrastructure, and critical facilities in those areas that can be impacted by the prioritized hazards. Since the majority of the hazards have an undefined hazard area (i.e., affecting an entire community or larger area) the following vulnerability assessment will only address those hazards that affect a specified area – flooding (river and flash). However, due to the historical occurrences of thunderstorms and lightning, and tornadoes, these hazards were added to the assessment. The following discussion only considers the assets in the community of Conrad.

Critical Facilities

Identifying the location of critical facilities and designated shelters (see Table B4) in Conrad is important in order to assess their vulnerability to hazards since these facilities are important to the community's operations and are key components of the economic sector. For instance, high-density residential or commercial development, schools, police stations, government buildings, hospitals and care facilities, airports, gas stations, hardware stores, grocery stores, and water supply systems. It is important to know the threats each hazard poses to these facilities. *Attachment 6C* illustrates the location of identified critical facilities throughout the city.

TABLE D4: CRITICAL FACILITIES AND DESIGNATED SHELTERS IN CONRAD

Critical Facilities	
City Hall	Wastewater Facility
Library	Water Tower
School	Lift Station
Fire Station	
Shelters	
None	

Source: Community

According to the available data, Conrad is projected to see an increase in population over the next thirty years. Currently, the infrastructure of the City is handling the current population, and will be able to for a few years with steady population growth. However, the need for more critical facilities should be closely monitored these next 5-years and readdressed when this HMP is updated. This is primarily because if the population continues to increase over a long span of time, there will most likely be in a greater need for additional critical facilities such as schools, daycare centers, or healthcare centers.

The highest risk of mass injury and/or casualty would be the BCLUW Elementary and High Schools (middle school located in Union, IA). When school is in session, hundreds of people are in the facility daily. This includes people from other communities attending various events throughout the year. As the largest employer in the community, a disruption in normal operations would be damaging to the local economy.

Another large gathering of people would be the annual Conrad "Black Dirt" Days celebration held the second weekend in June and is held in locations throughout the city. Hundreds of people gather during the event, including people from other communities as well as vendors and entertainment acts.

Homes in Hazardous Areas

A facility's vulnerability to a flooding event is normally low, since these structures are rarely constructed within the 100-year floodplain. According to the information provided, bridges and roadways would be impacted by flooding. This disruption in the transportation infrastructure would create a longer time period to receive and provide services and supplies to an area if a bridge was washed away due to flooding.

Table B5 lists the number properties in Conrad that are located within the 100-year floodplain. According to data provided by FEMA, Conrad has 11 dwellings within the flood hazard area. According to the data provided by INRCOG and Grundy County, there are 49 parcels located within the 100-year floodplain; about half of this land is undeveloped. See *Attachment 5D: Flood Scenario Map of the City* and Table B5.

TABLE B5: CITY OF CONRAD 100-YEAR FLOODPLAIN PROPERTIES

Total Dwellings	11
Total Buildings	45
Total Structures	56
Total Value of all Structures	$6,209,530

Source: INRCOG & Grundy County Assessor

Tornadoes and windstorms are events that can cause harm to all structures and populations in the area. As part of a vulnerability assessment, a hypothetical tornado scenario was created for the community. Attachment 5h and Attachment 5j 4k illustrate the impact of a hypothetical tornado event in Conrad. Table B6 displays the degrees of impact that a hypothetical tornado scenario of various strengths would have on Conrad. As can be seen from the table, a direct hit from an EF4 or EF5 tornado would damage at least 74 percent of the City.

As stated on the FEMA website, mobile homes are highly vulnerable to tornadoes. Even mobile homes that are tied down, offer little protection from tornadoes. According to the Census, there are 32 mobile homes located in Conrad. This number seems to have increase faster over the past couple years, this increase in popularity could be because the affordability of these homes, but with the affordability comes the potential of risk. Multi-family housing units are another type of housing that is considered at-risk during one of these events. There are approximately 40 families residing in multi-family housing units in Conrad according to the U.S. Census.

TABLE B6: TORNADO SCENARIO FOR CONRAD

Scale	Tornado Width	# of Parcels	Damaged Values	% of City Damaged
EF0	50 Meters	38	$1,537,350.00	2.98%
EF1	150 Meters	71	$2,465,377.50	4.78%
EF2	250 Meters	102	$6,562,890.00	12.73%
EF3	500 Meters	233	$12,564,645.00	24.36%
EF4	900 Meters	412	$38,567,640.00	74.79%
EF5	1100 Meters	453	$44,069,470.00	85.46%

While there are no facilities officially designated as shelters, the High School and fire station could be used if the buildings were unharmed during a major disaster. Local churches and City Hall could also be used in an emergency.

Vulnerability – Social Assets (Populations)

The social vulnerability assessment also identified how the hazards affect the population of Conrad and it is assumes that the identified populations are more likely to require assistance during times of disaster; therefore, are considered, generally speaking, more "at-risk" than the remaining population. The "at-risk" population must be identified and targeted in successful mitigation efforts. Table C7 identifies the various population segments that may consider "at-risk" in the event of a hazard.

TABLE B7: CITY OF DIKE "AT-RISK" POPULATION

	2010		
Total City Population (2010)	1,108	Group Quarters Population	35
Elderly (65 yrs. and older)	252	Persons with Disabilities (age 5+)	206
Youth (under 18 yrs. old)	293	Persons w/Sensory Disability	30
Householder Living Alone	145	Persons w/Physical Disability	71
Non-English Speaking Population (speaks English less than 'very well'	7	Persons w/Mental Disability	28
Population Living in Poverty	39	Persons w/Self-Care Disability	12
Population in Mobile Homes	45	Persons w/Go-Outside-Home Disability	41
		Persons w/Employment Disability	24

Source: U.S. Census, 2010; Iowa Data Center

The elderly is often listed as an "at risk" population. According to 2010 Census data, Conrad has 252 persons, 23% of the population, 65 years or older. 145 of the 464

households are occupied by individuals who are living alone.

Persons under the age of 18 are also at higher risk during some disasters. This is mostly due to the fact that young people often are not aware of the proper actions to take in the event of a disaster. In addition, very young children can be more susceptible to a disaster such as a disease epidemic simply due to their age. In 2010, there were 293 persons, 26% of the population, under the age of 18.

As mentioned, there are 32 mobile housing units in Conrad. With the number of mobile homes know, it is estimated with the average household size of 2.31 there are approximately 74 people living in the mobile homes. Findings from the ACS estimate there are 62 families living in multi-unit housing units in the city.

Nursing homes or skilled living centers are also highly vulnerable to tornadoes. These facilities are designed for caring for the elderly population, majority of which use wheelchairs or other assistance devices, limiting mobility. Also, the majority of nursing homes are constructed as a single-level building with or without basements. There are 35 persons in the community living in group quarters at the Oakview Nursing Home located in Conrad.

Vulnerability – Estimating Potential Property Losses

Valuations are an important component of hazard mitigation planning, as it provides measurable data that can be used to form some type of estimate as to the potential losses a community could face in the event of a disaster. The valuations for the City of Conrad are available from the County Assessor's office. City of Conrad's property valuations are in Table B8.

This information was made available from the Grundy County Assessor's office. It should be noted however that these dollar amounts do not include gas and electric utility valuations nor do the evaluations include exempt properties, including government buildings, infrastructure, and religious/nonprofit properties. These results should be considered preliminary, as a full accounting of assets has not been completed.

TABLE B8: ASSET INVENTORY – VALUE OF STRUCTURES IN CONRAD

Type of Structure	Lot/Land Value	Value of All Structures	Total Value	Number of Structures
Residential	$6,275,080	$43,720,686	$49,995,686	408
Commercial	$759,880	$5,625,030	$6,384,910	49
Industrial	$225,110	$2,483,900	$2,709,010	4
Agriculture	$751,973	$27,060	$779,033	N/A
Total	**$8,012,043**	**$51,856,676**	**$59,868,639**	**461**

Source: Grundy County Assessor; Values as of 6/10/2016

Future Development

Future development within identified hazard areas can change the threat level of an area by placing critical facilities, businesses, transportation networks, utilities, and populations within vulnerable areas. While it can be difficult to curb development in the planning area, it is the jurisdiction's advantage to be aware of development trends in order to successfully mitigation future hazards as risks increase. However, continued conformity with the State Building Codes and local land use ordinances and regulations (zoning, subdivision, floodplain management, etc.) will help to mitigate the effects hazards have on new and future development.

Repetitive Loss Properties

FEMA defines a repetitive loss property as an insurable building that has experienced two losses in a 10-year period in which each loss is $1,000 or more. City of Conrad does participate in the NFIP; there are no repetitive loss properties in Conrad.

This HMP attempts to reduce loss by identifying potential natural and manmade hazards. As a result of many natural and manmade hazards, repairs and reconstruction area often completed in a way that returns the structure to pre-disaster condition yet does little to prevent a reoccurrence of damage. Replication of the pre-disaster conditions allows for the repetitive cycle of property damage, reconstruction, and re-damage. Hazard mitigation is needed to ensure that such cycles are broken, that post-disaster repairs and reconstruction are analyzed, and sound, less vulnerable conditions are produced. Additionally, other mitigation strategies may be considered, such as voluntary property buy-outs.

Using GIS spatial data from FIRM maps, in combination with property value data from the Grundy Assessor's office, estimates of value in the floodplain were calculated. Table B9 shows the estimated value of land, buildings, and dwellings, within the city, in a floodplain.

TABLE B9: FLOODPLAIN DATA FOR CONRAD

	Number of Parcels	Land Value	Building Value	Dwelling Value	Total Value	Percent of City Affected
1% Annual Floodplain	49	$1,286,032	$3,352,820	$2,856,710	$7,495,562	12.58%

Source: Grundy County Assessor's Office; Analysis conducted by INRCOG; Parcel values and FIRM maps as of 10/19/2005

MITIGATION STRATEGY

Hazard Mitigation Plan Goals

The hazard mitigation plan goals were reviewed by the Hazard Mitigation Planning Committee at their second committee meeting. The committee set as a priority the development of broad-based goals that would address a multitude of hazards and encompass a variety of mitigation activities. The hazard mitigation plan goals for the City of Conrad are as follows:

1. Minimize to the greatest possible extent the number of injuries and/or loss of life associated with all identified hazards.

2. Reduce or eliminate property damage due to the occurrence of disasters.
3. Identify ways that response operations, in the event of a disaster, can be improved.
4. Return the community to either pre-disaster or improved conditions in a timely manner in the wake of a disaster.
5. Develop strategies that can be used to reduce the community's overall risk to the negative effects of natural, technological, and man-made disasters.
6. Reconvene the planning committee on an annual basis to review the plan document, check for compliance with the plan goals, and track progress in achieving the mitigation strategies.
7. Maintain the Countywide Multi-Jurisdictional format for future plan updates.

Current Mitigation Actions

Prevention Mitigation Actions

The city has an adopted Floodplain Management Ordinance and is a member of the Flood Insurance Program. The city also has a comprehensive plan that addresses future planning; as well as, a zoning and subdivision ordinance for land development.

TABLE B10: CONRAD'S CURRENT PLANNING AND REGULATORY DOCUMENTS

Previous HMP	Comprehensive Plan	Building Code	Zoning Ordinance	Subdivision Regulations	Floodplain Management Ordinance	Tree-Trimming Ordinance	Storm Water Ordinance	Snow Removal Ordinance
Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes

Source: Community

Property Protection Mitigation Actions

The city slip-lined the majority of the sanitary sewer lines in town. This method reduces the amount of excavation, while still preventing leaks and structurally reinforcing aging sewer lines. The other benefit is that the reinforced lines will be less susceptible to storm water infiltration, which can overload the sewer treatment facility and cause backups of sewage into homes and businesses.

Public Education & Awareness Mitigation Actions

The city council set a storm warning siren policy, which defines when the sirens would be activated, tested and what each sound means. Grundy County uses the AlertIowa notification system to notify users in case of an emergency.

Emergency Services Mitigation Actions

Grundy County Emergency Management Agency

Conrad works with the Grundy County Emergency Management Coordinator, based out of the City of Grundy Center, on various safety and emergency events. The Emergency Management Coordinator works in conjunction with local fire, rescue, police, and government officials to draft and implement workable emergency action plans in the community. The current Emergency Management Coordinator is Zach Tripp and current contact information is as follows: Grundy County Emergency Management Agency, 705 8th Street, Grundy Center, Iowa 50638, (319) 824-6933, email: ztripp@grundysheriff.org

Law Enforcement Department

The city contracts with the Grundy County Sheriff for law enforcement.

Fire Department

Conrad utilizes an all-volunteer fire department which includes 25 firemen at this time. The Fire Department was established in 1892. They respond to an average of 35 calls a year which vary from structural fires and field fires, storm watching, assisting BCERT, and mutual aid in surrounding areas as needed. The volunteers receive continued training on equipment and procedures.

Ambulance and First Responders

Emergency Medical Services and Rescue activities are provided by the Beaman-Conrad Emergency Response Team (B-CERT). This group of highly skilled volunteers responds to medical emergencies in the Beaman and Conrad area. The group maintains a large amount of equipment, including a defibrillator, the Jaws of Life, and other tools to effectively respond to emergency situations. Average response time is 6 minutes with up to 60 calls per year. The calls vary from standard medical, accidents, assisting fire fighters, and mutual aid with other departments. BCERT does not charge for the service they provide.

Medical Facilities

The City has a local medical clinic which is open Monday through Friday from 8 a.m. to 4 p.m. Grundy Memorial Hospital is located in Grundy Center and is the only medical facility (other than small clinics) located in the county.

HAZMAT

The City of Conrad contracts with Northeast Iowa Response Group for response to hazardous material spills. The Northeast Iowa Response Group is a division of Waterloo Fire Rescue as is the Hazardous Materials Regional Training Center. The Training Center provides training to fire departments and companies from around the state and country. Not only is this a training center it also serves as a hazardous materials quick response unit to Black Hawk County, surrounding counties, and many municipalities in a ten county region. The Unit provides local fire departments with hazard materials emergency procedures thus reducing additional contamination. An evacuation plan is also in place in conjunction with the activities with the local department. Contact information for the facility is as follows: Hazardous Materials Regional Training Center, 1925 Newell Street, Waterloo, Iowa 50707, Phone: (319) 291-4275, Toll Free: (800) 291-4682, Fax: (319) 291-4285

The jurisdictions also partner the Northeast Iowa Response Group for assistance in responding to any methamphetamine labs located in the city limits. The Response Group assists the Police Departments in containment of the site and disposal of the hazardous chemicals.

Warning Systems

The City of Conrad currently has three warning sirens. One siren is located south of the Conrad Gold Course, the second is located on the north side of the city near Conrad City Park, and the third is located north of the BCLUW High School. These three sirens are responsible for alerting the entire city.

Grundy County uses the AlertIowa notification system that is utilized statewide. The program is funded by the State of Iowa and administered through Iowa Homeland Security and Emergency Management Office. AlertIowa will be administered through Grundy County Emergency Management Agency and will be available to all county cities and school districts.

AlertIowa will allow for emergency notifications at all times via landline telephones, cell phones, email, text message, and social media. The County will use their emergency notification network for all of the following events: blizzards, flash flooding, severe thunderstorms, and tornadoes. There is an optional way to receive the same alert for events such as: excessive heat warnings, hazardous materials warnings, heavy snow warning, high wind warnings, ice storm warnings, law enforcement warnings, shelter in place warnings, sleet warnings, wind chill warnings, and winter storm warnings.

Public Works / Streets Department

The city has a dedicated public works staff of two employees to maintain the major utilities and infrastructure within the city. They are responsible for 16 miles of city streets. Some of their major equipment includes: a tractor, two dump trucks with plows, two pickup trucks and one street sweeper.

Natural Resource Protection Mitigation Actions

The city has constructed a flood wall around the sanitary sewer overflow basin.

Structural Projects Mitigation Actions

There are no structural projects to mention at this time.

Future Mitigation Actions

While the existing mitigation activities discussed above detail the city's efforts to mitigate hazards when possible and to respond to hazards in a timely and efficient manner, the Committee also recognizes that there are many more mitigation activities and projects that would benefit county residents. Thus, the Committee developed a list of future hazard mitigation activities that, if accomplished, would serve to further reduce the risk of hazards to the community. The list may include a combination of projects the Committee feels the community should try to accomplish and mitigation efforts that are ongoing that the Committee view as vital to the continued well-being of the public.

Priority

The Committee analyzed the potential mitigation activities. This analysis included a discussion of the potential benefits of implementing the activity, some hurdles that the community may face in implementing the action step, and the drawbacks of implementation. The analysis utilized the STAPLEE feasibility criteria. The STAPLEE technique is a FEMA suggested method of evaluation. The STAPLEE approach assesses both positive and negative impacts on the following aspects of a county: **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental.

TABLE D11: STAPLEE ELEMENTS

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

The Committee was asked to discuss the STAPLEE elements (Table D11) and determine each element's ranking (High -H, Medium -M, Low-L) for each identified future mitigation activity. Afterwards, the average priority for each migration activity was recorded as the overall priority ranking for that particular future mitigation activity.

Timeline

The Committee identified the time period each period each of the proposed mitigation activity will occur. Activities that occur regularly (either daily, weekly,

monthly or annually) were identified as Active. If the action is to occur within the next 1-5 years it was identified as Short-Term, if the activity would take 5-10 years it was labeled as Mid-Term, and any activities that would take 10 or more years were identified as Long-Term.

Funding

Although in the long-term hazard mitigation actions will save money by avoiding the loss of lives or property damages, in the short-term each action will have an associated cost. The City will rely heavily on local funding sources to fulfill most of the plan obligations; however, they will also seek funds from State and Federal agencies for both pre- and post-disaster mitigation activities.

The estimated cost(s) for each mitigation action, program, or project is either: Minimal, Low, Moderate, or High depending upon various factors.

- Minimal: Cost estimate is $10,000 or less based on using current staff, time commitment, continuous of current duties, proposed action/program/ project, and funding sources.
- Low: Cost estimate for project range from $10,001 - $99,999 based on existing proposed treatment, time commitment, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.).
- Moderate: Cost estimate for project range from $100,000 - $299,999 based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.), and funding sources.
- High: Cost estimate for project range is $300,000 or higher based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, project components (permits, acquisition, coordination, etc.), and funding sources.

Implementation Strategy

One of the first steps the Committee took was to review the City's existing Hazard Mitigation Activities and provide an update on their status, see Based on each activity's progress, City's chose to continue the activity or drop it from the plan update. Once the Committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. In addition, the Committee identified a time line for each activity, associated hazards, estimated cost, priority, identified the responsible party or parties for each activity, and indicated at least which of the city's goals the action addresses. Table F12is the City of Conrad's Implementation Strategy.

TABLE B9: CITY OF CONRAD'S IMPLEMENTATION STRATEGY

Priority	Mitigation Action/Program/Project	Associated Hazard	Primary Agency Responsible for Implementation	Date for Completion	Estimated Cost (s)	Funding Source
H	Educate the public	All	Grundy County EMA	On-Going	Minimal	Local
H	Continue training and education for fire departments, law enforcement agencies and ambulance crew personnel	All	City Council and Roads Depts.	On-Going	Moderate	Local, State
M	Maintain and acquire materials and equipment for fire departments, law enforcement agencies and ambulance crew personnel	All	City Council	On-Going	Minimal	Local, State
H	Provide emergency shelters for evacuees	All	Grundy County EMA	On-Going	Minimal	Local
H	Maintain mutual aid agreements	All	Grundy County EMA, City Council	On-Going	Minimal	Local
M	Maintain tree trimming program	Severe Winter Storm, Tornado/Windstorm, Thunderstorm/Lightning/Hail/Hail	City Council	On-Going	Low	Local
M	Determine locations for potential heating shelters and volunteer organization	Severe Winter Storm	Grundy County EMA	On-Going	Minimal	Local
M	Encourage utility providers and developers to place all utilities underground	Severe Winter Storm, Infrastructure Failure, Thunderstorm/Lightning/Hail	City Council	On-Going	Moderate	Local
H	Purchase and maintain backup generators	Severe Winter Storm,	Grundy County EMA	On-Going	Minimal	Local

		Thunderstorm/Lightning/Hail, Tornado, Emergency Management				
H	Maintain public works equipment	Severe Winter Storm	Public Works	On-Going	Minimal	Local
H	Notify the media on shelter locations	Severe Winter Storm, Extreme Heat, Tornado	Sheriff, EMA	On-Going	Minimal	Local
H	Make sure residents keep sidewalks clear of snow and ice	Severe Winter Storm	Public Works	On-Going	Minimal	Local
L	Maintain use of snow fences in the city/county	Severe Winter Storm	Public Works	On-Going	Minimal	Local
H	Use surge protectors to prevent electrical damage to critical and sensitive equipment	Thunderstorm/Lightning/Hail	Staff	On-Going	Minimal	Local
M	Backup all digital data	Thunderstorm/Lightning/Hail	Staff	On-Going	Minimal	Local
M	Purchase NOAA weather radios	Thunderstorm/Lightning/Hail, Tornado/Windstorm, Radiological Incident	Grundy County EMA	On-Going	Minimal	Local, State
L	Enforce and update building codes, as needed	Thunderstorm/Lightning/Hail, Tornado/Windstorm, Expansive Soils, Earthquake	City Council	On-Going	Minimal	Local
L	Maintain storm spotter training for local fire departments/deputies and EMS crews	Thunderstorm/Lightning/Hail, Tornado/Windstorm	Grundy County EMA	On-Going	Minimal	Local
M	Continue enforcement of city sump pump discharge ordinance	Thunderstorm/Lightning/Hail	City Council	On-Going	Minimal	Local
L	Maintain a list of potential storm sewer projects	Thunderstorm/Lightning/Hail	City Council	On-Going	Minimal	Local
M	Make available a cleanup crew for after a storm	Thunderstorm/Lightning/Hail	City Council, EMA	On-Going	Minimal to Low	Local
L	Maintain law enforcement monitoring of large storage supplies	HAZMAT Incident	Sheriff	On-Going	Minimal	Local
M	Acquire necessary response and detection equipment for city/county employees	HAZMAT Incident	Grundy County EMA	On-Going	Minimal	Local, State
L	Encourage lead based paint and asbestos removal	HAZMAT Incident	City Council	On-Going	Minimal	Local
L	Provide a local hazardous waste drop-off site	HAZMAT Incident	City Council	On-Going	Minimal to Low	Local
H	Maintain mutual aid agreements with the Northeast Iowa response Group	HAZMAT Incident	City Council	On-Going	Minimal	Local
H	Keep HAZMAT manuals/information current and easily accessible	HAZMAT Incident	All Depts.	On-Going	Minimal	Local
H	Maintain, test, and replace warning sirens	Tornado/Windstorm, Thunderstorm/Lightning/Hail, Infrastructure Failure	Grundy County EMA	On-Going	Minimal to Low	Local, State
H	Install new warning sirens where needed or replace warning sirens with insufficient decibel levels	Tornado/Windstorm	Grundy County EMA	On-Going	Moderate	Local, State
M	Encourage and maintain enrollment in emergency notification system	Thunderstorm/Lightning/Hail, Tornado/Windstorm, Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local
H	Construct or designate a safe room or storm shelter	Tornado/Windstorm	Grundy County EMA	On-Going	High	Local, State, Federal
M	Encourage home owners to keep emergency kits	Tornado/Windstorm	Grundy County EMA	On-Going	Minimal	Local

H	Encourage backup power generation for local telephone systems and cellular operations	Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local
M	Maintain or install GPS units in all emergency service and city/county vehicles	Infrastructure Failure	Staff	On-Going	Minimal	Local
L	Maintain automatic TTY TDD machines for emergency personnel and city/county employees	Infrastructure Failure	Staff	On-Going	Minimal	Local
H	Enhance Standard Operating Procedures for dissemination of information/press releases in the event of a disaster	Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local
M	Continue training and promotion of the Incident Command System	Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local, State
M	Complete continuity of government plan	Infrastructure Failure	City Council	On-Going	Minimal	Local
H	Encourage use of Iowa One call before digging	Infrastructure Failure	City Council	On-Going	Minimal	Local
H	Upgrade radio communications equipment as needed	Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local
H	Regularly review and amend fire and medical HAZMAT response standard operating procedures	Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local
L	Improve standard operating procedures for schools	Infrastructure Failure	Grundy County EMA, Schools	On-Going	Minimal	Local
M	Seek to improve communications with other agencies	Infrastructure Failure, Terrorism	City Council	On-Going	Minimal	Local
M	Keep supply of backup radios and cellphones	Infrastructure Failure	Staff	On-Going	Minimal to Low	Local
M	Maintain list of county emergency contacts	Infrastructure Failure	Staff	On-Going	Minimal	Local
M	Keep the county updated on personnel changes	Infrastructure Failure	Staff	On-Going	Minimal to Low	Local
H	Continue cooperation between city roads department and local fire departments during snow emergencies	Severe Winter Storm	Roads Department	On-Going	Minimal	Local
L	Pursue partnership with rural water as the system expands	Grass/Wild Fire	City Council	On-Going	Minimal	Local
M	Encourage residents to keep smoke detectors, sprinkler systems and fire extinguishers maintained in their homes	Grass/Wild Fire	Grundy County EMA	On-Going	Minimal	Local
L	Continue an annual inspection program for commercial and industrial properties	Grass/Wild Fire	Fire Department	On-Going	Minimal	Local
H	Continue fire prevention program	Grass/Wild Fire	Grundy County EMA	On-Going	Minimal	Local
M	Improve water system to enhance firefighting capacity/ability	Grass/Wild Fire	City Council	On-Going	Minimal	Local
H	Maintain membership in the NFIP	Flash Flood, River Flooding	City Council, EMA	On-Going	Minimal	Local
H	Maintain, enforce and update floodplain ordinance	Flash Flood, River Flooding	City Council	On-Going	Minimal	Local
M	Acquire more water pumps	Flash Flood, River Flooding, Dam Failure	Grundy County EMA, Public Works	On-Going	Minimal	Local
L	Continue with improvement to the storm water system	Flash Flood	City Council	On-Going	Low to Moderate	Local, State
H	Prevent inflow and infiltration into the sanitary sewer	Flash Flood, River Flooding	City Council	On-Going	Minimal	Local
L	Educate the public on maintaining their sump pumps	Flash Flood	City Council	On-Going	Minimal	Local
M	Maintain and keep storm drains clear of debris	Flash Flood	Public Works	On-Going	Minimal	Local
M	Stockpile sand and sandbags	Flash Flood, River Flooding	Grundy County EMA	On-Going	Minimal to Low	Local
L	Identify, purchase and remove structures from flood hazard areas	Flash Flood, River Flooding	Grundy County EMA, City Council	On-Going	Moderate	Local, Federal
L	Initiate and enforce burn ban in times of drought or as	Grass/Wild Fire, Drought	City Council	On-Going	Minimal	Local

	needed					
M	Maintain and improve signals/signage along roadways and at railroad crossings	Transportation Incident	Roads Department, Sheriff	On-Going	Minimal	Local, State
M	Establish alternative transportation routes should a road need to be closed	Transportation Incident, River Flooding, Flash Flood, Infrastructure Failure	Grundy County EMA, Sheriff	On-Going	Minimal	Local
L	Purchase emergency signs to be used in case of an incident	Transportation Incident	City Council, Sheriff, EMA	On-Going	Minimal	Local
M	Enforce no parking designations at special events	Transportation Incident	Sheriff	On-Going	Low	Local
L	Identify fallout shelter locations	Radiological Incident	City Council	On-Going	Low	Local
L	Keep communication lines open with Nuclear Plant in Palo, IA	Radiological Incident	City Council, EMA	On-Going	Minimal	Local
M	Maintain and/or develop a wellhead protection program	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, Sheriff	On-Going	Low	Local, State
M	Monitor wells in areas of identified contamination	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, EMA	On-Going	Low	Local
H	Monitor the drinking water supply	HAZMAT Incident, Human Disease, Animal/Plant/Crop Disease	City Council	On-Going	Moderate	Local
L	Identify and map areas of past contamination	HAZMAT Incident	City Council	On-Going	Low	Local
M	Maintain and/or develop storm water management program	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease, Flash Flood	City Council	On-Going	Low	Local
L	Eliminate and cap private and abandoned wells in the city	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council	On-Going	Low	Local
L	Eliminate the use of septic tank systems in the city limits	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council	On-Going	Minimal	Local
H	Follow monitoring requirements set forth by the Iowa DNR	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, Engineer	On-Going	Low	Local
M	Carry out conservation measures such as erosion control and work with the following organizations: Extension, NRCS, Farm Bureau, EPA, DNR, and Soil and water Conservation District	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, Engineer	On-Going	Moderate	Local, State, Federal
M	Maintain and update anti-virus software	Terrorism	Staff	On-Going	Minimal	Local
L	Secure vulnerable targets, as identified by the LEPC and County EMA with alarms, security cameras and fences	Terrorism	Sheriff	On-Going	Minimal	Local
M	Review and update fire codes as necessary	Grass/Wild Fire	Fire Department	On-Going	Minimal	Local
L	Continue to cooperate with pipeline owners and operators to ensure locations are marked	Grass/Wild Fire	City Council	On-Going	Minimal	Local
M	Purchase a new tanker and/or pumper	Grass/Wild Fire	City Council	On-Going	Low to Moderate	Local
L	Encourage community to plant shade trees	Extreme Heat	City Council	On-Going	Minimal	Local
L	Provide fans and/or cooling shelter	Extreme Heat	County EMA	On-Going	Minimal to Low	Local
M	Maintain air conditioner(s) in community buildings	Extreme Heat	Public Works	On-Going	Minimal	Local
L	Keep a supply of drinking water to distribute	Extreme Heat	Grundy County EMA	On-Going	Low	Local
L	Encourage the public to receive vaccinations	Human Disease	Grundy County EMA, Health Dept.	On-Going	Minimal	Local
M	Cooperate with any countywide mass vaccination plan	Human Disease	Grundy County EMA	On-Going	Minimal	Local

L	Monitor disease outbreak news from the CDC and Iowa Department of Public Health	Human Disease, Animal/Plant/Crop Disease	Grundy County EMA, Sheriff	On-Going	Low to Moderate	Local
H	Restrict water usage should it be necessary	Drought	City Council	On-Going	Minimal to Low	Local
L	Encourage the use of proper materials and construction techniques	Expansive Soils	City Council	On-Going	Minimal to Low	Local
L	Educate city personnel to identify risk areas	Expansive Soils	City Council	On-Going	Minimal	Local
M	Install tiling to help water move away from structures	Expansive Soils	Public Works	On-Going	Minimal to Low	Local
L	Enforce a curfew	Terrorism	Sheriff	On-Going	Minimal to Low	Local, State
H	Continue regular bridge inspections	Infrastructure Failure	City Council, Engineer	On-Going	Minimal to Low	Local
M	Place barricades to close dangerous bridges	Infrastructure Failure	City Council, Sheriff	On-Going	Minimal to Low	Local
L	Maintain embargos/weight limits as necessary	Infrastructure Failure	City Council, Engineer	On-Going	Minimal to Low	Local, State
L	Identify and inventory potential sinkhole sites	Sinkholes	Public Works	On-Going	Minimal to Low	Local
L	Educate city personnel to handle a sinkhole situation	Sinkholes	City Council, Engineer	On-Going	Minimal	Local
M	Secure the area (around a sinkhole)	Sinkholes	Public Works	On-Going	Minimal	Local
M	Inspect any utility lines that are near a sinkhole	Sinkholes	Public Works	On-Going	Minimal	Local
L	Enforce the local zoning ordinances	Landslides	City Council	On-Going	Minimal	Local
M	Clear ditches, streams, and waterways on a regular basis	River Flooding	City Council, Public Works	On-Going	Minimal	Local
L	Encourage floodproofing/elevating structures in the floodplain	River Flooding	City Council, EMA	On-Going	Minimal	Local
M	Update flood maps/flood studies for areas throughout the county	River Flooding	City Council	On-Going	Minimal	Local
L	Identify bridges and culverts than can cost effectively be reengineered to reduce future flooding	River Flooding	City Council, Engineer	On-Going	Minimal	Local
M	Establish transportation evacuation routes and protocols	River Flooding	City Council, EMA, Sheriff	On-Going	Minimal	Local
M	Develop sandbagging procedures for the community	River Flooding	City Council, EMA	On-Going	Minimal	Local
M	Develop and maintain staging area for dumping during cleanup	River Flooding	City Council, Public Works	On-Going	Minimal	Local
M	Continue cooperation with county in developing flood mitigation efforts	Flash Flood, River Flooding	City Council, EMA	On-Going	Minimal	Local
L	Purchase additional parkland in order to increase greens space and reducing surface flow	River Flooding	City Council	On-Going	Minimal	Local
L	Set a designated number of people to be trained in post-disaster record keeping/damage assessments	Emergency Management*	City Council, EMA	On-Going	Minimal	Local
H	Inform the public of reputable and ill reputable contractors following disasters	Emergency Management*	City Council	On-Going	Minimal	Local
M	Encourage all communities to participate in their Local Emergency Planning Commission (LEPC)	Emergency Management*	City Council, EMA	On-Going	Minimal	Local
H	Maintain and update emergency response plans	Emergency Management*	City Council, EMA	On-Going	Low to Moderate	Local

H	Maintain lists of personnel and equipment available to use with response plans	Emergency Management*	City Council, Staff	On-Going	Minimal	Local
H	Maintain communication with county contacts	Emergency Management*	City Council, Staff	On-Going	Moderate	Local
H	Maintain NIMS compliance	Emergency Management*	City Council, EMA	On-Going	Moderate	Local, State, Federal

APPENDIX C: CITY OF DIKE

COMMUNITY PROFILE

Location

Dike is located in eastern Grundy County. The town is located at the coordinates of 42.4641° N and 92.6282° W. Grundy County Lake is situated outside of city limits, but in the southwestern portion of town. U.S. Route 20 runs east / west through the southernmost portion of the City. Black Hawk Creek splits just south of town, the North Fork of Black Hawk Creek travels to the south of Grundy County Lake.

History

Dike is named for railroad construction engineer Chester Thomas Dike, who chose the site and laid out the town in 1900. Not much else is available on the community history at this time.

Transportation

U.S. Route 20 is a national highway travelling east/west through the southern portion of Dike. This highway travels through the entire state of Iowa, entering at Sioux City and exiting at Dubuque. This highway locally connects State Highway 14 and multiple other local roads. U.S. Route 20 also connects Interstate 35 and Interstate 380. U.S. Route 20 is the main route connecting smaller communities to the Cedar Falls-Waterloo Metropolitan area.

According to the Iowa Department of Transportation's 2013 traffic study, an average of 12,200 cars and trucks travel on the portion of U.S. Route 20 west of the overpass each day. An estimated 13,500 persons travel east of the overpass each day.

T55 travels north / south directly through the west-central part of Dike, and eventually travels under U.S. Route 20. The daily average for T55 north of Dike is 1,230 cars and trucks; the daily average for cars and trucks south of Dike on T55 is 1,530.

Grundy County's only airport is located in Grundy Center, approximately 11 miles northeast of Dike. Grundy Center Muni Airport-6K7 is a public airport located southwest of Grundy Center.

The closest major airport is the Waterloo Regional Airport (ALO), which is located approximately 13 miles northeast of Dike. This public airport is owned and operated by the City of Waterloo and overseen by an Airport Commission appointed by the Mayor. The primary runway is 8,400 foot long, 150 foot wide, and has a grooved asphalt surface. The airport is classified as a non-hub primary commercial service airport, offering general aviation and commercial service.

Community Services

The Dike Public Water Supply is derived from two wells equipped with vertical turbine pumps. Water treatment consists of aeration, iron filtration, polyphosphate addition, and gas chlorination for disinfection. All of the water flow now passes through one of three iron filters as the softener was converted to an iron filter. This supply no longer softens any water. Storage is provided by a 125,000 gallon elevated storage tank. There is booster pump station in Fox Ridge Addition.

The wastewater system in has a rated capacity of 1,500,000 gpd with average daily demand at 525,000 gpd and peak demand at 872,000 gpd. The system should have enough capacity to accommodate additional development and growth in the city.

TABLE C1: DIKE UTILITY PROVIDERS

Electric	Natural Gas	Water	Sewer	Sanitation	Telephone	Internet	Cable
City	Black Hills Energy	City	City	Private/Contract	Quest/Mediacom	Quest/Mediacom	Mediacom

Demographics

Table C2 provides an overview of Dike's demographics. From 2000 to 2010, the City experienced a 28.1% increase in population, from 944 to 1,209 persons.

TABLE C2: CITY OF DIKE DEMOGRAPHICS			
Government Framework	Mayor – City Council		
General Population, 2010 Census		***Economics Characteristics, 2010 Census***	
Total Population (2010)	1,209	Population 16 years and over	934
Total Males	604	Population in Labor Force (16 yrs. and over)	502
Total Females	605	Persons in Civilian Labor Force	502
Median Age	42.1	Persons Employed	489
At-Risk Population, <18 Yrs.	318	Persons Unemployed	13
At-Risk Population, >64 Yrs.	194	Persons in Armed Forces	0
One Race-White	1,195	Mean Travel Time to Work in Minutes (16 yrs. & over)	19.3
Black or African American	3	Persons Employed in Management, Professional, or Related Occupations	154
Asian	3	Persons Employed in Service Occupations	72
Two or more races	7	Persons Employed in Sales and Office Occupations	133
Hispanic or Latino (of any race)	15	Persons Employed in Farming, Fishing, or Forestry Occupations	9
Total Household Population	1,209	Persons Employed in Construction, Extraction, or Maintenance Occupations	45
Total Population in Group Quarters	0	Persons Employed in Production, Transportation, or Material Moving Occupations	76
Persons in Group Quarters – Correctional Institutions	0	Median Household Income	$43,750
Persons in Group Quarters – Nursing Homes	0	Median Family Income	$51,518
Housing Characteristics, 2010 Census		Per Capita Personal Income	$20,532
Total Housing Units	497	Families below Poverty Level	6
Total Owner-Occupied Housing Units	475	Individuals below Poverty Level	44
Total Renter-Occupied Housing Units	74	Unemployment Rate	2.6%
Total Vacant Housing Units	22	***Social Characteristics, 2010 Census***	
Total 1-Unit Detached and Attached Structures	339	School Enrollment (3 yrs. and over)	245
Total 2, 3, and 4-Unit Structures	24	Nursery School, Preschool	15
Total 5 to 19-Unit Structures	32	Kindergarten and Elementary School (grades 1-8)	140
Total Mobile Homes	0	High School (grades 9-12)	55
Year Majority of Housing Units were Built	1959 or earlier (51.4%)	College or Graduate School	35
Average Household Size	2.55	Education Attainment: Population 25 Years and Over	620
Average Family Size	2.94	Persons with Less than 9th Grade	34
Specified Renter Occupied Units	75	Persons with 9th to 12th Grade, No Diploma	57
Median Gross Rent	$370	Persons with High School Degree or Equivalency	217
Specified Owner-Occupied Units	284	Persons with Some College, No Degree	130
Median Housing Value, Owner-Occupied	$95,200		
Method of Heating Household	Utility Gas (89.4%)		
Households with No Telephone Service	0		

HAZARDS & RISK ASSESSMENT

Hazard Analysis

Section 3 identified and profiled the hazards for the entire planning area. However, each community analyzed their own vulnerability to those hazards applicable to their jurisdiction. Using the methodology outlined in Section 3 (Vulnerability Assessment), the City of Jesup evaluated the risk associated with a specific hazard, defined by probability and frequency of occurrence, magnitude, severity, exposures, and consequences. Jesup's vulnerability assessment provides in-depth knowledge of the hazards and vulnerabilities that affect the community. This analysis provides an all-hazard approach when evaluating the hazards of that affect the city, and the associated risks and impacts each hazard presents.

As mentioned previously in Section 3, the vulnerability assessment requires a five-year review with periodic updates, as needed. Potential future hazards and impacts may result from changing technology, new critical facilities, infrastructures, and development patterns, as well as demographic and socioeconomic changes that occur within or outside the area.

Disaster frequency and its effects or severity are important as a basis for planning emergency response and mitigation. Natural hazards tend to reoccur on a predictable seasonal basis, whereas manmade or technological events tend to change over time with advancement in technology and methods of operation. Five criteria were used by the Committee to assure a systematic and comprehensive approach to hazard analysis for their individual jurisdictions including: Historical Occurrence, Probability, Magnitude or Severity, Warning Time, and Duration.

The Committee assessed the defined hazards relevant to potential impact on the city. Using the scoring criteria previously defined (Tables 19-22) the city assessed each of the identified hazards based on probability, magnitude/severity, warning time, and duration. The scores for each of the factors were weighted using the formula below to develop the final hazard assessment score.

(Probability x .45) + (Magnitude/Severity x .30) + (Warning Time x .15) + (Duration x .10)
= Final Hazard Assessment Score

Table C3 is the analysis scores for the City of Dike. As seen in table, the top three hazards were identified as Terrorism, Thunderstorm/Lighting/Hail, and Tornado/Windstorm.

Table C3: Hazard Risk Assessment for Dike						
Hazard Rank	**Hazard**	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**Final Score**
1	Terrorism	2	3	4	4	**2.8**
2	Thunderstorm/Lighting/Hail	3	2	4	1	**2.65**
2	Tornado/Windstorm	3	2	4	1	**2.65**
4	Severe Winter Storm	3	2	2	1	**2.35**
4	Animal/Plant/Crop Disease	2	3	1	4	**2.35**
4	Drought	2	3	1	4	**2.35**
4	Earthquake	1	3	4	4	**2.35**
8	Grass/Wild Fire	2	2	4	2	**2.3**
9	Radiological Incident	1	3	4	3	**2.25**
9	Flash Flood	2	2	3	3	**2.25**
11	Sinkholes	2	2	2	2	**2**
12	Human Disease	2	2	1	3	**1.95**
12	Extreme Heat	2	2	1	3	**1.95**
14	Infrastructure Failure	1	2	4	2	**1.85**
14	Transportation Incident	1	2	4	2	**1.85**
14	HAZMAT Incident	1	2	4	2	**1.85**
17	River Flooding	1	2	3	2	**1.7**
17	Levee/Dam Failure	1	2	3	2	**1.7**
17	Landslide	1	2	3	2	**1.7**
20	Expansive Soils	1	2	1	3	**1.5**

Vulnerability – Identifying Assets (Critical Facilities)

This section will describe the vulnerability for existing and future buildings, infrastructure, and critical facilities in those areas that can be impacted by the prioritized hazards. Since the majority of the hazards have an undefined hazard area (i.e., affecting an entire community or larger area) the following vulnerability assessment will only address those hazards that affect a specified area – flooding (river and flash). However, due to the historical occurrences of tornadoes, this hazard was added to the assessment.

Critical Facilities

Identifying the location of critical facilities and designated shelters (see Table C4) in Dike is important in order to assess their vulnerability to hazards. These critical facilities are important to the operation of a community, the quality of life, and the key components of the economic sector. For instance, high-density residential or commercial development, schools, police stations, government buildings, hospitals and care facilities, airports, gas stations, hardware stores, grocery stores, and water supply systems. It is important to know the threats each hazard poses to these facilities. *Attachment 6G* illustrates the location of identified critical facilities in Dike.

Emergency shelters are also something that is important to identify. The City of Dike does not have a designated emergency shelter, but the fire station and community center has been used in the past during incidents which required assistance to people in need. With Grundy County Lake within Dike's city limits, the town has considered adding an emergency shelter for persons that are using the recreation areas in case of an emergency.

TABLE C4: CRITICAL FACILITIES AND DESIGNATED SHELTERS IN DIKE

Critical Facilities	
City Hall	Wastewater Facility
Library	Water Tower
Wells	Schools
Fire Station	
Shelters	
Fire Station (Not Designated)	Community Center (Not Designated)

Source: Community

According to available data, Dike is projected to see an increase in population over the next thirty years. Between 2000 and 2010, Dike's population increased just over 28 percent. This aggressive population growth rate is mainly due to the new developments that have formed in the last ten years. While the growth rate is expected to return to a more normal rate, it is projected to still maintain a gradual increase. According to an estimate by the U.S. Census American Community Survey, Dike's current population as of the 2015 ACS was estimated to be 1,376. This is a 12.14% population growth in a 5 year span. As this is only an estimate, the actual growth might reflect some change in these numbers. With aggressive growth rates like Dike has been seeing, there is a high chance that the rate will start to taper off and return to what the rest of the surrounding communities similar to Dikes characteristics, size, etc. are experiencing. With this growth, additional critical facilities such as schools, daycare centers, or healthcare centers are not necessary at this time. However, the need for more critical facilities should be closely monitored these next 5-years and readdressed when this HMP is updated.

Homes in Hazardous Areas

A facility's vulnerability to a flooding event is normally low, since these structures are rarely constructed within the 100-year floodplain. According to the information provided, bridges and roadways would be impacted by flooding. This disruption in the transportation infrastructure would create a longer time period to receive and provide services and supplies to an area if a bridge was washed away due to

TABLE C5: CITY OF DIKE 100-YEAR FLOODPLAIN PROPERTIES

Total Dwellings	11
Total Buildings	25
Total Structures	36
Total Value of all Structures	$3,629,465

Source: INRCOG & Grundy County Assessor

flooding.

Table C5 lists the number properties in Dike that are located within the 100-year floodplain. According to data provided by FEMA, Dike has 11 dwellings within the flood hazard area. According to the data provided by INRCOG and Grundy County, there are 29 parcels located within the 100-year floodplain; about half of this land is undeveloped. See *Attachment 5D: Flood Scenario Map of the City* and Table C5.

Tornadoes and windstorms are events that can cause harm to all structures and populations in the area. As part of a vulnerability assessment, a hypothetical tornado scenario was created for the community. Attachment 5h and Attachment 5j 4k illustrate the impact of a hypothetical tornado event in Dike. Table C6 displays the degrees of impact that a hypothetical tornado scenario of various strengths would have on Dike. As can be seen from the table, a direct hit from an EF4 or EF5 tornado would damage at least 70 percent of the City.

TABLE C6: TORNADO SCENARIO FOR DIKE

Scale	Tornado Width	# of Parcels	Damaged Values	% of City Damaged
EF0	50 Meters	75	$2,330,567.50	11.60%
EF1	150 Meters	131	$3,814,787.50	18.98%
EF2	250 Meters	176	$10,230,820.00	25.45%
EF3	500 Meters	295	$17,885,380.00	44.50%
EF4	900 Meters	457	$56,027,990.00	69.70%
EF5	1100 Meters	500	$61,942,460.00	77.05%

TABLE C7: CITY OF DIKE "AT-RISK" POPULATION

	2010
Total City Population (2010)	1,209
Elderly (65 yrs. and older)	194
Youth (under 18 yrs. old)	318
Householder Living Alone	92
Non-English Speaking Population (speaks English less than 'very well'	12
Population Living in Poverty	44
Population in Mobile Homes	0
Group Quarters Population	0
Persons with Disabilities (age 5+)	192
Persons w/Sensory Disability	31
Persons w/Physical Disability	72
Persons w/Mental Disability	17
Persons w/Self-Care Disability	21
Persons w/Go-Outside-Home Disability	16
Persons w/Employment	35

Disability	
Source: U.S. Census, 2010; Iowa Data Center	

As stated on the FEMA website, mobile homes are highly vulnerable to tornadoes. Even mobile homes that are tied down, offer little protection from tornadoes. However, there are no mobile homes is Dike so this isn't much of a concern for the community. Multi-family housing units are another type of housing that is considered at-risk during one of these events. There are approximately 40 families residing in multi-family housing units in Dike according to the U.S. Census.

Vulnerability – Social Assets (Populations)

The social vulnerability assessment also identified how the hazards affect the population of Dike and it is assumes that the identified populations are more likely to require assistance during times of disaster; therefore, are considered, generally speaking, more "at-risk" than the remaining population. The "at-risk" population must be identified and targeted in successful mitigation efforts. Table C7 identifies the various population segments that may consider "at-risk" in the event of a hazard.

The elderly is often listed as an "at risk" population. According to 2010 Census data, Dike has 194 persons, 16% of the population, 65 years or older. 92 of the 475 households are occupied by individuals who are living alone.

Persons under the age of 18 are also at higher risk during some disasters. This is mostly due to the fact that young people often are not aware of the proper actions to take in the event of a disaster. In addition, very young children can be more susceptible to a disaster such as a disease epidemic simply due to their age. In 2010, there were 318 persons, 26% of the population, under the age of 18.

As mentioned, there are no mobile housing units in Dike. Findings from the ACS indicate there are 40 families living in multi-unit housing units in the city.

No nursing homes are located in Dike. Nursing homes or skilled living centers are also highly vulnerable to tornadoes. These facilities are designed for caring for the elderly population, majority of which use wheelchairs or other assistance devices, limiting mobility. Also, the majority of nursing homes are constructed as a single-level building with or without basements.

Vulnerability – Estimating Potential Property Losses

Valuations are an important component of hazard mitigation planning, as it provides measurable data that can be used to form some type of estimate as to the potential losses a community could face in the event of a disaster. The valuations for the City of Dike are available from the County Assessor's office. City of Dike's property valuations are in Table C8.

This information was made available from the Grundy County Assessor's office. It should be noted however that these dollar amounts do not include gas and electric utility valuations nor do the evaluations include exempt properties, including government buildings, infrastructure, and religious/nonprofit properties. These results should be considered preliminary, as a full accounting of assets has not been completed.

TABLE C8: ASSET INVENTORY – VALUE OF STRUCTURES IN DIKE				
Type of	**Lot/Land Value**	**Value of All**	**Total Value**	**Number of**

Structure		Structures		Structures
Residential	$14,968,437	$77,412,206	$92,380,643	486
Commercial	$1,202,243	$7,027,509	$8,229,752	48
Industrial	$3,590	$27,420	$31,010	1
Agriculture	$263,135	$129,750	$392,885	N/A
Total	**$16,437,405**	**$84,596,885**	**$101,034,290**	**535**

Source: Grundy County Assessor; Values as of 6/10/2016

Future Development

Future development within identified hazard areas can change the threat level of an area by placing critical facilities, businesses, transportation networks, utilities, and populations within vulnerable areas. While it can be difficult to curb development in the planning area, it is the jurisdiction's advantage to be aware of development trends in order to successfully mitigation future hazards as risks increase. However, continued conformity with the State Building Codes and local land use ordinances and regulations (zoning, subdivision, floodplain management, etc.) will help to mitigate the effects hazards have on new and future development. Dike has seen decent growth and development over the past years; fortunately, the planning area has not experienced a large enough development growth or change that the City needs to be concerned about the threat level increasing in the City's newly developed areas.

Repetitive Loss Properties

FEMA defines a repetitive loss property as an insurable building that has experienced two losses in a 10-year period in which each loss is $1,000 or more. There are no repetitive loss properties in Dike.

This HMP attempts to reduce loss by identifying potential natural and manmade hazards. As a result of many natural and manmade hazards, repairs and reconstruction area often completed in a way that returns the structure to pre-disaster condition yet does little to prevent a reoccurrence of damage. Replication of the pre-disaster conditions allows for the repetitive cycle of property damage, reconstruction, and re-damage. Hazard mitigation is needed to ensure that such cycles are broken, that post-disaster repairs and reconstruction are analyzed, and sound, less vulnerable conditions are produced. Additionally, other mitigation strategies may be considered, such as voluntary property buy-outs.

According to FEMA's data, Dike has no repetitive loss properties; however, there is one NFIP policy worth $350,000.

TABLE C9: FLOODPLAIN DATA FOR DIKE

	Number of Parcels	Land Value	Building Value	Dwelling Value	Total Value	Percent of City Affected
1% Annual Floodplain	29	$783,765	$1,376,218	$1,469,482	$3,629,465	3.75%
0.2% Annual Floodplain	-	-	-	-	-	-

Source: Grundy County Assessor's Office; Analysis conducted by INRCOG; Parcel values and FIRM maps as of 10/19/2005

MITIGATION STRATEGY

Hazard Mitigation Plan Goals

The hazard mitigation plan goals were reviewed by the Hazard Mitigation Planning Committee at their second committee meeting. The committee set as a priority the development of broad-based goals that would address a multitude of hazards and encompass a variety of mitigation activities. The hazard mitigation plan goals for the City of Dike are as follows:

1. Minimize to the greatest possible extent the number of injuries and/or loss of life associated with all identified hazards.
2. Reduce or eliminate property damage due to the occurrence of disasters.
3. Identify ways that response operations, in the event of a disaster, can be improved.
4. Return the community to either pre-disaster or improved conditions in a timely manner in the wake of a disaster.
5. Develop strategies that can be used to reduce the community's overall risk to the negative effects of natural, technological, and man-made disasters.
6. Reconvene the planning committee on an annual basis to review the plan document, check for compliance with the plan goals, and track progress in achieving the mitigation strategies.
7. Maintain the Countywide Multi-Jurisdictional format for future plan updates.

Current Mitigation Actions

Prevention Mitigation Actions

The city has an adopted Floodplain Management Ordinance and is a member of the Flood Insurance Program. The city also has a comprehensive plan that addresses future planning; as well as, a zoning ordinance and subdivision regulations for land development.

TABLE C10: DIKE'S CURRENT PLANNING AND REGULATORY DOCUMENTS

Previous HMP	Comprehensive Plan	Building Code	Zoning Ordinance	Subdivision Regulations	Floodplain Management Ordinance	Tree-Trimming Ordinance	Storm Water Ordinance	Snow Removal Ordinance
Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes

Source: Community

Property Protection Mitigation Actions

The city is discussing and investigating upgrades and/or replacement of the sanitary sewer lift station.

Public Education and Awareness Mitigation Actions

Each household in Dike is mailed an information packet on the tornado warning siren system and steps to take in the event of a disaster on a semi-annual basis. The city is working on adding information to the city website and the fire department website. Grundy County uses the AlertIowa notification system to notify users in case of an emergency.

Emergency Services Mitigation Actions

Grundy County Emergency Management Agency

Dike works with the Grundy County Emergency Management Coordinator, based out of the City of Grundy Center, on various safety and emergency events. The Emergency Management Coordinator works in conjunction with local fire, rescue, police, and government officials to draft and implement workable emergency action plans in the community. The current Emergency Management Coordinator is Zach Tripp and current contact information is as follows: Grundy County Emergency Management Agency, 705 8th Street, Grundy Center, Iowa 50638, (319) 824-6933, email: ztripp@grundysheriff.org

Law Enforcement

The City contracts through a 28E agreement with the Grundy County Sheriff's Department for law enforcement services. The City pays a monthly fee for this service.

Fire Protection

Dike has a 21-member local volunteer fire department. Some of their equipment includes two pumpers, two tankers, and a grass rig. All personnel are trained in the use of fire suppression equipment such as hose / nozzles, ladders, exhaust / positive pressure fans, and various hand tools. Due to the rural nature of the majority of their response territory, they also train on tanker shuttle and rural water supply along with the use of fire hydrants. The department requires CPR / first-aid and HAZMAT operations level of its basic firefighters within the first year of membership.

The department responds to an average of 130 alarms per year with around 20% of those being fire related and 80% medical emergencies.

Ambulance

The emergency medical services in Dike consist of two advanced life support ambulances. These ambulances are equipped with new monitors and assorted equipment. The personnel on the department are primarily trained to the EMT-B level. They have two paramedic specialists and one EMT intermediate. This allows the city to have an advanced service when personnel are available.

Medical Facilities

Dike does not have any medical facilities.

HAZMAT

The City of Dike contracts with Northeast Iowa Response Group for response to hazardous material spills. The Northeast Iowa Response Group is a division of Waterloo Fire Rescue as is the Hazardous Materials Regional Training Center. The Training Center provides training to fire departments and companies from around the state and country. Not only is this a training center it also serves as a hazardous materials quick response unit to Black Hawk County, surrounding counties, and many municipalities in a ten county region. The Unit provides local fire departments with hazard materials emergency procedures thus reducing additional contamination. An evacuation plan is also in place in conjunction with the activities with the local department. Contact information for the facility is as follows: Hazardous Materials Regional Training Center, 1925 Newell Street, Waterloo, Iowa 50707, Phone: (319) 291-4275, Toll Free: (800) 291-4682, Fax: (319) 291-4285

The jurisdictions also partner the Northeast Iowa Response Group for assistance in responding to any methamphetamine labs located in the city limits. The Response Group assists the Police Departments in containment of the site and disposal of the hazardous chemicals.

Warning Systems

The City of Dike currently has two sirens, one located behind the fire station and the second located just south of the Fox Ridge Country Club, which are responsible for alerting the entire city. It can be manually tripped in the Fire Station or it can be set off at the Grundy County Law Enforcement Center. Weather

spotting is another duty for the fire department. They are on-call whenever a severe thunderstorm warning is issued along with a tornado watch. If a tornado is spotted the citizens of Dike can be alerted via the two warning sirens.

Grundy County uses the AlertIowa notification system that is utilized statewide. The program is funded by the State of Iowa and administered through Iowa Homeland Security and Emergency Management Office. AlertIowa will be administered through Grundy County Emergency Management Agency and will be available to all county cities and school districts.

AlertIowa will allow for emergency notifications at all times via landline telephones, cell phones, email, text message, and social media. The County will use their emergency notification network for all of the following events: blizzards, flash flooding, severe thunderstorms, and tornadoes. There is an optional way to receive the same alert for events such as: excessive heat warnings, hazardous materials warnings, heavy snow warning, high wind warnings, ice storm warnings, law enforcement warnings, shelter in place warnings, sleet warnings, wind chill warnings, and winter storm warnings.

Public Works / Street Department

The City has a public works department that maintains the city's infrastructure.

Natural Resource Protection Mitigation Actions

The city is not undertaking any actions at this time.

Structural Projects Mitigation Actions

The city is not undertaking any actions at this time.

Future Mitigation Actions

While the existing mitigation activities discussed above detail the city's efforts to mitigate hazards when possible and to respond to hazards in a timely and efficient manner, the Committee also recognizes that there are many more mitigation activities and projects that would benefit county residents. Thus, the Committee developed a list of future hazard mitigation activities that, if accomplished, would serve to further reduce the risk of hazards to the community. The list may include a combination of projects the Committee feels the community should try to accomplish and mitigation efforts that are ongoing that the Committee view as vital to the continued well-being of the public.

Priority

The Committee analyzed the potential mitigation activities. This analysis included a discussion of the potential benefits of implementing the activity, some hurdles that the community may face in implementing the action step, and the drawbacks of implementation. The analysis utilized the STAPLEE feasibility criteria. The STAPLEE technique is a FEMA suggested method of evaluation. The STAPLEE approach assesses both positive and negative impacts on the following aspects of a county: **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental.

The Committee was asked to discuss the STAPLEE elements (Table C11) and determine each element's ranking (High -H, Medium -M, Low-L) for each identified future mitigation activity. Afterwards, the average priority for each migration activity was recorded as the overall priority ranking for that particular future mitigation activity.

TABLE C11: STAPLEE ELEMENTS

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

Timeline

The Committee identified the time period each period each of the proposed mitigation activity will occur. Activities that occur regularly (either daily, weekly, monthly or annually) were identified as Active. If the action is to occur within the next 1-5 years it was identified as Short-Term, if the activity would take 5-10 years it was labeled as Mid-Term, and any activities that would take 10 or more years were identified as Long-Term.

Funding

Although in the long-term hazard mitigation actions will save money by avoiding the loss of lives or property damages, in the short-term each action will have an associated cost. The City will rely heavily on local funding sources to fulfill most of the plan obligations; however, they will also seek funds from State and Federal agencies for both pre- and post-disaster mitigation activities.

The estimated cost(s) for each mitigation action, program, or project is either: Minimal, Low, Moderate, or High depending upon various factors.

- Minimal: Cost estimate is $10,000 or less based on using current staff, time commitment, continuous of current duties, proposed action/program/ project, and funding sources.
- Low: Cost estimate for project range from $10,001 - $99,999 based on existing proposed treatment, time commitment, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.).
- Moderate: Cost estimate for project range from $100,000 - $299,999 based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.), and funding sources.

- High: Cost estimate for project range is $300,000 or higher based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, project components (permits, acquisition, coordination, etc.), and funding sources.

Implementation Strategy

One of the first steps the Committee took was to review the City's existing Hazard Mitigation Activities and provide an update on their status, see Based on each activity's progress, City's chose to continue the activity or drop it from the plan update. Once the Committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. In addition, the Committee identified a time line for each activity, associated hazards, estimated cost, priority, identified the responsible party or parties for each activity, and indicated at least which of the city's goals the action addresses. Table F12is the City of Dike's Implementation Strategy.

TABLE C12: CITY OF DIKE'S IMPLEMENTATION STRATEGY

Priority	Mitigation Action/Program/Project	Associated Hazard	Primary Agency Responsible for Implementation	Date for Completion	Estimated Cost (s)	Funding Source
H	Educate the public	All	Grundy County EMA	On-Going	Minimal	Local
H	Continue training and education for fire departments, law enforcement agencies and ambulance crew personnel	All	City Council and Roads Depts.	On-Going	Moderate	Local, State
H	Maintain and acquire materials and equipment for fire departments, law enforcement agencies and ambulance crew personnel	All	City Council	On-Going	Minimal	Local, State
H	Provide emergency shelters for evacuees	All	Grundy County EMA	On-Going	Minimal	Local
H	Maintain mutual aid agreements	All	Grundy County EMA, City Council	On-Going	Minimal	Local
M	Maintain tree trimming program	Severe Winter Storm, Tornado/Windstorm, Thunderstorm/Lightning/Hail/Hail	City Council	On-Going	Low	Local
H	Determine locations for potential heating shelters and volunteer organization	Severe Winter Storm	Grundy County EMA	On-Going	Minimal	Local
M	Encourage utility providers and developers to place all utilities underground	Severe Winter Storm, Infrastructure Failure, Thunderstorm/Lightning/Hail	City Council	On-Going	Moderate	Local
H	Purchase and maintain backup generators	Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado, Emergency Management	Grundy County EMA	On-Going	Minimal	Local
H	Maintain public works equipment	Severe Winter Storm	Public Works	On-Going	Minimal	Local
H	Notify the media on shelter locations	Severe Winter Storm, Extreme Heat, Tornado	Sheriff, EMA	On-Going	Minimal	Local
H	Make sure residents keep sidewalks clear of snow and ice	Severe Winter Storm	Public Works	On-Going	Minimal	Local
L	Maintain use of snow fences in the city/county	Severe Winter Storm	Public Works	On-Going	Minimal	Local
H	Use surge protectors to prevent electrical damage to critical and sensitive equipment	Thunderstorm/Lightning/Hail	Staff	On-Going	Minimal	Local
M	Backup all digital data	Thunderstorm/Lightning/Hail	Staff	On-Going	Minimal	Local
M	Purchase NOAA weather radios	Thunderstorm/Lightning/Hail, Tornado/Windstorm, Radiological Incident	Grundy County EMA	On-Going	Minimal	Local, State

L	Enforce and update building codes, as needed	Thunderstorm/Lightning/Hail, Tornado/Windstorm, Expansive Soils, Earthquake	City Council	On-Going	Minimal	Local
L	Maintain storm spotter training for local fire departments/deputies and EMS crews	Thunderstorm/Lightning/Hail, Tornado/Windstorm	Grundy County EMA	On-Going	Minimal	Local
M	Continue enforcement of city sump pump discharge ordinance	Thunderstorm/Lightning/Hail	City Council	On-Going	Minimal	Local
M	Maintain a list of potential storm sewer projects	Thunderstorm/Lightning/Hail	City Council	On-Going	Minimal	Local
M	Make available a cleanup crew for after a storm	Thunderstorm/Lightning/Hail	City Council, EMA	On-Going	Minimal to Low	Local
H	Maintain law enforcement monitoring of large storage supplies	HAZMAT Incident	Sheriff	On-Going	Minimal	Local
M	Acquire necessary response and detection equipment for city/county employees	HAZMAT Incident	Grundy County EMA	On-Going	Minimal	Local, State
M	Encourage lead based paint and asbestos removal	HAZMAT Incident	City Council	On-Going	Minimal	Local
L	Provide a local hazardous waste drop-off site	HAZMAT Incident	City Council	On-Going	Minimal to Low	Local
H	Maintain mutual aid agreements with the Northeast Iowa response Group	HAZMAT Incident	City Council	On-Going	Minimal	Local
H	Keep HAZMAT manuals/information current and easily accessible	HAZMAT Incident	All Depts.	On-Going	Minimal	Local
H	Maintain, test, and replace warning sirens	Tornado/Windstorm, Thunderstorm/Lightning/Hail, Infrastructure Failure	Grundy County EMA	On-Going	Minimal to Low	Local, State
H	Install new warning sirens where needed or replace warning sirens with insufficient decibel levels	Tornado/Windstorm	Grundy County EMA	On-Going	Moderate	Local, State
M	Encourage and maintain enrollment in emergency notification system	Thunderstorm/Lightning/Hail, Tornado/Windstorm, Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local
H	Construct or designate a safe room or storm shelter	Tornado/Windstorm	Grundy County EMA	On-Going	High	Local, State, Federal
M	Encourage home owners to keep emergency kits	Tornado/Windstorm	Grundy County EMA	On-Going	Minimal	Local
M	Encourage backup power generation for local telephone systems and cellular operations	Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local
M	Maintain or install GPS units in all emergency service and city/county vehicles	Infrastructure Failure	Staff	On-Going	Minimal	Local
L	Maintain automatic TTY TDD machines for emergency personnel and city/county employees	Infrastructure Failure	Staff	On-Going	Minimal	Local
H	Enhance Standard Operating Procedures for dissemination of information/press releases in the event of a disaster	Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local
M	Continue training and promotion of the Incident Command System	Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local, State
M	Complete continuity of government plan	Infrastructure Failure	City Council	On-Going	Minimal	Local
H	Encourage use of Iowa One call before digging	Infrastructure Failure	City Council	On-Going	Minimal	Local
H	Upgrade radio communications equipment as needed	Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local

H	Regularly review and amend fire and medical HAZMAT response standard operating procedures	Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local
L	Improve standard operating procedures for schools	Infrastructure Failure	Grundy County EMA, Schools	On-Going	Minimal	Local
M	Seek to improve communications with other agencies	Infrastructure Failure, Terrorism	City Council	On-Going	Minimal	Local
M	Keep supply of backup radios and cellphones	Infrastructure Failure	Staff	On-Going	Minimal to Low	Local
M	Maintain list of county emergency contacts	Infrastructure Failure	Staff	On-Going	Minimal	Local
M	Keep the county updated on personnel changes	Infrastructure Failure	Staff	On-Going	Minimal to Low	Local
H	Continue cooperation between city roads department and local fire departments during snow emergencies	Severe Winter Storm	Roads Department	On-Going	Minimal	Local
L	Pursue partnership with rural water as the system expands	Grass/Wild Fire	City Council	On-Going	Minimal	Local
M	Encourage residents to keep smoke detectors, sprinkler systems and fire extinguishers maintained in their homes	Grass/Wild Fire	Grundy County EMA	On-Going	Minimal	Local
L	Continue an annual inspection program for commercial and industrial properties	Grass/Wild Fire	Fire Department	On-Going	Minimal	Local
H	Continue fire prevention program	Grass/Wild Fire	Grundy County EMA	On-Going	Minimal	Local
H	Improve water system to enhance firefighting capacity/ability	Grass/Wild Fire	City Council	On-Going	Minimal	Local
H	Maintain membership in the NFIP	Flash Flood, River Flooding	City Council, EMA	On-Going	Minimal	Local
H	Maintain, enforce and update floodplain ordinance	Flash Flood, River Flooding	City Council	On-Going	Minimal	Local
M	Acquire more water pumps	Flash Flood, River Flooding, Dam Failure	Grundy County EMA, Public Works	On-Going	Minimal	Local
M	Continue with improvement to the storm water system	Flash Flood	City Council	On-Going	Low to Moderate	Local, State
H	Prevent inflow and infiltration into the sanitary sewer	Flash Flood, River Flooding	City Council	On-Going	Minimal	Local
L	Educate the public on maintaining their sump pumps	Flash Flood	City Council	On-Going	Minimal	Local
M	Maintain and keep storm drains clear of debris	Flash Flood	Public Works	On-Going	Minimal	Local
M	Stockpile sand and sandbags	Flash Flood, River Flooding	Grundy County EMA	On-Going	Minimal to Low	Local
L	Identify, purchase and remove structures from flood hazard areas	Flash Flood, River Flooding	Grundy County EMA, City Council	On-Going	Moderate	Local, Federal
L	Initiate and enforce burn ban in times of drought or as needed	Grass/Wild Fire, Drought	City Council	On-Going	Minimal	Local
M	Maintain and improve signals/signage along roadways and at railroad crossings	Transportation Incident	Roads Department, Sheriff	On-Going	Minimal	Local, State
M	Establish alternative transportation routes should a road need to be closed	Transportation Incident, River Flooding, Flash Flood, Infrastructure Failure	Grundy County EMA, Sheriff	On-Going	Minimal	Local
L	Purchase emergency signs to be used in case of an incident	Transportation Incident	City Council, Sheriff, EMA	On-Going	Minimal	Local
M	Enforce no parking designations at special events	Transportation Incident	Sheriff	On-Going	Low	Local
L	Identify fallout shelter locations	Radiological Incident	City Council	On-Going	Low	Local
L	Keep communication lines open with Nuclear Plant in Palo	Radiological Incident	City Council, EMA	On-Going	Minimal	Local
M	Maintain and/or develop a wellhead protection program	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, Sheriff	On-Going	Low	Local, State

M	Monitor wells in areas of identified contamination	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, EMA	On-Going	Low	Local
H	Monitor the drinking water supply	HAZMAT Incident, Human Disease, Animal/Plant/Crop Disease	City Council	On-Going	Moderate	Local
L	Identify and map areas of past contamination	HAZMAT Incident	City Council	On-Going	Low	Local
H	Maintain and/or develop storm water management program	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease, Flash Flood	City Council	On-Going	Low	Local
L	Eliminate and cap private and abandoned wells in the city	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council	On-Going	Low	Local
L	Eliminate the use of septic tank systems in the city limits	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council	On-Going	Minimal	Local
H	Follow monitoring requirements set forth by the Iowa DNR	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, Engineer	On-Going	Low	Local
M	Carry out conservation measures such as erosion control and work with the following organizations: Extension, NRCS, Farm Bureau, EPA, DNR, and Soil and water Conservation District	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, Engineer	On-Going	Moderate	Local, State, Federal
M	Maintain and update anti-virus software	Terrorism	Staff	On-Going	Minimal	Local
L	Secure vulnerable targets, as identified by the LEPC and County EMA with alarms, security cameras and fences	Terrorism	Sheriff	On-Going	Minimal	Local
M	Review and update fire codes as necessary	Grass/Wild Fire	Fire Department	On-Going	Minimal	Local
L	Continue to cooperate with pipeline owners and operators to ensure locations are marked	Grass/Wild Fire	City Council	On-Going	Minimal	Local
M	Purchase a new tanker and/or pumper	Grass/Wild Fire	City Council	On-Going	Low to Moderate	Local
L	Encourage community to plant shade trees	Extreme Heat	City Council	On-Going	Minimal	Local
L	Provide fans and/or cooling shelter	Extreme Heat	County EMA	On-Going	Minimal to Low	Local
M	Maintain air conditioner(s) in community buildings	Extreme Heat	Public Works	On-Going	Minimal	Local
L	Keep a supply of drinking water to distribute	Extreme Heat	Grundy County EMA	On-Going	Low	Local
L	Encourage the public to receive vaccinations	Human Disease	Grundy County EMA, Health Dept.	On-Going	Minimal	Local
M	Cooperate with any countywide mass vaccination plan	Human Disease	Grundy County EMA	On-Going	Minimal	Local
L	Monitor disease outbreak news from the CDC and Iowa Department of Public Health	Human Disease, Animal/Plant/Crop Disease	Grundy County EMA, Sheriff	On-Going	Low to Moderate	Local
H	Restrict water usage should it be necessary	Drought	City Council	On-Going	Minimal to Low	Local
L	Encourage the use of proper materials and construction techniques	Expansive Soils	City Council	On-Going	Minimal to Low	Local
L	Educate city personnel to identify risk areas	Expansive Soils	City Council	On-Going	Minimal	Local
M	Install tiling to help water move away from structures	Expansive Soils	Public Works	On-Going	Minimal to Low	Local
M	Enforce a curfew	Terrorism	Sheriff	On-Going	Minimal to Low	Local, State
H	Continue regular bridge inspections	Infrastructure Failure	City Council, Engineer	On-Going	Minimal to Low	Local
M	Place barricades to close dangerous bridges	Infrastructure Failure	City Council, Sheriff	On-Going	Minimal to	Local

					Low	
L	Maintain embargos/weight limits as necessary	Infrastructure Failure	City Council, Engineer	On-Going	Minimal to Low	Local, State
L	Identify and inventory potential sinkhole sites	Sinkholes	Public Works	On-Going	Minimal to Low	Local
L	Educate city personnel to handle a sinkhole situation	Sinkholes	City Council, Engineer	On-Going	Minimal	Local
M	Secure the area (around a sinkhole)	Sinkholes	Public Works	On-Going	Minimal	Local
M	Inspect any utility lines that are near a sinkhole	Sinkholes	Public Works	On-Going	Minimal	Local
L	Enforce the local zoning ordinances	Landslides	City Council	On-Going	Minimal	Local
M	Clear ditches, streams, and waterways on a regular basis	River Flooding	City Council, Public Works	On-Going	Minimal	Local
L	Encourage floodproofing/elevating structures in the floodplain	River Flooding	City Council, EMA	On-Going	Minimal	Local
M	Update flood maps/flood studies for areas throughout the county	River Flooding	City Council	On-Going	Minimal	Local
L	Identify bridges and culverts than can cost effectively be reengineered to reduce future flooding	River Flooding	City Council, Engineer	On-Going	Minimal	Local
M	Establish transportation evacuation routes and protocols	River Flooding	City Council, EMA, Sheriff	On-Going	Minimal	Local
H	Develop sandbagging procedures for the community	River Flooding	City Council, EMA	On-Going	Minimal	Local
M	Develop and maintain staging area for dumping during cleanup	River Flooding	City Council, Public Works	On-Going	Minimal	Local
M	Continue cooperation with county in developing flood mitigation efforts	Flash Flood, River Flooding	City Council, EMA	On-Going	Minimal	Local
L	Purchase additional parkland in order to increase greens space and reducing surface flow	River Flooding	City Council	On-Going	Minimal	Local
M	Set a designated number of people to be trained in post-disaster record keeping/damage assessments	Emergency Management*	City Council, EMA	On-Going	Minimal	Local
H	Inform the public of reputable and ill reputable contractors following disasters	Emergency Management*	City Council	On-Going	Minimal	Local
M	Encourage all communities to participate in their Local Emergency Planning Commission (LEPC)	Emergency Management*	City Council, EMA	On-Going	Minimal	Local
H	Maintain and update emergency response plans	Emergency Management*	City Council, EMA	On-Going	Low to Moderate	Local
H	Maintain lists of personnel and equipment available to use with response plans	Emergency Management*	City Council, Staff	On-Going	Minimal	Local
H	Maintain communication with county contacts	Emergency Management*	City Council, Staff	On-Going	Moderate	Local
H	Maintain NIMS compliance	Emergency Management*	City Council, EMA	On-Going	Moderate	Local, State, Federal

APPENDIX D: CITY OF GRUNDY CENTER

COMMUNITY PROFILE

Location

Grundy Center is located near the center of Grundy County. The town is located at the coordinates of 42.3617° N and 92.7685° W. Black Hawk Creek runs through the northern portion of the City, which flows through Wolfe Family Preserve, which is located just to the west of the City. Minnehaha Creek splits from Black Hawk Creek in the Wolfe Family Preserve and travels just south of Grundy Center. State Highway 14 comes into Grundy Center from the west and goes northbound in the center of town.

Transportation

There are a number of state highways and county roads leading into Grundy Center. The most popular of road that travels through Grundy Center is State Highway 14, which enters from the west portion and north portion of the City. When travelling north, State Highway 14 eventually connects with U.S. Highway 20. State Highway 14 merges with State Highway 175 in the middle of town. State Highway 14 travels east / west through the middle of Grundy Center.

According to the Iowa Department of Transportation's 2013 traffic study, an average of 3,140 cars and trucks travel on the portion of State Highway 14 west of the city limits. The north portion of State Highway 14 sees an average of 3,450 cars and trucks daily. Because State Highway 14 and State Highway 175 marge when they meet in Grundy Center, the count to the west of town for State Highway 175 is the same as State Highway 14 of 3,140 cars and trucks daily. To the east of Grundy Center, the traffic count is 1,750 cars and trucks daily.

County Highway T37 travels north / south through the western portion of the City. The daily average for T37 north of Grundy Center is 1,640 cars and trucks; the daily average for cars and trucks south of Grundy Center on T37 is 260.

County Highway T45 travels north / south connecting to and stopping at State Highway 175 in the eastern portion of the City. The daily average for cars and trucks south of State Highway 175 on T45 is 300.

Grundy County's only airport is located in Grundy Center, approximately 4 miles southwest of Grundy Center. Grundy Center Muni Airport-6K7 is a public airport.

The closest major airport is the Waterloo Regional Airport (ALO), which is located approximately 27 miles northeast of Grundy Center. This public airport is owned and operated by the City of Waterloo and overseen by an Airport Commission appointed by the Mayor. The primary runway is 8,400 foot long, 150 foot wide, and has a grooved asphalt surface. The airport is classified as a non-hub primary commercial service airport, offering general aviation and commercial service.

Community Services

Central Iowa Water Association provides the city with water. The city has elevated storage capacity of 500,000 gallons with peak demand at 575,000 gpd. The overall capacity of the system is 560,000 gpd and average capacity is 309,000 gpd.

Grundy Center provides sanitary sewer service with the treatment facility located on the eastern side of town. The rated capacity of the system is 2,100,000 gpd with peak demand at 1,872,000 gpd and average daily demand at 832,000 gpd. Thus, the city has plenty of capacity to accommodate additional development.

TABLE D1: GRUNDY CENTER UTILITY PROVIDERS

Electric	Natural Gas	Water	Sewer	Sanitation	Telephone	Internet	Cable
Grundy Center Municipal Utilities	Black Hills Energy	City	City	City	Grundy Center Municipal Utilities/Windstream	Grundy Center Municipal Utilities/Windstream	Grundy Center Municipal Utilities

Demographics

Table D2 provides an overview of Grundy Center's demographics. From 2000 to 2010, the City experienced a 4.2% increase in population, from 2,596 to 2,706 persons.

TABLE D2: CITY OF GRUNDY CENTER DEMOGRAPHICS

Government Framework	Mayor – City Council		
General Population, 2010 Census		***Economics Characteristics, 2010 Census***	
Total Population (2010)	2,706	Population 16 years and over	2,155
Total Males	1,254	Population in Labor Force (16 yrs. and over)	1,241
Total Females	1,452	Persons in Civilian Labor Force	1,241
Median Age	42.9	Persons Employed	1,189
At-Risk Population, <18 Yrs.	620	Persons Unemployed	52
At-Risk Population, >64 Yrs.	615	Persons in Armed Forces	0
One Race-White	2,668	Mean Travel Time to Work in Minutes (16 yrs. & over)	21.5
Black or African American	5	Persons Employed in Management, Professional, or Related Occupations	371
Asian	4	Persons Employed in Service Occupations	187
Native Hawaiian or Pacific Islander	3	Persons Employed in Sales and Office Occupations	298
Two or More Races	26	Persons Employed in Farming, Fishing, or Forestry Occupations	3
Hispanic or Latino (of any race)	12	Persons Employed in Construction, Extraction, or Maintenance Occupations	79
Not Hispanic or Latino	2,694	Persons Employed in Production, Transportation, or Material Moving Occupations	251
Total Household Population	2,625	Median Household Income	$37,222
Total Population in Group Quarters	81	Median Family Income	$46,223
Persons in Group Quarters – Nursing Homes	81	Per Capita Personal Income	$18,859
Persons in Group Quarters – Noninstitutionalized	0	Families below Poverty Level	28
Housing Characteristics, 2010 Census		Individuals below Poverty Level	109
Total Housing Units	1,256	Unemployment Rate	4.2%
Total Owner-Occupied Housing Units	905	***Social Characteristics, 2010 Census***	
Total Renter-Occupied Housing Units	257	School Enrollment (3 yrs. and over)	566
Total Vacant Housing Units	94	Nursery School, Preschool	42
Total 1-Unit Detached and Attached Structures	980	Kindergarten and Elementary School (grades 1-8)	298
Total 2, 3, and 4-Unit Structures	145	High School (grades 9-12)	148
Total 5 to 19-Unit Structures	18	College or Graduate School	78
Total Mobile Homes	31	Education Attainment: Population 25 Years and Over	1,813
Year Majority of Housing Units were Built	1959 or earlier (57.4%)	Persons with Less than 9th Grade	196
Average Household Size	2.27	Persons with 9th to 12th Grade, No Diploma	122
Average Family Size	2.83	Persons with High School Degree or Equivalency	643
Specified Renter-Occupied Units	220	Persons with Some College, No Degree	399
Median Gross Rent	$343	Persons with Associate Degree	131
Specified Owner-Occupied Units	796	Persons with Bachelor's Degree	222
Median Housing Value, Owner-Occupied	$73,600	Persons with Graduate or Higher Degree	100
Method of Heating Household	Utility Gas (86.7%)	Persons with a Disability (5 yrs. and over)	575
Households with No Telephone Service	11	Persons that Speak a Language other than English at Home (5yrs +)	151

HAZARDS & RISK ASSESSMENT

Hazard Analysis

Section 3 identified and profiled the hazards for the entire planning area. However, each community analyzed their own vulnerability to those hazards applicable to their jurisdiction. Using the methodology outlined in Section 3 (Vulnerability Assessment), the City of Grundy Center evaluated the risk associated with a specific hazard, defined by probability and frequency of occurrence, magnitude, severity, exposures, and consequences. Grundy Center's vulnerability assessment provides in-depth knowledge of the hazards and vulnerabilities that affect the community. This analysis provides an all-hazard approach when evaluating the hazards of that affect the city, and the associated risks and impacts each hazard presents.

As mentioned previously in Section 3, the vulnerability assessment requires a five-year review with periodic updates, as needed. Potential future hazards and impacts may result from changing technology, new critical facilities, infrastructures, and development patterns, as well as demographic and socioeconomic changes that occur within or outside the area.

Disaster frequency and its effects or severity are important as a basis for planning emergency response and mitigation. Natural hazards tend to reoccur on a predictable seasonal basis, whereas manmade or technological events tend to change over time with advancement in technology and methods of operation. Five criteria were used by the Committee to assure a systematic and comprehensive approach to hazard analysis for their individual jurisdictions including: Historical Occurrence, Probability, Magnitude or Severity, Warning Time, and Duration.

The Committee assessed the defined hazards relevant to potential impact on the city. Using the scoring criteria previously defined (Tables 19-22) the city assessed each of the identified hazards based on probability, magnitude/severity, warning time, and duration. The scores for each of the factors were weighted using the formula below to develop the final hazard assessment score.

(Probability x .45) + (Magnitude/Severity x .30) + (Warning Time x .15) + (Duration x .10)
= Final Hazard Assessment Score

Table D3 is the analysis scores for the City of Grundy Center. As seen in Table D3, the top three hazards for Grundy Center are Thunderstorm/Lightning/Hail, and Tornado/Windstorm, and Flash Flooding

TABLE D3: IDENTIFIED HAZARDS FOR GRUNDY CENTER						
Hazard Rank	**Hazards**	**Probability**	**Magnitude/Severity**	**Warning Time**	**Duration**	**Assessment Score**
1	Thunderstorm/Lightning/Hail	4	2	4	1	**3.1**
2	Tornado/Windstorm	2	4	4	1	**2.8**
3	Flash Flood	3	2	4	2	**2.75**
4	Radiological Incident	1	4	4	4	**2.65**
4	Terrorism	1	4	4	4	**2.65**
6	HAZMAT Incident	2	2	4	4	**2.5**
6	Infrastructure Failure	2	2	4	4	**2.5**
8	Extreme Heat	3	2	1	3	**2.4**
9	Grass/Wild Fire	2	2	4	1	**2.2**
10	Severe Winter Storm	2	2	1	3	**1.95**
10	Drought	2	2	1	3	**1.95**
12	Transportation Incident	1	1	4	2	**1.55**
13	Human Disease	1	2	1	3	**1.5**
14	Earthquake	1	1	4	1	**1.45**
14	Sinkholes	1	1	4	1	**1.45**
16	Expansive Soils	1	1	1	3	**1.2**
17	Animal/Plant/Crop Disease	1	1	1	2	**1.1**
17	Landslide	1	1	1	2	**1.1**
19	River Flooding	1	1	1	1	**1**
20	Levee/Dam Failure	-	-	-	-	**-**

Vulnerability – Identifying Assets (Critical Facilities)

This section will describe the vulnerability for existing and future buildings, infrastructure, and critical facilities in those areas that can be impacted by the prioritized hazards. Since the majority of the hazards have an undefined hazard area (i.e., affecting an entire community or larger area) the following vulnerability assessment will only address those hazards that affect a specified area – flooding (river and flash). However, due to the historical occurrences of tornadoes, this hazard was added to the assessment.

Critical Facilities

Identifying the location of critical facilities and designated shelters (see Table D4) in Grundy Center is important in order to assess their vulnerability to hazards. These critical facilities are important to the operation of a community, the quality of life, and the key components of the economic sector. For instance, high-density residential or commercial development, schools, police stations, government buildings, hospitals and care facilities, airports, gas stations, hardware stores, grocery stores, and water supply systems. It is important to know the threats each hazard poses to these facilities. *Attachment 6G* illustrates the location of identified critical facilities in Grundy Center.

Emergency shelters are also something that is important to identify. The City of Grundy Center does have a designated emergency shelter, it is the Grundy Center Tornado Safe Room located in the middle school. The community center has been used in the past during incidents which required assistance to people in need.

TABLE D4: CRITICAL FACILITIES AND DESIGNATED SHELTERS IN GRUNDY CENTER

Critical Facilities	
City Hall	Wastewater Facility
Library	Water Tower
Courthouse	Hospital
Fire Station	Schools
Shelters	
Grundy Center Tornado Safe Room	Community Center

Source: Community

According to available data, Grundy Center is projected to see a slow increase in population over the next thirty years. Between 2000 and 2010, Grundy Center's population increased just over 4 percent, this steady population growth rate has been averaged since 1980. With this rather small growth rate, additional critical facilities such as schools, daycare centers, or healthcare centers are not necessary at this time. However, the need for more critical facilities should be monitored these next 5-years and readdressed when this HMP is updated.

Homes in Hazardous Areas

A facility's vulnerability to a flooding event is normally low, since these structures are rarely constructed within the 100-year floodplain. According to the information provided, bridges and roadways would be impacted by flooding. This disruption in the transportation infrastructure would create a longer time period to receive and provide services and supplies to an area if a bridge was washed away due to flooding.

Table C5 lists the number properties in Grundy Center that are located within the 100-year floodplain. According to data provided by FEMA, Grundy Center has 2 dwellings within the flood hazard area. According to the data provided by INRCOG and Grundy County, there are 37 parcels located within the 100-year floodplain; most of this land is undeveloped. See *Attachment 5D: Flood Scenario Map of the City* and Table D5.

TABLE D5: CITY OF GRUNDY CENTER 100-YEAR FLOODPLAIN PROPERTIES

Total Dwellings	2
Total Buildings	67
Total Structures	69
Total Value of all Structures	$440,250

Source: INRCOG & Grundy County Assessor

Tornadoes and windstorms are events that can cause harm to all structures and populations in the area. As part of a vulnerability assessment, a hypothetical tornado scenario was created for the community. Attachment 5h and Attachment 5j 4k illustrate the impact of a hypothetical tornado event in Grundy Center. Table D6 displays the degrees of impact that a hypothetical tornado scenario of various strengths would have on Grundy Center. As can be seen from the table, a direct hit from an EF4 or EF 5 tornado would damage at least 65 percent of the City.

As stated on the FEMA website, mobile homes are highly vulnerable to tornadoes. Even mobile homes that are tied down, offer little protection from tornadoes. According to Census data provided, there are approximately 27 mobile homes is Grundy Center, using the average persons per household of 2.26 means that there is approximately 60 people living in mobile homes in the City. Multi-family housing units are another type of housing that is considered at-risk during one of these events. There are approximately 150 families residing in multi-family housing units in Grundy Center according to the U.S. Census.

TABLE D6: TORNADO SCENARIO FOR GRUNDY CENTER

Scale	Tornado Width	# of Parcels	Damaged Values	% of City Damaged
EF0	50 Meters	75	$2,330,567.50	11.60%
EF1	150 Meters	131	$3,814,787.50	18.98%
EF2	250 Meters	176	$10,230,820.00	25.45%
EF3	500 Meters	295	$17,885,380.00	44.50%
EF4	900 Meters	457	$56,027,990.00	69.70%
EF5	1100 Meters	500	$61,942,460.00	77.05%

Vulnerability – Social Assets (Populations)

The social vulnerability assessment also identified how the hazards affect the population of Grundy Center and it is assumes that the identified populations are more likely to require assistance during times of disaster; therefore, are considered, generally speaking, more "at-risk" than the remaining population. The "at-risk" population must be identified and targeted in successful mitigation efforts. Table D7 presents an overview of the at-risk population in Grundy Center according to available information retrieved from the 2010 U.S. Census, 2011-2015 American Community Survey estimates, and Iowa Data Center.

According to Table D7, 23% of residents are 64 years or older. Grundy Care Center nursing and assisted living facility is also an issue if a hazard would arise. Due to the health of the residents, transportation and care of the patients would be component to a successful mitigation. There are 81 people residing in this facility.

In addition to group homes, persons living in mobile homes, also known as manufactured housing may also be at risk from tornadoes or high winds. There are an estimated 70 persons living in mobile homes.

Persons under the age of 18 are also at higher risk during some disasters. This is mostly due to the fact that young persons are often not aware of the proper actions to take in the event of a disaster. In addition, very young children would be more susceptible to a disaster such as a disease epidemic simply due to their age. In 2010, there was 23% of the city's total population under the age of 18.

TABLE D7: CITY OF GRUNDY CENTER "AT-RISK" POPULATION

	2010
Total City Population (2010)	2,706
Elderly (65 yrs. and older)	615
Youth (under 18 yrs. old)	620
Householder Living Alone	377
Non-English Speaking Population (speaks English less than 'very well'	36
Population Living in Poverty	109
Population in Mobile Homes	70
Group Quarters Population	81
Persons with Disabilities (age 5+)	575
Persons w/Sensory Disability	82
Persons w/Physical Disability	164
Persons w/Mental Disability	81
Persons w/Self-Care Disability	32
Persons w/Go-Outside-Home Disability	98
Persons w/Employment Disability	118

Source: U.S. Census, 2010; Iowa Data Center

The highest risk of mass injury and/or casualty would be the schools within the Grundy Center School District (elementary, middle and high schools). When school is in session, hundreds of people are in the facility daily. This includes people from other communities attending various events throughout the year. As the largest employer in the community, a disruption in normal operations would be damaging to the local economy.

A more consistent gathering of people would be the local business district, where people gather and shop daily. Amenities found in the area include dining, banking, various shopping outlets, the local post office and library. Any disruption to this area would result in the need to go outside of town for basic amenities. The main highway (Highway 14) runs just outside of town, a disruption in traffic would also be a hazard.

While there is one official designated as shelter, the middle school safe room, the community center could also be used if the building was unharmed during a major disaster. Local churches and City Hall could also be used in an emergency.

Vulnerability – Estimating Potential Property Losses

Valuations are an important component of hazard mitigation planning in so much as it provides measurable data that can be used to form some type of estimate as to the potential losses a community could face in the event of a disaster. The valuations for the City of Grundy Center are available from the County Assessor's office. City of Grundy Center's property valuations are in Table D8.

This information was made available from the Grundy County Assessor's office. It should be noted however that these dollar amounts do not include gas and electric utility valuations nor do the evaluations include exempt properties, including government buildings, infrastructure, and religious/nonprofit properties. These results should be considered preliminary, as a full accounting of assets has not been completed.

TABLE D8: ASSET INVENTORY – VALUE OF STRUCTURES IN GRUNDY CENTER

Type of Structure	Lot/Land Value	Value of All Structures	Total Value	Number of Structures
Residential	$101,774,563	$119,864,597	$103,622,570	1,084
Commercial	$17,146,850	$19,992,597	$17,146,850	124
Industrial	$2,405,430	$2,740,080	$2,405,430	8
Agriculture	$133,780	$1,960,369	$133,780	N/A
Total	**$121,460,623**	**$144,557,643**	**$123,308,630**	**1216**

Source: Grundy County Assessor; Values as of 6/10/2016

Future Development

Future development within identified hazard areas can change the threat level of an area by placing critical facilities, businesses, transportation networks, utilities, and populations within vulnerable areas. While it can be difficult to curb development in the planning area, it is the jurisdiction's advantage to be aware of development trends in order to successfully mitigation future hazards as risks increase. However, continued conformity with the State Building Codes and local land use ordinances and regulations (zoning, subdivision, floodplain management, etc.) will help to mitigate the effects hazards have on new and future

development.

Repetitive Loss Properties

FEMA defines a repetitive loss property as an insurable building that has experienced two losses in a 10-year period in which each loss is $1,000 or more. City of Grundy Center does participate in the NFIP; there are no repetitive loss properties in Grundy Center.

This HMP attempts to reduce loss by identifying potential natural and manmade hazards. As a result of many natural and manmade hazards, repairs and reconstruction area often completed in a way that returns the structure to pre-disaster condition yet does little to prevent a reoccurrence of damage. Replication of the pre-disaster conditions allows for the repetitive cycle of property damage, reconstruction, and re-damage. Hazard mitigation is needed to ensure that such cycles are broken, that post-disaster repairs and reconstruction are analyzed, and sound, less vulnerable conditions are produced. Additionally, other mitigation strategies may be considered, such as voluntary property buy-outs.

Using GIS spatial data from FIRM maps, in combination with property value data from the Grundy Assessor's office, estimates of value in the floodplain were calculated. Table D9 shows the estimated value of land, buildings, and dwellings, within the city, in a floodplain.

TABLE D9: FLOODPLAIN DATA FOR GRUNDY CENTER

	Number of Parcels	Land Value	Building Value	Dwelling Value	Total Value	Percent of City Affected
1% Annual Floodplain	37	$1,175,174	$374,230	$66,020	$1,615,424	1.14%
0.2% Annual Floodplain	-	-	-	-	-	-

Source: Grundy County Assessor's Office; Analysis conducted by INRCOG; Parcel values and FIRM maps as of 10/19/2005

MITIGATION STRATEGY

Hazard Mitigation Plan Goals

The hazard mitigation plan goals were reviewed by the Hazard Mitigation Planning Committee at their second committee meeting. The committee set as a priority the development of broad-based goals that would address a multitude of hazards and encompass a variety of mitigation activities. The hazard mitigation plan goals for the City of Grundy Center are as follows:

8. Minimize to the greatest possible extent the number of injuries and/or loss of life associated with all identified hazards.
9. Reduce or eliminate property damage due to the occurrence of disasters.
10. Identify ways that response operations, in the event of a disaster, can be improved.
11. Return the community to either pre-disaster or improved conditions in a timely manner in the wake of a disaster.

12. Develop strategies that can be used to reduce the community's overall risk to the negative effects of natural, technological, and man-made disasters.
13. Reconvene the planning committee on an annual basis to review the plan document, check for compliance with the plan goals, and track progress in achieving the mitigation strategies.
14. Maintain the Countywide Multi-Jurisdictional format for future plan updates.

Current Mitigation Actions

Prevention Mitigation Actions

The city has an adopted Floodplain Management Ordinance and is a member of the Flood Insurance Program. The city also has a comprehensive plan that addresses future planning; as well as, a zoning ordinance for land development.

TABLE C10: GRUNDY CENTER'S CURRENT PLANNING AND REGULATORY DOCUMENTS

Previous HMP	Comprehensive Plan	Building Code	Zoning Ordinance	Subdivision Regulations	Floodplain Management Ordinance	Tree-Trimming Ordinance	Storm Water Ordinance	Snow Removal Ordinance
Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes

Source: Community

Property Protection Mitigation Actions

Grundy Center has not done or been involved with any property protection mitigation actions.

Public Education and Awareness Mitigation Actions

Grundy County uses the AlertIowa notification system to notify users in case of an emergency.

Emergency Services Mitigation Actions

Grundy County Emergency Management Agency

Grundy Center works with the Grundy County Emergency Management Coordinator, based out of the City of Grundy Center, on various safety and emergency events. The Emergency Management Coordinator works in conjunction with local fire, rescue, police, and government officials to draft and implement workable emergency action plans in the community. The current Emergency Management Coordinator is Zach Tripp and current contact information is as follows: Grundy County Emergency Management Agency, 705 8th Street, Grundy Center, Iowa 50638, (319) 824-6933, email: ztripp@grundysheriff.org

Law Enforcement

The city has their own police force with one officer on duty at all times. They have 4 full-time officers, a part-time and a reserve officer.

Fire Protection

The city has a volunteer fire department with 31 volunteers. They have one tanker, 3 pumpers and a grass rig. Also 3 utility trailer and ambulance which hauls people or can act as a back-up to the ambulance department.

Ambulance

The city has a volunteer department with 3 paramedics. They have two rigs available with 12 to 16 people at the EMT level or above, and another 10-12 people for driving.

Medical Facilities

Grundy Memorial Hospital is located in Grundy Center and is the only medical facility (other than small clinics) located in the county. Grundy Memorial Hospital is a 25-bed critical access hospital with 24/7/365 emergency care. Grundy Memorial Hospital ranks amongst the top 5% of hospitals nationwide for their quality measures and patient experience scores. They also have been ranked among the nation's Top 20 Most Recommended rural hospitals.

HAZMAT

Grundy Center contracts with Northeast Iowa Response Group for response to hazardous material spills. The Northeast Iowa Response Group is a division of Waterloo Fire Rescue as is the Hazardous Materials Regional Training Center. The Training Center provides training to fire departments and companies from around the state and country. Not only is this a training center it also serves as a hazardous materials quick response unit to Black Hawk County, surrounding counties, and many municipalities in a ten county region. The Unit provides local fire departments with hazard materials emergency procedures thus reducing additional contamination. An evacuation plan is also in place in conjunction with the activities with the local department. Contact information for the facility is as follows: Hazardous Materials Regional Training Center, 1925 Newell Street, Waterloo, Iowa 50707, Phone: (319) 291-4275, Toll Free: (800) 291-4682, Fax: (319) 291-4285

The jurisdiction also partners the Northeast Iowa Response Group for assistance in responding to any methamphetamine labs located in the city limits. The Response Group assists the Police Departments in containment of the site and disposal of the hazardous chemicals.

Warning Systems

Grundy County uses the AlertIowa notification system that is utilized statewide. The program is funded by the State of Iowa and administered through Iowa Homeland Security and Emergency Management Office. AlertIowa will be administered through Grundy County Emergency Management Agency and will be available to all county cities and school districts.

AlertIowa will allow for emergency notifications at all times via landline telephones, cell phones, email, text message, and social media. The County will use their emergency notification network for all of the following events: blizzards, flash flooding, severe thunderstorms, and tornadoes. There is an optional way to receive the same alert for events such as: excessive heat warnings, hazardous materials warnings, heavy snow warning, high wind warnings, ice storm warnings, law enforcement warnings, shelter in place warnings, sleet warnings, wind chill warnings, and winter storm warnings.

Public Works

Grundy Center has about 25 miles of streets with a few alleys. The public works department has 6 people employees including the Director. They have a full range of equipment including dump trucks which plow snow in the winter and also a Back hoe, track hoe, maintainer, and utility trucks. This does not represent what equipment or man power the electric/communications utility has.

Natural Resource Protection Mitigation Actions

Grundy Center does not have nor done any natural resource protection mitigation actions.

Structural Projects Mitigation Actions

Grundy Center recently acquired the former Grundy Center Baptist Church. This property had become dilapidated over many years; plans to turn it into a historical building are being discussed.

Future Mitigation Actions

While the existing mitigation activities discussed above detail the city's efforts to mitigate hazards when possible and to respond to hazards in a timely and efficient manner, the Committee also recognizes that there are many more mitigation activities and projects that would benefit county residents. Thus, the Committee developed a list of future hazard mitigation activities that, if accomplished, would serve to further reduce the risk of hazards to the community. The list may include a combination of projects the Committee feels the community should try to accomplish and mitigation efforts that are ongoing that the Committee view as vital to the continued well-being of the public.

Priority

The Committee analyzed the potential mitigation activities. This analysis included a discussion of the potential benefits of implementing the activity, some hurdles that the community may face in implementing the action step, and the drawbacks of implementation. The analysis utilized the STAPLEE feasibility criteria. The STAPLEE technique is a FEMA suggested method of evaluation. The STAPLEE approach assesses both positive and negative impacts on the following aspects of a county: **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental.

The Committee was asked to discuss the STAPLEE elements (Table D11) and determine each element's ranking (High -H, Medium -M, Low-L) for each identified future mitigation activity. Afterwards, the average priority for each migration activity was recorded as the overall priority ranking for that particular future mitigation activity.

TABLE D11: STAPLEE ELEMENTS

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

Timeline

The Committee identified the time period each period each of the proposed mitigation activity will occur. Activities that occur regularly (either daily, weekly, monthly or annually) were identified as Active. If the action is to occur within the next 1-5 years it was identified as Short-Term, if the activity would take 5-10 years it was labeled as Mid-Term, and any activities that would take 10 or more years were identified as Long-Term.

Funding

Although in the long-term hazard mitigation actions will save money by avoiding the loss of lives or property damages, in the short-term each action will have an associated cost. The City will rely heavily on local funding sources to fulfill most of the plan obligations; however, they will also seek funds from State and Federal agencies for both pre- and post-disaster mitigation activities.

The estimated cost(s) for each mitigation action, program, or project is either: Minimal, Low, Moderate, or High depending upon various factors.

- Minimal: Cost estimate is $10,000 or less based on using current staff, time commitment, continuous of current duties, proposed action/program/ project, and funding sources.
- Low: Cost estimate for project range from $10,001 - $99,999 based on existing proposed treatment, time commitment, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.).
- Moderate: Cost estimate for project range from $100,000 - $299,999 based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.), and funding sources.
- High: Cost estimate for project range is $300,000 or higher based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, project components (permits, acquisition, coordination, etc.), and funding sources.

Implementation Strategy

One of the first steps the Committee took was to review the City's existing Hazard Mitigation Activities and provide an update on their status, see Based on each activity's progress, City's chose to continue the activity or drop it from the plan update. Once the Committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. In addition, the Committee identified a time line for each activity, associated hazards, estimated cost, priority, identified the responsible party or parties for each activity, and indicated at least which of the city's goals the action addresses. Table F12is the City of Grundy Center's Implementation Strategy.

TABLE D12: CITY OF GRUNDY CENTER'S IMPLEMENTATION STRATEGY (ALSO INCLUDES GRUNDY CENTER SCHOOL DISTRICT)

Priority	Mitigation Action/Program/Project	Associated Hazard	Primary Agency Responsible for Implementation	Date for Completion	Estimated Cost (s)	Funding Source
H	Educate the public	All	Grundy County EMA, School Board	On-Going	Minimal	Local
H	Continue training and education for fire departments, law enforcement agencies and ambulance crew personnel	All	City Council and Roads Depts.	On-Going	Moderate	Local, State
H	Maintain and acquire materials and equipment for fire departments, law enforcement agencies and ambulance crew personnel	All	City Council	On-Going	Minimal	Local, State
H	Provide emergency shelters for evacuees	All	Grundy County EMA, School Board, City Council	On-Going	Minimal	Local
H	Maintain mutual aid agreements	All	Grundy County EMA, City Council	On-Going	Minimal	Local
M	Maintain tree trimming program	Severe Winter Storm, Tornado/Windstorm, Thunderstorm/Lightning/Hail/Hail	City Council	On-Going	Low	Local
M	Determine locations for potential heating shelters and volunteer organization	Severe Winter Storm	Grundy County EMA	On-Going	Minimal	Local
M	Encourage utility providers and developers to place all utilities underground	Severe Winter Storm, Infrastructure Failure, Thunderstorm/Lightning/Hail	City Council	On-Going	Moderate	Local
H	Purchase and maintain backup generators	Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado, Emergency Management	Grundy County EMA, School Board, City Council	On-Going	Minimal	Local

H	Maintain public works equipment	Severe Winter Storm	Public Works	On-Going	Minimal	Local
M	Notify the media on shelter locations	Severe Winter Storm, Extreme Heat, Tornado	Sheriff, EMA, City Council, School Board	On-Going	Minimal	Local
H	Make sure residents keep sidewalks clear of snow and ice	Severe Winter Storm	Public Works	On-Going	Minimal	Local
L	Maintain use of snow fences in the city/county	Severe Winter Storm	Public Works	On-Going	Minimal	Local
M	Use surge protectors to prevent electrical damage to critical and sensitive equipment	Thunderstorm/Lightning/Hail	Staff	On-Going	Minimal	Local
M	Backup all digital data	Thunderstorm/Lightning/Hail	Staff	On-Going	Minimal	Local
M	Purchase NOAA weather radios	Thunderstorm/Lightning/Hail, Tornado/Windstorm, Radiological Incident	Grundy County EMA	On-Going	Minimal	Local, State
L	Enforce and update building codes, as needed	Thunderstorm/Lightning/Hail, Tornado/Windstorm, Expansive Soils, Earthquake	City Council	On-Going	Minimal	Local
L	Maintain storm spotter training for local fire departments/deputies and EMS crews	Thunderstorm/Lightning/Hail, Tornado/Windstorm	Grundy County EMA	On-Going	Minimal	Local
H	Continue enforcement of city sump pump discharge ordinance	Thunderstorm/Lightning/Hail	City Council	On-Going	Minimal	Local
M	Maintain a list of potential storm sewer projects	Thunderstorm/Lightning/Hail	City Council	On-Going	Minimal	Local
M	Make available a cleanup crew for after a storm	Thunderstorm/Lightning/Hail	City Council, EMA	On-Going	Minimal to Low	Local
H	Maintain law enforcement monitoring of large storage supplies	HAZMAT Incident	Sheriff	On-Going	Minimal	Local
M	Acquire necessary response and detection equipment for city/county employees	HAZMAT Incident	Grundy County EMA	On-Going	Minimal	Local, State
M	Encourage lead based paint and asbestos removal	HAZMAT Incident	City Council	On-Going	Minimal	Local
M	Provide a local hazardous waste drop-off site	HAZMAT Incident	City Council	On-Going	Minimal to Low	Local
H	Maintain mutual aid agreements with the Northeast Iowa response Group	HAZMAT Incident	City Council	On-Going	Minimal	Local
H	Keep HAZMAT manuals/information current and easily accessible	HAZMAT Incident	All Depts.	On-Going	Minimal	Local
H	Maintain, test, and replace warning sirens	Tornado/Windstorm, Thunderstorm/Lightning/Hail, Infrastructure Failure	Grundy County EMA	On-Going	Minimal to Low	Local, State
H	Install new warning sirens where needed or replace warning sirens with insufficient decibel levels	Tornado/Windstorm	Grundy County EMA	On-Going	Moderate	Local, State
M	Encourage and maintain enrollment in emergency notification system	Thunderstorm/Lightning/Hail, Tornado/Windstorm, Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local
H	Construct or designate a safe room or storm shelter in a community facility. Construct a tornado safe room in a Grundy Center School District facility.	Tornado/Windstorm	Grundy County EMA, School Board, City Council	On-Going	High	Local, State, Federal
M	Encourage home owners to keep emergency kits	Tornado/Windstorm	Grundy County EMA	On-Going	Minimal	Local
H	Encourage backup power generation for local telephone systems and cellular operations	Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local

H	Maintain or install GPS units in all emergency service and city/county vehicles	Infrastructure Failure	Staff	On-Going	Minimal	Local
M	Maintain automatic TTY TDD machines for emergency personnel and city/county employees	Infrastructure Failure	Staff	On-Going	Minimal	Local
H	Enhance Standard Operating Procedures for dissemination of information/press releases in the event of a disaster	Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local
H	Continue training and promotion of the Incident Command System	Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local, State
H	Complete continuity of government plan	Infrastructure Failure	City Council	On-Going	Minimal	Local
H	Encourage use of Iowa One call before digging	Infrastructure Failure	City Council	On-Going	Minimal	Local
H	Upgrade radio communications equipment as needed	Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local
H	Regularly review and amend fire and medical HAZMAT response standard operating procedures	Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local
M	Improve standard operating procedures for schools	Infrastructure Failure	Grundy County EMA, Schools	On-Going	Minimal	Local
M	Seek to improve communications with other agencies	Infrastructure Failure, Terrorism	City Council	On-Going	Minimal	Local
M	Keep supply of backup radios and cellphones	Infrastructure Failure	Staff	On-Going	Minimal to Low	Local
M	Maintain list of county emergency contacts	Infrastructure Failure	Staff	On-Going	Minimal	Local
M	Keep the county updated on personnel changes	Infrastructure Failure	Staff	On-Going	Minimal to Low	Local
H	Continue cooperation between city roads department and local fire departments during snow emergencies	Severe Winter Storm	Roads Department	On-Going	Minimal	Local
L	Pursue partnership with rural water as the system expands	Grass/Wild Fire	City Council	On-Going	Minimal	Local
M	Encourage residents to keep smoke detectors, sprinkler systems and fire extinguishers maintained in their homes	Grass/Wild Fire	Grundy County EMA	On-Going	Minimal	Local
M	Continue an annual inspection program for commercial and industrial properties	Grass/Wild Fire	Fire Department	On-Going	Minimal	Local
H	Continue fire prevention program	Grass/Wild Fire	Grundy County EMA	On-Going	Minimal	Local
H	Improve water system to enhance firefighting capacity/ability	Grass/Wild Fire	City Council	On-Going	Minimal	Local
H	Maintain membership in the NFIP	Flash Flood, River Flooding	City Council, EMA	On-Going	Minimal	Local
H	Maintain, enforce and update floodplain ordinance	Flash Flood, River Flooding	City Council	On-Going	Minimal	Local
H	Acquire more water pumps	Flash Flood, River Flooding, Dam Failure	Grundy County EMA, Public Works	On-Going	Minimal	Local
M	Continue with improvement to the storm water system	Flash Flood	City Council	On-Going	Low to Moderate	Local, State
H	Prevent inflow and infiltration into the sanitary sewer	Flash Flood, River Flooding	City Council	On-Going	Minimal	Local
M	Educate the public on maintaining their sump pumps	Flash Flood	City Council	On-Going	Minimal	Local
H	Maintain and keep storm drains clear of debris	Flash Flood	Public Works	On-Going	Minimal	Local
H	Stockpile sand and sandbags	Flash Flood, River Flooding	Grundy County EMA	On-Going	Minimal to Low	Local
L	Identify, purchase and remove structures from flood hazard areas	Flash Flood, River Flooding	Grundy County EMA, City Council	On-Going	Moderate	Local, Federal
M	Initiate and enforce burn ban in times of drought or as needed	Grass/Wild Fire, Drought	City Council	On-Going	Minimal	Local
M	Maintain and improve signals/signage along roadways and	Transportation Incident	Roads Department, Sheriff	On-Going	Minimal	Local,

	at railroad crossings					State
H	Establish alternative transportation routes should a road need to be closed	Transportation Incident, River Flooding, Flash Flood, Infrastructure Failure	Grundy County EMA, Sheriff	On-Going	Minimal	Local
L	Purchase emergency signs to be used in case of an incident	Transportation Incident	City Council, Sheriff, EMA	On-Going	Minimal	Local
M	Enforce no parking designations at special events	Transportation Incident	Sheriff	On-Going	Low	Local
L	Identify fallout shelter locations	Radiological Incident	City Council	On-Going	Low	Local
L	Keep communication lines open with Nuclear Plant in Palo, IA	Radiological Incident	City Council, EMA	On-Going	Minimal	Local
H	Maintain and/or develop a wellhead protection program	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, Sheriff	On-Going	Low	Local, State
H	Monitor wells in areas of identified contamination	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, EMA	On-Going	Low	Local
H	Monitor the drinking water supply	HAZMAT Incident, Human Disease, Animal/Plant/Crop Disease	City Council	On-Going	Moderate	Local
M	Identify and map areas of past contamination	HAZMAT Incident	City Council	On-Going	Low	Local
H	Maintain and/or develop storm water management program	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease, Flash Flood	City Council	On-Going	Low	Local
M	Eliminate and cap private and abandoned wells in the city	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council	On-Going	Low	Local
M	Eliminate the use of septic tank systems in the city limits	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council	On-Going	Minimal	Local
H	Follow monitoring requirements set forth by the Iowa DNR	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, Engineer	On-Going	Low	Local
M	Carry out conservation measures such as erosion control and work with the following organizations: Extension, NRCS, Farm Bureau, EPA, DNR, and Soil and water Conservation District	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, Engineer	On-Going	Moderate	Local, State, Federal
M	Maintain and update anti-virus software	Terrorism	Staff	On-Going	Minimal	Local
M	Secure vulnerable targets, as identified by the LEPC and County EMA with alarms, security cameras and fences	Terrorism	Sheriff	On-Going	Minimal	Local
H	Review and update fire codes as necessary	Grass/Wild Fire	Fire Department	On-Going	Minimal	Local
M	Continue to cooperate with pipeline owners and operators to ensure locations are marked	Grass/Wild Fire	City Council	On-Going	Minimal	Local
M	Purchase a new tanker and/or pumper	Grass/Wild Fire	City Council	On-Going	Low to Moderate	Local
M	Encourage community to plant shade trees	Extreme Heat	City Council	On-Going	Minimal	Local
M	Provide fans and/or cooling shelter	Extreme Heat	County EMA	On-Going	Minimal to Low	Local
M	Maintain air conditioner(s) in community buildings	Extreme Heat	Public Works	On-Going	Minimal	Local
M	Keep a supply of drinking water to distribute	Extreme Heat	Grundy County EMA	On-Going	Low	Local
M	Encourage the public to receive vaccinations	Human Disease	Grundy County EMA, Health Dept.	On-Going	Minimal	Local
H	Cooperate with any countywide mass vaccination plan	Human Disease	Grundy County EMA	On-Going	Minimal	Local
M	Monitor disease outbreak news from the CDC and Iowa Department of Public Health	Human Disease, Animal/Plant/Crop Disease	Grundy County EMA, Sheriff	On-Going	Low to Moderate	Local

H	Restrict water usage should it be necessary	Drought	City Council	On-Going	Minimal to Low	Local
M	Encourage the use of proper materials and construction techniques	Expansive Soils	City Council	On-Going	Minimal to Low	Local
M	Educate city personnel to identify risk areas	Expansive Soils	City Council	On-Going	Minimal	Local
M	Install tiling to help water move away from structures	Expansive Soils	Public Works	On-Going	Minimal to Low	Local
M	Enforce a curfew	Terrorism	Sheriff	On-Going	Minimal to Low	Local, State
H	Continue regular bridge inspections	Infrastructure Failure	City Council, Engineer	On-Going	Minimal to Low	Local
M	Place barricades to close dangerous bridges	Infrastructure Failure	City Council, Sheriff	On-Going	Minimal to Low	Local
M	Maintain embargos/weight limits as necessary	Infrastructure Failure	City Council, Engineer	On-Going	Minimal to Low	Local, State
L	Identify and inventory potential sinkhole sites	Sinkholes	Public Works	On-Going	Minimal to Low	Local
L	Educate city personnel to handle a sinkhole situation	Sinkholes	City Council, Engineer	On-Going	Minimal	Local
M	Secure the area (around a sinkhole)	Sinkholes	Public Works	On-Going	Minimal	Local
M	Inspect any utility lines that are near a sinkhole	Sinkholes	Public Works	On-Going	Minimal	Local
L	Enforce the local zoning ordinances	Landslides	City Council	On-Going	Minimal	Local
M	Clear ditches, streams, and waterways on a regular basis	River Flooding	City Council, Public Works	On-Going	Minimal	Local
M	Encourage floodproofing/elevating structures in the floodplain	River Flooding	City Council, EMA	On-Going	Minimal	Local
M	Update flood maps/flood studies for areas throughout the county	River Flooding	City Council	On-Going	Minimal	Local
L	Identify bridges and culverts than can cost effectively be reengineered to reduce future flooding	River Flooding	City Council, Engineer	On-Going	Minimal	Local
H	Establish transportation evacuation routes and protocols	River Flooding	City Council, EMA, Sheriff	On-Going	Minimal	Local
H	Develop sandbagging procedures for the community	River Flooding	City Council, EMA	On-Going	Minimal	Local
H	Develop and maintain staging area for dumping during cleanup	River Flooding	City Council, Public Works	On-Going	Minimal	Local
M	Continue cooperation with county in developing flood mitigation efforts	Flash Flood, River Flooding	City Council, EMA	On-Going	Minimal	Local
M	Purchase additional parkland in order to increase greens space and reducing surface flow	River Flooding	City Council	On-Going	Minimal	Local
H	Regularly inspect dams	Emergency Management*	City Council	On-going	Minimal	Local
M	Set a designated number of people to be trained in post-disaster record keeping/damage assessments	Emergency Management*	City Council, EMA	On-Going	Minimal	Local
H	Inform the public of reputable and ill reputable contractors following disasters	Emergency Management*	City Council	On-Going	Minimal	Local
M	Encourage all communities to participate in their Local Emergency Planning Commission (LEPC)	Emergency Management*	City Council, EMA	On-Going	Minimal	Local
H	Maintain and update emergency response plans	Emergency Management*	City Council, EMA	On-Going	Low to Moderate	Local
H	Maintain lists of personnel and equipment available to use with response plans	Emergency Management*	City Council, Staff	On-Going	Minimal	Local

H	Maintain communication with county contacts	Emergency Management*	City Council, Staff	On-Going	Moderate	Local
H	Maintain NIMS compliance	All	City Council, EMA	On-Going	Moderate	All

APPENDIX E: CITY OF HOLLAND

COMMUNITY PROFILE

Location

Holland is located in the central portion of Grundy County. The town is located at the coordinates of 42.3989° N and 92.8005° W. Holland Creek runs primarily south of the City, but it does have a tributary that is on the eastern portion of Holland.

Transportation

There are only three roads that can be used to enter and exit the City of Holland. The most popular of road that travels into Holland is 210th Street. 210th Street enters Holland from the east and intersects with 205th Street and 215th Street near the center of Holland.

According to the Iowa Department of Transportation's 2013 traffic study, an average of 1,330 cars and trucks travel on the portion of 210th Street just to the east of the city limits. To the east of Holland is State Highway 14, which travels north/south, daily use for State Highway 14 at the intersection of 210th Street and State Highway 14 is 3,870 to the north and 3,000 to the south of the intersection.

205th Street is the next in popularity in terms of use, and according to that same study done in 2013 by the Department of Transportation, 800 cars and trucks travel on 205th Street daily. 205th Street travels out the western side of Holland.

215th Street is the least popular road that connects Holland to outside communities; this is a smaller connecting road to the southwest of the City. In that same 2013 study done by the Department of Transportation, 130 cars and trucks travel daily on 215th Street.

Grundy County's only airport is located near Grundy Center, approximately 4 miles southwest of Holland. Grundy Center Muni Airport-6K7 is a public airport.

The closest major airport is the Waterloo Regional Airport (ALO), which is located approximately 25 miles northeast of Holland. This public airport is owned and operated by the City of Waterloo and overseen by an Airport Commission appointed by the Mayor. The primary runway is 8,400 foot long, 150 foot wide, and has a grooved asphalt surface. The airport is classified as a non-hub primary commercial service airport, offering general aviation and commercial service.

Community Services

Holland is part of the Central Iowa Water Association's regional water supply and is provided an adequate amount of water through this distribution system.

The city has their own wastewater treatment facility and provides sanitary sewer service to their residents. The rated capacity of the system is 115,200 gpd, average daily demand is 10,000 gpd and peak demand is 41,000 gpd. Therefore, the sewer system has plenty of surplus capacity to accommodate existing and future development.

TABLE E1: HOLLAND UTILITY PROVIDERS

Electric	Natural Gas	Water	Sewer	Sanitation	Telephone	Internet	Cable
Rural Electric Company / Alliant Energy	Alliant Energy	Central Iowa Water Association	Central Iowa Water Association	Central Iowa Water Association	Windstream	Windstream / T&T Computers	Satellite

Demographics

Table E2 provides an overview of Holland's demographics. From 2000 to 2010, the City experienced a 12.8% increase in population, from 250 to 282 persons.

TABLE E2: CITY OF HOLLAND DEMOGRAPHICS

Government Framework	Mayor – City Council		
General Population, 2010 Census		***Economics Characteristics, 2010 Census***	
Total Population (2010)	282	Population 16 years and over	208
Total Males	145	Population in Labor Force (16 yrs. and over)	139
Total Females	137	Persons in Civilian Labor Force	139
Median Age	35.5	Persons Employed	139
At-Risk Population, <18 Yrs.	74	Persons Unemployed	0
At-Risk Population, >64 Yrs.	41	Persons in Armed Forces	0
One Race-White	281	Mean Travel Time to Work in Minutes (16 yrs. & over)	19.6
Black or African American	0	Persons Employed in Management, Professional, or Related Occupations	26
Asian	0	Persons Employed in Service Occupations	17
Native Hawaiian or Pacific Islander	0	Persons Employed in Sales and Office Occupations	30
Two or More Races	1	Persons Employed in Farming, Fishing, or Forestry Occupations	1
Hispanic or Latino (of any race)	0	Persons Employed in Construction, Extraction, or Maintenance Occupations	15
Not Hispanic or Latino	282	Persons Employed in Production, Transportation, or Material Moving Occupations	50
Total Household Population	282	Median Household Income	$34,886
Total Population in Group Quarters	0	Median Family Income	$38,125
Persons in Group Quarters – Nursing Homes	0	Per Capita Personal Income	$15,370
Persons in Group Quarters – Noninstitutionalized	0	Families below Poverty Level	6
Housing Characteristics, 2010 Census		Individuals below Poverty Level	109
Total Housing Units	113	Unemployment Rate	0.0%
Total Owner-Occupied Housing Units	93	***Social Characteristics, 2010 Census***	
Total Renter-Occupied Housing Units	14	School Enrollment (3 yrs. and over)	57
Total Vacant Housing Units	6	Nursery School, Preschool	3
Total 1-Unit Detached and Attached Structures	100	Kindergarten and Elementary School (grades 1-8)	41
Total 2, 3, and 4-Unit Structures	10	High School (grades 9-12)	7
Total 5 to 19-Unit Structures	0	College or Graduate School	6
Total Mobile Homes	0	Education Attainment: Population 25 Years and Over	188
Year Majority of Housing Units were Built	1959 or earlier (65.2%)	Persons with Less than 9th Grade	19
Average Household Size	2.64	Persons with 9th to 12th Grade, No Diploma	11
Average Family Size	3.12	Persons with High School Degree or Equivalency	79
Specified Renter-Occupied Units	12	Persons with Some College, No Degree	49
Median Gross Rent	$431	Persons with Associate Degree	20
Specified Owner-Occupied Units	88	Persons with Bachelor's Degree	8
Median Housing Value, Owner-Occupied	$46,300	Persons with Graduate or Higher Degree	2
Method of Heating Household	Utility Gas (90.6%)	Persons with a Disability (5 yrs. and over)	63
Households with No Telephone Service	2	Persons that Speak a Language other than English at Home (5yrs +)	8

HAZARDS & RISK ASSESSMENT

Hazard Analysis

Section 3 identified and profiled the hazards for the entire planning area. However, each community analyzed their own vulnerability to those hazards applicable to their jurisdiction. Using the methodology outlined in Section 3 (Vulnerability Assessment), the City of Holland evaluated the risk associated with a specific hazard, defined by probability and frequency of occurrence, magnitude, severity, exposures, and consequences. Holland's vulnerability assessment provides in-depth knowledge of the hazards and vulnerabilities that affect the community. This analysis provides an all-hazard approach when evaluating the hazards of that affect the city, and the associated risks and impacts each hazard presents.

As mentioned previously in Section 3, the vulnerability assessment requires a five-year review with periodic updates, as needed. Potential future hazards and impacts may result from changing technology, new critical facilities, infrastructures, and development patterns, as well as demographic and socioeconomic changes that occur within or outside the area.

Disaster frequency and its effects or severity are important as a basis for planning emergency response and mitigation. Natural hazards tend to reoccur on a predictable seasonal basis, whereas manmade or technological events tend to change over time with advancement in technology and methods of operation. Five criteria were used by the Committee to assure a systematic and comprehensive approach to hazard analysis for their individual jurisdictions including: Historical Occurrence, Probability, Magnitude or Severity, Warning Time, and Duration.

The Committee assessed the defined hazards relevant to potential impact on the city. Using the scoring criteria previously defined (Tables 19-22) the city assessed each of the identified hazards based on probability, magnitude/severity, warning time, and duration. The scores for each of the factors were weighted using the formula below to develop the final hazard assessment score.

(Probability x .45) + (Magnitude/Severity x .30) + (Warning Time x .15) + (Duration x .10)

= Final Hazard Assessment Score

Table E3 is the analysis scores for the City of Holland. As seen in Table E3, the top three hazards for Holland are Animal/Plant/Crop Disease, Flash Flood, and Tornado/Windstorm.

TABLE E3: IDENTIFIED HAZARDS FOR HOLLAND						
Hazard Rank	**Hazards**	**Probability**	**Magnitude/Severity**	**Warning Time**	**Duration**	**Assessment Score**
1	Animal/Plant/Crop Disease	4	2	4	3	**3.3**
2	Flash Flood	4	2	3	4	**3.25**
3	Tornado/Windstorm	4	2	4	2	**3.2**
4	Thunderstorm/Lightning/Hail	4	2	3	2	**3.05**
5	Extreme Heat	4	2	1	4	**2.95**
6	Drought	4	2	1	4	**2.95**
7	Severe Winter Storm	4	2	1	3	**2.85**
8	HAZMAT Incident	2	2	4	2	**2.3**
9	Infrastructure Failure	2	2	3	3	**2.25**
9	River Flooding	2	2	3	3	**2.25**
11	Grass/Wild Fire	2	2	4	1	**2.2**
12	Earthquake	1	2	4	1	**1.75**
13	Radiological Incident	1	1	4	3	**1.65**
14	Terrorism	1	1	4	2	**1.55**
14	Transportation Incident	1	1	4	2	**1.55**
16	Levee/Dam Failure	1	1	3	3	**1.5**
17	Sinkholes	1	1	4	1	**1.45**
17	Landslide	1	1	4	1	**1.45**
19	Human Disease	1	1	2	3	**1.35**
20	Expansive Soils	-	-	-	-	**-**

Vulnerability – Identifying Assets (Critical Facilities)

This section will describe the vulnerability for existing and future buildings, infrastructure, and critical facilities in those areas that can be impacted by the prioritized hazards. Since the majority of the hazards have an undefined hazard area (i.e., affecting an entire community or larger area) the following vulnerability assessment will only address those hazards that affect a specified area – flooding (river and flash).

Critical Facilities

Identifying the location of critical facilities and designated shelters (see Table E4) in Holland is important in order to assess their vulnerability to hazards. These critical facilities are important to the community's operations, quality of life, and the key components of the economic sector. For instance, high-density residential or commercial development, schools, police stations, government buildings, hospitals and care facilities, airports, gas stations, hardware stores, grocery stores, and water supply systems. It is important to know the threats each hazard poses to these facilities. *Attachment* 6F illustrates the location of identified critical facilities throughout the community.

TABLE E4: CRITICAL FACILITIES AND DESIGNATED SHELTERS IN HOLLAND

Critical Facilities	
City Hall	Wastewater Facility
Fire Department	Heartland Co-op
Shelters	
None	

Source: Community

According to available data, Holland is projected to see a decrease in population over the next thirty years, but at a very slow decrease. This population decrease most likely result in a lesser need for additional critical facilities that would be located within the city limits. However, the need for more or less critical facilities should be monitored these next 5-years and readdressed when this HMP is updated.

Homes in Hazardous Areas

A facility's vulnerability to a flooding event is normally low, since these structures are rarely constructed within the 100-year floodplain. According to the information provided, bridges and roadways would be impacted by flooding. This disruption in the transportation infrastructure would create a longer time period to receive and provide services and supplies to an area if a bridge was washed away due to flooding.

TABLE E5: CITY OF HOLLAND 100-YEAR FLOODPLAIN PROPERTIES

Total Dwellings	7
Total Buildings	7
Total Structures	14
Total Value of all Structures	$813,120

Source: INRCOG & Grundy County Assessor

Table E5 lists the number properties in Holland that are located within the 100-year floodplain. According to data provided by FEMA, Holland has 7 dwellings within the flood hazard area. According to the data provided by INRCOG and Grundy County, there are 16 parcels located within the 100-year floodplain; most of this land is undeveloped. See *Attachment 5D: Flood Scenario Map of the City* and Table E5.

Tornadoes and windstorms are events that can cause harm to all structures and populations in the area. As part of a vulnerability assessment, a hypothetical tornado scenario was created for the community. Attachment 5h and Attachment 5j 4k illustrate the impact of a hypothetical tornado event in Holland. Table E6 displays the degrees of impact that a hypothetical tornado

TABLE E6: TORNADO SCENARIO FOR HOLLAND

Scale	Tornado Width	# of Parcels	Damaged Values	% of City Damaged
EF0	50 Meters	31	$466,600	5.72%
EF1	150 Meters	72	$911,068	11.17%
EF2	250 Meters	89	$2,144,455	26.28%
EF3	500 Meters	126	$3,124,305	38.29%
EF4	900 Meters	157	$8,159,380	100.00%
EF5	1100 Meters	157	$8,159,380	100.00%

scenario of various strengths would have on Holland. As can be seen from the table, a direct hit from an EF4 or EF 5 tornado would damage 100 percent of the City.

As stated on the FEMA website, mobile homes are highly vulnerable to tornadoes. Even mobile homes that are tied down, offer little protection from tornadoes. According to Census data provided, there are no mobile homes in Holland. Multi-family housing units are another type of housing that is considered at-risk during one of these events. There are approximately 2 families residing in multi-family housing units in Holland according to the U.S. Census.

Vulnerability – Social Assets (Populations)

The social vulnerability assessment also identified how the hazards affect the population of Holland and it is assumes that the identified populations are more likely to require assistance during times of disaster; therefore, are considered, generally speaking, more "at-risk" than the remaining population. The "at-risk" population must be identified and targeted in successful mitigation efforts. Table E7 presents an overview of the at-risk population in Holland according to available information retrieved from the 2010 U.S. Census, 2011-2015 American Community Survey estimates, and Iowa Data Center.

TABLE E7: CITY OF HOLLAND "AT-RISK" POPULATION

	2010
Total City Population (2010)	282
Elderly (65 yrs. and older)	41
Youth (under 18 yrs. old)	82
Householder Living Alone	26
Non-English Speaking Population (speaks English less than 'very well'	4
Population Living in Poverty	17
Population in Mobile Homes	0
Group Quarters Population	0
Persons with Disabilities (age 5+)	63
Persons w/Sensory Disability	15
Persons w/Physical Disability	15
Persons w/Mental Disability	12
Persons w/Self-Care Disability	2
Persons w/Go-Outside-Home Disability	14
Persons w/Employment Disability	5

Source: U.S. Census, 2010; Iowa Data Center

According to Table E7, 14.5% of residents are 64 years or older. Due to the health of the older residents, transportation and care of these persons would be component to a successful mitigation. Persons under the age of 18 are also at higher risk during some disasters. This is mostly due to the fact that young persons often are not aware of the proper actions to take in the event of a disaster. In addition, very young children would be more susceptible to a disaster such as a disease epidemic simply due to their age. In 2010, there was 29% of the city's total population under the age of 18.

Vulnerability – Estimating Potential Property Losses

Valuations are an important component of hazard mitigation planning in so much as it provides measurable data that can be used to form some type of estimate as to the potential losses a community could face in the event of a disaster. The valuations for the City of Holland are available from the County Assessor's office. City of Holland's property valuations are in Table D8.

This information was made available from the Grundy County Assessor's office. It should be noted however that these dollar amounts do not include gas and electric utility valuations nor do the evaluations include exempt properties, including government buildings, infrastructure, and religious/nonprofit properties. These results should be considered preliminary, as a full accounting of assets has not been completed.

TABLE E8: ASSET INVENTORY – VALUE OF STRUCTURES IN HOLLAND				
Type of Structure	**Lot/Land Value**	**Value of All Structures**	**Total Value**	**Number of Structures**
Residential	$1,211,980	$7,692,970	$8,904,950	111
Commercial	$85,490	$538,050	$623,540	12
Industrial	$0	$0	$0	0
Agriculture	$36,470	$0	$36,470	0
Total	**$1,333,940**	**$8,231,020**	**$9,564,960**	**123**
Source: Grundy County Assessor; Values as of 6/10/2016				

Future Development

Future development within identified hazard areas can change the threat level of an area by placing critical facilities, businesses, transportation networks, utilities, and populations within vulnerable areas. While it can be difficult to curb development in the planning area, it is the jurisdiction's advantage to be aware of development trends in order to successfully mitigation future hazards as risks increase. However, continued conformity with the State Building Codes and local land use ordinances and regulations (zoning, subdivision, floodplain management, etc.) will help to mitigate the effects hazards have on new and future development.

Repetitive Loss Properties

FEMA defines a repetitive loss property as an insurable building that has experienced two losses in a 10-year period in which each loss is $1,000 or more. City of Holland does participate in the NFIP; there are no repetitive loss properties in Holland.

This HMP attempts to reduce loss by identifying potential natural and manmade hazards. As a result of many natural and manmade hazards, repairs and reconstruction area often completed in a way that returns the structure to pre-disaster condition yet does little to prevent a reoccurrence of damage. Replication of the pre-disaster conditions allows for the repetitive cycle of property damage, reconstruction, and re-damage. Hazard mitigation is needed to ensure that such cycles are broken, that post-disaster repairs and reconstruction are analyzed, and sound, less vulnerable conditions are produced. Additionally, other mitigation strategies may be considered, such as voluntary property buy-outs.

Using GIS spatial data from FIRM maps, in combination with property value data from the Grundy Assessor's office, estimates of value in the floodplain were calculated. Table E9 shows the estimated value of land, buildings, and dwellings, within the city, in a floodplain.

TABLE E9: FLOODPLAIN DATA FOR HOLLAND						
	Number of Parcels	Land Value	Building Value	Dwelling Value	Total Value	Percent of City Affected
1% Annual Floodplain	16	$210,189	$0	$813,120	$1,023,309	10.78%
0.2% Annual Floodplain	-	-	-	-	-	-
Source: Grundy County Assessor's Office; Analysis conducted by INRCOG; Parcel values and FIRM maps as of 10/19/2005						

MITIGATION STRATEGY

Hazard Mitigation Plan Goals

The hazard mitigation plan goals were reviewed by the Hazard Mitigation Planning Committee at their second committee meeting. The committee set as a priority the development of broad-based goals that would address a multitude of hazards and encompass a variety of mitigation activities. The hazard mitigation plan goals for the City of Holland are as follows:

1. Minimize to the greatest possible extent the number of injuries and/or loss of life associated with all identified hazards.
2. Reduce or eliminate property damage due to the occurrence of disasters.
3. Identify ways that response operations, in the event of a disaster, can be improved.
4. Return the community to either pre-disaster or improved conditions in a timely manner in the wake of a disaster.
5. Develop strategies that can be used to reduce the community's overall risk to the negative effects of natural, technological, and man-made disasters.
6. Reconvene the planning committee on an annual basis to review the plan document, check for compliance with the plan goals, and track progress in achieving the mitigation strategies.
7. Maintain the Countywide Multi-Jurisdictional format for future plan updates.

Current Mitigation Actions

Prevention Mitigation Actions

The city has an adopted Floodplain Management Ordinance and is a member of the Flood Insurance Program.

TABLE E10: HOLLAND'S CURRENT PLANNING AND REGULATORY DOCUMENTS								
Previous HMP	**Comprehensive Plan**	**Building Code**	**Zoning Ordinance**	**Subdivision Regulations**	**Floodplain Management Ordinance**	**Tree-Trimming Ordinance**	**Storm Water Ordinance**	**Snow Removal Ordinance**
Yes	No	No	No	No	Yes	No	No	Yes
Source: Community								

Property Protection Mitigation Actions

Holland has not done or been involved with any property protection mitigation actions.

Public Education and Awareness Mitigation Actions

The city does have one tornado warning siren to alert people of an approaching tornado or severe thunderstorm. Grundy County uses the AlertIowa notification system to notify users in case of an emergency.

Emergency Services Mitigation Actions

Grundy County Emergency Management Agency

Holland works with the Grundy County Emergency Management Coordinator, based out of the City of Grundy Center, on various safety and emergency events. The Emergency Management Coordinator works in conjunction with local fire, rescue, police, and government officials to draft and implement workable emergency action plans in the community. The current Emergency Management Coordinator is Zach Tripp and current contact information is as follows: Grundy County Emergency Management Agency, 705 8th Street, Grundy Center, Iowa 50638, (319) 824-6933, email: ztripp@grundysheriff.org

Law Enforcement

Holland contracts with Grundy County Sheriff's Department for law enforcement and police protection.

Fire Protection

The city has a volunteer fire department. The department has one pumper, one tanker, two grass rigs, one equipment van, and a Jaws of Life.

Ambulance

The city does not have an ambulance service.

Medical Facilities

The city has no medical facilities. Grundy Memorial Hospital is located in Grundy Center and is the only medical facility (other than small clinics) located in the county.

HAZMAT

Holland contracts with Northeast Iowa Response Group for response to hazardous material spills. The Northeast Iowa Response Group is a division of Waterloo Fire Rescue as is the Hazardous Materials Regional Training Center. The Training Center provides training to fire departments and companies from around the state and country. Not only is this a training center it also serves as a hazardous materials quick response unit to Black Hawk County, surrounding counties, and many municipalities in a ten county region. The Unit provides local fire departments with hazard materials emergency procedures thus reducing additional contamination. An evacuation plan is also in place in conjunction with the activities with the local department. Contact information for the facility is as follows: Hazardous Materials Regional Training Center, 1925 Newell Street, Waterloo, Iowa 50707, Phone: (319) 291-4275, Toll Free: (800) 291-4682, Fax: (319) 291-4285

The jurisdiction also partners the Northeast Iowa Response Group for assistance in responding to any methamphetamine labs located in the city limits. The Response Group assists the Police Departments in containment of the site and disposal of the hazardous chemicals.

Warning Systems

Grundy County uses the AlertIowa notification system that is utilized statewide. The program is funded by the State of Iowa and administered through Iowa Homeland Security and Emergency Management Office. AlertIowa will be administered through Grundy County Emergency Management Agency and will be available to all county cities and school districts.

AlertIowa will allow for emergency notifications at all times via landline telephones, cell phones, email, text message, and social media. The County will use their emergency notification network for all of the following events: blizzards, flash flooding, severe thunderstorms, and tornadoes. There is an optional way to receive the same alert for events such as: excessive heat warnings, hazardous materials warnings, heavy snow warning, high wind warnings, ice storm warnings, law enforcement warnings, shelter in place warnings, sleet warnings, wind chill warnings, and winter storm warnings.

Natural Resource Protection Mitigation Actions

Holland does not have nor done any natural resource protection mitigation actions.

Structural Projects Mitigation Actions

Holland does not have nor done any structural projects mitigation actions.

Future Mitigation Actions

While the existing mitigation activities discussed above detail the city's efforts to mitigate hazards when possible and to respond to hazards in a timely and efficient manner, the Committee also recognizes that there are many more mitigation activities and projects that would benefit county residents. Thus, the Committee developed a list of future hazard mitigation activities that, if accomplished, would serve to further reduce the risk of hazards to the community. The list may include a combination of projects the Committee feels the community should try to accomplish and mitigation efforts that are ongoing that the Committee view as vital to the continued well-being of the public.

Priority

The Committee analyzed the potential mitigation activities. This analysis included a discussion of the potential benefits of implementing the activity, some hurdles that the community may face in implementing the action step, and the drawbacks of implementation. The analysis utilized the STAPLEE feasibility criteria. The STAPLEE technique is a FEMA suggested method of evaluation. The STAPLEE approach assesses both positive and negative impacts on the following aspects of a county: **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental.

The Committee was asked to discuss the STAPLEE elements (Table E11) and determine each element's ranking (High -H, Medium -M, Low-L) for each identified future mitigation activity. Afterwards, the average priority for each migration activity was recorded as the overall priority ranking for that particular future mitigation activity.

TABLE E11: STAPLEE ELEMENTS

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

Timeline

The Committee identified the time period each period each of the proposed mitigation activity will occur. Activities that occur regularly (either daily, weekly, monthly or annually) were identified as Active. If the action is to occur within the next 1-5 years it was identified as Short-Term, if the activity would take 5-10 years it was labeled as Mid-Term, and any activities that would take 10 or more years were identified as Long-Term.

Funding

Although in the long-term hazard mitigation actions will save money by avoiding the loss of lives or property damages, in the short-term each action will have an associated cost. The City will rely heavily on local funding sources to fulfill most of the plan obligations; however, they will also seek funds from State and Federal agencies for both pre- and post-disaster mitigation activities.

The estimated cost(s) for each mitigation action, program, or project is either: Minimal, Low, Moderate, or High depending upon various factors.

- Minimal: Cost estimate is $10,000 or less based on using current staff, time commitment, continuous of current duties, proposed action/program/ project, and funding sources.
- Low: Cost estimate for project range from $10,001 - $99,999 based on existing proposed treatment, time commitment, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.).
- Moderate: Cost estimate for project range from $100,000 - $299,999 based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.), and funding sources.
- High: Cost estimate for project range is $300,000 or higher based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, project components (permits, acquisition, coordination, etc.), and funding sources.

Implementation Strategy

One of the first steps the Committee took was to review the City's existing Hazard Mitigation Activities and provide an update on their status, see Based on each activity's progress, City's chose to continue the activity or drop it from the plan update. Once the Committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. In addition, the Committee identified a time line for each activity, associated hazards, estimated cost, priority, identified the responsible party or parties for each activity, and indicated at least which of the city's goals the action addresses. Table E12is the City of Holland's Implementation Strategy.

TABLE E12: CITY OF HOLLAND'S IMPLEMENTATION STRATEGY

Priority	Mitigation Action/Program/Project	Associated Hazard	Primary Agency Responsible for Implementation	Date for Completion	Estimated Cost (s)	Funding Source
H	Educate the public	All	Grundy County EMA	Active	Minimal	Local
H	Continue training and education for fire departments, law enforcement agencies and ambulance crew personnel	All	City Council and Roads Depts.	On-going	Moderate	Local, State
H	Maintain and acquire materials and equipment for fire departments, law enforcement agencies and ambulance crew personnel	All	City Council	Active	Minimal	Local, State
H	Provide emergency shelters for evacuees	All	Grundy County EMA	On-going	Minimal	Local
H	Maintain mutual aid agreements	All	Grundy County EMA, City Council	Active	Minimal	Local
M	Maintain tree trimming program	Severe Winter Storm,	City Council	Active	Low	Local

		Tornado/Windstorm, Thunderstorm/Lightning/Hail/Hail				
H	Determine locations for potential heating shelters and volunteer organization	Severe Winter Storm	Grundy County EMA	On-going	Minimal	Local
M	Encourage utility providers and developers to place all utilities underground	Severe Winter Storm, Infrastructure Failure, Thunderstorm/Lightning/Hail	City Council	Active	Moderate	Local
H	Purchase and maintain backup generators	Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado, Emergency Management	Grundy County EMA	Not Complete	Minimal	Local
H	Maintain public works equipment	Severe Winter Storm	Public Works	Active	Minimal	Local
H	Notify the media on shelter locations	Severe Winter Storm, Extreme Heat, Tornado	Sheriff, EMA	As Needed	Minimal	Local
H	Make sure residents keep sidewalks clear of snow and ice	Severe Winter Storm	Public Works	Active	Minimal	Local
L	Maintain use of snow fences in the city/county	Severe Winter Storm	Public Works	Active	Minimal	Local
H	Use surge protectors to prevent electrical damage to critical and sensitive equipment	Thunderstorm/Lightning/Hail	Staff	Active	Minimal	Local
M	Backup all digital data	Thunderstorm/Lightning/Hail	Staff	Not Completed	Minimal	Local
M	Purchase NOAA weather radios	Thunderstorm/Lightning/Hail, Tornado/Windstorm, Radiological Incident	Grundy County EMA	Active	Minimal	Local, State
L	Enforce and update building codes, as needed	Thunderstorm/Lightning/Hail, Tornado/Windstorm, Expansive Soils, Earthquake	City Council	Active	Minimal	Local
L	Maintain storm spotter training for local fire departments/deputies and EMS crews	Thunderstorm/Lightning/Hail, Tornado/Windstorm	Grundy County EMA	Active	Minimal	Local
M	Continue enforcement of city sump pump discharge ordinance	Thunderstorm/Lightning/Hail	City Council	Ongoing	Minimal	Local
L	Maintain a list of potential storm sewer projects	Thunderstorm/Lightning/Hail	City Council	Active	Minimal	Local
M	Make available a cleanup crew for after a storm	Thunderstorm/Lightning/Hail	City Council, EMA	Not Applicable	Minimal to Low	Local
L	Maintain law enforcement monitoring of large storage supplies	HAZMAT Incident	Sheriff	Active	Minimal	Local
M	Acquire necessary response and detection equipment for city/county employees	HAZMAT Incident	Grundy County EMA	Active	Minimal	Local, State
L	Encourage lead based paint and asbestos removal	HAZMAT Incident	City Council	Active	Minimal	Local
L	Provide a local hazardous waste drop-off site	HAZMAT Incident	City Council	Active	Minimal to Low	Local
H	Maintain mutual aid agreements with the Northeast Iowa response Group	HAZMAT Incident	City Council	Active	Minimal	Local
H	Keep HAZMAT manuals/information current and easily accessible	HAZMAT Incident	All Depts.	Not Applicable	Minimal	Local
H	Maintain, test, and replace warning sirens	Tornado/Windstorm, Thunderstorm/Lightning/Hail, Infrastructure Failure	Grundy County EMA	Not Applicable	Minimal to Low	Local, State

H	Install new warning sirens where needed or replace warning sirens with insufficient decibel levels	Tornado/Windstorm	Grundy County EMA	Active	Moderate	Local, State
H	Encourage and maintain enrollment in emergency notification system	Thunderstorm/Lightning/Hail, Tornado/Windstorm, Infrastructure Failure	Grundy County EMA	Not Completed	Minimal	Local
H	Construct or designate a safe room or storm shelter	Tornado/Windstorm	Grundy County EMA	Not Completed	High	Local, State, Federal
H	Encourage home owners to keep emergency kits	Tornado/Windstorm	Grundy County EMA	Not Completed	Minimal	Local
H	Encourage backup power generation for local telephone systems and cellular operations	Infrastructure Failure	Grundy County EMA	Ongoing	Minimal	Local
M	Maintain or install GPS units in all emergency service and city/county vehicles	Infrastructure Failure	Staff	Active	Minimal	Local
L	Maintain automatic TTY TDD machines for emergency personnel and city/county employees	Infrastructure Failure	Staff	Active	Minimal	Local
M	Enhance Standard Operating Procedures for dissemination of information/press releases in the event of a disaster	Infrastructure Failure	Grundy County EMA	Active	Minimal	Local
M	Continue training and promotion of the Incident Command System	Infrastructure Failure	Grundy County EMA	Active	Minimal	Local, State
M	Complete continuity of government plan	Infrastructure Failure	City Council	Active	Minimal	Local
H	Encourage use of Iowa One call before digging	Infrastructure Failure	City Council	As Needed	Minimal	Local
H	Upgrade radio communications equipment as needed	Infrastructure Failure	Grundy County EMA	On-going	Minimal	Local
H	Regularly review and amend fire and medical HAZMAT response standard operating procedures	Infrastructure Failure	Grundy County EMA	On-going	Minimal	Local
L	Improve standard operating procedures for schools	Infrastructure Failure	Grundy County EMA, Schools	Active	Minimal	Local
M	Seek to improve communications with other agencies	Infrastructure Failure, Terrorism	City Council	Active	Minimal	Local
L	Keep supply of backup radios and cellphones	Infrastructure Failure	Staff	Active	Minimal to Low	Local
M	Maintain list of county emergency contacts	Infrastructure Failure	Staff	Active	Minimal	Local
M	Keep the county updated on personnel changes	Infrastructure Failure	Staff	Active	Minimal to Low	Local
H	Continue cooperation between city roads department and local fire departments during snow emergencies	Severe Winter Storm	Roads Department	Not Completed	Minimal	Local
L	Pursue partnership with rural water as the system expands	Grass/Wild Fire	City Council	Active	Minimal	Local
M	Encourage residents to keep smoke detectors, sprinkler systems and fire extinguishers maintained in their homes	Grass/Wild Fire	Grundy County EMA	Active	Minimal	Local
L	Continue an annual inspection program for commercial and industrial properties	Grass/Wild Fire	Fire Department	On-going	Minimal	Local
H	Continue fire prevention program	Grass/Wild Fire	Grundy County EMA	Active	Minimal	Local
H	Improve water system to enhance firefighting capacity/ability	Grass/Wild Fire	City Council	Active	Minimal	Local
H	Maintain membership in the NFIP	Flash Flood, River Flooding	City Council, EMA	Active	Minimal	Local
H	Maintain, enforce and update floodplain ordinance	Flash Flood, River Flooding	City Council	Not	Minimal	Local

				Completed		
M	Acquire more water pumps	Flash Flood, River Flooding, Dam Failure	Grundy County EMA, Public Works	On-going	Minimal	Local
L	Continue with improvement to the storm water system	Flash Flood	City Council	Active	Low to Moderate	Local, State
H	Prevent inflow and infiltration into the sanitary sewer	Flash Flood, River Flooding	City Council	On-going	Minimal	Local
L	Educate the public on maintaining their sump pumps	Flash Flood	City Council	Active	Minimal	Local
M	Maintain and keep storm drains clear of debris	Flash Flood	Public Works	Active	Minimal	Local
M	Stockpile sand and sandbags	Flash Flood, River Flooding	Grundy County EMA	On-going	Minimal to Low	Local
L	Identify, purchase and remove structures from flood hazard areas	Flash Flood, River Flooding	Grundy County EMA, City Council	Active	Moderate	Local, Federal
L	Initiate and enforce burn ban in times of drought or as needed	Grass/Wild Fire, Drought	City Council	On-going	Minimal	Local
L	Maintain and improve signals/signage along roadways and at railroad crossings	Transportation Incident	Roads Department, Sheriff	On-going	Minimal	Local, State
M	Establish alternative transportation routes should a road need to be closed	Transportation Incident, River Flooding, Flash Flood, Infrastructure Failure	Grundy County EMA, Sheriff	Active	Minimal	Local
L	Purchase emergency signs to be used in case of an incident	Transportation Incident	City Council, Sheriff, EMA	Active	Minimal	Local
L	Enforce no parking designations at special events	Transportation Incident	Sheriff	On-going	Low	Local
L	Identify fallout shelter locations	Radiological Incident	City Council	On-going	Low	Local
L	Keep communication lines open with Nuclear Plant in Palo, IA	Radiological Incident	City Council, EMA	Active	Minimal	Local
M	Maintain and/or develop a wellhead protection program	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, Sheriff	Active	Low	Local, State
M	Monitor wells in areas of identified contamination	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, EMA	As needed	Low	Local
H	Monitor the drinking water supply	HAZMAT Incident, Human Disease, Animal/Plant/Crop Disease	City Council	Active	Moderate	Local
L	Identify and map areas of past contamination	HAZMAT Incident	City Council	Active	Low	Local
M	Maintain and/or develop storm water management program	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease, Flash Flood	City Council	Active	Low	Local
M	Eliminate and cap private and abandoned wells in the city	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council	On-going	Low	Local
L	Eliminate the use of septic tank systems in the city limits	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council	On-going	Minimal	Local
H	Follow monitoring requirements set forth by the Iowa DNR	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, Engineer	Active	Low	Local
M	Carry out conservation measures such as erosion control and work with the following organizations: Extension, NRCS, Farm Bureau, EPA, DNR, and Soil and water Conservation District	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, Engineer	Active	Moderate	Local, State, Federal
M	Maintain and update anti-virus software	Terrorism	Staff	As Needed	Minimal	Local

L	Secure vulnerable targets, as identified by the LEPC and County EMA with alarms, security cameras and fences	Terrorism	Sheriff	As Needed	Minimal	Local
M	Review and update fire codes as necessary	Grass/Wild Fire	Fire Department	As Needed	Minimal	Local
L	Continue to cooperate with pipeline owners and operators to ensure locations are marked	Grass/Wild Fire	City Council	Active	Minimal	Local
M	Purchase a new tanker and/or pumper	Grass/Wild Fire	City Council	Not Completed	Low to Moderate	Local
L	Encourage community to plant shade trees	Extreme Heat	City Council	Active	Minimal	Local
L	Provide fans and/or cooling shelter	Extreme Heat	County EMA	Not Completed	Minimal to Low	Local
M	Maintain air conditioner(s) in community buildings	Extreme Heat	Public Works	Active	Minimal	Local
L	Keep a supply of drinking water to distribute	Extreme Heat	Grundy County EMA	Active	Low	Local
L	Encourage the public to receive vaccinations	Human Disease	Grundy County EMA, Health Dept.	Active	Minimal	Local
M	Cooperate with any countywide mass vaccination plan	Human Disease	Grundy County EMA	Active	Minimal	Local
L	Monitor disease outbreak news from the CDC and Iowa Department of Public Health	Human Disease, Animal/Plant/Crop Disease	Grundy County EMA, Sheriff	Active	Low to Moderate	Local
H	Restrict water usage should it be necessary	Drought	City Council	Active	Minimal to Low	Local
L	Encourage the use of proper materials and construction techniques	Expansive Soils	City Council	Active	Minimal to Low	Local
L	Educate city personnel to identify risk areas	Expansive Soils	City Council	On-going	Minimal	Local
M	Install tiling to help water move away from structures	Expansive Soils	Public Works	Active	Minimal to Low	Local
L	Enforce a curfew	Terrorism	Sheriff	As Needed	Minimal to Low	Local, State
H	Continue regular bridge inspections	Infrastructure Failure	City Council, Engineer	Active	Minimal to Low	Local
M	Place barricades to close dangerous bridges	Infrastructure Failure	City Council, Sheriff	On-going	Minimal to Low	Local
L	Maintain embargos/weight limits as necessary	Infrastructure Failure	City Council, Engineer	Active	Minimal to Low	Local, State
L	Identify and inventory potential sinkhole sites	Sinkholes	Public Works	Active	Minimal to Low	Local
L	Educate city personnel to handle a sinkhole situation	Sinkholes	City Council, Engineer	Active	Minimal	Local
M	Secure the area (around a sinkhole)	Sinkholes	Public Works	Active	Minimal	Local
M	Inspect any utility lines that are near a sinkhole	Sinkholes	Public Works	Not Applicable	Minimal	Local
L	Enforce the local zoning ordinances	Landslides	City Council	Active	Minimal	Local
M	Clear ditches, streams, and waterways on a regular basis	River Flooding	City Council, Public Works	Active	Minimal	Local
L	Encourage floodproofing/elevating structures in the floodplain	River Flooding	City Council, EMA	Active	Minimal	Local
M	Update flood maps/flood studies for areas throughout the county	River Flooding	City Council	Active	Minimal	Local
L	Identify bridges and culverts than can cost effectively be	River Flooding	City Council, Engineer	Active	Minimal	Local

	reengineered to reduce future flooding					
M	Establish transportation evacuation routes and protocols	River Flooding	City Council, EMA, Sheriff	Active	Minimal	Local
M	Develop sandbagging procedures for the community	River Flooding	City Council, EMA	Active	Minimal	Local
M	Develop and maintain staging area for dumping during cleanup	River Flooding	City Council, Public Works	Active	Minimal	Local
M	Continue cooperation with county in developing flood mitigation efforts	Flash Flood, River Flooding	City Council, EMA	Active	Minimal	Local
L	Purchase additional parkland in order to increase greens space and reducing surface flow	River Flooding	City Council	Active	Minimal	Local
L	Set a designated number of people to be trained in post-disaster record keeping/damage assessments	Emergency Management*	City Council, EMA	Active	Minimal	Local
H	Inform the public of reputable and ill reputable contractors following disasters	Emergency Management*	City Council	Active	Minimal	Local
M	Encourage all communities to participate in their Local Emergency Planning Commission (LEPC)	Emergency Management*	City Council, EMA	On-going	Minimal	Local
H	Maintain and update emergency response plans	Emergency Management*	City Council, EMA	Active	Low to Moderate	Local
H	Maintain lists of personnel and equipment available to use with response plans	Emergency Management*	City Council, Staff	Active	Minimal	Local
H	Maintain communication with county contacts	Emergency Management*	City Council, Staff	On-going	Moderate	Local
H	Maintain NIMS compliance	Emergency Management*	City Council, EMA	Active	Moderate	Local, State, Federal

APPENDIX F – CITY OF MORRISON

COMMUNITY PROFILE

Location

Morrison is located in western Grundy County. The town is located at the coordinates of 42.32442° N and 92.6738° W. Black Hawk Creek runs to the north of the City. Black Hawk Creek Wildlife Center is also approximately half of a mile northeast of the city. State Highway 175 travels through the northern part of Morrison, travelling primarily east / west.

Transportation

The most popular of road that travels through Morrison is State Highway 175, which runs east / west through the City. State Highway 175 connects with State Highway 14 west of Morrison about 5 miles.

According to the Iowa Department of Transportation's 2013 traffic study, an average of 1,540 cars and trucks travel on the portion of State Highway 175 west of the city limits. To the east of Morrison, State Highway 175 averages of 1,550 cars and trucks daily.

County Highway T53 travels north / south through the eastern portion of the City. The daily average for T37 north of Morrison is 180 cars and trucks; the daily average for cars and trucks south of Morrison on T37 is 30.

Grundy County's only airport is located in Grundy Center, approximately 6 miles northwest of Morrison. Grundy Center Muni Airport-6K7 is a public airport.

The closest major airport is the Waterloo Regional Airport (ALO), which is located approximately 25 miles northeast of Morrison. This public airport is owned and operated by the City of Waterloo and overseen by an Airport Commission appointed by the Mayor. The primary runway is 8,400 foot long, 150 foot wide, and has a grooved asphalt surface. The airport is classified as a non-hub primary commercial service airport, offering general aviation and commercial service.

Community Services

The City of Morrison's water, sewer, and sanitation is provided by the Central Iowa Water Association, which provides water from a series of wells, pumps and towers to communities all over Grundy County and surrounding counties.

TABLE F1: MORRISON UTILITY PROVIDERS

Electric	Natural Gas	Water	Sewer	Sanitation	Telephone	Internet	Cable
Alliant Energy	Heartland Co-op	Central Iowa Rural Water	Central Iowa Rural Water	Central Iowa Rural Water	Windstream	Windstream	N/A

Demographics

Table F2 provides an overview of Morrison's demographics. From 2000 to 2010, the City experienced a 20.8% decrease in population, from 202 to 160 persons.

TABLE F2: CITY OF MORRISON DEMOGRAPHICS			
Government Framework	Mayor – City Council		
General Population, 2010 Census		***Economics Characteristics, 2010 Census***	
Total Population (2010)	94	Population (16 yrs. and over	74
Total Males	49	Population in Labor Force (16 yrs. and over)	46
Total Females	45	Persons in Civilian Labor Force	46
Median Age	40.5	Persons Employed	43
At-Risk Population, <18 Yrs.	23	Persons Unemployed	3
At-Risk Population, >64 Yrs.	17	Persons in Armed Forces	0
One Race-White	87	Mean Travel Time to Work in Minutes (16 yrs. & over)	17.1
Black or African American	2	Persons Employed in Management, Professional, or Related Occupations	6
Asian	1	Persons Employed in Service Occupations	17
Two or More Races	4	Persons Employed in Sales and Office Occupations	4
Hispanic or Latino (of any race)	0	Persons Employed in Farming, Fishing, or Forestry Occupations	0
Not Hispanic or Latino	94	Persons Employed in Construction, Extraction, or Maintenance Occupations	1
Total Household Population	94	Persons Employed in Production, Transportation, or Material Moving Occupations	15
Total Population in Group Quarters	0	Median Household Income	$26,250
Persons in Group Quarters – Correctional Institutions	0	Median Family Income	$31,875
Persons in Group Quarters – Nursing Homes	0	Per Capita Personal Income	$12,538
Housing Characteristics, 2010 Census		Families below Poverty Level	0
Total Housing Units	40	Individuals below Poverty Level	11
Total Owner-Occupied Housing Units	38	Unemployment Rate	6.5%
Total Renter-Occupied Housing Units	2	***Social Characteristics, 2010 Census***	
Total Vacant Housing Units	0	School Enrollment (3 yrs. and over)	20
Total 1-Unit Detached and Attached Structures	36	Nursery School, Preschool	4
Total 2, 3, and 4-Unit Structures	0	Kindergarten and Elementary School (grades 1-8)	9
Total 5 to 19-Unit Structures	0	High School (grades 9-12)	6
Total 20 or More Unit Structures	0	College or Graduate School	1
Total Mobile Homes	4	Education Attainment: Population 25 Years and Over	71
Year Majority of Housing Units were Built	1979 or earlier (95.2%)	Persons with Less than 9th Grade	6
Average Household Size	2.35	Persons with 9th to 12th Grade, No Diploma	12
Average Family Size	2.88	Persons with High School Degree or Equivalency	39
Specified Renter-Occupied Units	2	Persons with Some College, No Degree	7
Median Gross Rent	$275	Persons with Associate Degree	3
Specified Owner-Occupied Homes	34	Persons with Bachelor's Degree	2
Median Housing Value, Owner-Occupied	$36,000	Persons with Graduate or Higher Degree	2
Method of Heating Household	Bottled, tank or LP Gas (93%)	Persons with a Disability Status (5 yrs.+)	33
Households with No Telephone Service	5	Persons that Speak a Language other than English at Home (5yrs+)	0

HAZARDS & RISK ASSESSMENT

Hazard Analysis

Section 3 identified and profiled the hazards for the entire planning area. However, each community analyzed their own vulnerability to those hazards applicable to their jurisdiction. Using the methodology outlined in Section 3 (Vulnerability Assessment), the City of Morrison evaluated the risk associated with a specific hazard, defined by probability and frequency of occurrence, magnitude, severity, exposures, and consequences. Morrison's vulnerability assessment provides in-depth knowledge of the hazards and vulnerabilities that affect the community. This analysis provides an all-hazard approach when evaluating the hazards of that affect the city, and the associated risks and impacts each hazard presents.

As mentioned previously in Section 3, the vulnerability assessment requires a five-year review with periodic updates, as needed. Potential future hazards and impacts may result from changing technology, new critical facilities, infrastructures, and development patterns, as well as demographic and socioeconomic changes that occur within or outside the area.

Disaster frequency and its effects or severity are important as a basis for planning emergency response and mitigation. Natural hazards tend to reoccur on a predictable seasonal basis, whereas manmade or technological events tend to change over time with advancement in technology and methods of operation. Five criteria were used by the Committee to assure a systematic and comprehensive approach to hazard analysis for their individual jurisdictions including: Historical Occurrence, Probability, Magnitude or Severity, Warning Time, and Duration.

The Committee assessed the defined hazards relevant to potential impact on the city. Using the scoring criteria previously defined (Tables 19-22) the city assessed each of the identified hazards based on probability, magnitude/severity, warning time, and duration. The scores for each of the factors were weighted using the formula below to develop the final hazard assessment score.

(Probability x .45) + (Magnitude/Severity x .30) + (Warning Time x .15) + (Duration x .10)
= Final Hazard Assessment Score

Table F3 is the analysis scores for the City of Morrison. As seen in table, the top three hazards were identified as terrorism, HAZMAT Incident, and infrastructure failures.

Table F3: Hazard Risk Assessment for Morrison						
Hazard Rank	**Hazard**	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**Final Score**
1	Terrorism	4	4	4	4	**4**
2	HAZMAT Incident	4	2	2	2	**2.9**
2	Infrastructure Failure	4	2	2	2	**2.9**
4	Earthquake	1	4	4	4	**2.65**
5	Animal/Plant/Crop Disease	4	1	1	1	**2.35**
5	Flash Flood	4	1	1	1	**2.35**
5	Grass/Wild Fire	4	1	1	1	**2.35**
5	Landslide	4	1	1	1	**2.35**
5	River Flooding	4	1	1	1	**2.35**
5	Sinkholes	4	1	1	1	**2.35**
5	Tornado/Windstorm	4	1	1	1	**2.35**
12	Human Disease	2	2	2	2	**2**
13	Extreme Heat	1	2	2	2	**1.55**
14	Levee/Dam Failure	1	1	1	1	**1**
14	Drought	1	1	1	1	**1**
14	Expansive Soils	1	1	1	1	**1**
14	Radiological Incident	1	1	1	1	**1**
14	Severe Winter Storm	1	1	1	1	**1**
14	Thunderstorm/Lighting/Hail	1	1	1	1	**1**
14	Transportation Incident	1	1	1	1	**1**

Vulnerability – Identifying Assets (Critical Facilities)

This section will describe the vulnerability for existing and future buildings, infrastructure, and critical facilities in those areas that can be impacted by the prioritized hazards. Since the majority of the hazards have an undefined hazard area (i.e., affecting an entire community or larger area) the following vulnerability assessment will only address those hazards that affect a specified area – flooding (river and flash). However, due to the historical occurrences of tornadoes, this hazard was added to the assessment.

Critical Facilities

Identifying the location of critical facilities and designated shelters (see Table F4) in Morrison is important in order to assess their vulnerability to hazards. These critical facilities are important to the operation of a community, the quality of life, and the key components of the economic sector. For instance, high-density residential or commercial development, schools, police stations, government buildings, hospitals and care facilities, airports, gas stations, hardware stores, grocery stores, and water supply systems. It is important to know the threats each hazard poses to these facilities. *Attachment 6G* illustrates the location of identified critical facilities in Morrison.

Emergency shelters are also something that is important to identify. The City of Morrison does not have a designated emergency shelter.

TABLE D4: CRITICAL FACILITIES AND DESIGNATED SHELTERS IN MORRISON

Critical Facilities	
Public Works Garage	Warning Siren
Electrical Substation (Outside of City Limits)	Lift Station (Outside of City Limits)
Shelters	
None	

Source: Community

According to available data, Morrison is projected to see a decrease in population over the next thirty years. This population decrease most likely result in a lesser need for additional critical facilities such as schools, daycare centers, or healthcare centers. However, reevaluating the need for more critical facilities should be closely monitored these next 5-years and readdressed when this HMP is updated.

Homes in Hazardous Areas

A facility's vulnerability to a flooding event is normally low, since these structures are rarely constructed within the 100-year floodplain. According to the information provided, bridges and roadways would be impacted by flooding. This disruption in the transportation infrastructure would create a longer time period to receive and provide services and supplies to an area if a bridge was washed away due to flooding. However, river flooding is not considered a major hazard in Morrison, while flash flooding poses a higher risk.

TABLE F5: CITY OF MORRISON 100-YEAR FLOODPLAIN PROPERTIES

Total Dwellings	3
Total Buildings	0
Total Structures	3
Total Value of all Structures	$118,350

Source: INRCOG & Grundy County Assessor

According to the data provided by INRCOG, Grundy County, and FEMA, there are currently three dwellings in the floodplain that are valued at $118,350. According to the data provided by INRCOG and Grundy County, there are 3 parcels located within the 100-year floodplain. However, flash flooding is a more common occurrence within the built areas of the community, which can cause property and potential injuries if the flash flood event is large. Measures should be taken to ensure problematic areas are dealt with to reduce future flash flooding events. See *Attachment 5D: Flood Scenario Map of the City* and Table F5.

Tornadoes and windstorms are events that can cause harm to all structures and populations in the area. As part of a vulnerability assessment, a hypothetical tornado scenario was created for the community. Attachment 5h and Attachment 5j 4k illustrate the impact of a hypothetical tornado event in Morrison. Table F6 displays the degrees of impact that a hypothetical tornado scenario of various strengths would have on Morrison. As can be seen from the table, a direct hit from an EF4 or EF 5 tornado would damage 100 percent of the City.

As stated on the FEMA website, mobile homes are highly vulnerable to tornadoes. Even mobile homes that are tied down, offer little protection from tornadoes. According to Census data provided, there are approximately 4 mobile homes is Morrison, using the average persons per household of 2.35 means that there is approximately 10 people living in mobile homes in the City. Multi-family housing units are another type of housing that is considered at-risk during one of these events.

TABLE F6: TORNADO SCENARIO FOR MORRISON

Scale	Tornado Width	# of Parcels	Damaged Values	% of City Damaged
EF0	50 Meters	16	$151,300.00	5.09%
EF1	150 Meters	31	$276,490.00	9.30%
EF2	250 Meters	43	$737,420.00	24.80%
EF3	500 Meters	71	$1,266,645.00	42.60%
EF4	900 Meters	80	$2,973,230.00	100.00%
EF5	1100 Meters	80	$2,973,230.00	100.00%

Vulnerability – Social Assets (Populations)

The social vulnerability assessment also identified how the hazards affect the population of Morrison and it is assumes that the identified populations are more likely to require assistance during times of disaster; therefore, are considered, generally speaking, more "at-risk" than the remaining population. The "at-risk" population must be identified and targeted in successful mitigation efforts. Table F7 presents an overview of the at-risk population in Morrison according to available information retrieved from the 2010 U.S. Census, 2011-2015 American Community Survey estimates, and Iowa Data Center.

According to Table F7, 18% of residents are 64 years or older. Due to the health of the older population, transportation and care of the older population would be component to a successful mitigation.

In addition to the older population, persons living in mobile homes, also known as manufactured housing may also be at risk from tornadoes or high winds. There are an estimated 10 persons living in mobile homes.

Persons under the age of 18 are also at higher risk during some disasters. This is mostly due to the fact that young persons are often not aware of the proper actions to take in the event of a disaster. In addition, very young children would be more susceptible to a disaster such as a disease epidemic simply due to their age. In 2010, there was 24% of the city's total population under the age of 18.

The population is obviously more vulnerable in the evening and on weekends when more people are at home. Children home alone while parents are absent and the elderly are especially vulnerable. Most homes in Morrison have basements, but whether or not each home's basement is suitable as a tornado shelter is a question that cannot be

TABLE F7: CITY OF MORRISON "AT-RISK" POPULATION

	2010
Total City Population (2010)	94
Elderly (65 yrs. and older)	17
Youth (under 18 yrs. old)	23
Householder Living Alone	12
Non-English Speaking Population (speaks English less than 'very well'	0
Population Living in Poverty	11
Population in Mobile Homes	3
Group Quarters Population	0
Persons with Disabilities (age 5+)	33
Persons w/Sensory Disability	8
Persons w/Physical Disability	12
Persons w/Mental Disability	5
Persons w/Self-Care Disability	2
Persons w/Go-Outside-Home Disability	4
Persons w/Employment Disability	2

Source: U.S. Census, 2010; Iowa Data Center

answered. The city does not have a designated emergency shelter.

Vulnerability – Estimating Potential Property Losses

Valuations are an important component of hazard mitigation planning in so much as it provides measurable data that can be used to form some type of estimate as to the potential losses a community could face in the event of a disaster. The valuations for the City of Morrison are available from the County Assessor's office. City of Morrison's property valuations are in Table F8.

This information was made available from the Grundy County Assessor's office. It should be noted however that these dollar amounts do not include gas and electric utility valuations nor do the evaluations include exempt properties, including government buildings, infrastructure, and religious/nonprofit properties. These results should be considered preliminary, as a full accounting of assets has not been completed.

TABLE F8: ASSET INVENTORY – VALUE OF STRUCTURES IN MORRISON

Type of Structure	Lot/Land Value	Value of All Structures	Total Value	Number of Structures
Residential	$442,060	$2,464,710	$2,906,770	44
Commercial	$98,700	$633,970	$732,670	10
Industrial	$1,100	$0	$1,100	0
Agriculture	$0	$0	$0	0
Total	**$541,860**	**$3,098,680**	**$3,640,540**	**54**

Source: Grundy County Assessor; Values as of 6/10/2016

Future Development

Future development within identified hazard areas can change the threat level of an area by placing critical facilities, businesses, transportation networks, utilities, and populations within vulnerable areas. While it can be difficult to curb development in the planning area, it is the jurisdiction's advantage to be aware of development trends in order to successfully mitigation future hazards as risks increase. However, continued conformity with the State Building Codes and local land use ordinances and regulations (zoning, subdivision, floodplain management, etc.) will help to mitigate the effects hazards have on new and future development. Fortunately, the planning area has not experienced a significant change in development since the area is rural and the amount of development – residential, commercial, and industrial – has not changed in the past five years.

Repetitive Loss Properties

FEMA defines a repetitive loss property as an insurable building that has experienced two losses in a 10-year period in which each loss is $1,000 or more. City of Morrison does participate in the NFIP; there are no repetitive loss properties in Morrison.

This HMP attempts to reduce loss by identifying potential natural and manmade hazards. As a result of many natural and manmade hazards, repairs and

reconstruction area often completed in a way that returns the structure to pre-disaster condition yet does little to prevent a reoccurrence of damage. Replication of the pre-disaster conditions allows for the repetitive cycle of property damage, reconstruction, and re-damage. Hazard mitigation is needed to ensure that such cycles are broken, that post-disaster repairs and reconstruction are analyzed, and sound, less vulnerable conditions are produced. Additionally, other mitigation strategies may be considered, such as voluntary property buy-outs.

Using GIS spatial data from FIRM maps, in combination with property value data from the Grundy Assessor's office, estimates of value in the floodplain were calculated. Table F9 shows the estimated value of land, buildings, and dwellings, within the city, in a floodplain.

TABLE F9: FLOODPLAIN DATA FOR MORRISON

	Number of Parcels	Land Value	Building Value	Dwelling Value	Total Value	Percent of City Affected
1% Annual Floodplain	3 (4 on Map)	$27,960	$0	$118,350	$146,310	4.18%
0.2% Annual Floodplain	-	-	-	-	-	-

Source: Grundy County Assessor's Office; Analysis conducted by INRCOG; Parcel values and FIRM maps as of 10/19/2005

MITIGATION STRATEGY

Hazard Mitigation Plan Goals

The hazard mitigation plan goals were reviewed by the Hazard Mitigation Planning Committee at their second committee meeting. The committee set as a priority the development of broad-based goals that would address a multitude of hazards and encompass a variety of mitigation activities. The hazard mitigation plan goals for the City of Morrison are as follows:

1. Minimize to the greatest possible extent the number of injuries and/or loss of life associated with all identified hazards.
2. Reduce or eliminate property damage due to the occurrence of disasters.
3. Identify ways that response operations, in the event of a disaster, can be improved.
4. Return the community to either pre-disaster or improved conditions in a timely manner in the wake of a disaster.
5. Develop strategies that can be used to reduce the community's overall risk to the negative effects of natural, technological, and man-made disasters.
6. Reconvene the planning committee on an annual basis to review the plan document, check for compliance with the plan goals, and track progress in achieving the mitigation strategies.
7. Maintain the Countywide Multi-Jurisdictional format for future plan updates.

Current Mitigation Actions

Prevention Mitigation Actions

The city has an adopted Floodplain Management Ordinance and is a member of the Flood Insurance Program.

TABLE F10: CURRENT PLANNING AND REGULATORY DOCUMENTS FOR MORRISON

Previous HMP	Comprehensive Plan	Building Code	Zoning Ordinance	Subdivision Regulations	Floodplain Management Ordinance	Tree-Trimming Ordinance	Storm Water Ordinance	Snow Removal Ordinance
Yes	No	No	No	No	Yes	No	No	No

Source: Community

Property Protection Mitigation Actions

Morrison has not done or been involved with any property protection mitigation actions.

Public Education & Awareness Mitigation Actions

Morrison does not provide any public education mitigation actions. The city has one tornado siren and has a floodplain management ordinance. Grundy County uses the AlertIowa notification system to notify users in case of an emergency.

Emergency Services Mitigation Actions

Grundy County Emergency Management Agency

Morrison works with the Grundy County Emergency Management Coordinator, based out of the City of Grundy Center, on various safety and emergency events. The Emergency Management Coordinator works in conjunction with local fire, rescue, police, and government officials to draft and implement workable emergency action plans in the community. The current Emergency Management Coordinator is Zach Tripp and current contact information is as follows: Grundy County Emergency Management Agency, 705 8th Street, Grundy Center, Iowa 50638, (319) 824-6933, email: ztripp@grundysheriff.org

Law Enforcement

The City of Morrison contracts with the Grundy County Sheriff's Department for law enforcement.

Fire Protection

The City of Morrison contracts with the City of Reinbeck for fire protection.

Ambulance

The City contracts with Reinbeck for ambulance service.

Medical Facilities

Grundy Memorial Hospital is located in Grundy Center and is the only medical facility (other than small clinics) located in the county.

HAZMAT

Morrison contracts with Northeast Iowa Response Group for response to hazardous material spills. The Northeast Iowa Response Group is a division of Waterloo Fire Rescue as is the Hazardous Materials Regional Training Center. The Training Center provides training to fire departments and companies from around the state and country. Not only is this a training center it also serves as a hazardous materials quick response unit to Black Hawk County, surrounding counties, and many municipalities in a ten county region. The Unit provides local fire departments with hazard materials emergency procedures thus reducing additional contamination. An evacuation plan is also in place in conjunction with the activities with the local department. Contact information for the facility is as follows: Hazardous Materials Regional Training Center, 1925 Newell Street, Waterloo, Iowa 50707, Phone: (319) 291-4275, Toll Free: (800) 291-4682, Fax: (319) 291-4285

The jurisdictions also partner the Northeast Iowa Response Group for assistance in responding to any methamphetamine labs located in the city limits. The Response Group assists the Police Departments in containment of the site and disposal of the hazardous chemicals.

Warning Systems

The city has one warning siren.

Grundy County uses the AlertIowa notification system that is utilized statewide. The program is funded by the State of Iowa and administered through Iowa Homeland Security and Emergency Management Office. AlertIowa will be administered through Grundy County Emergency Management Agency and will be available to all county cities and school districts.

AlertIowa will allow for emergency notifications at all times via landline telephones, cell phones, email, text message, and social media. The County will use their emergency notification network for all of the following events: blizzards, flash flooding, severe thunderstorms, and tornadoes. There is an optional way to receive the same alert for events such as: excessive heat warnings, hazardous materials warnings, heavy snow warning, high wind warnings, ice storm warnings, law enforcement warnings, shelter in place warnings, sleet warnings, wind chill warnings, and winter storm warnings.

Public Works / Street Department

The City of Morrison has two miles of streets and 0.5 miles of alley. Two part-time employees work for the street department. The City contracts for snow removal.

<u>Natural Resource Protection Mitigation Actions</u>

Morrison does not have nor done any natural resource protection mitigation actions.

Structural Projects Mitigation Actions

Morrison does not have nor done any structural projects mitigation actions.

Future Mitigation Actions

While the existing mitigation activities discussed above detail the city's efforts to mitigate hazards when possible and to respond to hazards in a timely and efficient manner, the Committee also recognizes that there are many more mitigation activities and projects that would benefit county residents. Thus, the Committee developed a list of future hazard mitigation activities that, if accomplished, would serve to further reduce the risk of hazards to the community. The list may include a combination of projects the Committee feels the community should try to accomplish and mitigation efforts that are ongoing that the Committee view as vital to the continued well-being of the public.

Priority

The Committee analyzed the potential mitigation activities. This analysis included a discussion of the potential benefits of implementing the activity, some hurdles that the community may face in implementing the action step, and the drawbacks of implementation. The analysis utilized the STAPLEE feasibility criteria. The STAPLEE technique is a FEMA suggested method of evaluation. The STAPLEE approach assesses both positive and negative impacts on the following aspects of a county: **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental.

The Committee was asked to discuss the STAPLEE elements (Table F11) and determine each element's ranking (High -H, Medium -M, Low-L) for each identified future mitigation activity. Afterwards, the average priority for each migration activity was recorded as the overall priority ranking for that particular future mitigation activity.

TABLE F11: STAPLEE ELEMENTS

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

Timeline

The Committee identified the time period each period each of the proposed mitigation activity will occur. Activities that occur regularly (either daily, weekly,

monthly or annually) were identified as Active. If the action is to occur within the next 1-5 years it was identified as Short-Term, if the activity would take 5-10 years it was labeled as Mid-Term, and any activities that would take 10 or more years were identified as Long-Term.

Funding

Although in the long-term hazard mitigation actions will save money by avoiding the loss of lives or property damages, in the short-term each action will have an associated cost. The City will rely heavily on local funding sources to fulfill most of the plan obligations; however, they will also seek funds from State and Federal agencies for both pre- and post-disaster mitigation activities.

The estimated cost(s) for each mitigation action, program, or project is either: Minimal, Low, Moderate, or High depending upon various factors.

- Minimal: Cost estimate is $10,000 or less based on using current staff, time commitment, continuous of current duties, proposed action/program/ project, and funding sources.
- Low: Cost estimate for project range from $10,001 - $99,999 based on existing proposed treatment, time commitment, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.).
- Moderate: Cost estimate for project range from $100,000 - $299,999 based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.), and funding sources.
- High: Cost estimate for project range is $300,000 or higher based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, project components (permits, acquisition, coordination, etc.), and funding sources.

Implementation Strategy

One of the first steps the Committee took was to review the City's existing Hazard Mitigation Activities and provide an update on their status, see Based on each activity's progress, City's chose to continue the activity or drop it from the plan update. Once the Committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. In addition, the Committee identified a time line for each activity, associated hazards, estimated cost, priority, identified the responsible party or parties for each activity, and indicated at least which of the city's goals the action addresses. Table F12 is the City of Morrison's Implementation Strategy.

TABLE F12: CITY OF MORRISON'S IMPLEMENTATION STRATEGY

Priority	Mitigation Action/Program/Project	Associated Hazard	Primary Agency Responsible for Implementation	Date for Completion	Estimated Cost (s)	Funding Source
H	Educate the public	All	Grundy County EMA	N/A	Minimal	Local
H	Continue training and education for fire departments, law enforcement agencies and ambulance crew personnel	All	City Council and Roads Depts.	On-Going	Moderate	Local, State
H	Maintain and acquire materials and equipment for fire departments, law enforcement agencies and ambulance crew personnel	All	City Council	On-Going	Minimal	Local, State
H	Provide emergency shelters for evacuees	All	Grundy County EMA	Not Completed	Minimal	Local
H	Maintain mutual aid agreements	All	Grundy County EMA, City Council	Not Completed	Minimal	Local
M	Maintain tree trimming program	Severe Winter Storm, Tornado/Windstorm, Thunderstorm/Lightning/Hail/Hail	City Council	On-Going	Low	Local
L	Determine locations for potential heating shelters and volunteer organization	Severe Winter Storm	Grundy County EMA	Active	Minimal	Local
L	Encourage utility providers and developers to place all utilities underground	Severe Winter Storm, Infrastructure Failure, Thunderstorm/Lightning/Hail	City Council	On-Going	Moderate	Local
L	Purchase and maintain backup generators	Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado, Emergency Management	Grundy County EMA	Not Completed	Minimal	Local
H	Maintain public works equipment	Severe Winter Storm	Public Works	Active	Minimal	Local
L	Notify the media on shelter locations	Severe Winter Storm, Extreme Heat, Tornado	Sheriff, EMA	Not Completed	Minimal	Local
M	Make sure residents keep sidewalks clear of snow and ice	Severe Winter Storm	Public Works	N/A	Minimal	Local
L	Maintain use of snow fences in the city/county	Severe Winter Storm	Public Works	Active	Minimal	Local
L	Use surge protectors to prevent electrical damage to critical and sensitive equipment	Thunderstorm/Lightning/Hail	Staff	Not Completed	Minimal	Local
L	Backup all digital data	Thunderstorm/Lightning/Hail	Staff	N/A	Minimal	Local
L	Purchase NOAA weather radios	Thunderstorm/Lightning/Hail, Tornado/Windstorm, Radiological Incident	Grundy County EMA	Active	Minimal	Local, State
L	Enforce and update building codes, as needed	Thunderstorm/Lightning/Hail, Tornado/Windstorm, Expansive Soils, Earthquake	City Council	N/A	Minimal	Local
L	Maintain storm spotter training for local fire departments/deputies and EMS crews	Thunderstorm/Lightning/Hail, Tornado/Windstorm	Grundy County EMA	Not Completed	Minimal	Local
L	Continue enforcement of city sump pump discharge ordinance	Thunderstorm/Lightning/Hail	City Council	N/A	Minimal	Local
L	Maintain a list of potential storm sewer projects	Thunderstorm/Lightning/Hail	City Council	N/A	Minimal	Local
M	Make available a cleanup crew for after a storm	Thunderstorm/Lightning/Hail	City Council, EMA	On-Going	Minimal to Low	Local

L	Maintain law enforcement monitoring of large storage supplies	HAZMAT Incident	Sheriff	N/A	Minimal	Local
L	Acquire necessary response and detection equipment for city/county employees	HAZMAT Incident	Grundy County EMA	N/A	Minimal	Local, State
L	Encourage lead based paint and asbestos removal	HAZMAT Incident	City Council	N/A	Minimal	Local
L	Provide a local hazardous waste drop-off site	HAZMAT Incident	City Council	N/A	Minimal to Low	Local
H	Maintain mutual aid agreements with the Northeast Iowa response Group	HAZMAT Incident	City Council	Active	Minimal	Local
M	Keep HAZMAT manuals/information current and easily accessible	HAZMAT Incident	All Depts.	Active	Minimal	Local
H	Maintain, test, and replace warning sirens	Tornado/Windstorm, Thunderstorm/Lightning/Hail, Infrastructure Failure	Grundy County EMA	Active	Minimal to Low	Local, State
H	Install new warning sirens where needed or replace warning sirens with insufficient decibel levels	Tornado/Windstorm	Grundy County EMA	Completed	Moderate	Local, State
M	Encourage and maintain enrollment in emergency notification system	Thunderstorm/Lightning/Hail, Tornado/Windstorm, Infrastructure Failure	Grundy County EMA	Active	Minimal	Local
M	Construct or designate a safe room or storm shelter	Tornado/Windstorm	Grundy County EMA	N/A	High	Local, State, Federal
M	Encourage home owners to keep emergency kits	Tornado/Windstorm	Grundy County EMA	N/A	Minimal	Local
L	Encourage backup power generation for local telephone systems and cellular operations	Infrastructure Failure	Grundy County EMA	N/A	Minimal	Local
L	Maintain or install GPS units in all emergency service and city/county vehicles	Infrastructure Failure	Staff	N/A	Minimal	Local
L	Maintain automatic TTY TDD machines for emergency personnel and city/county employees	Infrastructure Failure	Staff	N/A	Minimal	Local
L	Enhance Standard Operating Procedures for dissemination of information/press releases in the event of a disaster	Infrastructure Failure	Grundy County EMA	N/A	Minimal	Local
L	Continue training and promotion of the Incident Command System	Infrastructure Failure	Grundy County EMA	N/A	Minimal	Local, State
L	Complete continuity of government plan	Infrastructure Failure	City Council	N/A	Minimal	Local
H	Encourage use of Iowa One call before digging	Infrastructure Failure	City Council	N/A	Minimal	Local
M	Upgrade radio communications equipment as needed	Infrastructure Failure	Grundy County EMA	N/A	Minimal	Local
M	Regularly review and amend fire and medical HAZMAT response standard operating procedures	Infrastructure Failure	Grundy County EMA	N/A	Minimal	Local
L	Improve standard operating procedures for schools	Infrastructure Failure	Grundy County EMA, Schools	N/A	Minimal	Local
M	Seek to improve communications with other agencies	Infrastructure Failure, Terrorism	City Council	Active	Minimal	Local
L	Keep supply of backup radios and cellphones	Infrastructure Failure	Staff	N/A	Minimal to Low	Local
M	Maintain list of county emergency contacts	Infrastructure Failure	Staff	Active	Minimal	Local
M	Keep the county updated on personnel changes	Infrastructure Failure	Staff	Active	Minimal to Low	Local
H	Continue cooperation between city roads department	Severe Winter Storm	Roads Department	N/A	Minimal	Local

L	Pursue partnership with rural water as the system expands	Grass/Wild Fire	City Council	Active	Minimal	Local
L	Encourage residents to keep smoke detectors, sprinkler systems and fire extinguishers maintained in their homes	Grass/Wild Fire	Grundy County EMA	N/A	Minimal	Local
L	Continue an annual inspection program for commercial and industrial properties	Grass/Wild Fire	Fire Department	Not Completed	Minimal	Local
M	Continue fire prevention program	Grass/Wild Fire	Grundy County EMA	N/A	Minimal	Local
L	Improve water system to enhance firefighting capacity/ability	Grass/Wild Fire	City Council	Active	Minimal	Local
H	Maintain membership in the NFIP	Flash Flood, River Flooding	City Council, EMA	Active	Minimal	Local
H	Maintain, enforce and update floodplain ordinance	Flash Flood, River Flooding	City Council	Active	Minimal	Local
L	Acquire more water pumps	Flash Flood, River Flooding, Dam Failure	Grundy County EMA, Public Works	N/A	Minimal	Local
L	Continue with improvement to the storm water system	Flash Flood	City Council	N/A	Low to Moderate	Local, State
H	Prevent inflow and infiltration into the sanitary sewer	Flash Flood, River Flooding	City Council	Active	Minimal	Local
L	Educate the public on maintaining their sump pumps	Flash Flood	City Council	N/A	Minimal	Local
M	Maintain and keep storm drains clear of debris	Flash Flood	Public Works	N/A	Minimal	Local
L	Stockpile sand and sandbags	Flash Flood, River Flooding	Grundy County EMA	Active	Minimal to Low	Local
L	Identify, purchase and remove structures from flood hazard areas	Flash Flood, River Flooding	Grundy County EMA, City Council	Not Completed	Moderate	Local, Federal
L	Initiate and enforce burn ban in times of drought or as needed	Grass/Wild Fire, Drought	City Council	Active	Minimal	Local
L	Maintain and improve signals/signage along roadways and at railroad crossings	Transportation Incident	Roads Department, Sheriff	Active	Minimal	Local, State
L	Establish alternative transportation routes should a road need to be closed	Transportation Incident, River Flooding, Flash Flood, Infrastructure Failure	Grundy County EMA, Sheriff	N/A	Minimal	Local
L	Purchase emergency signs to be used in case of an incident	Transportation Incident	City Council, Sheriff, EMA	Active	Minimal	Local
L	Enforce no parking designations at special events	Transportation Incident	Sheriff	Active	Low	Local
L	Identify fallout shelter locations	Radiological Incident	City Council	N/A	Low	Local
L	Keep communication lines open with Nuclear Plant in Palo, IA	Radiological Incident	City Council, EMA	Not Completed	Minimal	Local
L	Maintain and/or develop a wellhead protection program	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, Sheriff	N/A	Low	Local, State
L	Monitor wells in areas of identified contamination	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, EMA	N/A	Low	Local
H	Monitor the drinking water supply	HAZMAT Incident, Human Disease, Animal/Plant/Crop Disease	City Council	Active	Moderate	Local
L	Identify and map areas of past contamination	HAZMAT Incident	City Council	N/A	Low	Local
L	Maintain and/or develop storm water management program	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease, Flash Flood	City Council	N/A	Low	Local
L	Eliminate and cap private and abandoned wells in the city	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council	N/A	Low	Local
L	Eliminate the use of septic tank systems in the city limits	HAZMAT Incident, Animal/Plant/Crop	City Council	Completed	Minimal	Local

		Disease, Human Disease				
H	Follow monitoring requirements set forth by the Iowa DNR	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, Engineer	Active	Low	Local
L	Carry out conservation measures such as erosion control and work with the following organizations: Extension, NRCS, Farm Bureau, EPA, DNR, and Soil and water Conservation District	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, Engineer	N/A	Moderate	Local, State, Federal
L	Maintain and update anti-virus software	Terrorism	Staff	N/A	Minimal	Local
L	Secure vulnerable targets, as identified by the LEPC and County EMA with alarms, security cameras and fences	Terrorism	Sheriff	N/A	Minimal	Local
L	Review and update fire codes as necessary	Grass/Wild Fire	Fire Department	N/A	Minimal	Local
L	Continue to cooperate with pipeline owners and operators to ensure locations are marked	Grass/Wild Fire	City Council	N/A	Minimal	Local
L	Purchase a new tanker and/or pumper	Grass/Wild Fire	City Council	N/A	Low to Moderate	Local
L	Encourage community to plant shade trees	Extreme Heat	City Council	N/A	Minimal	Local
L	Provide fans and/or cooling shelter	Extreme Heat	County EMA	N/A	Minimal to Low	Local
L	Maintain air conditioner(s) in community buildings	Extreme Heat	Public Works	N/A	Minimal	Local
L	Keep a supply of drinking water to distribute	Extreme Heat	Grundy County EMA	N/A	Low	Local
L	Encourage the public to receive vaccinations	Human Disease	Grundy County EMA, Health Dept.	N/A	Minimal	Local
L	Cooperate with any countywide mass vaccination plan	Human Disease	Grundy County EMA	N/A	Minimal	Local
L	Monitor disease outbreak news from the CDC and Iowa Department of Public Health	Human Disease, Animal/Plant/Crop Disease	Grundy County EMA, Sheriff	N/A	Low to Moderate	Local
H	Restrict water usage should it be necessary	Drought	City Council	On-Going	Minimal to Low	Local
L	Encourage the use of proper materials and construction techniques	Expansive Soils	City Council	Active	Minimal to Low	Local
L	Educate city personnel to identify risk areas	Expansive Soils	City Council	N/A	Minimal	Local
L	Install tiling to help water move away from structures	Expansive Soils	Public Works	N/A	Minimal to Low	Local
L	Enforce a curfew	Terrorism	Sheriff	N/A	Minimal to Low	Local, State
M	Continue regular bridge inspections	Infrastructure Failure	City Council, Engineer	N/A	Minimal to Low	Local
M	Place barricades to close dangerous bridges	Infrastructure Failure	City Council, Sheriff	N/A	Minimal to Low	Local
L	Maintain embargos/weight limits as necessary	Infrastructure Failure	City Council, Engineer	N/A	Minimal to Low	Local, State
L	Identify and inventory potential sinkhole sites	Sinkholes	Public Works	N/A	Minimal to Low	Local
L	Educate city personnel to handle a sinkhole situation	Sinkholes	City Council, Engineer	N/A	Minimal	Local
M	Secure the area (around a sinkhole)	Sinkholes	Public Works	N/A	Minimal	Local
M	Inspect any utility lines that are near a sinkhole	Sinkholes	Public Works	N/A	Minimal	Local
L	Enforce the local zoning ordinances	Landslides	City Council	N/A	Minimal	Local
L	Clear ditches, streams, and waterways on a regular basis	River Flooding	City Council, Public Works	N/A	Minimal	Local

L	Encourage floodproofing/elevating structures in the floodplain	River Flooding	City Council, EMA	N/A	Minimal	Local
L	Update flood maps/flood studies for areas throughout the county	River Flooding	City Council	Active	Minimal	Local
L	Identify bridges and culverts than can cost effectively be reengineered to reduce future flooding	River Flooding	City Council, Engineer	N/A	Minimal	Local
L	Establish transportation evacuation routes and protocols	River Flooding	City Council, EMA, Sheriff	N/A	Minimal	Local
L	Develop sandbagging procedures for the community	River Flooding	City Council, EMA	N/A	Minimal	Local
L	Develop and maintain staging area for dumping during cleanup	River Flooding	City Council, Public Works	N/A	Minimal	Local
M	Continue cooperation with county in developing flood mitigation efforts	Flash Flood, River Flooding	City Council, EMA	N/A	Minimal	Local
L	Purchase additional parkland in order to increase greens space and reducing surface flow	River Flooding	City Council	N/A	Minimal	Local
L	Set a designated number of people to be trained in post-disaster record keeping/damage assessments	Emergency Management*	City Council, EMA	N/A	Minimal	Local
H	Inform the public of reputable and ill reputable contractors following disasters	Emergency Management*	City Council	N/A	Minimal	Local
M	Encourage all communities to participate in their Local Emergency Planning Commission (LEPC)	Emergency Management*	City Council, EMA	N/A	Minimal	Local
M	Maintain and update emergency response plans	Emergency Management*	City Council, EMA	Active	Low to Moderate	Local
H	Maintain lists of personnel and equipment available to use with response plans	Emergency Management*	City Council, Staff	Active	Minimal	Local
H	Maintain communication with county contacts	Emergency Management*	City Council, Staff	Active	Moderate	Local
H	Maintain NIMS compliance	Emergency Management*	City Council, EMA	Not Completed	Moderate	Local, State, Federal

APPENDIX G: CITY OF REINBECK

COMMUNITY PROFILE

Location

Reinbeck is located in the eastern portion of Grundy County. The town is located at the coordinates of 42.3236° N and 92.5994° W. Black Hawk Creek runs through the northern portion of the City, which flows through Strohbehn Park, which is located in the north central part of the City. Mosquito Creek splits from Black Hawk Creek to the west of the City and travels south. State Highway 175 travels east / west through the northern portion of Reinbeck.

Transportation

State Highway 175 travels east / west through the northern part of Reinbeck. This is the most popular road that travels to and through Reinbeck. County Highway T65 enters Reinbeck from the north on the western edge of the City. These two roads are the main source of connectivity with the rest of the County.

According to the Iowa Department of Transportation's 2013 traffic study, an average of 2,440 cars and trucks travel on the portion of State Highway 175 west of the city limits. The east portion of State Highway 175 sees an average of 2,140 cars and trucks daily.

County Highway T65 travels north / south through the western portion of the City. The daily average for T37 north of Reinbeck is 1,140 cars and trucks; the daily average for cars and trucks south of Reinbeck on T37 is 110.

Grundy County's only airport is located in Grundy Center, approximately 13 miles southwest of Reinbeck. Grundy Center Muni Airport-6K7 is a public airport.

The closest major airport is the Waterloo Regional Airport (ALO), which is located approximately 24 miles northeast of Reinbeck. This public airport is owned and operated by the City of Waterloo and overseen by an Airport Commission appointed by the Mayor. The primary runway is 8,400 foot long, 150 foot wide, and has a grooved asphalt surface. The airport is classified as a non-hub primary commercial service airport, offering general aviation and commercial service.

Community Services

The City of Reinbeck's water is supplied by local wells. The system has an elevated storage capacity of 400,000 gallons. The rated capacity of the municipal water system is 1,230,000 gallons. Average consumption is around 275,000 gallons per day (gpd***),*** while the peak consumption is approximately 300,000 gpd.

A primary sewage treatment plant serves Reinbeck. The average load for the system is approximately 200,000 gpd. The system has experienced a peak load of around 400,000 gpd and the rated capacity of the system is 200,000 gpd.

TABLE G1: REINBECK UTILITY PROVIDERS

Electric	Natural Gas	Water	Sewer	Sanitation	Telephone	Internet	Cable
Alliant Energy	Alliant Energy	City	City	City	Reinbeck Telecommunications Utility, Mediacom, Windstream	Reinbeck Telecommunications Utility, Mediacom, Windstream	Reinbeck Telecommunications Utility, Mediacom, Windstream

Demographics

Table G2 provides an overview of Reinbeck's demographics. From 2000 to 2010, the City experienced a 5% decrease in population, from 1,751 to 1,664 persons.

TABLE G2: CITY OF REINBECK DEMOGRAPHICS

Government Framework	Mayor – City Council		
General Population, 2010 Census		***Economics Characteristics, 2010 Census***	
Total Population (2010)	1,664	Population 16 years and over	1,370
Total Males	807	Population in Labor Force (16 yrs. and over)	872
Total Females	857	Persons in Civilian Labor Force	870
Median Age	45.1	Persons Employed	849
At-Risk Population, <18 Yrs.	348	Persons Unemployed	21
At-Risk Population, >64 Yrs.	399	Persons in Armed Forces	2
One Race-White	1,643	Mean Travel Time to Work in Minutes (16 yrs. & over)	16.7
Black or African American	4	Persons Employed in Management, Professional, or Related Occupations	251
Asian	1	Persons Employed in Service Occupations	113
Native Hawaiian or Pacific Islander	2	Persons Employed in Sales and Office Occupations	216
Two or More Races	6	Persons Employed in Farming, Fishing, or Forestry Occupations	10
Hispanic or Latino (of any race)	19	Persons Employed in Construction, Extraction, or Maintenance Occupations	91
Not Hispanic or Latino	1,645	Persons Employed in Production, Transportation, or Material Moving Occupations	168
Total Household Population	1,626	Median Household Income	$36,667
Total Population in Group Quarters	38	Median Family Income	$45,938
Persons in Group Quarters – Nursing Homes	38	Per Capita Personal Income	$19,814
Persons in Group Quarters – Noninstitutionalized	0	Families below Poverty Level	16
Housing Characteristics, 2010 Census		Individuals below Poverty Level	68
Total Housing Units	802	Unemployment Rate	2.4%
Total Owner-Occupied Housing Units	582	***Social Characteristics, 2010 Census***	
Total Renter-Occupied Housing Units	156	School Enrollment (3 yrs. and over)	399
Total Vacant Housing Units	64	Nursery School, Preschool	19
Total 1-Unit Detached and Attached Structures	641	Kindergarten and Elementary School (grades 1-8)	228
Total 2, 3, and 4-Unit Structures	90	High School (grades 9-12)	97
Total 5 to 19-Unit Structures	15	College or Graduate School	55
Total Mobile Homes	22	Education Attainment: Population 25 Years and Over	1,238
Year Majority of Housing Units were Built	1959 or earlier (65.4%)	Persons with Less than 9th Grade	84
Average Household Size	2.20	Persons with 9th to 12th Grade, No Diploma	81
Average Family Size	2.72	Persons with High School Degree or Equivalency	502
Specified Renter-Occupied Units	158	Persons with Some College, No Degree	269
Median Gross Rent	$409	Persons with Associate Degree	88
Specified Owner-Occupied Units	530	Persons with Bachelor's Degree	154
Median Housing Value, Owner-Occupied	$68,600	Persons with Graduate or Higher Degree	60
Method of Heating Household	Utility Gas (84.9%)	Persons with a Disability (5 yrs. and over)	417
Households with No Telephone Service	2	Persons that Speak a Language other than English at Home (5yrs +)	43

HAZARDS & RISK ASSESSMENT

Hazard Analysis

Section 3 identified and profiled the hazards for the entire planning area. However, each community analyzed their own vulnerability to those hazards applicable to their jurisdiction. Using the methodology outlined in Section 3 (Vulnerability Assessment), the City of Reinbeck evaluated the risk associated with a specific hazard, defined by probability and frequency of occurrence, magnitude, severity, exposures, and consequences. Reinbeck's vulnerability assessment provides in-depth knowledge of the hazards and vulnerabilities that affect the community. This analysis provides an all-hazard approach when evaluating the hazards of that affect the city, and the associated risks and impacts each hazard presents.

As mentioned previously in Section 3, the vulnerability assessment requires a five-year review with periodic updates, as needed. Potential future hazards and impacts may result from changing technology, new critical facilities, infrastructures, and development patterns, as well as demographic and socioeconomic changes that occur within or outside the area.

Disaster frequency and its effects or severity are important as a basis for planning emergency response and mitigation. Natural hazards tend to reoccur on a predictable seasonal basis, whereas manmade or technological events tend to change over time with advancement in technology and methods of operation. Five criteria were used by the Committee to assure a systematic and comprehensive approach to hazard analysis for their individual jurisdictions including: Historical Occurrence, Probability, Magnitude or Severity, Warning Time, and Duration.

The Committee assessed the defined hazards relevant to potential impact on the city. Using the scoring criteria previously defined (Tables 19-22) the city assessed each of the identified hazards based on probability, magnitude/severity, warning time, and duration. The scores for each of the factors were weighted using the formula below to develop the final hazard assessment score.

(Probability x .45) + (Magnitude/Severity x .30) + (Warning Time x .15) + (Duration x .10)
= Final Hazard Assessment Score

Table D3 is the analysis scores for the City of Reinbeck. As seen in Table G3, the top three hazards for Reinbeck are Thunderstorm/Lightning/Hail, and Tornado/Windstorm, and Flash Flooding

TABLE G3: IDENTIFIED HAZARDS FOR REINBECK						
Hazard Rank	**Hazards**	**Probability**	**Magnitude/Severity**	**Warning Time**	**Duration**	**Assessment Score**
1	Thunderstorm/Lightning/Hail	4	3	4	1	**3.4**
1	Tornado/Windstorm	4	3	4	1	**3.4**
3	Flash Flood	4	1	2	3	**2.7**
4	Extreme Heat	4	1	1	4	**2.65**
5	Severe Winter Storm	3	1	3	2	**2.3**
6	River Flooding	3	1	2	3	**2.25**
7	HAZMAT Incident	2	1	4	1	**1.9**
8	Infrastructure Failure	2	1	1	4	**1.75**
8	Drought	2	1	1	4	**1.75**
10	Terrorism	1	1	4	1	**1.45**
11	Radiological Incident	1	1	3	1	**1.3**
11	Human Disease	1	1	1	4	**1.3**
13	Landslide	1	1	2	1	**1.15**
14	Earthquake	1	1	1	2	**1.1**
15	Grass/Wild Fire	1	1	1	1	**1**
15	Transportation Incident	1	1	1	1	**1**
15	Sinkholes	1	1	1	1	**1**
15	Expansive Soils	1	1	1	1	**1**
15	Animal/Plant/Crop Disease	1	1	1	1	**1**
15	Levee/Dam Failure	1	1	1	1	**1**

Vulnerability – Identifying Assets (Critical Facilities)

This section will describe the vulnerability for existing and future buildings, infrastructure, and critical facilities in those areas that can be impacted by the prioritized hazards. Since the majority of the hazards have an undefined hazard area (i.e., affecting an entire community or larger area) the following vulnerability assessment will only address those hazards that affect a specified area – flooding (river and flash). However, due to the historical occurrences of tornadoes, this hazard was added to the assessment.

Critical Facilities

Identifying the location of critical facilities and designated shelters (see Table G3) in Reinbeck is important in order to assess their vulnerability to hazards. These critical facilities are important to the operation of a community and the key installations of the economic sector. For instance, high-density residential or commercial development, schools, police stations, government buildings, hospitals and care facilities, airports, gas stations, hardware stores, grocery stores, and water supply systems. It is important to know the threats each hazard poses to these facilities. *Attachment 6H* illustrates the location of identified critical facilities throughout the community.

Emergency shelters are also something that is important to identify. The City of Reinbeck does not have any designated emergency shelters; it does have multiple shelters that could be possibly used during incidents which required assistance to people in need, see table G4.

TABLE G4: CRITICAL FACILITIES AND DESIGNATED SHELTERS IN REINBECK

Critical Facilities	
Water Plan	Sewer Plant
West View	Park View
Daycare Facilities	Schools
Fire Station	
Shelters	
Memorial Building	Schools

Source: Community

According to available data, Reinbeck is projected to see an increase in population over the next thirty years. This population increase currently is not likely to result in a greater need for additional critical facilities such as schools, daycare centers, or healthcare centers. However, the need for more critical facilities should be closely monitored these next 5-years and readdressed when this HMP is updated.

Homes in Hazardous Areas

A facility's vulnerability to a flooding event is normally low, since these structures are rarely constructed within the 100-year floodplain. According to the information provided, bridges and roadways would be impacted by flooding. This disruption in the transportation infrastructure would create a longer time period to receive and provide services and supplies to an area if a bridge was washed away due to flooding.

Table G5 lists the number properties in Reinbeck that are located within the 100-year floodplain. According to data provided by FEMA, Reinbeck has 0 dwellings within the flood hazard area. According to the data provided by INRCOG and Grundy County, there are 19 parcels and 15 buildings located within the 100-year floodplain; most of this land is undeveloped. See *Attachment 5D: Flood Scenario Map of the City* and Table G5.

TABLE G5: CITY OF REINBECK 100-YEAR FLOODPLAIN PROPERTIES

Total Dwellings	0
Total Buildings	15
Total Structures	15
Total Value of all Structures	$83,510

Source: INRCOG & Grundy County Assessor

Tornadoes and windstorms are events that can cause harm to all structures and populations in the area. As part of a vulnerability assessment, a hypothetical tornado scenario was created for the community. Attachment 5h and Attachment 5j 4k illustrate the impact of a hypothetical tornado event in Reinbeck. Table G6 displays the degrees of impact that a hypothetical tornado scenario of various strengths would have on Reinbeck. As can be seen from the table, a direct hit from an EF4 or EF 5 tornado would damage over half of the City.

As stated on the FEMA website, mobile homes are highly vulnerable to tornadoes. Even mobile homes that are tied down, offer little protection from tornadoes. According to Census data provided, there are approximately 22 mobile homes is Reinbeck, using the average persons per household of 2.2 means that there is approximately 48 people living in mobile homes in the City. Multi-family housing units are another type of housing that is considered at-risk during one of these events. There are approximately 156 families residing in multi-family housing units in Reinbeck according to the U.S. Census.

TABLE G6: TORNADO SCENARIO FOR REINBECK

Scale	Tornado Width	# of Parcels	Damaged Values	% of City Damaged
EF0	50 Meters	79	$1,675,677.50	2.10%
EF1	150 Meters	148	$2,726,862.50	3.41%
EF2	250 Meters	221	$10,817,380.00	13.54%
EF3	500 Meters	409	$16,227,200.00	20.30%
EF4	900 Meters	652	$46,562,620.00	58.26%
EF5	1100 Meters	729	$54,268,020.00	67.90%

Vulnerability – Social Assets (Populations)

The social vulnerability assessment also identified how the hazards affect the population of Reinbeck and it is assumes that the identified populations are more likely to require assistance during times of disaster; therefore, are considered, generally speaking, more "at-risk" than the remaining population. The "at-risk" population must be identified and targeted in successful mitigation efforts. Table G7 presents an overview of the at-risk population in Reinbeck according to available information retrieved from the 2010 U.S. Census and Iowa Data Center.

According to Table G7, 24% of residents are 65 years or older. There are 38 persons living in group quarters at the city's nursing home, indicating the remaining elderly populations live throughout the community. Due to the health of the residents, transportation and care of the patients would be component to a successful mitigation.

In addition to group homes, persons living in mobile homes, also known as manufactured housing may also be at risk from tornadoes or high winds. As mentioned before, there are an estimated 48 persons living in mobile homes.

Persons under the age of 18 are also at higher risk during some disasters. This is mostly due to the fact that young persons are often not aware of the proper actions to take in the event of a disaster. In addition, very young children would be more susceptible to a disaster such as a disease epidemic simply due to their age. In 2010, there was 21% of the city's total population under the age of 18.

The highest risk of mass injury and/or casualty would be the schools within the Gladbrook-Reinbeck School District. When school is in session, hundreds of people are in the facilities daily. This includes people from other communities

TABLE G7: CITY OF REINBECK "AT-RISK" POPULATION

	2010
Total City Population (2010)	1,664
Elderly (65 yrs. and older)	399
Youth (under 18 yrs. old)	348
Householder Living Alone	236
Non-English Speaking Population (speaks English less than 'very well'	13
Population Living in Poverty	68
Population in Mobile Homes	42
Group Quarters Population	38
Persons with Disabilities (age 5+)	417
Persons w/Sensory Disability	55
Persons w/Physical Disability	120
Persons w/Mental Disability	43
Persons w/Self-Care Disability	19
Persons w/Go-Outside-Home Disability	90
Persons w/Employment Disability	90

Source: U.S. Census, 2010; Iowa Data Center

attending various events throughout the year.

While there is no official designated shelter, the Memorial Building, schools, and community churches could be used if the buildings were unharmed during a major disaster.

Vulnerability – Estimating Potential Property Losses

Valuations are an important component of hazard mitigation planning in so much as it provides measurable data that can be used to form some type of estimate as to the potential losses a community could face in the event of a disaster. The valuations for the City of Reinbeck are available from the County Assessor's office. City of Reinbeck's property valuations are in Table G8.

This information was made available from the Grundy County Assessor's office. It should be noted however that these dollar amounts do not include gas and electric utility valuations nor do the evaluations include exempt properties, including government buildings, infrastructure, and religious/nonprofit properties. These results should be considered preliminary, as a full accounting of assets has not been completed.

TABLE G8: ASSET INVENTORY – VALUE OF STRUCTURES IN REINBECK

Type of Structure	Lot/Land Value	Value of All Structures	Total Value	Number of Structures
Residential	$10,510,610	$66,118,335	$76,628,945	724
Commercial	$1,363,660	$9,226,495	$10,590,155	89
Industrial	$435,730	$5,025,890	$5,461,620	2
Agriculture	$1,808,318	$846,750	$2,655,068	N/A
Total	**$14,118,318**	**$81,217,470**	$95,335,788	**815**

Source: Grundy County Assessor; Values as of 6/10/2016

Future Development

Future development within identified hazard areas can change the threat level of an area by placing critical facilities, businesses, transportation networks, utilities, and populations within vulnerable areas. While it can be difficult to curb development in the planning area, it is the jurisdiction's advantage to be aware of development trends in order to successfully mitigation future hazards as risks increase. However, continued conformity with the State Building Codes and local land use ordinances and regulations (zoning, subdivision, floodplain management, etc.) will help to mitigate the effects hazards have on new and future development.

Repetitive Loss Properties

FEMA defines a repetitive loss property as an insurable building that has experienced two losses in a 10-year period in which each loss is $1,000 or more. City of Reinbeck does participate in the NFIP; there are no repetitive loss properties in Reinbeck.

This HMP attempts to reduce loss by identifying potential natural and manmade hazards. As a result of many natural and manmade hazards, repairs and reconstruction area often completed in a way that returns the structure to pre-disaster condition yet does little to prevent a reoccurrence of damage. Replication of the pre-disaster conditions allows for the repetitive cycle of property damage, reconstruction, and re-damage. Hazard mitigation is needed to ensure that such cycles are broken, that post-disaster repairs and reconstruction are analyzed, and sound, less vulnerable conditions are produced. Additionally, other mitigation strategies may be considered, such as voluntary property buy-outs.

Using GIS spatial data from FIRM maps, in combination with property value data from the Grundy Assessor's office, estimates of value in the floodplain were calculated. Table G9 shows the estimated value of land, buildings, and dwellings, within the city, in a floodplain.

TABLE G9: FLOODPLAIN DATA FOR REINBECK

	Number of Parcels	Land Value	Building Value	Dwelling Value	Total Value	Percent of City Affected
1% Annual Floodplain	19	$712,979	$83,510	$0	$796,489	0.85%
0.2% Annual Floodplain	-	-	-	-	-	-

Source: Grundy County Assessor's Office; Analysis conducted by INRCOG; Parcel values and FIRM maps as of 10/19/2005

MITIGATION STRATEGY

Hazard Mitigation Plan Goals

The hazard mitigation plan goals were reviewed by the Hazard Mitigation Planning Committee at their second committee meeting. The committee set as a priority the development of broad-based goals that would address a multitude of hazards and encompass a variety of mitigation activities. The hazard mitigation plan goals for the City of Reinbeck are as follows:

1. Minimize to the greatest possible extent the number of injuries and/or loss of life associated with all identified hazards.
2. Reduce or eliminate property damage due to the occurrence of disasters.
3. Identify ways that response operations, in the event of a disaster, can be improved.
4. Return the community to either pre-disaster or improved conditions in a timely manner in the wake of a disaster.
5. Develop strategies that can be used to reduce the community's overall risk to the negative effects of natural, technological, and man-made disasters.
6. Reconvene the planning committee on an annual basis to review the plan document, check for compliance with the plan goals, and track progress in achieving the mitigation strategies.
7. Maintain the Countywide Multi-Jurisdictional format for future plan updates.

Current Mitigation Actions

Prevention Mitigation Actions

Reinbeck has an adopted Floodplain Management Ordinance and is a member of the Flood Insurance Program. The city also has a comprehensive plan that addresses future planning; as well as, a zoning ordinance and subdivision regulations for land development.

TABLE G10: REINBECK'S CURRENT PLANNING AND REGULATORY DOCUMENTS

Previous HMP	Comprehensive Plan	Building Code	Zoning Ordinance	Subdivision Regulations	Floodplain Management Ordinance	Tree-Trimming Ordinance	Storm Water Ordinance	Snow Removal Ordinance
Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes

Source: Community

Property Protection Mitigation Actions

The city has taken steps to reduce inflow and infiltration of storm water runoff into the sewer system, which strains the treatment plant and can cause backup of wastewater into homes and businesses.

Public Education and Awareness Mitigation Actions

The city produces a newsletter which will occasionally have articles on disaster preparedness and awareness. There are also signs posted on buildings that serve as shelters. Grundy County uses the AlertIowa notification system to notify users in case of an emergency.

Emergency Services Mitigation Actions

Grundy County Emergency Management Agency

Reinbeck works with the Grundy County Emergency Management Coordinator, based out of the City of Grundy Center, on various safety and emergency events. The Emergency Management Coordinator works in conjunction with local fire, rescue, police, and government officials to draft and implement workable emergency action plans in the community. The current Emergency Management Coordinator is Zach Tripp and current contact information is as follows: Grundy County Emergency Management Agency, 705 8th Street, Grundy Center, Iowa 50638, (319) 824-6933, email: ztripp@grundysheriff.org

Law Enforcement

The city contracts with the Grundy County Sheriff.

Fire Protection

The city has a volunteer fire department with 25 volunteers. They have two tankers (with portable pumpers), two pumpers, Pickup- Rescue Unit, and a Grass Attack Unit. The fire department has in place mutual aid agreements with surrounding communities to provide and receive assistance as needed on a mutual aid

basis.

Ambulance

The Reinbeck Volunteer Ambulance Service provides emergency rescue and ambulance service to the community. The ambulance service is staffed by 15 volunteers, with equipment including two ambulances.

Medical Facilities

Reinbeck currently has Two doctor offices and one dentist office which provide local medical assistance to the City. Grundy Memorial Hospital is located in Grundy Center and is the only medical facility (other than small clinics) located in the county.

HAZMAT

Reinbeck contracts with Northeast Iowa Response Group for response to hazardous material spills. The Northeast Iowa Response Group is a division of Waterloo Fire Rescue as is the Hazardous Materials Regional Training Center. The Training Center provides training to fire departments and companies from around the state and country. Not only is this a training center it also serves as a hazardous materials quick response unit to Black Hawk County, surrounding counties, and many municipalities in a ten county region. The Unit provides local fire departments with hazard materials emergency procedures thus reducing additional contamination. An evacuation plan is also in place in conjunction with the activities with the local department. Contact information for the facility is as follows: Hazardous Materials Regional Training Center, 1925 Newell Street, Waterloo, Iowa 50707, Phone: (319) 291-4275, Toll Free: (800) 291-4682, Fax: (319) 291-4285

The jurisdiction also partners the Northeast Iowa Response Group for assistance in responding to any methamphetamine labs located in the city limits. The Response Group assists the Police Departments in containment of the site and disposal of the hazardous chemicals.

Warning Systems

Grundy County uses the AlertIowa notification system that is utilized statewide. The program is funded by the State of Iowa and administered through Iowa Homeland Security and Emergency Management Office. AlertIowa will be administered through Grundy County Emergency Management Agency and will be available to all county cities and school districts.

AlertIowa will allow for emergency notifications at all times via landline telephones, cell phones, email, text message, and social media. The County will use their emergency notification network for all of the following events: blizzards, flash flooding, severe thunderstorms, and tornadoes. There is an optional way to receive the same alert for events such as: excessive heat warnings, hazardous materials warnings, heavy snow warning, high wind warnings, ice storm warnings, law enforcement warnings, shelter in place warnings, sleet warnings, wind chill warnings, and winter storm warnings.

Public Works

There are approximately 15.65 miles of roadway, not including the alleys in Reinbeck. The street department includes two public works employees. These two employees are also water and wastewater employees; therefore, they are responsible for all public works of the city. The city owns a grader, backhoe, skid loader, dump truck, street sweeper and a sander. There is a plow for one of the pickups.

Natural Resource Protection Mitigation Actions

A new residential subdivision under development will feature a bio-retention pond.

Structural Projects Mitigation Actions

Reinbeck does not have nor done any structural project mitigation actions.

Future Mitigation Actions

While the existing mitigation activities discussed above detail the city's efforts to mitigate hazards when possible and to respond to hazards in a timely and efficient manner, the Committee also recognizes that there are many more mitigation activities and projects that would benefit county residents. Thus, the Committee developed a list of future hazard mitigation activities that, if accomplished, would serve to further reduce the risk of hazards to the community. The list may include a combination of projects the Committee feels the community should try to accomplish and mitigation efforts that are ongoing that the Committee view as vital to the continued well-being of the public.

Priority

The Committee analyzed the potential mitigation activities. This analysis included a discussion of the potential benefits of implementing the activity, some hurdles that the community may face in implementing the action step, and the drawbacks of implementation. The analysis utilized the STAPLEE feasibility

TABLE G11: STAPLEE ELEMENTS

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

criteria. The STAPLEE technique is a FEMA suggested method of evaluation. The STAPLEE approach assesses both positive and negative impacts on the following aspects of a county: **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental.

The Committee was asked to discuss the STAPLEE elements (Table G11) and determine each element's ranking (High -H, Medium -M, Low-L) for each identified future mitigation activity. Afterwards, the average priority for each migration activity was recorded as the overall priority ranking for that particular future mitigation activity.

Timeline

The Committee identified the time period each period each of the proposed mitigation activity will occur. Activities that occur regularly (either daily, weekly,

monthly or annually) were identified as Active. If the action is to occur within the next 1-5 years it was identified as Short-Term, if the activity would take 5-10 years it was labeled as Mid-Term, and any activities that would take 10 or more years were identified as Long-Term.

Funding

Although in the long-term hazard mitigation actions will save money by avoiding the loss of lives or property damages, in the short-term each action will have an associated cost. The City will rely heavily on local funding sources to fulfill most of the plan obligations; however, they will also seek funds from State and Federal agencies for both pre- and post-disaster mitigation activities.

The estimated cost(s) for each mitigation action, program, or project is either: Minimal, Low, Moderate, or High depending upon various factors.

- Minimal: Cost estimate is $10,000 or less based on using current staff, time commitment, continuous of current duties, proposed action/program/ project, and funding sources.
- Low: Cost estimate for project range from $10,001 - $99,999 based on existing proposed treatment, time commitment, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.).
- Moderate: Cost estimate for project range from $100,000 - $299,999 based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.), and funding sources.
- High: Cost estimate for project range is $300,000 or higher based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, project components (permits, acquisition, coordination, etc.), and funding sources.

Implementation Strategy

One of the first steps the Committee took was to review the City's existing Hazard Mitigation Activities and provide an update on their status, see Based on each activity's progress, City's chose to continue the activity or drop it from the plan update. Once the Committee identified and ranked the future hazard mitigation

activities, the activities were then analyzed. In addition, the Committee identified a time line for each activity, associated hazards, estimated cost, priority, identified the responsible party or parties for each activity, and indicated at least which of the city's goals the action addresses. Table G12 is the City of Reinbeck's Implementation Strategy.

TABLE G12: CITY OF REINBECK'S IMPLEMENTATION STRATEGY

Priority	Mitigation Action/Program/Project	Associated Hazard	Primary Agency Responsible for Implementation	Date for Completion	Estimated Cost (s)	Funding Source
H	Educate the public	All	Grundy County EMA	Active	Minimal	Local
H	Continue training and education for fire departments, law enforcement agencies and ambulance crew personnel	All	City Council and Roads Depts.	Active	Moderate	Local, State
H	Maintain and acquire materials and equipment for fire departments, law enforcement agencies and ambulance crew personnel	All	City Council	Active	Minimal	Local, State
H	Provide emergency shelters for evacuees	All	Grundy County EMA	Active	Minimal	Local
H	Maintain mutual aid agreements	All	Grundy County EMA, City Council	Active	Minimal	Local
M	Maintain tree trimming program	Severe Winter Storm, Tornado/Windstorm, Thunderstorm/Lightning/Hail/Hail	City Council	Active	Low	Local
H	Determine locations for potential heating shelters and volunteer organization	Severe Winter Storm	Grundy County EMA	Active	Minimal	Local
H	Encourage utility providers and developers to place all utilities underground	Severe Winter Storm, Infrastructure Failure, Thunderstorm/Lightning/Hail	City Council	Active	Moderate	Local
H	Purchase and maintain backup generators	Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado, Emergency Management	Grundy County EMA	Active	Minimal	Local
H	Maintain public works equipment	Severe Winter Storm	Public Works	On-Going	Minimal	Local
M	Notify the media on shelter locations	Severe Winter Storm, Extreme Heat, Tornado	Sheriff, EMA	Active	Minimal	Local
H	Make sure residents keep sidewalks clear of snow and ice	Severe Winter Storm	Public Works	Active	Minimal	Local
L	Maintain use of snow fences in the city/county	Severe Winter Storm	Public Works	N/A	Minimal	Local
H	Use surge protectors to prevent electrical damage to critical and sensitive equipment	Thunderstorm/Lightning/Hail	Staff	Active	Minimal	Local
M	Backup all digital data	Thunderstorm/Lightning/Hail	Staff	Active	Minimal	Local
M	Purchase NOAA weather radios	Thunderstorm/Lightning/Hail, Tornado/Windstorm, Radiological Incident	Grundy County EMA	On-Going	Minimal	Local, State
L	Enforce and update building codes, as needed	Thunderstorm/Lightning/Hail, Tornado/Windstorm, Expansive Soils, Earthquake	City Council	N/A	Minimal	Local
L	Maintain storm spotter training for local fire departments/deputies and EMS crews	Thunderstorm/Lightning/Hail, Tornado/Windstorm	Grundy County EMA	Active	Minimal	Local
M	Continue enforcement of city sump pump discharge ordinance	Thunderstorm/Lightning/Hail	City Council	Not Complete	Minimal	Local
M	Maintain a list of potential storm sewer projects	Thunderstorm/Lightning/Hail	City Council	Active	Minimal	Local
M	Make available a cleanup crew for after a storm	Thunderstorm/Lightning/Hail	City Council, EMA	Active	Minimal to Low	Local
H	Maintain law enforcement monitoring of large storage	HAZMAT Incident	Sheriff	N/A	Minimal	Local

	supplies					
M	Acquire necessary response and detection equipment for city/county employees	HAZMAT Incident	Grundy County EMA	Active	Minimal	Local, State
M	Encourage lead based paint and asbestos removal	HAZMAT Incident	City Council	Not Complete	Minimal	Local
L	Provide a local hazardous waste drop-off site	HAZMAT Incident	City Council	Not Complete	Minimal to Low	Local
H	Maintain mutual aid agreements with the Northeast Iowa response Group	HAZMAT Incident	City Council	Active	Minimal	Local
H	Keep HAZMAT manuals/information current and easily accessible	HAZMAT Incident	All Depts.	Active	Minimal	Local
H	Maintain, test, and replace warning sirens	Tornado/Windstorm, Thunderstorm/Lightning/Hail, Infrastructure Failure	Grundy County EMA	Active	Minimal to Low	Local, State
H	Install new warning sirens where needed or replace warning sirens with insufficient decibel levels	Tornado/Windstorm	Grundy County EMA	Active	Moderate	Local, State
M	Encourage and maintain enrollment in emergency notification system	Thunderstorm/Lightning/Hail, Tornado/Windstorm, Infrastructure Failure	Grundy County EMA	Not Complete	Minimal	Local
H	Construct or designate a safe room or storm shelter	Tornado/Windstorm	Grundy County EMA	Not Complete	High	Local, State, Federal
M	Encourage home owners to keep emergency kits	Tornado/Windstorm	Grundy County EMA	Not Complete	Minimal	Local
H	Encourage backup power generation for local telephone systems and cellular operations	Infrastructure Failure	Grundy County EMA	Active	Minimal	Local
M	Maintain or install GPS units in all emergency service and city/county vehicles	Infrastructure Failure	Staff	Not Complete	Minimal	Local
L	Maintain automatic TTY TDD machines for emergency personnel and city/county employees	Infrastructure Failure	Staff	Not Complete	Minimal	Local
H	Enhance Standard Operating Procedures for dissemination of information/press releases in the event of a disaster	Infrastructure Failure	Grundy County EMA	Active	Minimal	Local
M	Continue training and promotion of the Incident Command System	Infrastructure Failure	Grundy County EMA	Active	Minimal	Local, State
M	Complete continuity of government plan	Infrastructure Failure	City Council	Active	Minimal	Local
H	Encourage use of Iowa One call before digging	Infrastructure Failure	City Council	Active	Minimal	Local
H	Upgrade radio communications equipment as needed	Infrastructure Failure	Grundy County EMA	Active	Minimal	Local
H	Regularly review and amend fire and medical HAZMAT response standard operating procedures	Infrastructure Failure	Grundy County EMA	Active	Minimal	Local
M	Improve standard operating procedures for schools	Infrastructure Failure	Grundy County EMA, Schools	N/A	Minimal	Local
M	Seek to improve communications with other agencies	Infrastructure Failure, Terrorism	City Council	Active	Minimal	Local
M	Keep supply of backup radios and cellphones	Infrastructure Failure	Staff	Active	Minimal to Low	Local
M	Maintain list of county emergency contacts	Infrastructure Failure	Staff	Active	Minimal	Local
M	Keep the county updated on personnel changes	Infrastructure Failure	Staff	Active	Minimal to Low	Local
H	Continue cooperation between city roads department	Severe Winter Storm	Roads Department	Active	Minimal	Local

L	Pursue partnership with rural water as the system expands	Grass/Wild Fire	City Council	Active	Minimal	Local
M	Encourage residents to keep smoke detectors, sprinkler systems and fire extinguishers maintained in their homes	Grass/Wild Fire	Grundy County EMA	Active	Minimal	Local
M	Continue an annual inspection program for commercial and industrial properties	Grass/Wild Fire	Fire Department	N/A	Minimal	Local
H	Continue fire prevention program	Grass/Wild Fire	Grundy County EMA	Active	Minimal	Local
M	Improve water system to enhance firefighting capacity/ability	Grass/Wild Fire	City Council	Active	Minimal	Local
H	Maintain membership in the NFIP	Flash Flood, River Flooding	City Council, EMA	Active	Minimal	Local
H	Maintain, enforce and update floodplain ordinance	Flash Flood, River Flooding	City Council	Active	Minimal	Local
M	Acquire more water pumps	Flash Flood, River Flooding, Dam Failure	Grundy County EMA, Public Works	Active	Minimal	Local
L	Continue with improvement to the storm water system	Flash Flood	City Council	Active	Low to Moderate	Local, State
H	Prevent inflow and infiltration into the sanitary sewer	Flash Flood, River Flooding	City Council	On-Going	Minimal	Local
L	Educate the public on maintaining their sump pumps	Flash Flood	City Council	N/A	Minimal	Local
M	Maintain and keep storm drains clear of debris	Flash Flood	Public Works	Active	Minimal	Local
M	Stockpile sand and sandbags	Flash Flood, River Flooding	Grundy County EMA	Active	Minimal to Low	Local
L	Identify, purchase and remove structures from flood hazard areas	Flash Flood, River Flooding	Grundy County EMA, City Council	On-Going	Moderate	Local, Federal
L	Initiate and enforce burn ban in times of drought or as needed	Grass/Wild Fire, Drought	City Council	Active	Minimal	Local
L	Maintain and improve signals/signage along roadways and at railroad crossings	Transportation Incident	Roads Department, Sheriff	N/A	Minimal	Local, State
L	Establish alternative transportation routes should a road need to be closed	Transportation Incident, River Flooding, Flash Flood, Infrastructure Failure	Grundy County EMA, Sheriff	Active	Minimal	Local
L	Purchase emergency signs to be used in case of an incident	Transportation Incident	City Council, Sheriff, EMA	Active	Minimal	Local
M	Enforce no parking designations at special events	Transportation Incident	Sheriff	Active	Low	Local
L	Identify fallout shelter locations	Radiological Incident	City Council	N/A	Low	Local
L	Keep communication lines open with Nuclear Plant in Palo	Radiological Incident	City Council, EMA	Not Complete	Minimal	Local
M	Maintain and/or develop a wellhead protection program	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, Sheriff	Active	Low	Local, State
M	Monitor wells in areas of identified contamination	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, EMA	Active	Low	Local
H	Monitor the drinking water supply	HAZMAT Incident, Human Disease, Animal/Plant/Crop Disease	City Council	Active	Moderate	Local
L	Identify and map areas of past contamination	HAZMAT Incident	City Council	N/A	Low	Local
M	Maintain and/or develop storm water management program	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease, Flash Flood	City Council	Active	Low	Local
M	Eliminate and cap private and abandoned wells in the city	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council	N/A	Low	Local
L	Eliminate the use of septic tank systems in the city limits	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council	On-Going	Minimal	Local
H	Follow monitoring requirements set forth by the Iowa DNR	HAZMAT Incident, Animal/Plant/Crop	City Council, Engineer	Active	Low	Local

		Disease, Human Disease				
M	Carry out conservation measures such as erosion control and work with the following organizations: Extension, NRCS, Farm Bureau, EPA, DNR, and Soil and water Conservation District	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, Engineer	Not Complete	Moderate	Local, State, Federal
M	Maintain and update anti-virus software	Terrorism	Staff	Active	Minimal	Local
L	Secure vulnerable targets, as identified by the LEPC and County EMA with alarms, security cameras and fences	Terrorism	Sheriff	Not Complete	Minimal	Local
M	Review and update fire codes as necessary	Grass/Wild Fire	Fire Department	N/A	Minimal	Local
L	Continue to cooperate with pipeline owners and operators to ensure locations are marked	Grass/Wild Fire	City Council	N/A	Minimal	Local
M	Purchase a new tanker and/or pumper	Grass/Wild Fire	City Council	On-Going	Low to Moderate	Local
L	Encourage community to plant shade trees	Extreme Heat	City Council	N/A	Minimal	Local
L	Provide fans and/or cooling shelter	Extreme Heat	County EMA	Active	Minimal to Low	Local
M	Maintain air conditioner(s) in community buildings	Extreme Heat	Public Works	Active	Minimal	Local
L	Keep a supply of drinking water to distribute	Extreme Heat	Grundy County EMA	Active	Low	Local
L	Encourage the public to receive vaccinations	Human Disease	Grundy County EMA, Health Dept.	N/A	Minimal	Local
L	Cooperate with any countywide mass vaccination plan	Human Disease	Grundy County EMA	On-Going	Minimal	Local
L	Monitor disease outbreak news from the CDC and Iowa Department of Public Health	Human Disease, Animal/Plant/Crop Disease	Grundy County EMA, Sheriff	On-Going	Low to Moderate	Local
H	Restrict water usage should it be necessary	Drought	City Council	Active	Minimal to Low	Local
L	Encourage the use of proper materials and construction techniques	Expansive Soils	City Council	Active	Minimal to Low	Local
L	Educate city personnel to identify risk areas	Expansive Soils	City Council	Active	Minimal	Local
M	Install tiling to help water move away from structures	Expansive Soils	Public Works	Active	Minimal to Low	Local
M	Enforce a curfew	Terrorism	Sheriff	Active	Minimal to Low	Local, State
H	Continue regular bridge inspections	Infrastructure Failure	City Council, Engineer	N/A	Minimal to Low	Local
M	Place barricades to close dangerous bridges	Infrastructure Failure	City Council, Sheriff	N/A	Minimal to Low	Local
L	Maintain embargos/weight limits as necessary	Infrastructure Failure	City Council, Engineer	N/A	Minimal to Low	Local, State
L	Identify and inventory potential sinkhole sites	Sinkholes	Public Works	N/A	Minimal to Low	Local
L	Educate city personnel to handle a sinkhole situation	Sinkholes	City Council, Engineer	N/A	Minimal	Local
M	Secure the area (around a sinkhole)	Sinkholes	Public Works	N/A	Minimal	Local
M	Inspect any utility lines that are near a sinkhole	Sinkholes	Public Works	N/A	Minimal	Local
L	Enforce the local zoning ordinances	Landslides	City Council	Active	Minimal	Local
M	Clear ditches, streams, and waterways on a regular basis	River Flooding	City Council, Public Works	N/A	Minimal	Local
L	Encourage floodproofing/elevating structures in the floodplain	River Flooding	City Council, EMA	Active	Minimal	Local

M	Update flood maps/flood studies for areas throughout the county	River Flooding	City Council	Active	Minimal	Local
L	Identify bridges and culverts than can cost effectively be reengineered to reduce future flooding	River Flooding	City Council, Engineer	N/A	Minimal	Local
M	Establish transportation evacuation routes and protocols	River Flooding	City Council, EMA, Sheriff	N/A	Minimal	Local
M	Develop sandbagging procedures for the community	River Flooding	City Council, EMA	Active	Minimal	Local
M	Develop and maintain staging area for dumping during cleanup	River Flooding	City Council, Public Works	Active	Minimal	Local
M	Continue cooperation with county in developing flood mitigation efforts	Flash Flood, River Flooding	City Council, EMA	Active	Minimal	Local
L	Purchase additional parkland in order to increase greens space and reducing surface flow	River Flooding	City Council	Not Complete	Minimal	Local
M	Set a designated number of people to be trained in post-disaster record keeping/damage assessments	Emergency Management*	City Council, EMA	N/A	Minimal	Local
H	Inform the public of reputable and ill reputable contractors following disasters	Emergency Management*	City Council	Active	Minimal	Local
M	Encourage all communities to participate in their Local Emergency Planning Commission (LEPC)	Emergency Management*	City Council, EMA	Not Complete	Minimal	Local
H	Maintain and update emergency response plans	Emergency Management*	City Council, EMA	Active	Low to Moderate	Local
H	Maintain lists of personnel and equipment available to use with response plans	Emergency Management*	City Council, Staff	Active	Minimal	Local
H	Maintain communication with county contacts	Emergency Management*	City Council, Staff	Active	Moderate	Local
H	Maintain NIMS compliance	Emergency Management*	City Council, EMA	Active	Moderate	Local, State, Federal

APPENDIX H: CITY OF STOUT

COMMUNITY PROFILE

Location

Stout is located in northern Grundy County. The town is located at the coordinates of 42. 5264° N and 92. 7119° W.

Transportation

There are two roads that can access Stout from outside of the community. County Highway T47 and County Highway D17 intersect near the middle of the City. T47 travels north / south while D17 travels east / west.

According to the Iowa Department of Transportation's 2013 traffic study, an average of 50 cars and trucks travel on the portion of County Highway D17 north of the city limits. The southern portion of County Highway D17 sees an average of 220 cars and trucks daily.

According to that same 2013 traffic study, an average of 370 cars and trucks travel on the portion of County Highway T47 west of the city limits. The east portion of County Highway T47 sees an average of 540 cars and trucks daily.

Grundy County's only airport is located in Grundy Center, approximately 18 miles southwest of Stout. Grundy Center Muni Airport-6K7 is a public airport.

The closest major airport is the Waterloo Regional Airport (ALO), which is located approximately 17 miles east of Stout. This public airport is owned and operated by the City of Waterloo and overseen by an Airport Commission appointed by the Mayor. The primary runway is 8,400 foot long, 150 foot wide, and has a grooved asphalt surface. The airport is classified as a non-hub primary commercial service airport, offering general aviation and commercial service.

Community Services

The city has a wastewater treatment plant located just outside the city limit lines to the east. This facility was funded with Community Development Block Grant and USDA funds. Central Iowa Water Association owns the system and finished making all the sewer line connections in early 2012. The community was previously did not have a sewer system and in violation of DNR regulations.

TABLE H1: STOUT UTILITY PROVIDERS

Electric	Natural Gas	Water	Sewer	Sanitation	Telephone	Internet	Cable
MidAmerican Energy	MidAmerican Energy	City of Stout (owned by CIWA)	City of Stout (owned by CIWA)	Beninga	CenturyLink	CenturyLink, Rise, Unggoy	CenturyLink, Rise, Unggoy

Demographics

Table D2 provides an overview of Stout's demographics. From 2000 to 2010, the City experienced a 20.8% decrease in population, from 202 to 160 persons.

TABLE D2: CITY OF STOUT DEMOGRAPHICS

Government Framework	Mayor – City Council		
General Population, 2010 Census		***Economics Characteristics, 2010 Census***	
Total Population (2010)	224	Population 16 years and over	171
Total Males	116	Population in Labor Force (16 yrs. and over)	95
Total Females	108	Persons in Civilian Labor Force	95
Median Age	37.2	Persons Employed	89
At-Risk Population, <18 Yrs.	57	Persons Unemployed	6
At-Risk Population, >64 Yrs.	27	Persons in Armed Forces	0
One Race-White	223	Mean Travel Time to Work in Minutes (16 yrs. & over)	26.4
Black or African American	0	Persons Employed in Management, Professional, or Related Occupations	15
Asian	1	Persons Employed in Service Occupations	18
Native Hawaiian or Pacific Islander	0	Persons Employed in Sales and Office Occupations	29
Two or More Races	0	Persons Employed in Farming, Fishing, or Forestry Occupations	0
Hispanic or Latino (of any race)	2	Persons Employed in Construction, Extraction, or Maintenance Occupations	17
Not Hispanic or Latino	222	Persons Employed in Production, Transportation, or Material Moving Occupations	10
Total Household Population	224	Median Household Income	$40,781
Total Population in Group Quarters	0	Median Family Income	$41,042
Persons in Group Quarters – Nursing Homes	0	Per Capita Personal Income	$12,504
Persons in Group Quarters – Noninstitutionalized	0	Families below Poverty Level	5
Housing Characteristics, 2010 Census		Individuals below Poverty Level	109
Total Housing Units	84	Unemployment Rate	6.3%
Total Owner-Occupied Housing Units	66	***Social Characteristics, 2010 Census***	
Total Renter-Occupied Housing Units	14	School Enrollment (3 yrs. and over)	72
Total Vacant Housing Units	4	Nursery School, Preschool	0
Total 1-Unit Detached and Attached Structures	76	Kindergarten and Elementary School (grades 1-8)	49
Total 2, 3, and 4-Unit Structures	0	High School (grades 9-12)	20
Total 5 to 19-Unit Structures	0	College or Graduate School	3
Total Mobile Homes	2	Education Attainment: Population 25 Years and Over	119
Year Majority of Housing Units were Built	1939 or earlier (56.4%)	Persons with Less than 9th Grade	8
Average Household Size	2.80	Persons with 9th to 12th Grade, No Diploma	14
Average Family Size	3.14	Persons with High School Degree or Equivalency	54
Specified Renter-Occupied Units	17	Persons with Some College, No Degree	23
Median Gross Rent	$517	Persons with Associate Degree	11
Specified Owner-Occupied Units	51	Persons with Bachelor's Degree	7
Median Housing Value, Owner-Occupied	$54,100	Persons with Graduate or Higher Degree	2
Method of Heating Household	Bottled, tank or LP Gas (84.9%)	Persons with a Disability (5 yrs. and over)	46
Households with No Telephone Service	1	Persons that Speak a Language other than English at Home (5yrs +)	4

HAZARDS & RISK ASSESSMENT

Hazard Analysis

Section 3 identified and profiled the hazards for the entire planning area. However, each community analyzed their own vulnerability to those hazards applicable to their jurisdiction. Using the methodology outlined in Section 3 (Vulnerability Assessment), the City of Stout evaluated the risk associated with a specific hazard, defined by probability and frequency of occurrence, magnitude, severity, exposures, and consequences. Stout's vulnerability assessment provides in-depth knowledge of the hazards and vulnerabilities that affect the community. This analysis provides an all-hazard approach when evaluating the hazards of that affect the city, and the associated risks and impacts each hazard presents.

As mentioned previously in Section 3, the vulnerability assessment requires a five-year review with periodic updates, as needed. Potential future hazards and impacts may result from changing technology, new critical facilities, infrastructures, and development patterns, as well as demographic and socioeconomic changes that occur within or outside the area.

Disaster frequency and its effects or severity are important as a basis for planning emergency response and mitigation. Natural hazards tend to reoccur on a predictable seasonal basis, whereas manmade or technological events tend to change over time with advancement in technology and methods of operation. Five criteria were used by the Committee to assure a systematic and comprehensive approach to hazard analysis for their individual jurisdictions including: Historical Occurrence, Probability, Magnitude or Severity, Warning Time, and Duration.

The Committee assessed the defined hazards relevant to potential impact on the city. Using the scoring criteria previously defined (Tables 19-22) the city assessed each of the identified hazards based on probability, magnitude/severity, warning time, and duration. The scores for each of the factors were weighted using the formula below to develop the final hazard assessment score.

(Probability x .45) + (Magnitude/Severity x .30) + (Warning Time x .15) + (Duration x .10)
= Final Hazard Assessment Score

Table H3 is the analysis scores for the City of Stout. As seen in Table H3, the top four hazards were identified as Tornado/Windstorm, Severe Winter Storm, Thunderstorm/Lightning/Hail, and Flash Flood.

TABLE H3: IDENTIFIED HAZARDS FOR STOUT						
Hazard Rank	**Hazards**	**Probability**	**Magnitude/Severity**	**Warning Time**	**Duration**	**Assessment Score**
1	Tornado/Windstorm	4	4	4	4	**4**
2	Severe Winter Storm	4	3	2	3	**3.3**
3	Thunderstorm/Lighting/Hail	4	2	4	2	**3.2**
3	Flash Flood	4	2	4	2	**3.2**
5	Infrastructure Failure	2	2	3	4	**2.35**
6	Grass/Wild Fire	2	2	4	1	**2.2**
7	Extreme Heat	3	1	1	3	**2.1**
8	Animal/Plant/Crop Disease	2	1	1	4	**1.75**
8	Expansive Soils	2	1	1	4	**1.75**
8	HAZMAT Incident	1	1	4	4	**1.75**
8	Human Disease	1	1	4	4	**1.75**
8	Terrorism	1	1	4	4	**1.75**
8	Sinkholes	2	1	3	1	**1.75**
14	Drought	1	1	1	4	**1.3**
15	Transportation Incident	1	1	1	1	**1**
15	Earthquake	1	1	1	1	**1**
15	Landslide	1	1	1	1	**1**
15	Levee/Dam Failure	1	1	1	1	**1**
15	Radiological Incident	1	1	1	1	**1**
15	River Flooding	1	1	1	1	**1**

Vulnerability – Identifying Assets (Critical Facilities)

This section will describe the vulnerability for existing and future buildings, infrastructure, and critical facilities in those areas that can be impacted by the prioritized hazards. Since the majority of the hazards have an undefined hazard area (i.e., affecting an entire community or larger area) the following vulnerability assessment will only address those hazards that affect a specified area – flooding (river and flash). However, due to the historical occurrences of tornadoes, this hazard was added to the assessment.

Critical Facilities

Identifying the location of critical facilities and designated shelters (see Table H4) in Stout is important in order to assess their vulnerability to hazards. These critical facilities are important to the operation of a community and the key installations of the economic sector. For instance, high-density residential or commercial development, schools, police stations, government buildings, hospitals and care facilities, airports, gas stations, hardware stores, grocery stores, and water supply systems. It is important to know the threats each hazard poses to these facilities. *Attachment 6I* illustrates the location of identified critical facilities throughout Stout.

Emergency shelters are also something that is important to identify. The City of Stout does not have any designated emergency shelters.

TABLE H4: CRITICAL FACILITIES AND DESIGNATED SHELTERS IN STOUT

Critical Facilities	
City Hall	Fire Station
Wastewater Treatment Plant	
Shelters	
None	

Source: Community

According to available data, Stout is projected to see a decrease in population over the next thirty years. This population decrease most likely result in a lesser need for additional critical facilities such as schools, daycare centers, or healthcare centers. However, the need for more critical facilities should be closely monitored these next 5-years and readdressed when this HMP is updated.

Homes in Hazardous Areas

A facility's vulnerability to a flooding event is normally low, since these structures are rarely constructed within the 100-year floodplain. According to the information provided, bridges and roadways would be impacted by flooding. This disruption in the transportation infrastructure would create a longer time period to receive and provide services and supplies to an area if a bridge was washed away due to flooding.

TABLE H5: CITY OF STOUT 100-YEAR FLOODPLAIN PROPERTIES

Total Dwellings	0
Total Buildings	0
Total Structures	0
Total Value of all Structures	$0

Source: INRCOG & Grundy County Assessor

According to FEMA, there are 0 residential structures located within the 100-year floodplain. However, according to GIS data, there are 0 acres of land in the 100-year floodplain. Therefore, flooding (at least river flooding) does not pose a risk to Stout. There are no rivers near Stout. See *Attachment 5I: Flood Scenario Map of the City.*

Tornadoes and windstorms are events that can cause harm to all structures and populations in the area. As part of a vulnerability assessment, a hypothetical tornado scenario was created for the community. Attachment 5h and Attachment 5j 4k illustrate the impact of a hypothetical tornado event in Stout. Table H6

displays the degrees of impact that a hypothetical tornado scenario of various strengths would have on Stout. As can be seen from the table, a direct hit from an EF4 or EF 5 tornado would damage at least 65 percent of the City.

As stated on the FEMA website, mobile homes are highly vulnerable to tornadoes. Even mobile homes that are tied down, offer little protection from tornadoes. According to Census data provided, there are approximately 2 mobile homes is Stout, using the average persons per household of 2.26 means that there is approximately 5 people living in mobile homes in the City. Multi-family housing units are another type of housing that is considered at-risk during one of these events. There are approximately 14 families residing in multi-family housing units in Stout according to the U.S. Census.

TABLE H6: TORNADO SCENARIO FOR STOUT

Scale	Tornado Width	# of Parcels	Damaged Values	% of City Damaged
EF0	50 Meters	16	$151,300	5.09%
EF1	150 Meters	31	$276,490	9.30%
EF2	250 Meters	43	$737,420	24.80%
EF3	500 Meters	71	$1,266,645	42.60%
EF4	900 Meters	80	$2,973,230	100.00%
EF5	1100 Meters	80	$2,973,230	100.00%

Nursing homes or skilled living centers are also highly vulnerable to tornadoes, but there are no such facilities in Stout.

Vulnerability – Social Assets (Populations)

The social vulnerability assessment also identified how the hazards affect the population of Stout and it is assumes that the identified populations are more likely to require assistance during times of disaster; therefore, are considered, generally speaking, more "at-risk" than the remaining population. The "at-risk" population must be identified and targeted in successful mitigation efforts. Table H7 presents an overview of the at-risk population in Stout according to available information retrieved from the 2010 U.S. Census and Iowa Data Center.

According to Table H7, 12% of residents are 64 years or older. If an incident were to arise, due to the health of the older residents, transportation and care of this population would be component to a successful mitigation.

In addition, persons living in mobile homes, also known as manufactured housing may also be at risk from tornadoes or high winds. There are an estimated 5 persons living in mobile homes.

Persons under the age of 18 are also at higher risk during some disasters. This is mostly due to the fact that young persons are often not aware of the proper actions to take in the event of a disaster. In addition, very young children would be more susceptible to a disaster such as a disease epidemic simply due to their age. In 2010, there was 25% of the population under the age of 18.

TABLE H7: CITY OF STOUT "AT-RISK" POPULATION

	2010
Total City Population (2010)	224
Elderly (65 yrs. and older)	27
Youth (under 18 yrs. old)	57
Householder Living Alone	14
Non-English Speaking Population (speaks English less than 'very well'	0
Population Living in Poverty	27
Population in Mobile Homes	2
Group Quarters Population	0
Persons with Disabilities (age 5+)	46
Persons w/Sensory Disability	5
Persons w/Physical Disability	13
Persons w/Mental Disability	11
Persons w/Self-Care Disability	2
Persons w/Go-Outside-Home Disability	2
Persons w/Employment Disability	13

Source: U.S. Census, 2010; Iowa Data Center

Vulnerability – Estimating Potential Property Losses

Valuations are an important component of hazard mitigation planning in so much as it provides measurable data that can be used to form some type of estimate as to the potential losses a community could face in the event of a disaster. The valuations for the City of Stout are available from the County Assessor's office. City of Stout's property valuations are in Table H8.

This information was made available from the Grundy County Assessor's office. It should be noted however that these dollar amounts do not include gas and electric utility valuations nor do the evaluations include exempt properties, including government buildings, infrastructure, and religious/nonprofit properties. These results should be considered preliminary, as a full accounting of assets has not been completed.

TABLE H8: ASSET INVENTORY – VALUE OF STRUCTURES IN STOUT

Type of Structure	Lot/Land Value	Value of All Structures	Total Value	Number of Structures
Residential	$951,110	$6,011,090	$6,962,200	82
Commercial	$7,820	$152,410	$160,230	4
Industrial	$0	$0	$0	0
Agriculture	$290,431	$230,530	$520,961	NA
Total	**$298,251**	**$6,394,030**	**$7,643,391**	**86**

Source: Grundy County Assessor; Values as of 6/10/2016

Future Development

Future development within identified hazard areas can change the threat level of an area by placing critical facilities, businesses, transportation networks, utilities, and populations within vulnerable areas. While it can be difficult to curb development in the planning area, it is the jurisdiction's advantage to be aware of development trends in order to successfully mitigation future hazards as risks increase. However, continued conformity with the State Building Codes and local land use ordinances and regulations (zoning, subdivision, floodplain management, etc.) will help to mitigate the effects hazards have on new and future development.

Repetitive Loss Properties

FEMA defines a repetitive loss property as an insurable building that has experienced two losses in a 10-year period in which each loss is $1,000 or more. There are no repetitive loss properties in Stout.

This HMP attempts to reduce loss by identifying potential natural and manmade hazards. As a result of many natural and manmade hazards, repairs and reconstruction area often completed in a way that returns the structure to pre-disaster condition yet does little to prevent a reoccurrence of damage. Replication of the pre-disaster conditions allows for the repetitive cycle of property damage, reconstruction, and re-damage. Hazard mitigation is needed to ensure that such cycles are broken, that post-disaster repairs and reconstruction are analyzed, and sound, less vulnerable conditions are produced. Additionally, other mitigation strategies may be considered, such as voluntary property buy-outs.

Using GIS spatial data from FIRM maps, in combination with property value data from the Grundy Assessor's office, estimates of value in the floodplain were calculated. Table H9 shows there is no land within the city limits that are located in a floodplain.

TABLE H9: FLOODPLAIN DATA FOR STOUT

	Number of Parcels	Land Value	Building Value	Dwelling Value	Total Value	Percent of City Affected
1% Annual Floodplain	0	$0	$0	$0	$0	0%
0.2% Annual Floodplain	-	-	-	-	-	-

Source: Grundy County Assessor's Office; Analysis conducted by INRCOG; Parcel values and FIRM maps as of 10/19/2005

Future Development

Future development within identified hazard areas can change the threat level of an area by placing critical facilities, businesses, transportation networks, utilities, and populations within vulnerable areas. While it can be difficult to curb development in the planning area, it is the jurisdiction's advantage to be aware of development trends in order to successfully mitigation future hazards as risks increase. However, continued conformity with the State Building Codes and local land use ordinances and regulations (zoning, subdivision, floodplain management, etc.) will help to mitigate the effects hazards have on new and future development.

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FEMA defines a repetitive loss property as an insurable building that has experienced two losses in a 10-year period in which each loss is $1,000 or more. There are no repetitive loss properties in Stout.

MITIGATION STRATEGY

Hazard Mitigation Plan Goals

The hazard mitigation plan goals were reviewed by the Hazard Mitigation Planning Committee at their second committee meeting. The committee set as a priority the development of broad-based goals that would address a multitude of hazards and encompass a variety of mitigation activities. The hazard mitigation plan goals for the City of Stout are as follows:

1. Minimize to the greatest possible extent the number of injuries and/or loss of life associated with all identified hazards.
2. Reduce or eliminate property damage due to the occurrence of disasters.
3. Identify ways that response operations, in the event of a disaster, can be improved.
4. Return the community to either pre-disaster or improved conditions in a timely manner in the wake of a disaster.
5. Develop strategies that can be used to reduce the community's overall risk to the negative effects of natural, technological, and man-made disasters.
6. Reconvene the planning committee on an annual basis to review the plan document, check for compliance with the plan goals, and track progress in achieving the mitigation strategies.
7. Maintain the Countywide Multi-Jurisdictional format for future plan updates.

Current Mitigation Actions

Prevention Mitigation Actions

The city has participated in the Hazard Mitigation Planning process in the past. No other prevention mitigation actions have been taken by the City of Stout.

TABLE H10: STOUT'S CURRENT PLANNING AND REGULATORY DOCUMENTS

Previous HMP	Comprehensive Plan	Building Code	Zoning Ordinance	Subdivision Regulations	Floodplain Management Ordinance	Tree-Trimming Ordinance	Storm Water Ordinance	Snow Removal Ordinance
Yes	No	No	No	No	No	No	No	Yes

Source: Community

Property Protection Mitigation Actions

Stout has not done or been involved with any property protection mitigation actions.

Public Education and Awareness Mitigation Actions

Grundy County uses the AlertIowa notification system to notify users in case of an emergency.

Emergency Services Mitigation Actions

Grundy County Emergency Management Agency

Stout works with the Grundy County Emergency Management Coordinator, based out of the City of Grundy Center, on various safety and emergency events. The Emergency Management Coordinator works in conjunction with local fire, rescue, police, and government officials to draft and implement workable emergency action plans in the community. The current Emergency Management Coordinator is Zach Tripp and current contact information is as follows: Grundy County Emergency Management Agency, 705 8th Street, Grundy Center, Iowa 50638, (319) 824-6933, email: ztripp@grundysheriff.org

Law Enforcement

The city contracts with the Grundy County Sheriff.

Fire Protection

The City of Stout currently has 17 volunteer firemen. The department receives training on an annual basis from the Iowa Fire Service Training Bureau and the Waterloo and Cedar Falls Fire Departments. Equipment owned and operated by the local fire department includes two in-service pumpers, two tankers, and are in the process of acquiring a new truck to use as a grass rig.

Ambulance

The City of Dike provides ambulance service to Stout.

Medical Facilities

There are no medical facilities in Stout. Grundy Memorial Hospital is located in Grundy Center and is the only medical facility (other than small clinics) located in the county.

HAZMAT

Stout contracts with Northeast Iowa Response Group for response to hazardous material spills. The Northeast Iowa Response Group is a division of Waterloo Fire Rescue as is the Hazardous Materials Regional Training Center. The Training Center provides training to fire departments and companies from around the state and country. Not only is this a training center it also serves as a hazardous materials quick response unit to Black Hawk County, surrounding counties, and many municipalities in a ten county region. The Unit provides local fire departments with hazard materials emergency procedures thus reducing additional contamination. An evacuation plan is also in place in conjunction with the activities with the local department. Contact information for the facility is as follows: Hazardous Materials Regional Training Center, 1925 Newell Street, Waterloo, Iowa 50707, Phone: (319) 291-4275, Toll Free: (800) 291-4682, Fax: (319) 291-4285

The jurisdiction also partners the Northeast Iowa Response Group for assistance in responding to any methamphetamine labs located in the city limits. The

Response Group assists the Police Departments in containment of the site and disposal of the hazardous chemicals.

Warning Systems

Grundy County uses the AlertIowa notification system that is utilized statewide. The program is funded by the State of Iowa and administered through Iowa Homeland Security and Emergency Management Office. AlertIowa will be administered through Grundy County Emergency Management Agency and will be available to all county cities and school districts.

AlertIowa will allow for emergency notifications at all times via landline telephones, cell phones, email, text message, and social media. The County will use their emergency notification network for all of the following events: blizzards, flash flooding, severe thunderstorms, and tornadoes. There is an optional way to receive the same alert for events such as: excessive heat warnings, hazardous materials warnings, heavy snow warning, high wind warnings, ice storm warnings, law enforcement warnings, shelter in place warnings, sleet warnings, wind chill warnings, and winter storm warnings.

Public Works Department

The city has part time employees to maintain basic city infrastructure and to plow snow in the winter months.

Natural Resource Protection Mitigation Actions

The city has a new wastewater treatment facility, which prevents untreated sewage from entering the ground and surface water systems.

Structural Projects Mitigation Actions

Stout does not have nor done any structural projects mitigation actions.

Future Mitigation Actions

While the existing mitigation activities discussed above detail the city's efforts to mitigate hazards when possible and to respond to hazards in a timely and efficient manner, the Committee also recognizes that there are many more mitigation activities and projects that would benefit county residents. Thus, the Committee developed a list of future hazard mitigation activities that, if accomplished, would serve to further reduce the risk of hazards to the community. The list may include a combination of projects the Committee feels the community should try to accomplish and mitigation efforts that are ongoing that the Committee view as vital to the continued well-being of the public.

Priority

The Committee analyzed the potential mitigation activities. This analysis included a discussion of the potential benefits of implementing the activity, some hurdles that the community may face in implementing the action step, and the drawbacks of implementation. The analysis utilized the STAPLEE feasibility criteria. The STAPLEE technique is a FEMA suggested method of evaluation. The STAPLEE approach assesses both positive and negative impacts on the following

aspects of a county: **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental.

The Committee was asked to discuss the STAPLEE elements (Table H11) and determine each element's ranking (High -H, Medium -M, Low-L) for each identified future mitigation activity. Afterwards, the average priority for each migration activity was recorded as the overall priority ranking for that particular future mitigation activity.

TABLE H11: STAPLEE ELEMENTS

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

Timeline

The Committee identified the time period each period each of the proposed mitigation activity will occur. Activities that occur regularly (either daily, weekly,

monthly or annually) were identified as Active. If the action is to occur within the next 1-5 years it was identified as Short-Term, if the activity would take 5-10 years it was labeled as Mid-Term, and any activities that would take 10 or more years were identified as Long-Term.

Funding

Although in the long-term hazard mitigation actions will save money by avoiding the loss of lives or property damages, in the short-term each action will have an associated cost. The City will rely heavily on local funding sources to fulfill most of the plan obligations; however, they will also seek funds from State and Federal agencies for both pre- and post-disaster mitigation activities.

The estimated cost(s) for each mitigation action, program, or project is either: Minimal, Low, Moderate, or High depending upon various factors.

- Minimal: Cost estimate is $10,000 or less based on using current staff, time commitment, continuous of current duties, proposed action/program/ project, and funding sources.
- Low: Cost estimate for project range from $10,001 - $99,999 based on existing proposed treatment, time commitment, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.).

- Moderate: Cost estimate for project range from $100,000 - $299,999 based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.), and funding sources.
- High: Cost estimate for project range is $300,000 or higher based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, project components (permits, acquisition, coordination, etc.), and funding sources.

Implementation Strategy

One of the first steps the Committee took was to review the City's existing Hazard Mitigation Activities and provide an update on their status, see Based on each activity's progress, City's chose to continue the activity or drop it from the plan update. Once the Committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. In addition, the Committee identified a time line for each activity, associated hazards, estimated cost, priority, identified the responsible party or parties for each activity, and indicated at least which of the city's goals the action addresses. Table H12 is the City of Stout's Implementation Strategy.

TABLE H12: CITY OF STOUT'S IMPLEMENTATION STRATEGY

Priority	Mitigation Action/Program/Project	Associated Hazard	Primary Agency Responsible for Implementation	Date for Completion	Estimated Cost (s)	Funding Source
H	Educate the public	All	Grundy County EMA	On-Going	Minimal	Local
H	Continue training and education for fire departments, law enforcement agencies and ambulance crew personnel	All	City Council and Roads Depts.	On-Going	Moderate	Local, State
H	Maintain and acquire materials and equipment for fire departments, law enforcement agencies and ambulance crew personnel	All	City Council	On-Going	Minimal	Local, State
H	Provide emergency shelters for evacuees	All	Grundy County EMA	On-Going	Minimal	Local
H	Maintain mutual aid agreements	All	Grundy County EMA, City Council	On-Going	Minimal	Local
M	Maintain tree trimming program	Severe Winter Storm, Tornado/Windstorm, Thunderstorm/Lightning/Hail/Hail	City Council	On-Going	Low	Local
M	Determine locations for potential heating shelters and volunteer organization	Severe Winter Storm	Grundy County EMA	On-Going	Minimal	Local
M	Encourage utility providers and developers to place all utilities underground	Severe Winter Storm, Infrastructure Failure, Thunderstorm/Lightning/Hail	City Council	On-Going	Moderate	Local
H	Purchase and maintain backup generators	Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado, Emergency Management	Grundy County EMA	On-Going	Minimal	Local
H	Maintain public works equipment	Severe Winter Storm	Public Works	On-Going	Minimal	Local
M	Notify the media on shelter locations	Severe Winter Storm, Extreme Heat, Tornado	Sheriff, EMA	On-Going	Minimal	Local
H	Make sure residents keep sidewalks clear of snow and ice	Severe Winter Storm	Public Works	On-Going	Minimal	Local
L	Maintain use of snow fences in the city/county	Severe Winter Storm	Public Works	On-Going	Minimal	Local
M	Use surge protectors to prevent electrical damage to critical and sensitive equipment	Thunderstorm/Lightning/Hail	Staff	On-Going	Minimal	Local

M	Backup all digital data	Thunderstorm/Lightning/Hail	Staff	On-Going	Minimal	Local
M	Purchase NOAA weather radios	Thunderstorm/Lightning/Hail, Tornado/Windstorm, Radiological Incident	Grundy County EMA	On-Going	Minimal	Local, State
L	Enforce and update building codes, as needed	Thunderstorm/Lightning/Hail, Tornado/Windstorm, Expansive Soils, Earthquake	City Council	On-Going	Minimal	Local
L	Maintain storm spotter training for local fire departments/deputies and EMS crews	Thunderstorm/Lightning/Hail, Tornado/Windstorm	Grundy County EMA	On-Going	Minimal	Local
M	Continue enforcement of city sump pump discharge ordinance	Thunderstorm/Lightning/Hail	City Council	On-Going	Minimal	Local
L	Maintain a list of potential storm sewer projects	Thunderstorm/Lightning/Hail	City Council	On-Going	Minimal	Local
M	Make available a cleanup crew for after a storm	Thunderstorm/Lightning/Hail	City Council, EMA	On-Going	Minimal to Low	Local
L	Maintain law enforcement monitoring of large storage supplies	HAZMAT Incident	Sheriff	On-Going	Minimal	Local
L	Acquire necessary response and detection equipment for city/county employees	HAZMAT Incident	Grundy County EMA	On-Going	Minimal	Local, State
L	Encourage lead based paint and asbestos removal	HAZMAT Incident	City Council	On-Going	Minimal	Local
L	Provide a local hazardous waste drop-off site	HAZMAT Incident	City Council	On-Going	Minimal to Low	Local
H	Maintain mutual aid agreements with the Northeast Iowa response Group	HAZMAT Incident	City Council	On-Going	Minimal	Local
H	Keep HAZMAT manuals/information current and easily accessible	HAZMAT Incident	All Depts.	On-Going	Minimal	Local
H	Maintain, test, and replace warning sirens	Tornado/Windstorm, Thunderstorm/Lightning/Hail, Infrastructure Failure	Grundy County EMA	On-Going	Minimal to Low	Local, State
H	Install new warning sirens where needed or replace warning sirens with insufficient decibel levels	Tornado/Windstorm	Grundy County EMA	On-Going	Moderate	Local, State
M	Encourage and maintain enrollment in emergency notification system	Thunderstorm/Lightning/Hail, Tornado/Windstorm, Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local
H	Construct or designate a safe room or storm shelter	Tornado/Windstorm	Grundy County EMA	On-Going	High	Local, State, Federal
M	Encourage home owners to keep emergency kits	Tornado/Windstorm	Grundy County EMA	On-Going	Minimal	Local
M	Encourage backup power generation for local telephone systems and cellular operations	Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local
L	Maintain or install GPS units in all emergency service and city/county vehicles	Infrastructure Failure	Staff	On-Going	Minimal	Local
L	Maintain automatic TTY TDD machines for emergency personnel and city/county employees	Infrastructure Failure	Staff	On-Going	Minimal	Local
M	Enhance Standard Operating Procedures for dissemination of information/press releases in the event of a disaster	Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local
M	Continue training and promotion of the Incident	Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local,

	Command System					State
M	Complete continuity of government plan	Infrastructure Failure	City Council	On-Going	Minimal	Local
H	Encourage use of Iowa One call before digging	Infrastructure Failure	City Council	On-Going	Minimal	Local
H	Upgrade radio communications equipment as needed	Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local
H	Regularly review and amend fire and medical HAZMAT response standard operating procedures	Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local
L	Improve standard operating procedures for schools	Infrastructure Failure	Grundy County EMA, Schools	On-Going	Minimal	Local
M	Seek to improve communications with other agencies	Infrastructure Failure, Terrorism	City Council	On-Going	Minimal	Local
L	Keep supply of backup radios and cellphones	Infrastructure Failure	Staff	On-Going	Minimal to Low	Local
M	Maintain list of county emergency contacts	Infrastructure Failure	Staff	On-Going	Minimal	Local
M	Keep the county updated on personnel changes	Infrastructure Failure	Staff	On-Going	Minimal to Low	Local
H	Continue cooperation between city roads department and local fire departments during snow emergencies	Severe Winter Storm	Roads Department	On-Going	Minimal	Local
L	Pursue partnership with rural water as the system expands	Grass/Wild Fire	City Council	On-Going	Minimal	Local
L	Encourage residents to keep smoke detectors, sprinkler systems and fire extinguishers maintained in their homes	Grass/Wild Fire	Grundy County EMA	On-Going	Minimal	Local
L	Continue an annual inspection program for commercial and industrial properties	Grass/Wild Fire	Fire Department	On-Going	Minimal	Local
H	Continue fire prevention program	Grass/Wild Fire	Grundy County EMA	On-Going	Minimal	Local
M	Improve water system to enhance firefighting capacity/ability	Grass/Wild Fire	City Council	On-Going	Minimal	Local
L	Continue with improvement to the storm water system	Flash Flood	City Council	On-Going	Low to Moderate	Local, State
H	Prevent inflow and infiltration into the sanitary sewer	Flash Flood, River Flooding	City Council	On-Going	Minimal	Local
L	Educate the public on maintaining their sump pumps	Flash Flood	City Council	On-Going	Minimal	Local
M	Maintain and keep storm drains clear of debris	Flash Flood	Public Works	On-Going	Minimal	Local
M	Stockpile sand and sandbags	Flash Flood, River Flooding	Grundy County EMA	On-Going	Minimal to Low	Local
L	Identify, purchase and remove structures from flood hazard areas	Flash Flood, River Flooding	Grundy County EMA, City Council	On-Going	Moderate	Local, Federal
L	Initiate and enforce burn ban in times of drought or as needed	Grass/Wild Fire, Drought	City Council	On-Going	Minimal	Local
L	Maintain and improve signals/signage along roadways and at railroad crossings	Transportation Incident	Roads Department, Sheriff	On-Going	Minimal	Local, State
L	Establish alternative transportation routes should a road need to be closed	Transportation Incident, River Flooding, Flash Flood, Infrastructure Failure	Grundy County EMA, Sheriff	On-Going	Minimal	Local
L	Purchase emergency signs to be used in case of an incident	Transportation Incident	City Council, Sheriff, EMA	On-Going	Minimal	Local
L	Enforce no parking designations at special events	Transportation Incident	Sheriff	On-Going	Low	Local
L	Identify fallout shelter locations	Radiological Incident	City Council	On-Going	Low	Local
L	Keep communication lines open with Nuclear Plant in Palo, IA	Radiological Incident	City Council, EMA	On-Going	Minimal	Local
M	Maintain and/or develop a wellhead protection program	HAZMAT Incident, Animal/Plant/Crop	City Council, Sheriff	On-Going	Low	Local,

		Disease, Human Disease				State
M	Monitor wells in areas of identified contamination	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, EMA	On-Going	Low	Local
H	Monitor the drinking water supply	HAZMAT Incident, Human Disease, Animal/Plant/Crop Disease	City Council	On-Going	Moderate	Local
L	Identify and map areas of past contamination	HAZMAT Incident	City Council	On-Going	Low	Local
L	Maintain and/or develop storm water management program	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease, Flash Flood	City Council	On-Going	Low	Local
L	Eliminate and cap private and abandoned wells in the city	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council	On-Going	Low	Local
L	Eliminate the use of septic tank systems in the city limits	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council	On-Going	Minimal	Local
H	Follow monitoring requirements set forth by the Iowa DNR	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, Engineer	On-Going	Low	Local
M	Carry out conservation measures such as erosion control and work with the following organizations: Extension, NRCS, Farm Bureau, EPA, DNR, and Soil and water Conservation District	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, Engineer	On-Going	Moderate	Local, State, Federal
M	Maintain and update anti-virus software	Terrorism	Staff	On-Going	Minimal	Local
L	Secure vulnerable targets, as identified by the LEPC and County EMA with alarms, security cameras and fences	Terrorism	Sheriff	On-Going	Minimal	Local
M	Review and update fire codes as necessary	Grass/Wild Fire	Fire Department	On-Going	Minimal	Local
L	Continue to cooperate with pipeline owners and operators to ensure locations are marked	Grass/Wild Fire	City Council	On-Going	Minimal	Local
M	Purchase a new tanker and/or pumper	Grass/Wild Fire	City Council	On-Going	Low to Moderate	Local
L	Encourage community to plant shade trees	Extreme Heat	City Council	On-Going	Minimal	Local
L	Provide fans and/or cooling shelter	Extreme Heat	County EMA	On-Going	Minimal to Low	Local
M	Maintain air conditioner(s) in community buildings	Extreme Heat	Public Works	On-Going	Minimal	Local
L	Keep a supply of drinking water to distribute	Extreme Heat	Grundy County EMA	On-Going	Low	Local
L	Encourage the public to receive vaccinations	Human Disease	Grundy County EMA, Health Dept.	On-Going	Minimal	Local
L	Cooperate with any countywide mass vaccination plan	Human Disease	Grundy County EMA	On-Going	Minimal	Local
L	Monitor disease outbreak news from the CDC and Iowa Department of Public Health	Human Disease, Animal/Plant/Crop Disease	Grundy County EMA, Sheriff	On-Going	Low to Moderate	Local
H	Restrict water usage should it be necessary	Drought	City Council	On-Going	Minimal to Low	Local
L	Encourage the use of proper materials and construction techniques	Expansive Soils	City Council	On-Going	Minimal to Low	Local
L	Educate city personnel to identify risk areas	Expansive Soils	City Council	On-Going	Minimal	Local
L	Install tiling to help water move away from structures	Expansive Soils	Public Works	On-Going	Minimal to Low	Local
L	Enforce a curfew	Terrorism	Sheriff	On-Going	Minimal to Low	Local, State
L	Identify and inventory potential sinkhole sites	Sinkholes	Public Works	On-Going	Minimal to Low	Local

L	Educate city personnel to handle a sinkhole situation	Sinkholes	City Council, Engineer	On-Going	Minimal	Local
M	Secure the area (around a sinkhole)	Sinkholes	Public Works	On-Going	Minimal	Local
M	Inspect any utility lines that are near a sinkhole	Sinkholes	Public Works	On-Going	Minimal	Local
L	Enforce the local zoning ordinances	Landslides	City Council	On-Going	Minimal	Local
M	Clear ditches, streams, and waterways on a regular basis	River Flooding	City Council, Public Works	On-Going	Minimal	Local
L	Encourage floodproofing/elevating structures in the floodplain	River Flooding	City Council, EMA	On-Going	Minimal	Local
M	Update flood maps/flood studies for areas throughout the county	River Flooding	City Council	On-Going	Minimal	Local
L	Identify bridges and culverts than can cost effectively be reengineered to reduce future flooding	River Flooding	City Council, Engineer	On-Going	Minimal	Local
M	Establish transportation evacuation routes and protocols	River Flooding	City Council, EMA, Sheriff	On-Going	Minimal	Local
L	Develop sandbagging procedures for the community	River Flooding	City Council, EMA	On-Going	Minimal	Local
L	Develop and maintain staging area for dumping during cleanup	River Flooding	City Council, Public Works	On-Going	Minimal	Local
M	Continue cooperation with county in developing flood mitigation efforts	Flash Flood, River Flooding	City Council, EMA	On-Going	Minimal	Local
L	Purchase additional parkland in order to increase greens space and reducing surface flow	River Flooding	City Council	On-Going	Minimal	Local
L	Set a designated number of people to be trained in post-disaster record keeping/damage assessments	Emergency Management*	City Council, EMA	On-Going	Minimal	Local
H	Inform the public of reputable and ill reputable contractors following disasters	Emergency Management*	City Council	On-Going	Minimal	Local
M	Encourage all communities to participate in their Local Emergency Planning Commission (LEPC)	Emergency Management*	City Council, EMA	On-Going	Minimal	Local
H	Maintain and update emergency response plans	Emergency Management*	City Council, EMA	On-Going	Low to Moderate	Local
H	Maintain lists of personnel and equipment available to use with response plans	Emergency Management*	City Council, Staff	On-Going	Minimal	Local
H	Maintain communication with county contacts	Emergency Management*	City Council, Staff	On-Going	Moderate	Local
H	Maintain NIMS compliance	Emergency Management*	City Council, EMA	On-Going	Moderate	Local, State, Federal

APPENDIX I: CITY OF WELLSBURG

COMMUNITY PROFILE

Location

Wellsburg is located near the western edge of Grundy County, south of U.S. Highway 20. The town is located at the coordinates of 42.4328° N and 92.9251° W. A tributary of South Beaver Creek runs through the southern portion of the City, which flows through the Meadowbrook Golf Course. The golf course is located on the western edge of the City.

History

Wellsburg was founded in 1880 by George Wells. The land was originally obtained for farming purposed by Wells, throughout the years he established himself as a farmer. In 1880, Wells gave one square mile of his land to be established as the town of "Wells." This was painted on the side of the local train depot that was built by the Burlington and Cedar Rapids Railroad. The addition of rail lines made accessing the closest market in Cedar Falls much easier. It has established itself as a small farming community, rich in German heritage with a growing vision to move boldly into the 21st Century.

Transportation

There are two main roads that bring people into Wellsburg, these roads are North Wells (also called F Avenue to the south of town), which enter from the north and south, and County Highway D25, which enters from the east and west. North Wells intersects with U.S. Highway 20 two miles north of Wellsburg. F Avenue connects with State Highway 175 a little more than 5 miles south of Wellsburg.

According to the Iowa Department of Transportation's 2013 traffic study, an average of 350 cars and trucks travel on the portion of County Highway D25 west of the city limits. The eastern portion of County Highway D25 sees an average of 380 cars and trucks daily.

According to the same Iowa Department of Transportation's 2013 traffic study, an average of 1,880 cars and trucks travel on the portion of North Wells north of the city limits. The eastern portion of North Wells sees an average of 1,550 cars and trucks daily.

Grundy County's only airport is located in Grundy Center, approximately 6 miles southeast of Wellsburg. Grundy Center Muni Airport-6K7 is a public airport.

The closest major airport is the Waterloo Regional Airport (ALO), which is located approximately 33 miles northeast of Wellsburg. This public airport is owned and operated by the City of Waterloo and overseen by an Airport Commission appointed by the Mayor. The primary runway is 8,400 foot long, 150 foot wide, and has a grooved asphalt surface. The airport is classified as a non-hub primary commercial service airport, offering general aviation and commercial service.

Community Services

The Wellsburg's water supply is served by Central Iowa Water Association's network of water distribution of tanks, wells and treatment facilities located throughout central Iowa. A large elevated storage tower south of Wellsburg provides water for the city.

Wellsburg's sanitary sewer system is provided to residents through a collection network and a 2-cell waste stabilization lagoon and three lift stations. The system's design and flow information are as follows: the rated capacity is 360,000 gpd and the peak demand is 310,000 gpd. The average daily demand is 170,000 gpd. The city should have plenty of capacity to accommodate additional development.

TABLE I1: WELLSBURG UTILITY PROVIDERS

Electric	Natural Gas	Water	Sewer	Sanitation	Telephone	Internet	Cable
Alliant Energy	Alliant Energy	Central Iowa Water Association	City	City	Windstream	Windstream	None

Demographics

Table I2 provides an overview of Wellsburg's demographics. From 2000 to 2010, the City experienced a 1.2% decrease in population, from 716 to 707 persons.

TABLE I2: CITY OF WELLSBURG DEMOGRAPHICS

Government Framework	Mayor – City Council		
General Population, 2010 Census		***Economics Characteristics, 2010 Census***	
Total Population (2010)	707	Population 16 years and over	576
Total Males	357	Population in Labor Force (16 yrs. and over)	321
Total Females	350	Persons in Civilian Labor Force	321
Median Age	45.3	Persons Employed	317
At-Risk Population, <18 Yrs.	147	Persons Unemployed	4
At-Risk Population, >64 Yrs.	167	Persons in Armed Forces	0
One Race-White	696	Mean Travel Time to Work in Minutes (16 yrs. & over)	21.2
Black or African American	0	Persons Employed in Management, Professional, or Related Occupations	83
Asian	2	Persons Employed in Service Occupations	65
Native Hawaiian or Pacific Islander	0	Persons Employed in Sales and Office Occupations	64
Two or More Races	5	Persons Employed in Farming, Fishing, or Forestry Occupations	0
Hispanic or Latino (of any race)	15	Persons Employed in Construction, Extraction, or Maintenance Occupations	27
Not Hispanic or Latino	692	Persons Employed in Production, Transportation, or Material Moving Occupations	78
Total Household Population	707	Median Household Income	$30,417
Total Population in Group Quarters	0	Median Family Income	$38,750
Persons in Group Quarters – Nursing Homes	0	Per Capita Personal Income	$17,636
Persons in Group Quarters – Noninstitutionalized	0	Families below Poverty Level	9
Housing Characteristics, 2010 Census		Individuals below Poverty Level	109
Total Housing Units	367	Unemployment Rate	1.2%
Total Owner-Occupied Housing Units	283	***Social Characteristics, 2010 Census***	
Total Renter-Occupied Housing Units	50	School Enrollment (3 yrs. and over)	172
Total Vacant Housing Units	34	Nursery School, Preschool	9
Total 1-Unit Detached and Attached Structures	355	Kindergarten and Elementary School (grades 1-8)	95
Total 2, 3, and 4-Unit Structures	11	High School (grades 9-12)	53
Total 5 to 19-Unit Structures	4	College or Graduate School	15
Total Mobile Homes	0	Education Attainment: Population 25 Years and Over	543
Year Majority of Housing Units were Built	1959 or earlier (72.7%)	Persons with Less than 9th Grade	67
Average Household Size	2.12	Persons with 9th to 12th Grade, No Diploma	33
Average Family Size	2.72	Persons with High School Degree or Equivalency	233
Specified Renter-Occupied Units	54	Persons with Some College, No Degree	107
Median Gross Rent	$281	Persons with Associate Degree	46
Specified Owner-Occupied Units	279	Persons with Bachelor's Degree	42
Median Housing Value, Owner-Occupied	$37,600	Persons with Graduate or Higher Degree	15
Method of Heating Household	Utility Gas (75.1%)	Persons with a Disability (5 yrs. and over)	290
Households with No Telephone Service	7	Persons that Speak a Language other than English at Home (5yrs +)	53

HAZARDS & RISK ASSESSMENT

Hazard Analysis

Section 3 identified and profiled the hazards for the entire planning area. However, each community analyzed their own vulnerability to those hazards applicable to their jurisdiction. Using the methodology outlined in Section 3 (Vulnerability Assessment), the City of Wellsburg evaluated the risk associated with a specific hazard, defined by probability and frequency of occurrence, magnitude, severity, exposures, and consequences. Wellsburg's vulnerability assessment provides in-depth knowledge of the hazards and vulnerabilities that affect the community. This analysis provides an all-hazard approach when evaluating the hazards of that affect the city, and the associated risks and impacts each hazard presents.

As mentioned previously in Section 3, the vulnerability assessment requires a five-year review with periodic updates, as needed. Potential future hazards and impacts may result from changing technology, new critical facilities, infrastructures, and development patterns, as well as demographic and socioeconomic changes that occur within or outside the area.

Disaster frequency and its effects or severity are important as a basis for planning emergency response and mitigation. Natural hazards tend to reoccur on a predictable seasonal basis, whereas manmade or technological events tend to change over time with advancement in technology and methods of operation. Five criteria were used by the Committee to assure a systematic and comprehensive approach to hazard analysis for their individual jurisdictions including: Historical Occurrence, Probability, Magnitude or Severity, Warning Time, and Duration.

The Committee assessed the defined hazards relevant to potential impact on the city. Using the scoring criteria previously defined (Tables 19-22) the city assessed each of the identified hazards based on probability, magnitude/severity, warning time, and duration. The scores for each of the factors were weighted using the formula below to develop the final hazard assessment score.

(Probability x .45) + (Magnitude/Severity x .30) + (Warning Time x .15) + (Duration x .10)
= Final Hazard Assessment Score

Table I3 is the analysis scores for the City of Wellsburg. As seen in Table I3, the top three hazards for Wellsburg are Thunderstorm/Lightning/Hail, and Tornado/Windstorm, and Flash Flooding

TABLE I3: IDENTIFIED HAZARDS FOR WELLSBURG						
Hazard Rank	**Hazards**	**Probability**	**Magnitude/Severity**	**Warning Time**	**Duration**	**Assessment Score**
1	Tornado/Windstorm	2	3	4	1	**2.89**
2	Thunderstorm/Lightning/Hail	4	2	4	1	**2.75**
3	Flash Flood	2	2	4	1	**2.51**
4	HAZMAT Incident	2	2	4	2	**2.33**
5	Severe Winter Storm	2	1	2	2	**2.29**
6	Grass/Wild Fire	2	1	4	1	**2.26**
7	Animal/Plant/Crop Disease	2	2	1	4	**2.23**
8	Extreme Heat	1	1	1	4	**2.21**
9	Terrorism	1	3	4	2	**2.13**
10	Infrastructure Failure	1	1	4	4	**2.08**
11	Drought	2	2	1	4	**1.91**
12	River Flooding	1	1	4	4	**1.89**
13	Earthquake	1	1	4	1	**1.79**
14	Radiological Incident	1	1	4	4	**1.70**
15	Transportation Incident	2	2	4	1	**1.65**
16	Landslide	1	1	4	1	**1.64**
17	Human Disease	1	1	1	4	**1.63**
18	Sinkholes	1	1	4	1	**1.60**
19	Expansive Soils	3	2	1	1	**1.44**
19	Levee/Dam Failure	1	1	4	4	**1.44**

Vulnerability – Identifying Assets (Critical Facilities)

This section will describe the vulnerability for existing and future buildings, infrastructure, and critical facilities in those areas that can be impacted by the prioritized hazards. Since the majority of the hazards have an undefined hazard area (i.e., affecting an entire community or larger area) the following vulnerability assessment will only address those hazards that affect a specified area – flooding (river and flash). However, due to the historical occurrences of tornadoes, this hazard was added to the assessment.

Critical Facilities

Identifying the location of critical facilities and designated shelters (see Table I4) in Wellsburg is important in order to assess their vulnerability to hazards. These critical facilities are important to the operation of a community and are key components of the town's quality of life and economic sector. For instance, high-density residential or commercial development, schools, police stations, government buildings, hospitals and care facilities, airports, gas stations, hardware stores, grocery stores, and water supply systems. It is important to know the threats each hazard poses to these facilities. *Attachment 6J* illustrates the location of identified critical facilities throughout Wellsburg.

TABLE I4: CRITICAL FACILITIES AND DESIGNATED SHELTERS IN WELLSBURG

Critical Facilities	
City Hall	Fire Station/EMT
School	Lift Stations
Wastewater Facility	Memorial Building
Library	Electric Sub-Station (located outside of city limits)
Shelters	
Memorial Building	Fire Department

Source: Community

Emergency shelters are also something that is important to identify. The City of Wellsburg does currently have a designated emergency shelter, located at the Memorial Building. The City also uses the Fire Department as an undesignated emergency shelter.

According to data available, Wellsburg is projected to see a decrease in population over the next thirty years. This population decrease most likely result in a lesser need for additional critical facilities such as schools, daycare centers, or healthcare centers. However, the need for more critical facilities should be closely monitored these next 5-years and readdressed when this HMP is updated.

Homes in Hazardous Areas

A facility's vulnerability to a flooding event is normally low, since these structures are rarely constructed within the 100-year floodplain. According to the information provided, bridges and roadways would be impacted by flooding. This disruption in the transportation infrastructure would create a longer time period to receive and provide services and supplies to an area if a bridge was washed away due to flooding. However, river flooding is not considered a major hazard in Wellsburg, while flash flooding poses a higher risk.

TABLE I5: CITY OF WELLSBURG 100-YEAR FLOODPLAIN PROPERTIES

Total Dwellings	11
Total Buildings	7
Total Structures	18
Total Value of all Structures	$1,112,275

Source: INRCOG & Grundy County Assessor

Table I5 lists the number properties in Wellsburg that are located within the 100-year floodplain. According to data provided by FEMA, Wellsburg has 11 dwellings within the flood hazard area. According to the data provided by INRCOG and Grundy County, there are 19 parcels located within the 100-year floodplain; most of this land is undeveloped or used for a purpose that would not have a significant impact. See *Attachment 5D: Flood Scenario Map of the City* and Table I5.

Tornadoes and windstorms are events that can cause harm to all structures and populations in the area. As part of a vulnerability assessment, a hypothetical tornado scenario was created for the community. Attachment 5h and Attachment 5j 4k illustrate the impact of a hypothetical tornado event in Wellsburg. Table I6 displays the degrees of impact that a hypothetical tornado scenario of various strengths would have on Wellsburg. As can be seen from the table, a direct hit from an EF4 or EF 5 tornado would damage at least 80 percent of the City.

As stated on the FEMA website, mobile homes are highly vulnerable to tornadoes. Even mobile homes that are tied down, offer little protection from tornadoes. According to Census data provided, there are approximately 2 mobile homes is Wellsburg, using the average persons per household of 2.12 means that there is approximately 5 people living in mobile homes in the City. Multi-family housing units are another type of housing that is considered at-risk during one of these events. There are approximately 22 families residing in multi-family housing units in Wellsburg according to the U.S. Census.

TABLE I6: TORNADO SCENARIO FOR WELLSBURG

Scale	Tornado Width	# of Parcels	Damaged Values	% of City Damaged
EF0	50 Meters	65	$1,253,365.00	4.62%
EF1	150 Meters	132	$1,985,477.50	7.32%
EF2	250 Meters	188	$5,472,170.00	20.17%
EF3	500 Meters	294	$8,214,825.00	30.28%
EF4	900 Meters	402	$22,073,455.00	81.37%
EF5	1100 Meters	427	$23,519,925.00	86.70%

Vulnerability – Social Assets (Populations)

The social vulnerability assessment also identified how the hazards affect the population of Wellsburg and it is assumes that the identified populations are more likely to require assistance during times of disaster; therefore, are considered, generally speaking, more "at-risk" than the remaining population. The "at-risk" population must be identified and targeted in successful mitigation efforts. Table I7 presents an overview of the at-risk population in Wellsburg according to available information retrieved from the 2010 U.S. Census and Iowa Data Center.

According to Table I7, 23% of residents are 64 years or older, but there are no persons living in group quarters or nursing or skilled health facilities in the community. There is one apartment complex with 20 units that house older residents. If an incident were to arise, transportation and care of this population would be an important component to a successful mitigation.

As mentioned before, mobile homes are also at risk during an event of a tornado or high winds. There is an estimated number of 2 mobile homes in Wellsburg housing approximately 5 people. Similarly to mobile homes, multi-family housing sometimes puts residents at risk without a proper area to seek shelter in.

Persons under the age of 18 are also at higher risk during some disasters. This is mostly due to the fact that young persons are often not aware of the proper actions to take in the event of a disaster. In addition, very young children would be more susceptible to a disaster such as a disease epidemic simply due to their age. In 2010, there was 21% of the county's total population under the age of 18.

TABLE I7: CITY OF WELLSBURG "AT-RISK" POPULATION

	2010
Total City Population (2010)	707
Elderly (65 yrs. and older)	167
Youth (under 18 yrs. old)	147
Householder Living Alone	114
Non-English Speaking Population (speaks English less than 'very well'	18
Population Living in Poverty	43
Population in Mobile Homes	0
Group Quarters Population	0
Persons with Disabilities (age 5+)	290
Persons w/Sensory Disability	42
Persons w/Physical Disability	91
Persons w/Mental Disability	33
Persons w/Self-Care Disability	22
Persons w/Go-Outside-Home Disability	66
Persons w/Employment Disability	36

Source: U.S. Census, 2010; Iowa Data Center

Vulnerability – Estimating Potential Property Losses

Valuations are an important component of hazard mitigation planning in so much as it provides measurable data that can be used to form some type of estimate as to the potential losses a community could face in the event of a disaster. The valuations for the City of Wellsburg are available from the County Assessor's office. City of Wellsburg's property valuations are in Table I8.

This information was made available from the Grundy County Assessor's office. It should be noted however that these dollar amounts do not include gas and electric utility valuations nor do the evaluations include exempt properties, including government buildings, infrastructure, and religious/nonprofit properties. These results should be considered preliminary, as a full accounting of assets has not been completed.

TABLE I8: ASSET INVENTORY – VALUE OF STRUCTURES IN WELLSBURG

Type of Structure	Lot/Land Value	Value of All Structures	Total Value	Number of Structures
Residential	$3,694,939	$22,380,631	$26,075,570	341
Commercial	$694,891	$5,031,120	$5,726,011	50
Industrial	$10,210	$30,300	$40,510	1
Agriculture	$964,005	$121,060	$1,085,065	NA
Total	**$5,364,045**	**$27,563,111**	**$32,927,156**	**392**

Source: Grundy County Assessor; Values as of 6/10/2016

Future Development

Future development within identified hazard areas can change the threat level of an area by placing critical facilities, businesses, transportation networks, utilities, and populations within vulnerable areas. While it can be difficult to curb development in the planning area, it is the jurisdiction's advantage to be aware of development trends in order to successfully mitigation future hazards as risks increase. However, continued conformity with the State Building Codes and local land use ordinances and regulations (zoning, subdivision, floodplain management, etc.) will help to mitigate the effects hazards have on new and future development.

Repetitive Loss Properties

FEMA defines a repetitive loss property as an insurable building that has experienced two losses in a 10-year period in which each loss is $1,000 or more. City of Wellsburg does participate in the NFIP; there are no repetitive loss properties in Wellsburg.

This HMP attempts to reduce loss by identifying potential natural and manmade hazards. As a result of many natural and manmade hazards, repairs and reconstruction area often completed in a way that returns the structure to pre-disaster condition yet does little to prevent a reoccurrence of damage. Replication of the pre-disaster conditions allows for the repetitive cycle of property damage, reconstruction, and re-damage. Hazard mitigation is needed to

ensure that such cycles are broken, that post-disaster repairs and reconstruction are analyzed, and sound, less vulnerable conditions are produced. Additionally, other mitigation strategies may be considered, such as voluntary property buy-outs.

Using GIS spatial data from FIRM maps, in combination with property value data from the Grundy Assessor's office, estimates of value in the floodplain were calculated. Table I9 shows the estimated value of land, buildings, and dwellings, within the city, in a floodplain.

TABLE I9: FLOODPLAIN DATA FOR WELLSBURG

	Number of Parcels	Land Value	Building Value	Dwelling Value	Total Value	Percent of City Affected
1% Annual Floodplain	19	$675,922	$132,840	$979,435	$1,788,197	5.51%
0.2% Annual Floodplain	-	-	-	-	-	-

Source: Grundy County Assessor's Office; Analysis conducted by INRCOG; Parcel values and FIRM maps as of 10/19/2005

MITIGATION STRATEGY

Hazard Mitigation Plan Goals

The hazard mitigation plan goals were reviewed by the Hazard Mitigation Planning Committee at their second committee meeting. The committee set as a priority the development of broad-based goals that would address a multitude of hazards and encompass a variety of mitigation activities. The hazard mitigation plan goals for the City of Wellsburg are as follows:

1. Minimize to the greatest possible extent the number of injuries and/or loss of life associated with all identified hazards.
2. Reduce or eliminate property damage due to the occurrence of disasters.
3. Identify ways that response operations, in the event of a disaster, can be improved.
4. Return the community to either pre-disaster or improved conditions in a timely manner in the wake of a disaster.
5. Develop strategies that can be used to reduce the community's overall risk to the negative effects of natural, technological, and man-made disasters.
6. Reconvene the planning committee on an annual basis to review the plan document, check for compliance with the plan goals, and track progress in achieving the mitigation strategies.
7. Maintain the Countywide Multi-Jurisdictional format for future plan updates.

Current Mitigation Actions

Prevention Mitigation Actions

The city has an adopted Floodplain Management Ordinance and is a member of the Flood Insurance Program.

TABLE C10: WELLSBURG'S CURRENT PLANNING AND REGULATORY DOCUMENTS

Previous HMP	Comprehensive Plan	Building Code	Zoning Ordinance	Subdivision Regulations	Floodplain Management Ordinance	Tree-Trimming Ordinance	Storm Water Ordinance	Snow Removal Ordinance
Yes	No	Yes	Yes	Yes	Yes	Yes	No	No

Source: Community

Property Protection Mitigation Actions

Wellsburg has not done or been involved with any property protection mitigation actions.

Public Education and Awareness Mitigation Actions

The City of Wellsburg uses the city website to provide information on the city's warning siren system and encourages residents to purchase weather radios. Grundy County uses the AlertIowa notification system to notify users in case of an emergency.

Emergency Services Mitigation Actions

Grundy County Emergency Management Agency

Wellsburg works with the Grundy County Emergency Management Coordinator, based out of the City of Grundy Center, on various safety and emergency events. The Emergency Management Coordinator works in conjunction with local fire, rescue, police, and government officials to draft and implement workable emergency action plans in the community. The current Emergency Management Coordinator is Zach Tripp and current contact information is as follows: Grundy County Emergency Management Agency, 705 8th Street, Grundy Center, Iowa 50638, (319) 824-6933, email: ztripp@grundysheriff.org

Law Enforcement

The City of Wellsburg contracts with the Grundy County Sheriff.

Fire Protection

The city has a volunteer fire department with 25 volunteers. They have 2 tankers, 1 pumpers one rescue truck, 1 jaws of life, and 1 grass rig.

Ambulance

The City of Wellsburg maintains an ambulance service of 8 volunteer members. They have 2 full-service ambulances.

Medical Facilities

Grundy Memorial Hospital is located in Grundy Center and is the only medical facility (other than small clinics) located in the county.

HAZMAT

Wellsburg contracts with Northeast Iowa Response Group for response to hazardous material spills. The Northeast Iowa Response Group is a division of Waterloo Fire Rescue as is the Hazardous Materials Regional Training Center. The Training Center provides training to fire departments and companies from around the state and country. Not only is this a training center it also serves as a hazardous materials quick response unit to Black Hawk County, surrounding counties, and many municipalities in a ten county region. The Unit provides local fire departments with hazard materials emergency procedures thus reducing additional contamination. An evacuation plan is also in place in conjunction with the activities with the local department. Contact information for the facility is as follows: Hazardous Materials Regional Training Center, 1925 Newell Street, Waterloo, Iowa 50707, Phone: (319) 291-4275, Toll Free: (800) 291-4682, Fax: (319) 291-4285

The jurisdiction also partners the Northeast Iowa Response Group for assistance in responding to any methamphetamine labs located in the city limits. The Response Group assists the Police Departments in containment of the site and disposal of the hazardous chemicals.

Warning Systems

Wellsburg does have 1 warning siren located in the center of the city.

Grundy County uses the AlertIowa notification system that is utilized statewide. The program is funded by the State of Iowa and administered through Iowa Homeland Security and Emergency Management Office. AlertIowa will be administered through Grundy County Emergency Management Agency and will be available to all county cities and school districts.

AlertIowa will allow for emergency notifications at all times via landline telephones, cell phones, email, text message, and social media. The County will use their emergency notification network for all of the following events: blizzards, flash flooding, severe thunderstorms, and tornadoes. There is an optional way to receive the same alert for events such as: excessive heat warnings, hazardous materials warnings, heavy snow warning, high wind warnings, ice storm warnings, law enforcement warnings, shelter in place warnings, sleet warnings, wind chill warnings, and winter storm warnings.

Public Works / Street Department

The City of Wellsburg has a dedicated street department of part-time employees to perform various maintenance tasks around the city. Their most essential function is providing plow service during snowfall events.

<u>Natural Resource Protection Mitigation Actions</u>

Wellsburg does not have nor done any natural resource protection mitigation actions.

Structural Projects Mitigation Actions

Wellsburg does not have nor done any structural projects mitigation actions.

Future Mitigation Actions

While the existing mitigation activities discussed above detail the city's efforts to mitigate hazards when possible and to respond to hazards in a timely and efficient manner, the Committee also recognizes that there are many more mitigation activities and projects that would benefit county residents. Thus, the Committee developed a list of future hazard mitigation activities that, if accomplished, would serve to further reduce the risk of hazards to the community. The list may include a combination of projects the Committee feels the community should try to accomplish and mitigation efforts that are ongoing that the Committee view as vital to the continued well-being of the public.

Priority

The Committee analyzed the potential mitigation activities. This analysis included a discussion of the potential benefits of implementing the activity, some hurdles that the community may face in implementing the action step, and the drawbacks of implementation. The analysis utilized the STAPLEE feasibility criteria. The STAPLEE technique is a FEMA suggested method of evaluation. The STAPLEE approach assesses both positive and negative impacts on the following aspects of a county: **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental.

TABLE I11: STAPLEE ELEMENTS

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

The Committee was asked to discuss the STAPLEE elements (Table I11) and determine each element's ranking (High -H, Medium -M, Low-L) for each identified future mitigation activity. Afterwards, the average priority for each migration activity was recorded as the overall priority ranking for that particular future mitigation activity.

Timeline

The Committee identified the time period each period each of the proposed mitigation activity will occur. Activities that occur regularly (either daily, weekly,

monthly or annually) were identified as Active. If the action is to occur within the next 1-5 years it was identified as Short-Term, if the activity would take 5-10 years it was labeled as Mid-Term, and any activities that would take 10 or more years were identified as Long-Term.

Funding

Although in the long-term hazard mitigation actions will save money by avoiding the loss of lives or property damages, in the short-term each action will have an associated cost. The City will rely heavily on local funding sources to fulfill most of the plan obligations; however, they will also seek funds from State and Federal agencies for both pre- and post-disaster mitigation activities.

The estimated cost(s) for each mitigation action, program, or project is either: Minimal, Low, Moderate, or High depending upon various factors.

- Minimal: Cost estimate is $10,000 or less based on using current staff, time commitment, continuous of current duties, proposed action/program/ project, and funding sources.
- Low: Cost estimate for project range from $10,001 - $99,999 based on existing proposed treatment, time commitment, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.).
- Moderate: Cost estimate for project range from $100,000 - $299,999 based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.), and funding sources.
- High: Cost estimate for project range is $300,000 or higher based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, project components (permits, acquisition, coordination, etc.), and funding sources.

Implementation Strategy

One of the first steps the Committee took was to review the City's existing Hazard Mitigation Activities and provide an update on their status, see Based on each activity's progress, City's chose to continue the activity or drop it from the plan update. Once the Committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. In addition, the Committee identified a time line for each activity, associated hazards, estimated cost, priority, identified the responsible party or parties for each activity, and indicated at least which of the city's goals the action addresses. Table I12 is the City of Wellsburg's Implementation Strategy.

TABLE I12: CITY OF WELLSBURG'S IMPLEMENTATION STRATEGY

Priority	Mitigation Action/Program/Project	Associated Hazard	Primary Agency Responsible for Implementation	Date for Completion	Estimated Cost (s)	Funding Source
H	Educate the public	All	Grundy County EMA	On-Going	Minimal	Local
H	Continue training and education for fire departments, law enforcement agencies and ambulance crew personnel	All	City Council and Roads Depts.	Active	Moderate	Local, State
H	Maintain and acquire materials and equipment for fire departments, law enforcement agencies and ambulance crew personnel	All	City Council	Active	Minimal	Local, State
H	Provide emergency shelters for evacuees	All	Grundy County EMA	Active	Minimal	Local
H	Maintain mutual aid agreements	All	Grundy County EMA, City Council	Active	Minimal	Local
M	Maintain tree trimming program	Severe Winter Storm, Tornado/Windstorm, Thunderstorm/Lightning/Hail/Hail	City Council	On-Going	Low	Local
M	Determine locations for potential heating shelters and volunteer organization	Severe Winter Storm	Grundy County EMA	Completed	Minimal	Local
M	Encourage utility providers and developers to place all utilities underground	Severe Winter Storm, Infrastructure Failure, Thunderstorm/Lightning/Hail	City Council	Not Completed	Moderate	Local
H	Purchase and maintain backup generators	Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado, Emergency Management	Grundy County EMA	Completed	Minimal	Local
H	Maintain public works equipment	Severe Winter Storm	Public Works	Active	Minimal	Local
M	Notify the media on shelter locations	Severe Winter Storm, Extreme Heat, Tornado	Sheriff, EMA	On-Going	Minimal	Local
H	Make sure residents keep sidewalks clear of snow and ice	Severe Winter Storm	Public Works	Active	Minimal	Local
L	Maintain use of snow fences in the city/county	Severe Winter Storm	Public Works	On-Going	Minimal	Local
M	Use surge protectors to prevent electrical damage to critical and sensitive equipment	Thunderstorm/Lightning/Hail	Staff	Active	Minimal	Local
M	Backup all digital data	Thunderstorm/Lightning/Hail	Staff	Active	Minimal	Local
M	Purchase NOAA weather radios	Thunderstorm/Lightning/Hail, Tornado/Windstorm, Radiological Incident	Grundy County EMA	Not Completed	Minimal	Local, State
L	Enforce and update building codes, as needed	Thunderstorm/Lightning/Hail, Tornado/Windstorm, Expansive Soils, Earthquake	City Council	Active	Minimal	Local
L	Maintain storm spotter training for local fire departments/deputies and EMS crews	Thunderstorm/Lightning/Hail, Tornado/Windstorm	Grundy County EMA	On-Going	Minimal	Local
M	Continue enforcement of city sump pump discharge ordinance	Thunderstorm/Lightning/Hail	City Council	In-Progress	Minimal	Local
L	Maintain a list of potential storm sewer projects	Thunderstorm/Lightning/Hail	City Council	Not Completed	Minimal	Local
M	Make available a cleanup crew for after a storm	Thunderstorm/Lightning/Hail	City Council, EMA	Active	Minimal to Low	Local
L	Maintain law enforcement monitoring of large storage	HAZMAT Incident	Sheriff	Active	Minimal	Local

	supplies					
L	Acquire necessary response and detection equipment for city/county employees	HAZMAT Incident	Grundy County EMA	On-Going	Minimal	Local, State
L	Encourage lead based paint and asbestos removal	HAZMAT Incident	City Council	On-Going	Minimal	Local
L	Provide a local hazardous waste drop-off site	HAZMAT Incident	City Council	On-Going	Minimal to Low	Local
H	Maintain mutual aid agreements with the Northeast Iowa response Group	HAZMAT Incident	City Council	Active	Minimal	Local
H	Keep HAZMAT Incident manuals/information current and easily accessible	HAZMAT Incident	All Depts.	On-Going	Minimal	Local
H	Maintain, test, and replace warning sirens	Tornado/Windstorm, Thunderstorm/Lightning/Hail, Infrastructure Failure	Grundy County EMA	On-Going	Minimal to Low	Local, State
H	Install new warning sirens where needed or replace warning sirens with insufficient decibel levels	Tornado/Windstorm	Grundy County EMA	On-Going	Moderate	Local, State
M	Encourage and maintain enrollment in emergency notification system	Thunderstorm/Lightning/Hail, Tornado/Windstorm, Infrastructure Failure	Grundy County EMA	On-Going	Minimal	Local
H	Construct or designate a safe room or storm shelter	Tornado/Windstorm	Grundy County EMA	Completed	High	Local, State, Federal
M	Encourage home owners to keep emergency kits	Tornado/Windstorm	Grundy County EMA	Not Completed	Minimal	Local
M	Encourage backup power generation for local telephone systems and cellular operations	Infrastructure Failure	Grundy County EMA	Not Completed	Minimal	Local
M	Maintain or install GPS units in all emergency service and city/county vehicles	Infrastructure Failure	Staff	Not Completed	Minimal	Local
L	Maintain automatic TTY TDD machines for emergency personnel and city/county employees	Infrastructure Failure	Staff	N/A	Minimal	Local
M	Enhance Standard Operating Procedures for dissemination of information/press releases in the event of a disaster	Infrastructure Failure	Grundy County EMA	Not Completed	Minimal	Local
M	Continue training and promotion of the Incident Command System	Infrastructure Failure	Grundy County EMA	Not Completed	Minimal	Local, State
M	Complete continuity of government plan	Infrastructure Failure	City Council	Not Completed	Minimal	Local
H	Encourage use of Iowa One call before digging	Infrastructure Failure	City Council	Active	Minimal	Local
H	Upgrade radio communications equipment as needed	Infrastructure Failure	Grundy County EMA	Active	Minimal	Local
H	Regularly review and amend fire and medical HAZMAT response standard operating procedures	Infrastructure Failure	Grundy County EMA	Active	Minimal	Local
L	Improve standard operating procedures for schools	Infrastructure Failure	Grundy County EMA, Schools	Active	Minimal	Local
M	Seek to improve communications with other agencies	Infrastructure Failure, Terrorism	City Council	Active	Minimal	Local
L	Keep supply of backup radios and cellphones	Infrastructure Failure	Staff	Active	Minimal to Low	Local
M	Maintain list of county emergency contacts	Infrastructure Failure	Staff	Active	Minimal	Local
M	Keep the county updated on personnel changes	Infrastructure Failure	Staff	On-Going	Minimal to Low	Local

H	Continue cooperation between city roads department and local fire departments during snow emergencies	Severe Winter Storm	Roads Department	Active	Minimal	Local
L	Pursue partnership with rural water as the system expands	Grass/Wild Fire	City Council	Completed	Minimal	Local
L	Encourage residents to keep smoke detectors, sprinkler systems and fire extinguishers maintained in their homes	Grass/Wild Fire	Grundy County EMA	Not Completed	Minimal	Local
L	Continue an annual inspection program for commercial and industrial properties	Grass/Wild Fire	Fire Department	Not Completed	Minimal	Local
H	Continue fire prevention program	Grass/Wild Fire	Grundy County EMA	Active	Minimal	Local
M	Improve water system to enhance firefighting capacity/ability	Grass/Wild Fire	City Council	Completed	Minimal	Local
H	Maintain membership in the NFIP	Flash Flood, River Flooding	City Council, EMA	Active	Minimal	Local
H	Maintain, enforce and update floodplain ordinance	Flash Flood, River Flooding	City Council	Active	Minimal	Local
M	Acquire more water pumps	Flash Flood, River Flooding, Dam Failure	Grundy County EMA, Public Works	Completed	Minimal	Local
L	Continue with improvement to the storm water system	Flash Flood	City Council	Not Completed	Low to Moderate	Local, State
H	Prevent inflow and infiltration into the sanitary sewer	Flash Flood, River Flooding	City Council	Active	Minimal	Local
L	Educate the public on maintaining their sump pumps	Flash Flood	City Council	Not Completed	Minimal	Local
M	Maintain and keep storm drains clear of debris	Flash Flood	Public Works	Active	Minimal	Local
M	Stockpile sand and sandbags	Flash Flood, River Flooding	Grundy County EMA	On-Going	Minimal to Low	Local
L	Identify, purchase and remove structures from flood hazard areas	Flash Flood, River Flooding	Grundy County EMA, City Council	N/A	Moderate	Local, Federal
L	Initiate and enforce burn ban in times of drought or as needed	Grass/Wild Fire, Drought	City Council	As Necessary	Minimal	Local
L	Maintain and improve signals/signage along roadways and at railroad crossings	Transportation Incident	Roads Department, Sheriff	As Necessary	Minimal	Local, State
L	Establish alternative transportation routes should a road need to be closed	Transportation Incident, River Flooding, Flash Flood, Infrastructure Failure	Grundy County EMA, Sheriff	As Necessary	Minimal	Local
L	Purchase emergency signs to be used in case of an incident	Transportation Incident	City Council, Sheriff, EMA	Active	Minimal	Local
L	Enforce no parking designations at special events	Transportation Incident	Sheriff	Active	Low	Local
L	Identify fallout shelter locations	Radiological Incident	City Council	Not Completed	Low	Local
L	Keep communication lines open with Nuclear Plant in Palo, IA	Radiological Incident	City Council, EMA	On-Going	Minimal	Local
M	Maintain and/or develop a wellhead protection program	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, Sheriff	N/A	Low	Local, State
M	Monitor wells in areas of identified contamination	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, EMA	N/A	Low	Local
H	Monitor the drinking water supply	HAZMAT Incident, Human Disease, Animal/Plant/Crop Disease	City Council	Active	Moderate	Local
L	Identify and map areas of past contamination	HAZMAT Incident	City Council	N/A	Low	Local
M	Maintain and/or develop storm water management	HAZMAT Incident, Animal/Plant/Crop	City Council	Not	Low	Local

	program	Disease, Human Disease, Flash Flood		Completed		
L	Eliminate and cap private and abandoned wells in the city	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council	Active	Low	Local
L	Eliminate the use of septic tank systems in the city limits	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council	Not Completed	Minimal	Local
H	Follow monitoring requirements set forth by the Iowa DNR	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, Engineer	Active	Low	Local
M	Carry out conservation measures such as erosion control and work with the following organizations: Extension, NRCS, Farm Bureau, EPA, DNR, and Soil and water Conservation District	HAZMAT Incident, Animal/Plant/Crop Disease, Human Disease	City Council, Engineer	As Necessary	Moderate	Local, State, Federal
M	Maintain and update anti-virus software	Terrorism	Staff	Active	Minimal	Local
L	Secure vulnerable targets, as identified by the LEPC and County EMA with alarms, security cameras and fences	Terrorism	Sheriff	N/A	Minimal	Local
M	Review and update fire codes as necessary	Grass/Wild Fire	Fire Department	Active	Minimal	Local
L	Continue to cooperate with pipeline owners and operators to ensure locations are marked	Grass/Wild Fire	City Council	N/A	Minimal	Local
M	Purchase a new tanker and/or pumper	Grass/Wild Fire	City Council	Active	Low to Moderate	Local
L	Encourage community to plant shade trees	Extreme Heat	City Council	Not Completed	Minimal	Local
L	Provide fans and/or cooling shelter	Extreme Heat	County EMA	Active	Minimal to Low	Local
M	Maintain air conditioner(s) in community buildings	Extreme Heat	Public Works	Active	Minimal	Local
L	Keep a supply of drinking water to distribute	Extreme Heat	Grundy County EMA	Not Completed	Low	Local
L	Encourage the public to receive vaccinations	Human Disease	Grundy County EMA, Health Dept.	Not Completed	Minimal	Local
L	Cooperate with any countywide mass vaccination plan	Human Disease	Grundy County EMA	Not Completed	Minimal	Local
L	Monitor disease outbreak news from the CDC and Iowa Department of Public Health	Human Disease, Animal/Plant/Crop Disease	Grundy County EMA, Sheriff	On-Going	Low to Moderate	Local
H	Restrict water usage should it be necessary	Drought	City Council	As Necessary	Minimal to Low	Local
L	Encourage the use of proper materials and construction techniques	Expansive Soils	City Council	Active	Minimal to Low	Local
L	Educate city personnel to identify risk areas	Expansive Soils	City Council	Not Completed	Minimal	Local
L	Install tiling to help water move away from structures	Expansive Soils	Public Works	Not Completed	Minimal to Low	Local
L	Enforce a curfew	Terrorism	Sheriff	Not Completed	Minimal to Low	Local, State
H	Continue regular bridge inspections	Infrastructure Failure	City Council, Engineer	Active	Minimal to Low	Local
M	Place barricades to close dangerous bridges	Infrastructure Failure	City Council, Sheriff	As Necessary	Minimal to Low	Local

L	Maintain embargos/weight limits as necessary	Infrastructure Failure	City Council, Engineer	On-Going	Minimal to Low	Local, State
L	Identify and inventory potential sinkhole sites	Sinkholes	Public Works	N/A	Minimal to Low	Local
L	Educate city personnel to handle a sinkhole situation	Sinkholes	City Council, Engineer	N/A	Minimal	Local
M	Secure the area (around a sinkhole)	Sinkholes	Public Works	N/A	Minimal	Local
M	Inspect any utility lines that are near a sinkhole	Sinkholes	Public Works	N/A	Minimal	Local
L	Enforce the local zoning ordinances	Landslides	City Council	Active	Minimal	Local
M	Clear ditches, streams, and waterways on a regular basis	River Flooding	City Council, Public Works	As Necessary	Minimal	Local
L	Encourage floodproofing/elevating structures in the floodplain	River Flooding	City Council, EMA	Active	Minimal	Local
M	Update flood maps/flood studies for areas throughout the county	River Flooding	City Council	On-Going	Minimal	Local
L	Identify bridges and culverts than can cost effectively be reengineered to reduce future flooding	River Flooding	City Council, Engineer	Active	Minimal	Local
M	Establish transportation evacuation routes and protocols	River Flooding	City Council, EMA, Sheriff	As Necessary	Minimal	Local
L	Develop sandbagging procedures for the community	River Flooding	City Council, EMA	Not Completed	Minimal	Local
L	Develop and maintain staging area for dumping during cleanup	River Flooding	City Council, Public Works	As Necessary	Minimal	Local
M	Continue cooperation with county in developing flood mitigation efforts	Flash Flood, River Flooding	City Council, EMA	Not Completed	Minimal	Local
L	Purchase additional parkland in order to increase greens space and reducing surface flow	River Flooding	City Council	Not Completed	Minimal	Local
L	Set a designated number of people to be trained in post-disaster record keeping/damage assessments	Emergency Management*	City Council, EMA	Not Completed	Minimal	Local
H	Inform the public of reputable and ill reputable contractors following disasters	Emergency Management*	City Council	As Necessary	Minimal	Local
M	Encourage all communities to participate in their Local Emergency Planning Commission (LEPC)	Emergency Management*	City Council, EMA	Not Completed	Minimal	Local
H	Maintain and update emergency response plans	Emergency Management*	City Council, EMA	Not Completed	Low to Moderate	Local
H	Maintain lists of personnel and equipment available to use with response plans	Emergency Management*	City Council, Staff	Not Completed	Minimal	Local
H	Maintain communication with county contacts	Emergency Management*	City Council, Staff	Active	Moderate	Local
H	Maintain NIMS compliance	Emergency Management*	City Council, EMA	Not Completed	Moderate	Local, State, Federal

APPENDIX J: GRUNDY CENTER COMMUNITY SCHOOL DISTRICT

DISTRICT PROFILE

Grundy Center Community School District, located in the City of Grundy Center, provides Pre-kindergarten through 12th grade education to nearly 700 students. The District serves the City of Grundy Center as well as surrounding unincorporated areas, which includes primarily Grundy Center residents. Figure J1 is a map of the school district's area as of the 2016-17 school year.

The school's campus is located in the southwest quadrant of the city at 1301 12th Street. In addition to the school buildings themselves, the campus includes a bus garage, tennis courts, football field and track.

Natural Environment

Black Hawk Creek runs through the northern portion of the City, which flows through Wolfe Family Preserve, which is located just to the west of the City. Minnehaha Creek splits from Black Hawk Creek in the Wolfe Family Preserve and travels just south of Grundy Center. State Highway 14 comes into Grundy Center from the west and goes northbound in the center of town.

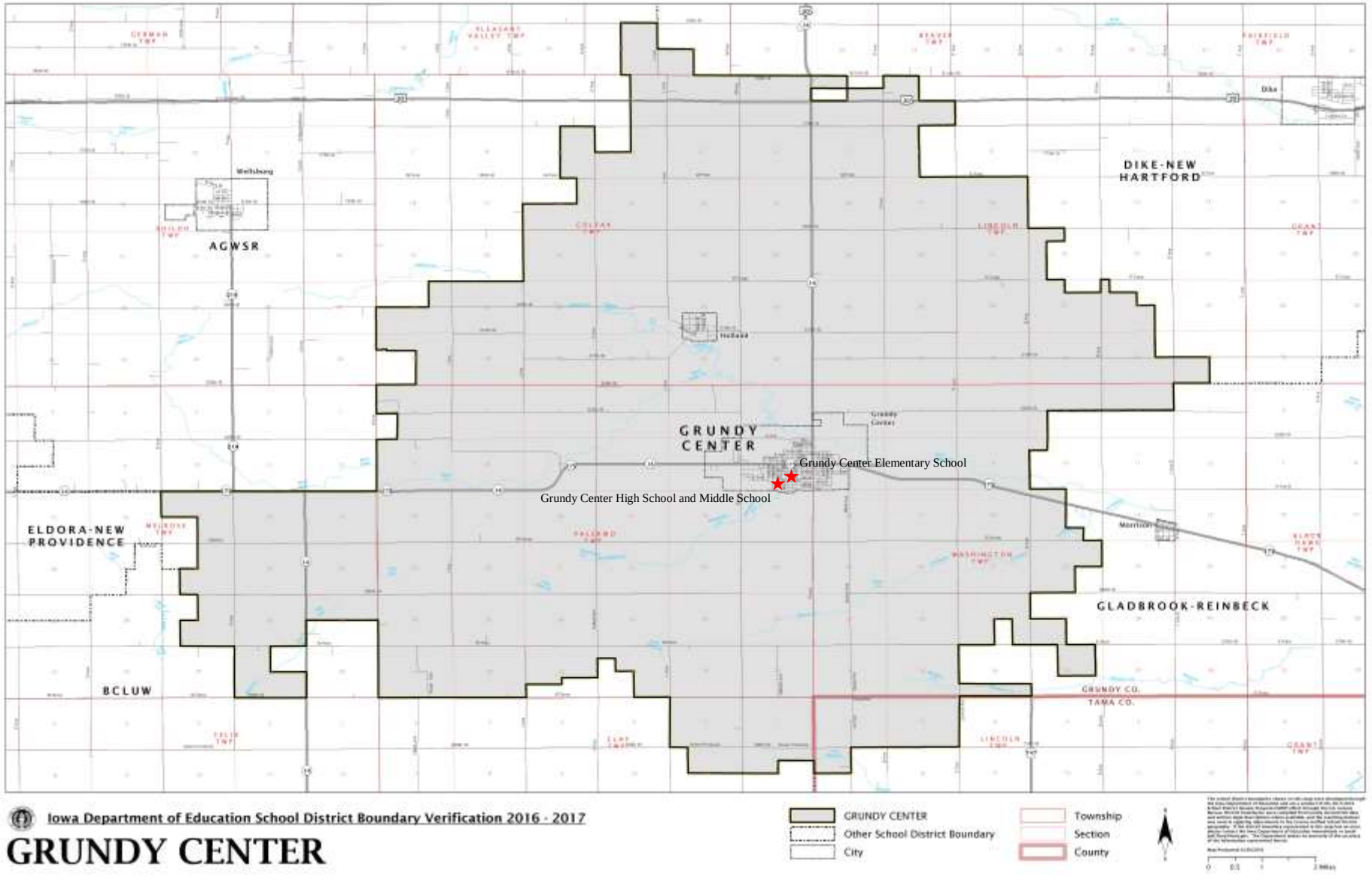
TABLE J1: HISTORIC CERTIFIED ENROLLMENT

School Year	Certified Enrollment
2012-13	674
2013-14	659
2014-15	663
2015-16	691
2016-17	700

Source: Iowa Department of Education

Figure J.1: Map of Grundy Center School District Area

Courtesey of: Iowa Department of Education, www.educateiowa.gov



Community Services

Table J2 shows the primary utility providers for the City of Grundy Center.

TABLE J2:GRUNDY CENTER COMMUNITY SCHOOLS UTILITY PROVIDERS						
Electric	**Natural Gas**	**Telephone/Internet**	**Cable**	**Water**	**Sewer**	**Sanitation**
Grundy Center Municipal Utilities	Black Hills Energy	City	City	City	Grundy Center Municipal Utilities/Windstream	Grundy Center Municipal Utilities/Windstream

HAZARD RISK ASSESSMENT

Hazard Analysis

Section 3 identified and profiled the hazards for the entire planning area. However, each community analyzed their own vulnerability to those hazards applicable to their jurisdiction. Using the methodology outlined in Section 3 (Vulnerability Assessment), the committee evaluated the risk associated with a specific hazard, defined by probability and frequency of occurrence, magnitude, severity, exposures, and consequences. The school district's vulnerability assessment provides in-depth knowledge of the hazards and vulnerabilities that affect the school district. This analysis provides an all-hazard approach when evaluating the hazards that affect the school district and the associated risks and impacts each hazard presents.

As mentioned previously in Section 3, the vulnerability assessment requires a five-year review with periodic updates, as needed. Potential future hazards and impacts may result from changing technology, new critical facilities, infrastructure, and development patterns, as well as demographic and socioeconomic changes that occur within or outside the area.

Disaster frequency and its effects or severity are important as a basis for planning emergency response and mitigation. Natural hazards tend to reoccur on a predictable seasonal basis, whereas human caused or technological events tend to change over time with advancement in technology and methods of operation.

The Committee assessed the defined hazards relevant to potential impact on the school district. Using the scoring criteria previously defined (Tables 19-22) the school district assessed each of the identified hazards based on probability, magnitude/severity, warning time, and duration. The scores for each of the factors were weighted using the formula below to develop the final hazard assessment score.

(Probability x .45) + (Magnitude/Severity x .30) + (Warning Time x .15) + (Duration x .10)
=Final Hazard Assessment Score

Table J3 displays the school district's hazard scores. The top three hazards for the Grundy Center Community Schools are Tornado/Windstorm, Severe Winter Storm, and Transportation Incident.

TABLE J3: HAZARD RISK ASSESSMENT FOR GRUNDY CENTER COMMUNITY SCHOOL DISTRICT						
Hazard Rank	**Hazard**	**Probability**	**Magnitude/Severity**	**Warning Time**	**Duration**	**Final Score**
1	Tornado/Windstorm	4	3	2	2	3.2
1	Severe Winter Storm	4	3	2	2	3.2
3	Transportation Incident	4	2	4	1	3.1
4	Animal/Plant/Crop Disease	3	4	1	3	3
5	Extreme Heat	3	3	2	3	2.85
5	HAZMAT Incident	3	2	4	3	2.85
7	Infrastructure Failure	2	3	4	4	2.8
8	Flash Flood	2	4	2	3	2.7
9	Thunderstorm/Lightning/Hail	3	3	2	1	2.65
10	Grass/Wild Fire	2	3	3	2	2.45
11	Drought	2	3	2	3	2.4
12	Expansive Soils	2	2	2	4	2.2
12	Sinkholes	2	1	4	4	2.2
14	River Flooding	2	2	2	3	2.1
15	Radiological Incident	1	2	4	4	2.05
16	Human Disease	2	2	1	3	1.95
17	Earthquake	1	1	4	4	1.75
18	Terrorism	1	1	4	2	1.55
19	Levee/Dam Failure	1	1	1	1	1
19	Landslide	1	1	1	1	1

MITIGATION STRATEGY

Hazard Mitigation Plan Goals

The district established the lowing hazard mitigation plan goals. These represent of broad-based goals that would address a multitude of hazards and encompass a variety of mitigation activities. The hazard mitigation plan goals are identified are as follows.

1) Maintain emergency services during hazard events, or if this is not possible, return to pre-disaster service levels as soon as possible.
2) Protect the health and welfare of students and staff by utilizing pre-disaster planning and constructing mitigation projects.
3) Take steps to mitigate or minimize the impact of natural, technological, and/or man-made disasters.
4) Take measures to minimize the occurrence of injuries and loss of life due to hazards.
5) Take measures to minimize or eliminate damages that may occur as a result of hazards.
6) Return to similar or improved pre-event conditions as quickly as possible following a disaster event.

Current Mitigation Activities

The school district already takes the following mitigation activities:

- The district has reviewed current emergency procedure plans with local city and county agencies
- A flip chart of Crisis Procedures is provided to all staff members and copies of these charts are kept in each classroom
- The district has added electronic security to limit access to each building.
- The School District participated in the Grundy County Multi-Jurisdictional Hazard Mitigation Plan, which was adopted on October 21, 2013.
- The District has constructed a safe room in the Middle/High School…but is considering another safe room at the Elementary Building on 9th Street.
- Fire and tornado drills are conducted as required by State guidelines.
- Staff development is being expanded to include more safety procedures.

Grundy County Emergency Management Agency

Grundy Center works with the Grundy County Emergency Management Coordinator, based out of the City of Grundy Center, on various safety and emergency events. The Emergency Management Coordinator works in conjunction with local fire, rescue, police, and government officials to draft and implement workable emergency action plans in the community. The current Emergency Management Coordinator is Zach Tripp and current contact information is as follows: Grundy County Emergency Management Agency, 705 8th Street, Grundy Center, Iowa 50638, (319) 824-6933, email: ztripp@grundysheriff.org

Law Enforcement

The city has their own police force with one officer on duty at all times. They have 4 full-time officers, a part-time and a reserve officer.

Fire Protection

The city has a volunteer fire department with 31 volunteers. They have one tanker, 3 pumpers and a grass rig. Also 3 utility trailer and ambulance which hauls people or can act as a back-up to the ambulance department.

Ambulance

The city has a volunteer department with 3 paramedics. They have two rigs available with 12 to 16 people at the EMT level or above, and another 10-12 people for driving.

Medical Facilities

Grundy Memorial Hospital is located in Grundy Center and is the only medical facility (other than small clinics) located in the county. Grundy Memorial Hospital is a 25-bed critical access hospital with 24/7/365 emergency care. Grundy Memorial Hospital ranks amongst the top 5% of hospitals nationwide for their quality measures and patient experience scores. They also have been ranked among the nation's Top 20 Most Recommended rural hospitals.

HAZMAT

Grundy Center contracts with Northeast Iowa Response Group for response to hazardous material spills. The Northeast Iowa Response Group is a division of Waterloo Fire Rescue as is the Hazardous Materials Regional Training Center. The Training Center provides training to fire departments and companies from around the state and country. Not only is this a training center it also serves as a hazardous materials quick response unit to Black Hawk County, surrounding counties, and many municipalities in a ten county region. The Unit provides local fire departments with hazard materials emergency procedures thus reducing additional contamination. An evacuation plan is also in place in conjunction with the activities with the local department. Contact information for the facility is as follows: Hazardous Materials Regional Training Center, 1925 Newell Street, Waterloo, Iowa 50707, Phone: (319) 291-4275, Toll Free: (800) 291-4682, Fax: (319) 291-4285

The jurisdiction also partners the Northeast Iowa Response Group for assistance in responding to any methamphetamine labs located in the city limits. The Response Group assists the Police Departments in containment of the site and disposal of the hazardous chemicals.

Warning Systems

Grundy County uses the AlertIowa notification system that is utilized statewide. The program is funded by the State of Iowa and administered through Iowa Homeland Security and Emergency Management Office. AlertIowa will be administered through Grundy County Emergency Management Agency and will be available to all county cities and school districts.

AlertIowa will allow for emergency notifications at all times via landline telephones, cell phones, email, text message, and social media. The County will use their emergency notification network for all of the following events: blizzards, flash flooding, severe thunderstorms, and tornadoes. There is an optional way to receive the same alert for events such as: excessive heat warnings, hazardous materials warnings, heavy snow warning, high wind warnings, ice storm warnings, law enforcement warnings, shelter in place warnings, sleet warnings, wind chill warnings, and winter storm warnings.

The district uses government delivery for push notifications via text for staff, families, students and applicable community members. We also access local media and utilize the website and social media for warning/evacuation notification.

The district utilizes the ALICE protocols for lockdowns/emergency situations. We actively conduct training activities in all above-referenced scenarios. This fall we implemented a regional active shooter training involving Grundy Center Memorial Hospital, local law enforcement and ambulance services from a multi-county region.

The district maintains records of evacuation drills and addresses process in handbooks/crisis folders.

Future Activities & Implementation Strategy / Action Plan

Priority

School representatives analyzed the potential mitigation activities. This analysis included a discussion of the potential benefits of implementing the activity, some hurdles that the community may face in implementing the action step, and the drawbacks of implementation. The analysis utilized the STAPLEE feasibility criteria. The STAPLEE technique is a FEMA suggested method of evaluation. The STAPLEE approach assesses both positive and negative impacts on the following aspects: **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental.

The Committee was asked to discuss the STAPLEE elements (Table J4) and determine each element's ranking (High - H, Medium -M, Low-L) for each identified future mitigation activity. Afterwards,

TABLE J4: STAPLEE ELEMENTS

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

the average priority for each migration activity was recorded as the overall priority ranking for that particular future mitigation activity.

Timeline

The Committee identified the time period each of the proposed mitigation activities will occur. Activities that occur regularly (either daily, weekly, monthly, or annually) were identified as Active. If the action is to occur within the next 1-5 years it was identified as Short-Term, if the activity would take 5-10 years it was labeled as Mid-Term, and any activities that would take 10 or more years were identified as Long-Term.

Funding

Although in the long-term hazard mitigation actions will save money by avoiding the loss of lives or property damages, in the short-term each action will have an associated cost. The School District will rely heavily on local funding sources to fulfill most of the plan obligations; however, they will also seek funds from State and Federal agencies for both pre- and post-disaster mitigation activities.

The estimated cost(s) for each mitigation action, program, or project is either: Minimal, Low, Moderate, or High depending upon various factors.

- Minimal: Cost estimate is $10,000 or less based on using current staff, time commitment, continuous of current duties, proposed action/program/ project, and funding sources.

- Low: Cost estimate for project range from $10,001 - $99,999 based on existing proposed treatment, time commitment, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.).

- Moderate: Cost estimate for project range from $100,000 - $299,999 based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.), and funding sources.

- High: Cost estimate for project range is $300,000 or higher based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, project components (permits, acquisition, coordination, etc.), and funding sources.

Grundy Center Community School District Future Mitigation Activities and Implementation Strategy are in Table J5.

TABLE J5: GRUNDY CENTER COMMUNITY SCHOOL DISTRICT HAZARD MITIGATION ACTION STEPS						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard(s)**	**Primary Agency Responsible for Implementation**	**Timeline**	**Estimated Cost ($)**	**Associated Goal(s)**
High	Educate the Student Population/Public through: continued cooperation with local service organizations (American Red Cross, County EMA, etc.) to educate residents on how to prepare for and respond to a variety of hazards	ALL	School* and Local Fire/Police	Active	Min	All
High	Consider the Construction of Community Tornado Shelter and Safe Room at Grundy Center Elementary School.	Tornadoes/Windstorms	School* and City	Short-Term	High	2, 4
High	Identify Locations (all school facilities, shelter locations) where it would be beneficial to have Backup Power Generation or maintain backup power generation	Tornadoes/Windstorms, Severe Winter Storms, Thunderstorm/ Lightning/Hail	School* and City	Short-Term	Min	2
High	Continue to Work to Safeguard against Potential Fire and Explosion Hazards Throughout the Community	Infrastructure Failure, Grass and Wild Land Fire, Explosion, Fixed HAZMAT Incident	School* and City	Active	Min	3, 4, 5
High	Maintain and Update as Needed, 28E Agreements with Surrounding Entities	ALL	School* and City	Active	Min	2
High	Continue Participation in the National Flood Insurance Program (NFIP)	River Flood, Flash Flood	School* and City	Active	Min	6
High	Systematically Review and Update, as needed, Hazard Reponses Policies and Procedures	ALL	School*	Active	Min	1
High	Identify and Evaluate Critical Facilities for Accessibility, Vulnerability, and Risk	Terrorism	School* and City	Short-Term	Min	1
High	Continue to Test and Chlorinate Drinking Water	Human Disease	School* and City	On-Going	Min	2, 4, 6
High	Continue to Cooperate with Local Medical Facilities and Health Department to increase likelihood of detection and proper response to outbreaks	Human Disease	School* and City	Active	Min	1, 2
Medium	Develop and Maintain Tree-Trimming Program in Order to Reduce the Chances of Falling Branches on Infrastructure and Property	Thunderstorm / Lighting / Hail	School* and City	Active	Low	3
Low	Develop and Maintain a List of Interpreters in order to Enhance Communication Barriers within the community	Communication Failure	School* and City	Active	Min	2
High	Restrict Water Usage, as necessary, to Maintain Water Supply	Drought	School* and City	Active	Min	1, 2
Medium	Construct new or retrofit current facilities to include tornado safe rooms	Tornado/Windstorm	School*	Mid-Term	High	4
High	Maintain and evaluate existing terrorism mitigation procedures	Terrorism	School*, City, and Police	Active	Min	3

ATTACHMENT 1: MAPS

1: Location Maps

1	Grundy County

2: Geography Maps

a	Topography
b	Sinkholes

3: Flood Plain and Flood Scenario Maps

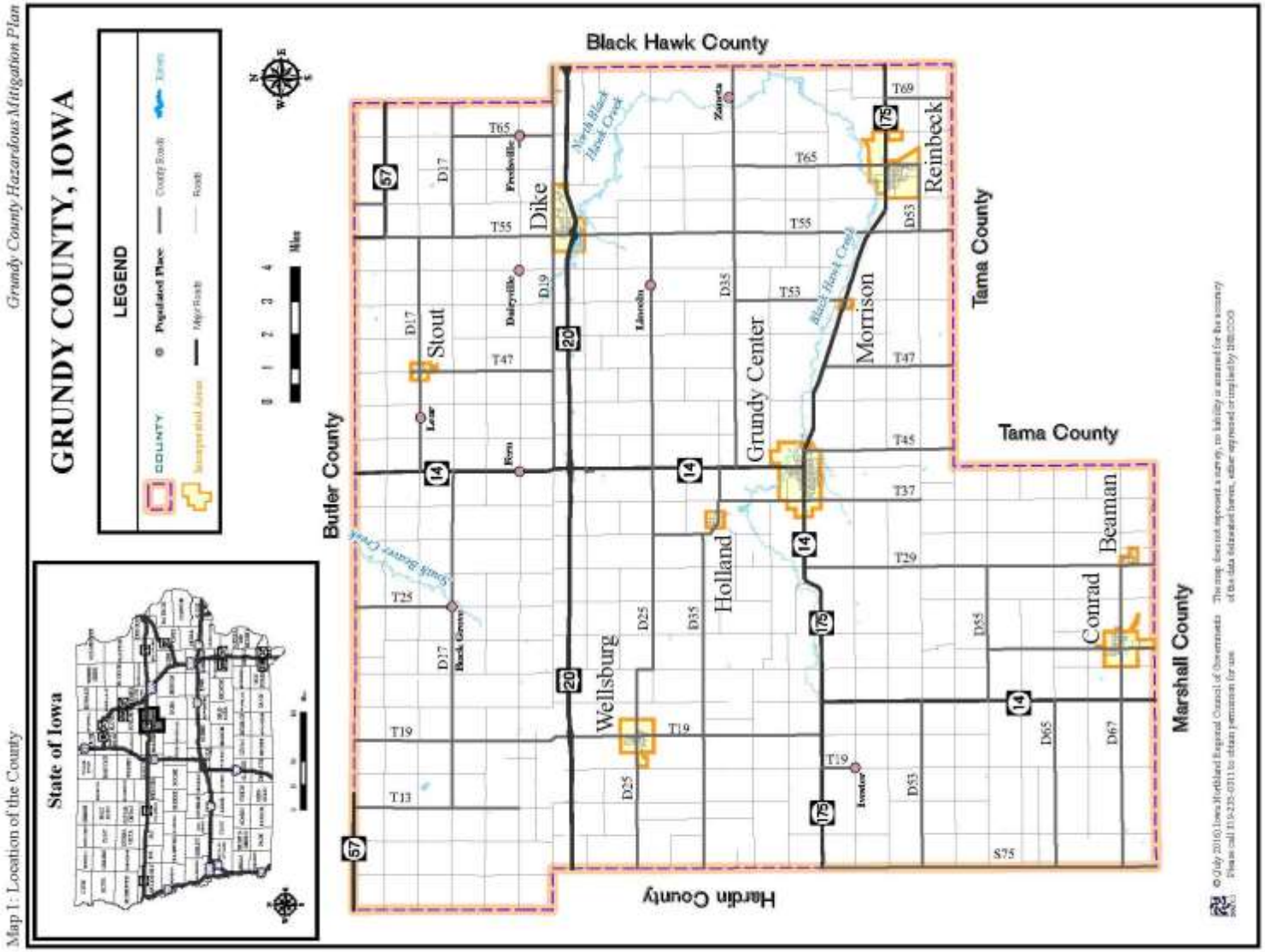
a/b	Grundy County
c/d	Beaman
e/f	Conrad
g/h	Dike
i/j	Grundy Center
k/l	Holland
m/n	Morrison
o/p	Reinbeck
q/r	Stout
s/t	Wellsburg

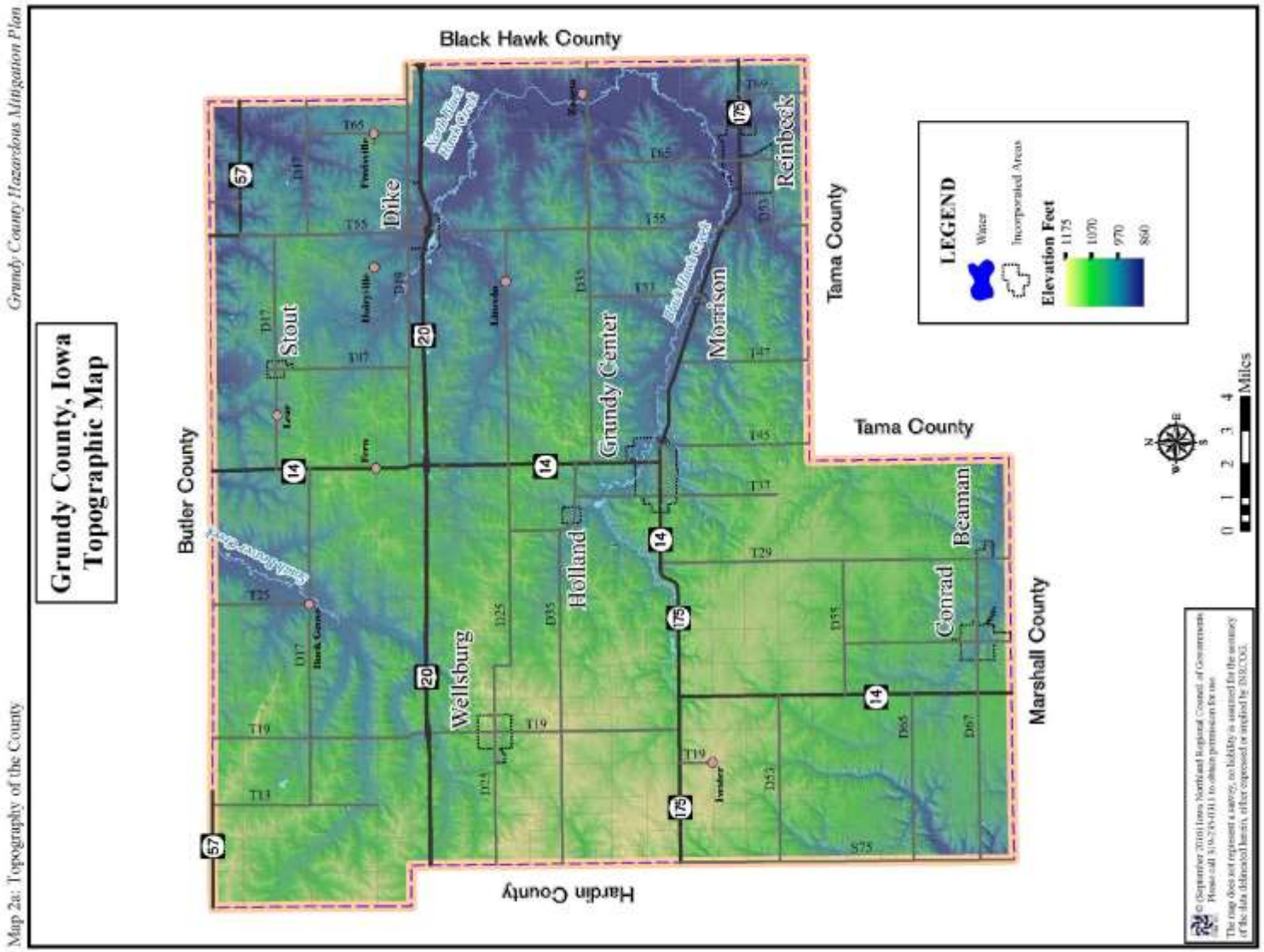
4: Historic Tornado and Scenario Maps

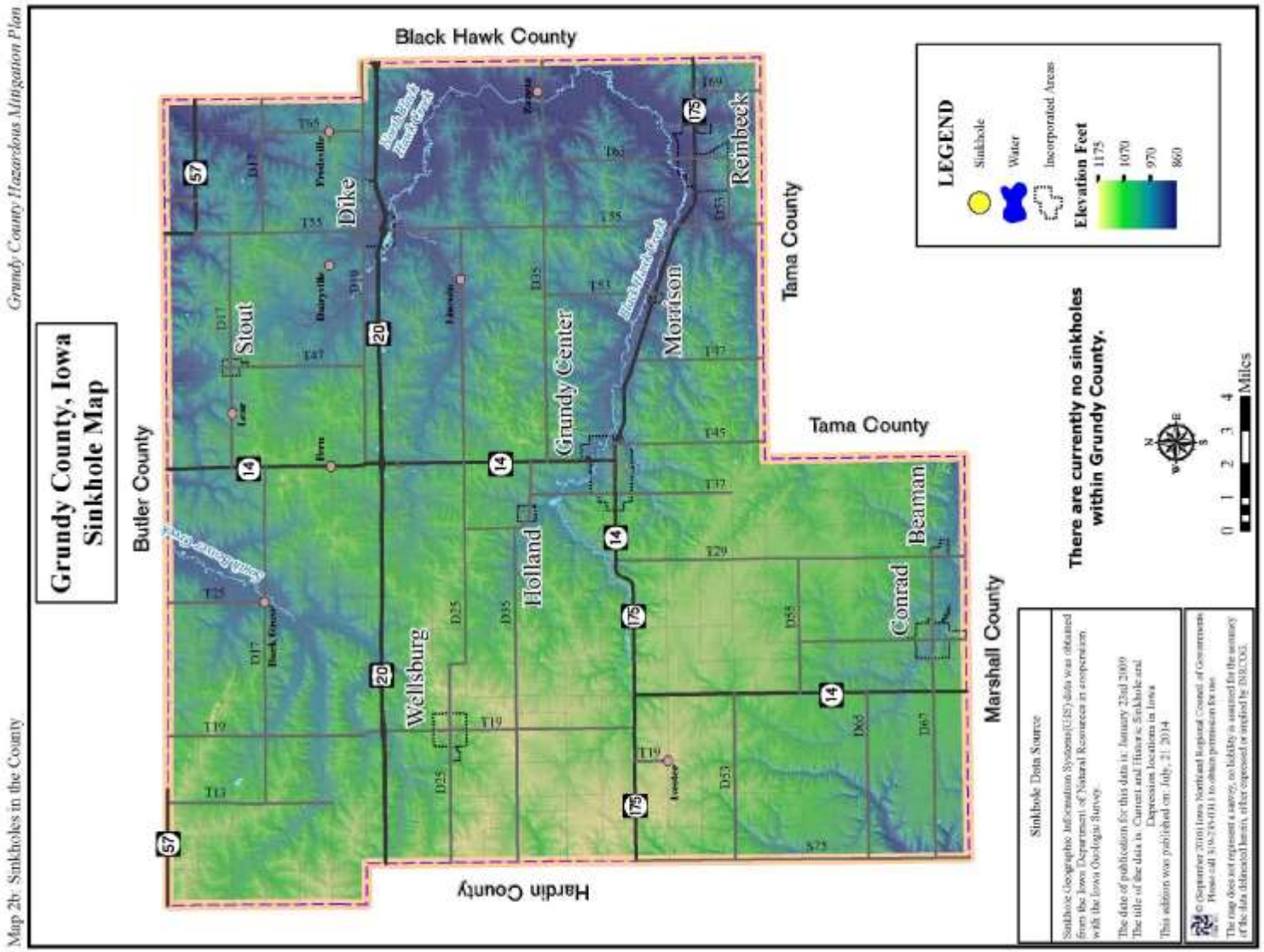
a/b	Grundy County - Historic
c/d	Beaman
e/f	Conrad
g/h	Dike
i/j	Grundy Center
k/l	Holland
m/n	Morrison
o/p	Reinbeck
q/r	Stout
q/r	Wellsburg

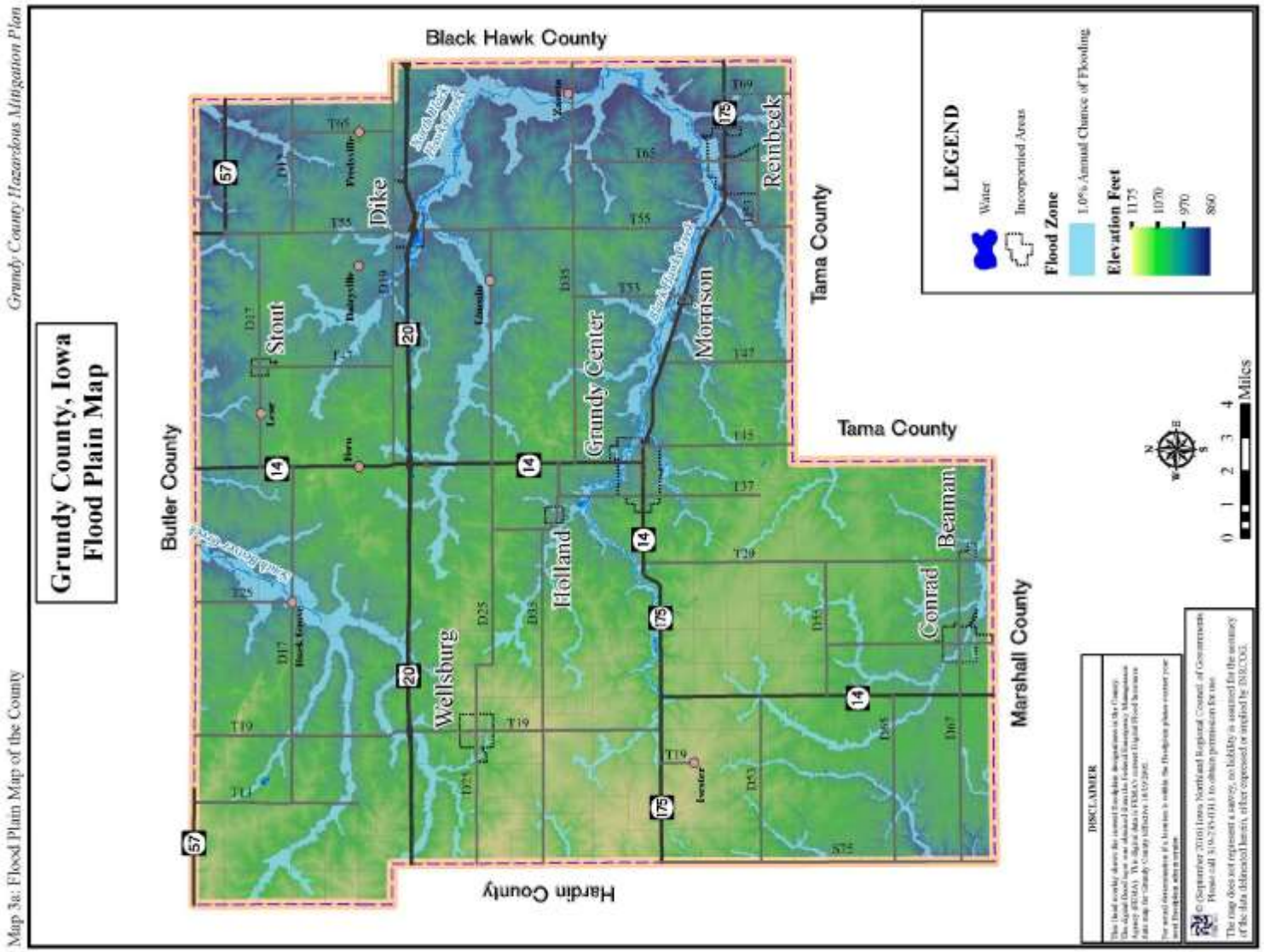
5: Critical Site Maps

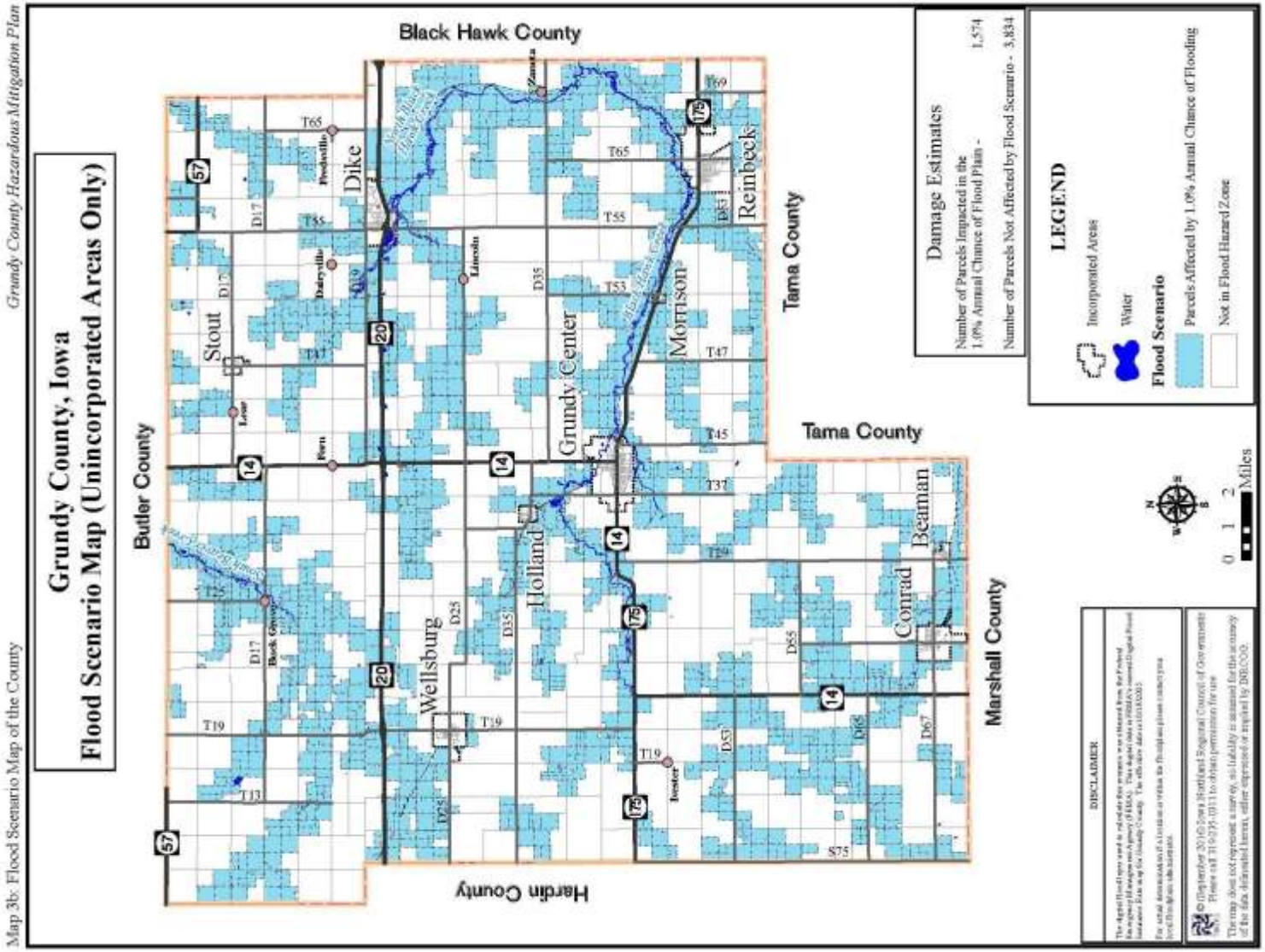
a	Grundy County
b	Beaman
c	Conrad
d	Dike
e	Grundy Center
f	Holland
g	Morrison
h	Reinbeck
i	Stout
j	Wellsburg


Grundy County Hazardous Mitigation Plan
GRUNDY COUNTY, IOWA
LEGEND
COUNTY
Populated Place
County Roads
Town
Incorporated Areas
Major Roads
Roads
Miles
0 1 2 3 4
State of Iowa
Map 1: Location of the County
Black Hawk County
Butler County
Tama County
Tama County
Marshall County
Hardin County
Dike
Stout
Grundy Center
Morrison
Reinbeck
Holland
Wellsburg
Conrad
Beaman
North Black Hawk Creek
Black Hawk Creek
South Beaver Creek
T65
T55
T47
T53
T69
T45
T37
T29
T25
T19
T13
D17
D19
D25
D35
D53
D55
D65
D67
S75
20
14
175
57

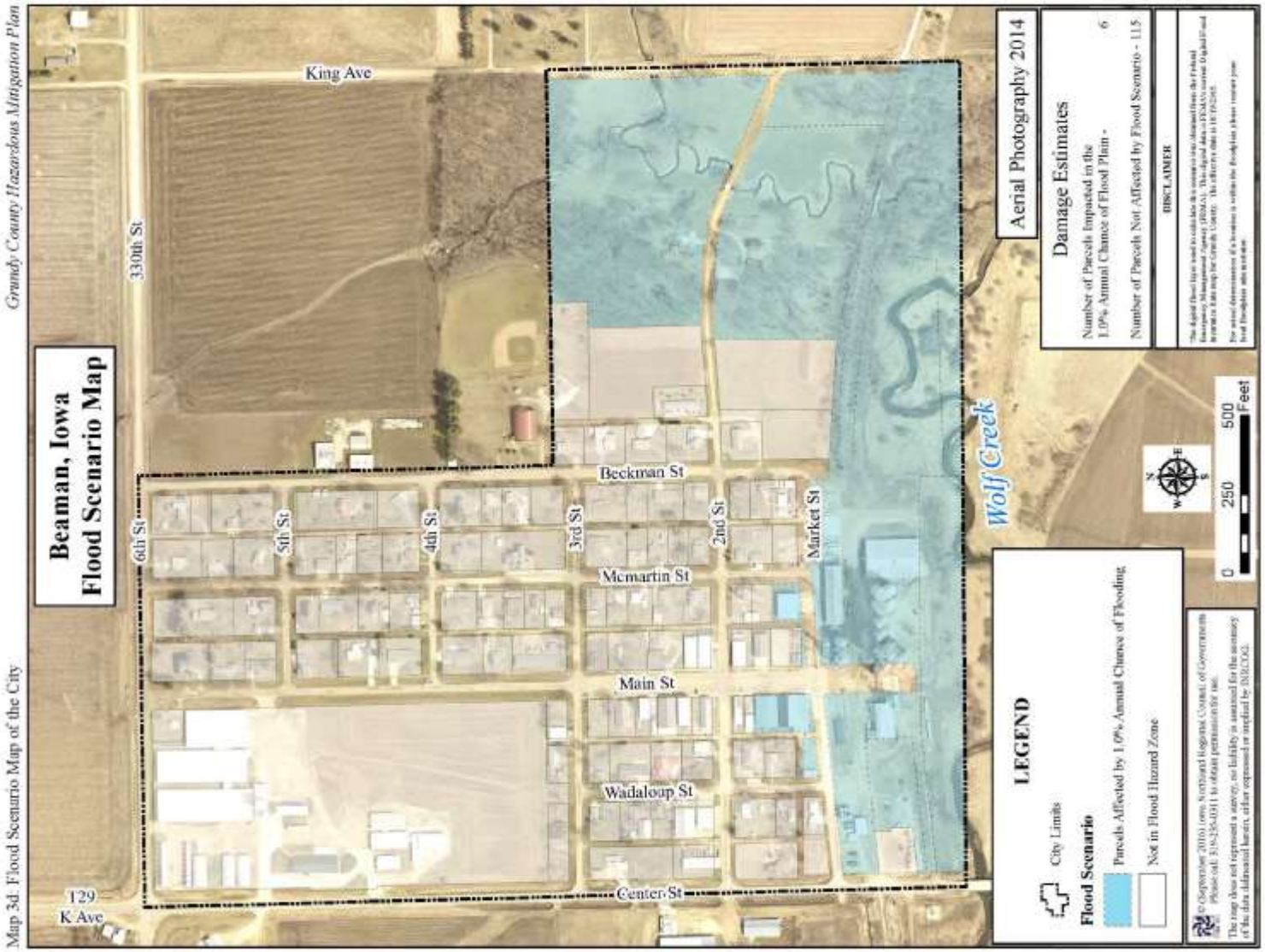

Grundy County Hazardous Mitigation Plan
Grundy County, Iowa
Topographic Map
Black Hawk County
Butler County
Tama County
Tama County
Marshall County
Hardin County
Stout
Dike
Reinbeck
Grundy Center
Morrison
Holland
Wellsburg
Conrad
Beaman
LEGEND
Water
Incorporated Areas
Elevation Feet
1175
1070
970
860
Miles
0 1 2 3 4
Map 2a: Topography of the County

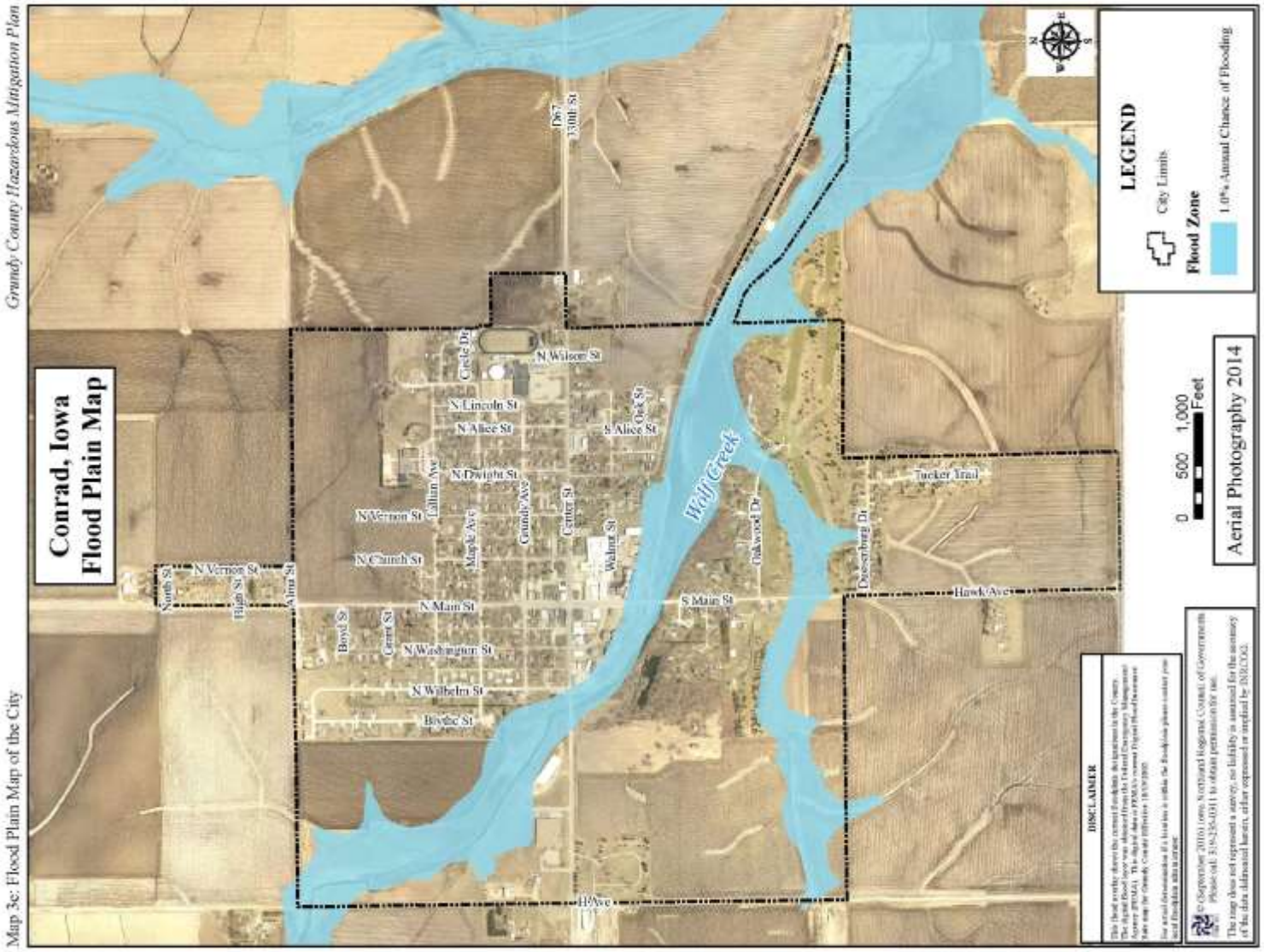

Grundy County Hazardous Mitigation Plan
Grundy County, Iowa
Sinkhole Map
Black Hawk County
Butler County
Tama County
Tama County
Marshall County
Hardin County
Stout
Dike
Reinbeck
Grundy Center
Morrison
Holland
Wellsburg
Conrad
Beaman
LEGEND
Sinkhole
Water
Incorporated Areas
Elevation Feet
1175
1070
970
860
There are currently no sinkholes within Grundy County.
0 1 2 3 4
Miles
Sinkhole Data Source
Map 2b: Sinkholes in the County

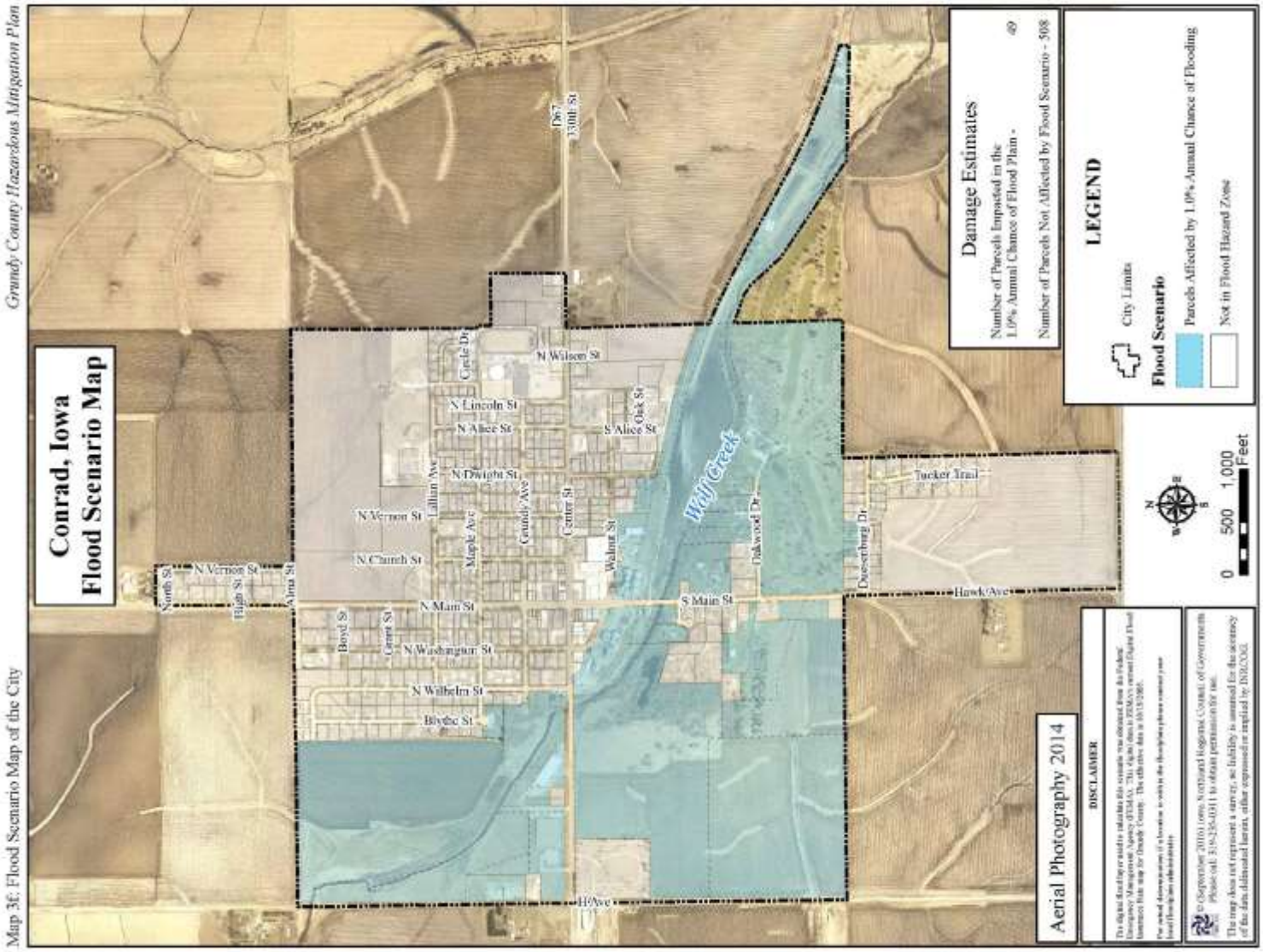

Grundy County Hazardous Mitigation Plan
Grundy County, Iowa
Flood Plain Map
Map 3a: Flood Plain Map of the County
Black Hawk County
Tama County
Tama County
Butler County
Marshall County
Hardin County
Dike
Reinbeck
Stout
Morrison
Grundy Center
Holland
Wellsburg
Conrad
Beaman
LEGEND
Water
Incorporated Areas
Flood Zone
1.0% Annual Chance of Flooding
Elevation Feet
1175
1070
970
860
Miles
0 1 2 3 4
DISCLAIMER

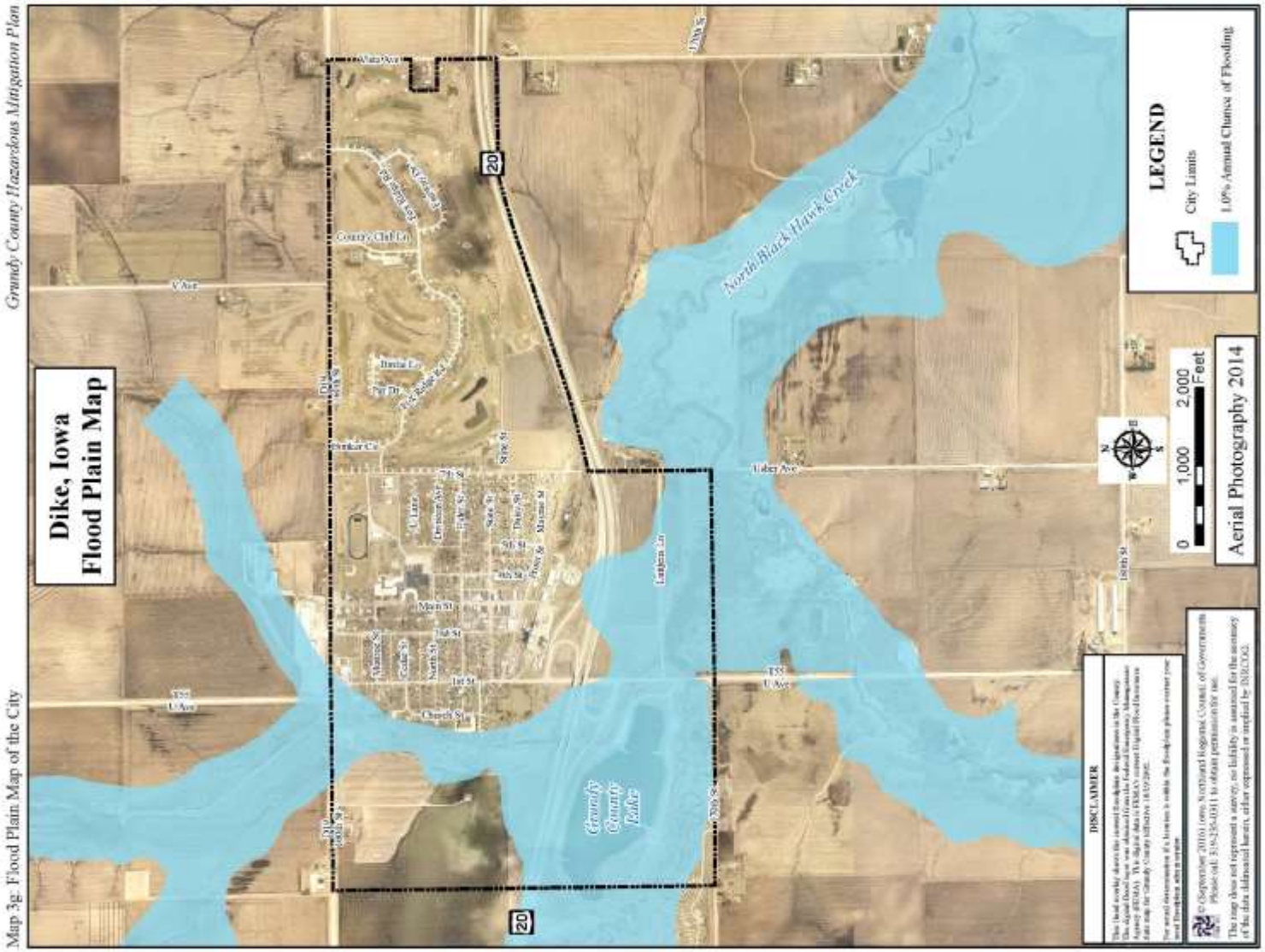

Grundy County Hazardous Mitigation Plan
Grundy County, Iowa
Flood Scenario Map (Unincorporated Areas Only)
Map 3b: Flood Scenario Map of the County
Black Hawk County
Butler County
Tama County
Tama County
Marshall County
Hardin County
Stout
Dike
Reinbeck
Grundy Center
Morrison
Wellsburg
Holland
Conrad
Beaman
Damage Estimates
Number of Parcels Impacted in the 1.0% Annual Chance of Flood Plain - 1,574
Number of Parcels Not Affected by Flood Scenario - 3,834
LEGEND
Incorporated Areas
Water
Flood Scenario
Parcels Affected by 1.0% Annual Chance of Flooding
Not in Flood Hazard Zone
N
W
E
S
0 1 2 Miles
DISCLAIMER


Grundy County Hazardous Mitigation Plan
Beaman, Iowa
Flood Plain Map
King Ave
330th St
6th St
5th St
4th St
3rd St
2nd St
Market St
Beckman St
Mcmartin St
Main St
Wadaloop St
Center St
T29
K Ave
129
K Ave
Wolf Creek
LEGEND
City Limits
Flood Zone
1.0% Annual Chance of Flooding
0
250
500
Feet
Aerial Photography 2014
DISCLAIMER
Map 3c: Flood Plain Map of the City

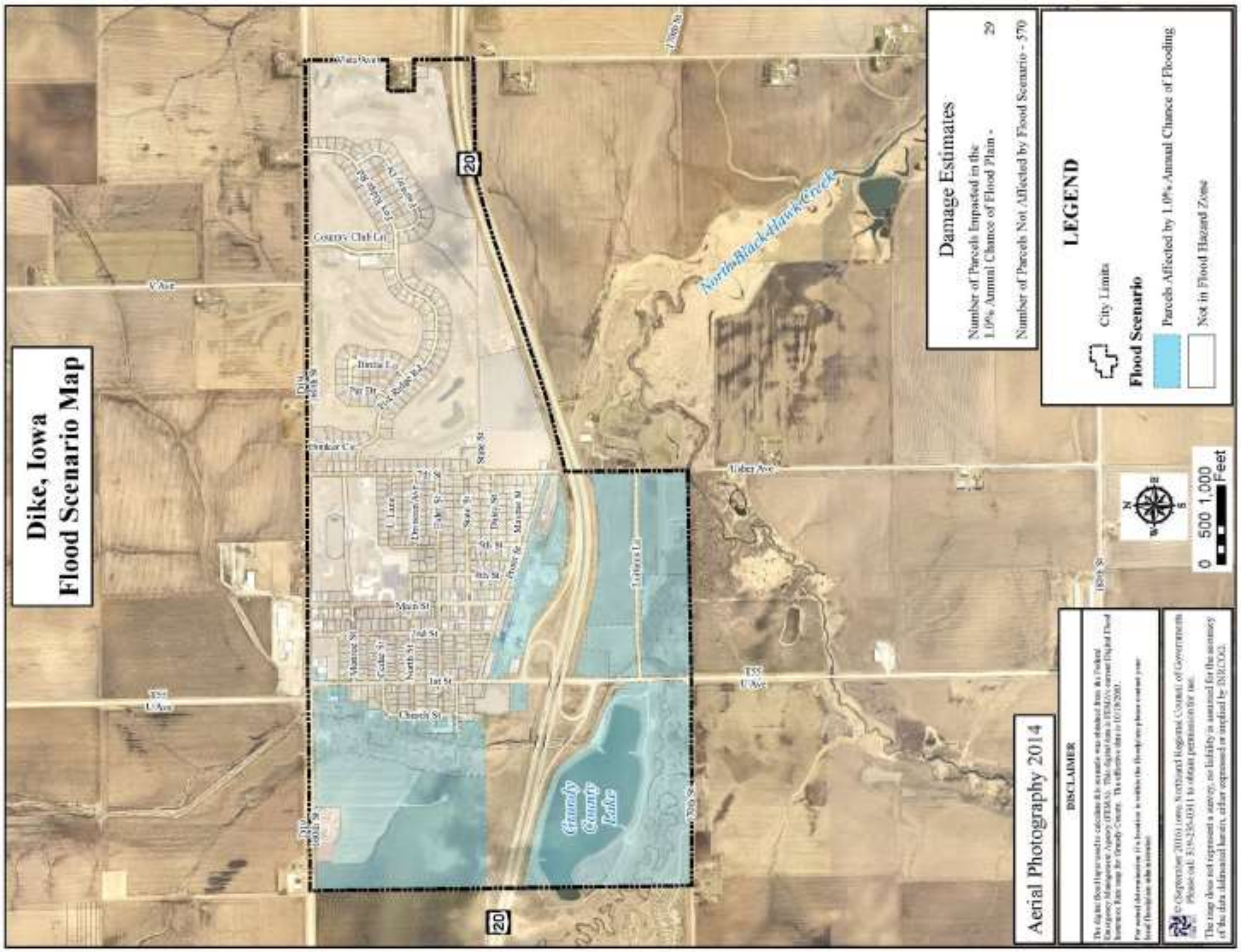

Grundy County Hazardous Mitigation Plan
Beaman, Iowa
Flood Scenario Map
King Ave
330th St
6th St
5th St
4th St
3rd St
2nd St
Market St
Beckman St
Mcmartin St
Main St
Wadaloop St
Center St
129
K Ave
Wolf Creek
Aerial Photography 2014
Damage Estimates
Number of Parcels Impacted in the 1.0% Annual Chance of Flood Plain - 6
Number of Parcels Not Affected by Flood Scenario - 115
DISCLAIMER
LEGEND
City Limits
Flood Scenario
Parcels Affected by 1.0% Annual Chance of Flooding
Not in Flood Hazard Zone
0
250
500
Feet
Map 3d. Flood Scenario Map of the City


Grundy County Hazardous Mitigation Plan
Conrad, Iowa
Flood Plain Map
Map 3c: Flood Plain Map of the City
LEGEND
City Limits
Flood Zone
1.0% Annual Chance of Flooding
0 500 1,000 Feet
Aerial Photography 2014
DISCLAIMER
Wolf Creek
N Wilson St
N Lincoln St
N Alice St
S Alice St
N Dwight St
N Vernon St
N Church St
N Main St
S Main St
N Washington St
N Wilhelm St
Bivins St
H Ave
Hawk Ave
Tucker Trail
Oakwood Dr
Deerenberg Dr
Maple Ave
Grundy Ave
Center St
Walnut St
Lillian Ave
Circle Dr
Oak St
Boyd St
Grant St
North St
High St
Alma St
330th St


Grundy County Hazardous Mitigation Plan
Map 3E: Flood Scenario Map of the City
Conrad, Iowa
Flood Scenario Map
Damage Estimates
Number of Parcels Impacted in the 1.0% Annual Chance of Flood Plain - 49
Number of Parcels Not Affected by Flood Scenario - 568
LEGEND
City Limits
Flood Scenario
Parcels Affected by 1.0% Annual Chance of Flooding
Not in Flood Hazard Zone
0 500 1,000 Feet
Aerial Photography 2014
DISCLAIMER
Wolf Creek
N Vernon St
N Church St
N Main St
N Washington St
N Wilhelm St
Blythe St
N Wilson St
N Lincoln St
N Alice St
N Dwight St
S Alice St
S Main St
Tucker Trail
Hawk Ave
H Ave
330th St

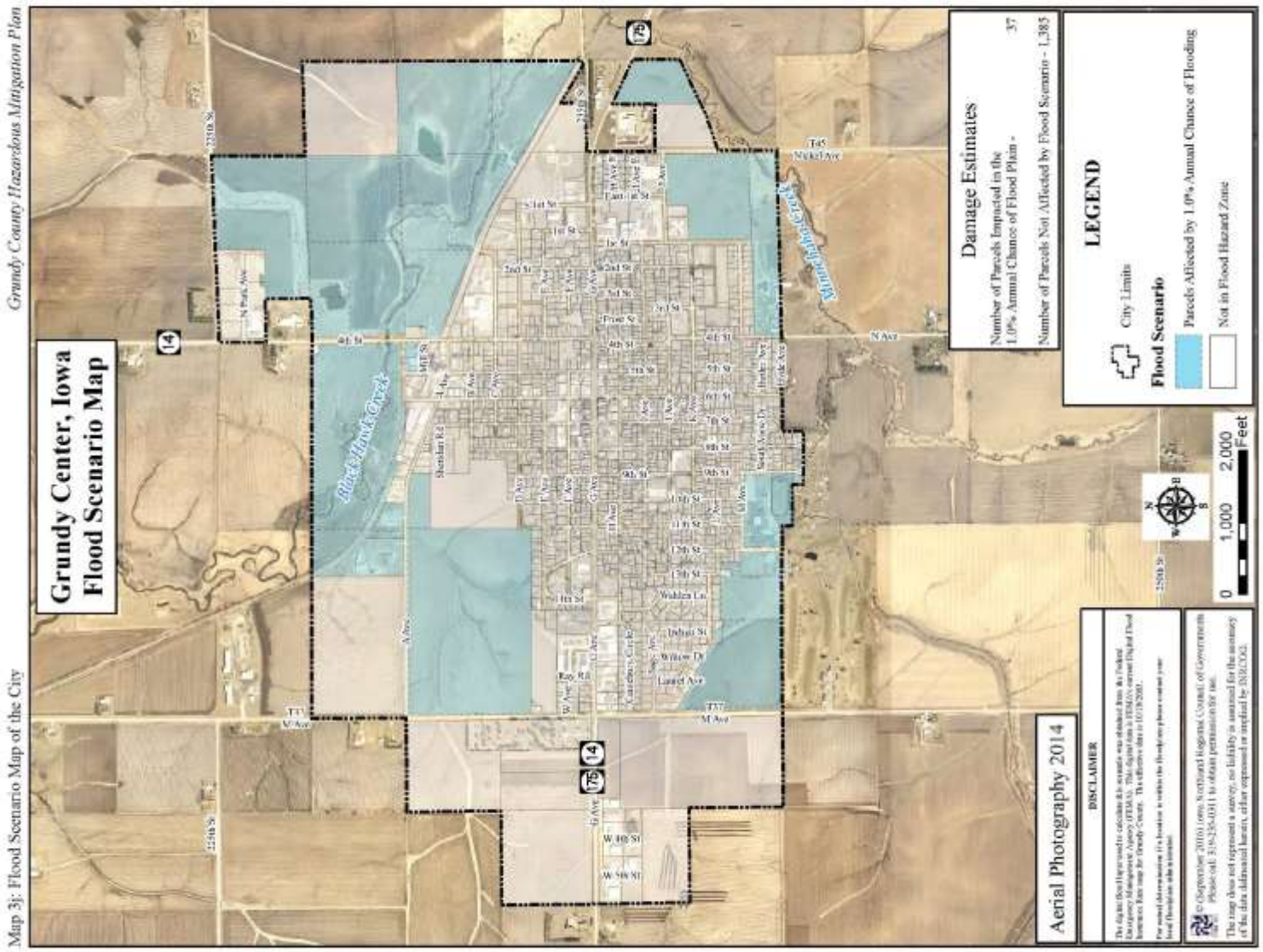

Grundy County Hazardous Mitigation Plan
Dike, Iowa
Flood Plain Map
North Black Hawk Creek
Grundy County Lake
LEGEND
City Limits
1.0% Annual Chance of Flooding
0
1,000
2,000
Feet
Aerial Photography 2014
DISCLAIMER
20
Map 3g: Flood Plain Map of the City

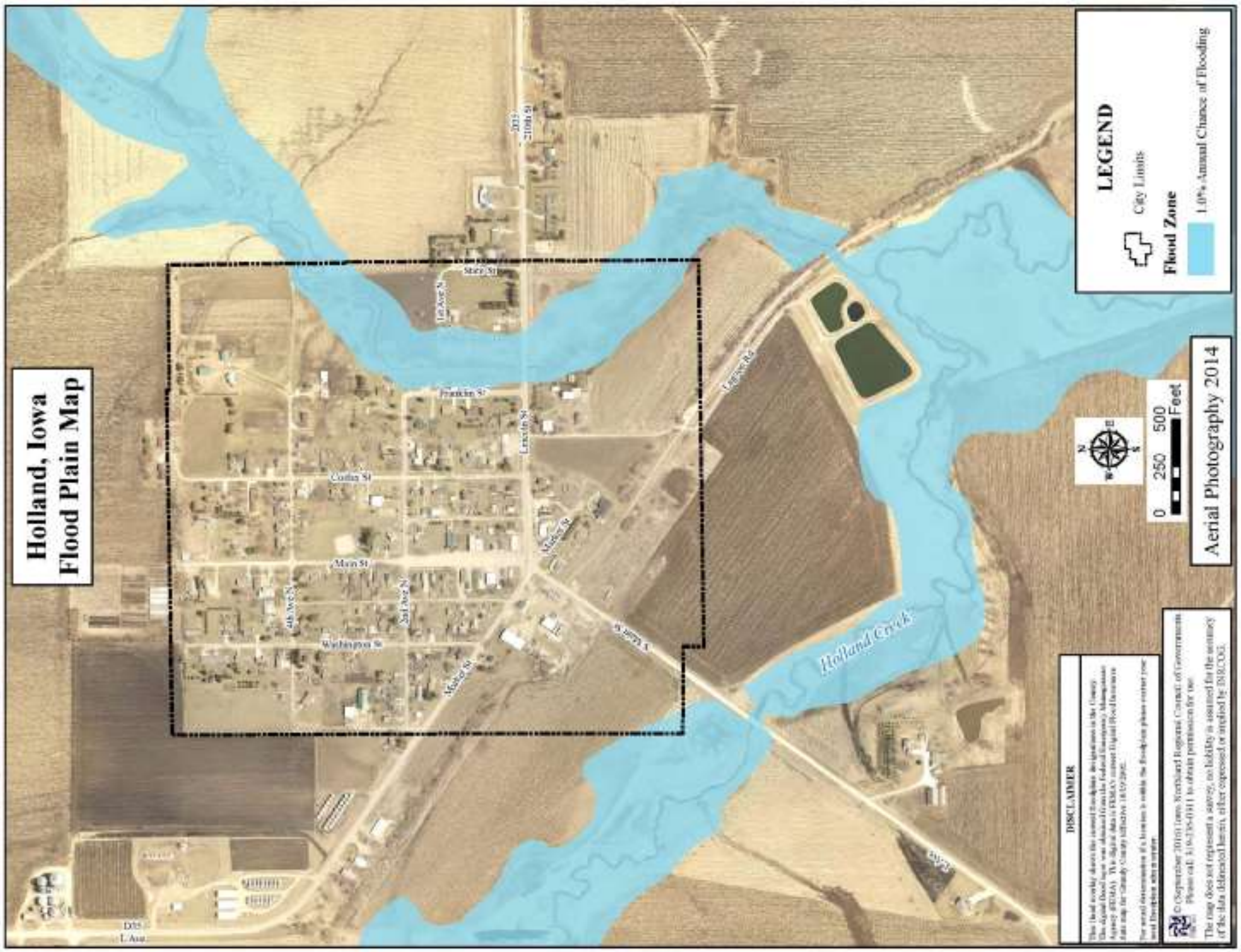
Grundy County Hazardous Mitigation Plan



Map 3h: Flood Scenario Map of the City


Grundy County Hazardous Mitigation Plan
Map 3i: Flood Plain Map of the City
Grundy Center, Iowa
Flood Plain Map
Black Hawk Creek
Miner Branch Creek
LEGEND
City Limits
Flood Zone
1.0% Annual Chance of Flooding
0
1,000
2,000
Feet
Aerial Photography 2014
DISCLAIMER


Grundy County Hazardous Mitigation Plan
Map 3j: Flood Scenario Map of the City
Grundy Center, Iowa
Flood Scenario Map
Damage Estimates
Number of Parcels Impacted in the 1.0% Annual Chance of Flood Plain - 37
Number of Parcels Not Affected by Flood Scenario - 1,385
LEGEND
City Limits
Flood Scenario
Parcels Affected by 1.0% Annual Chance of Flooding
Not in Flood Hazard Zone
0
1,000
2,000
Feet
Aerial Photography 2014
DISCLAIMER
Black Hawk Creek
Middle Indian Creek

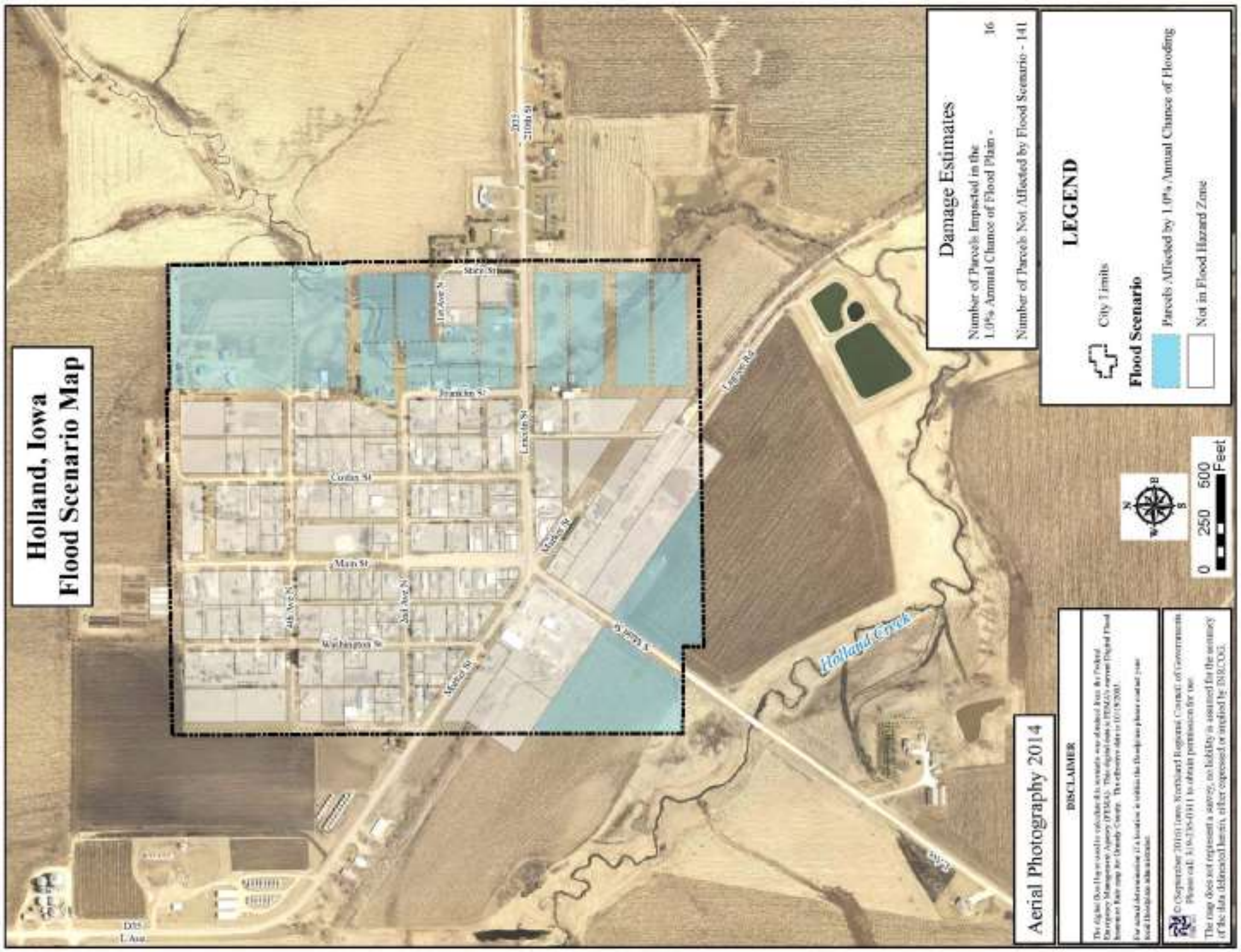


Map 3k: Flood Plain Map of the City

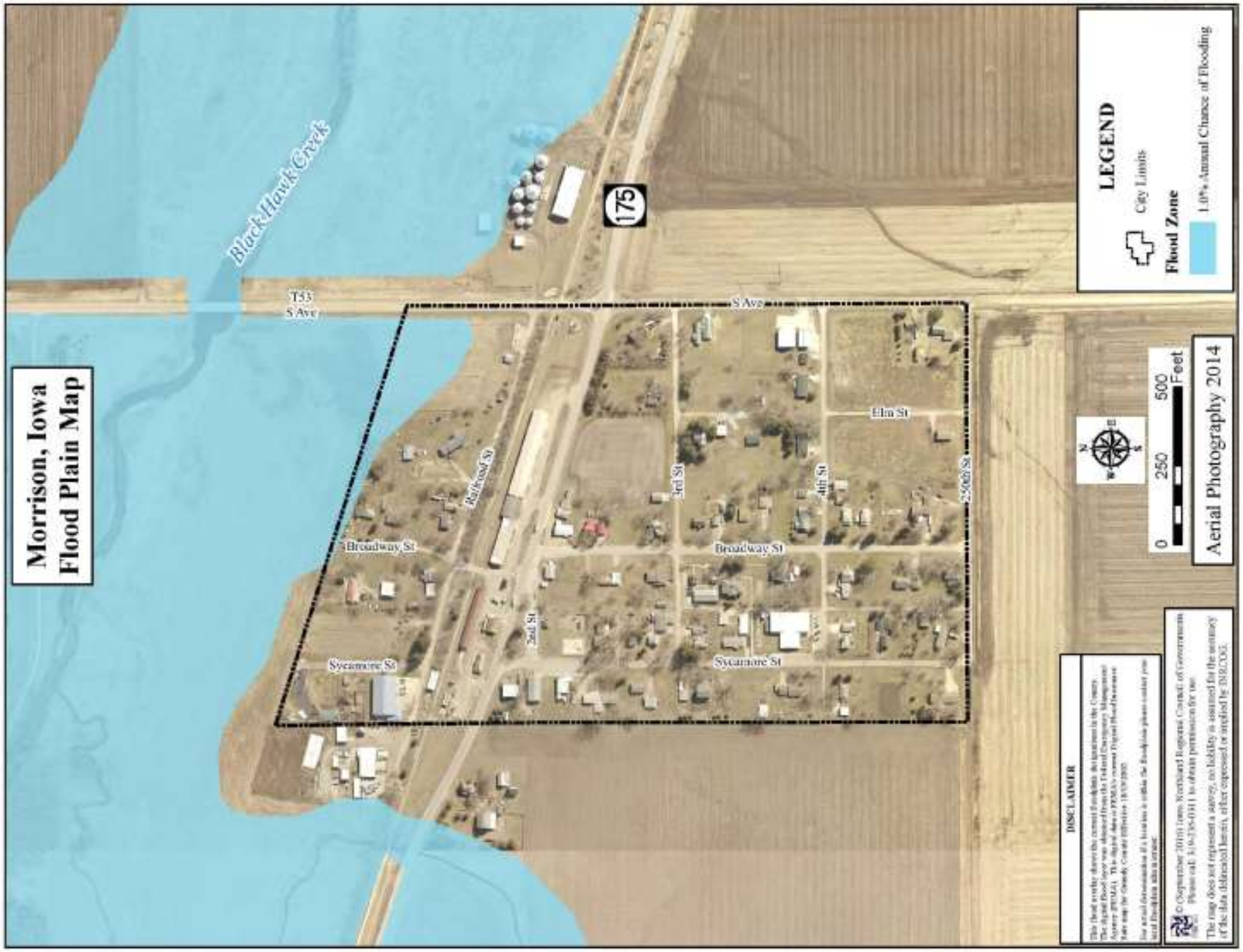
Grundy County Hazardous Mitigation Plan

Map 3L: Flood Scenario Map of the City

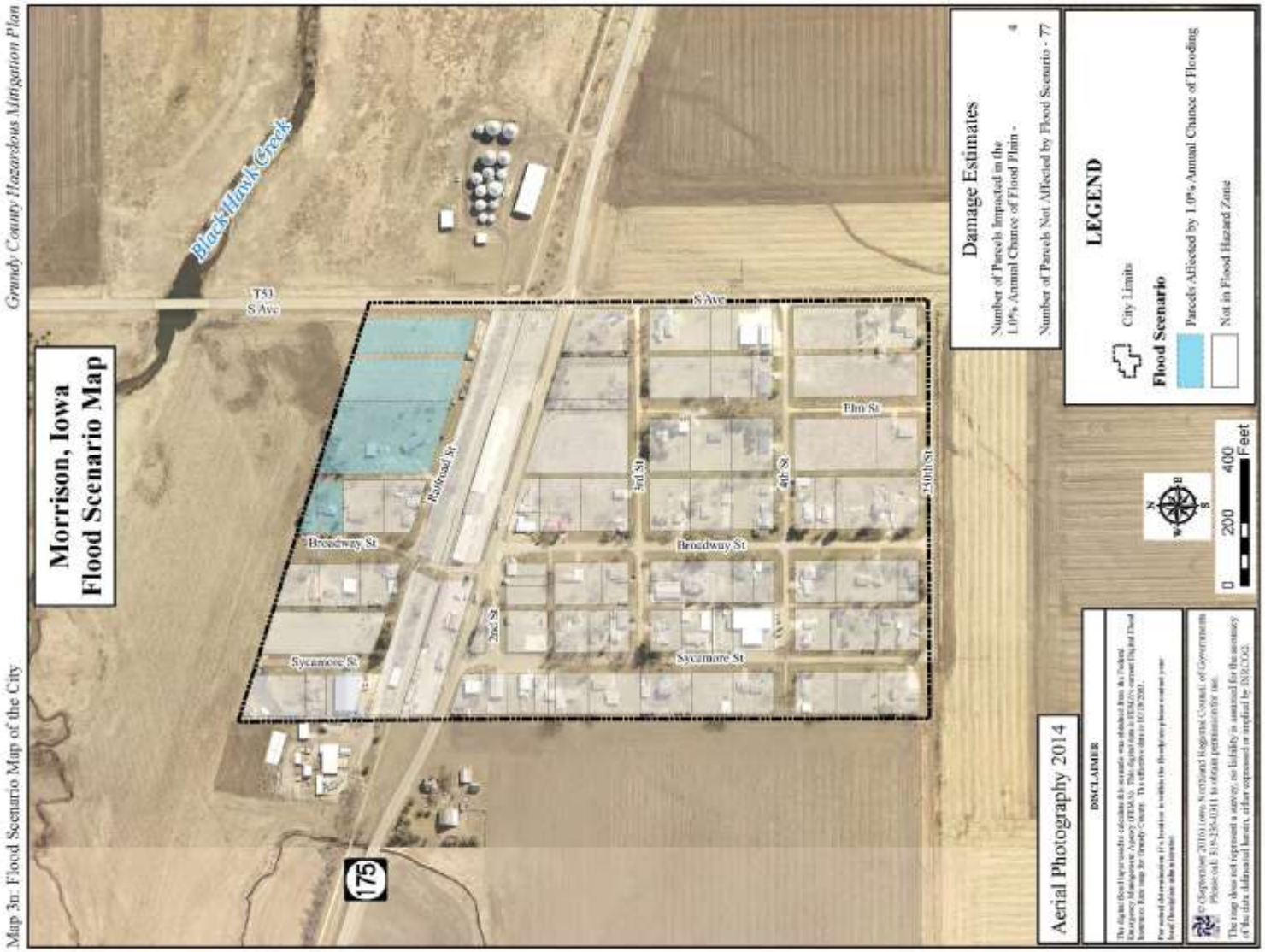
Grundy County Hazardous Mitigation Plan

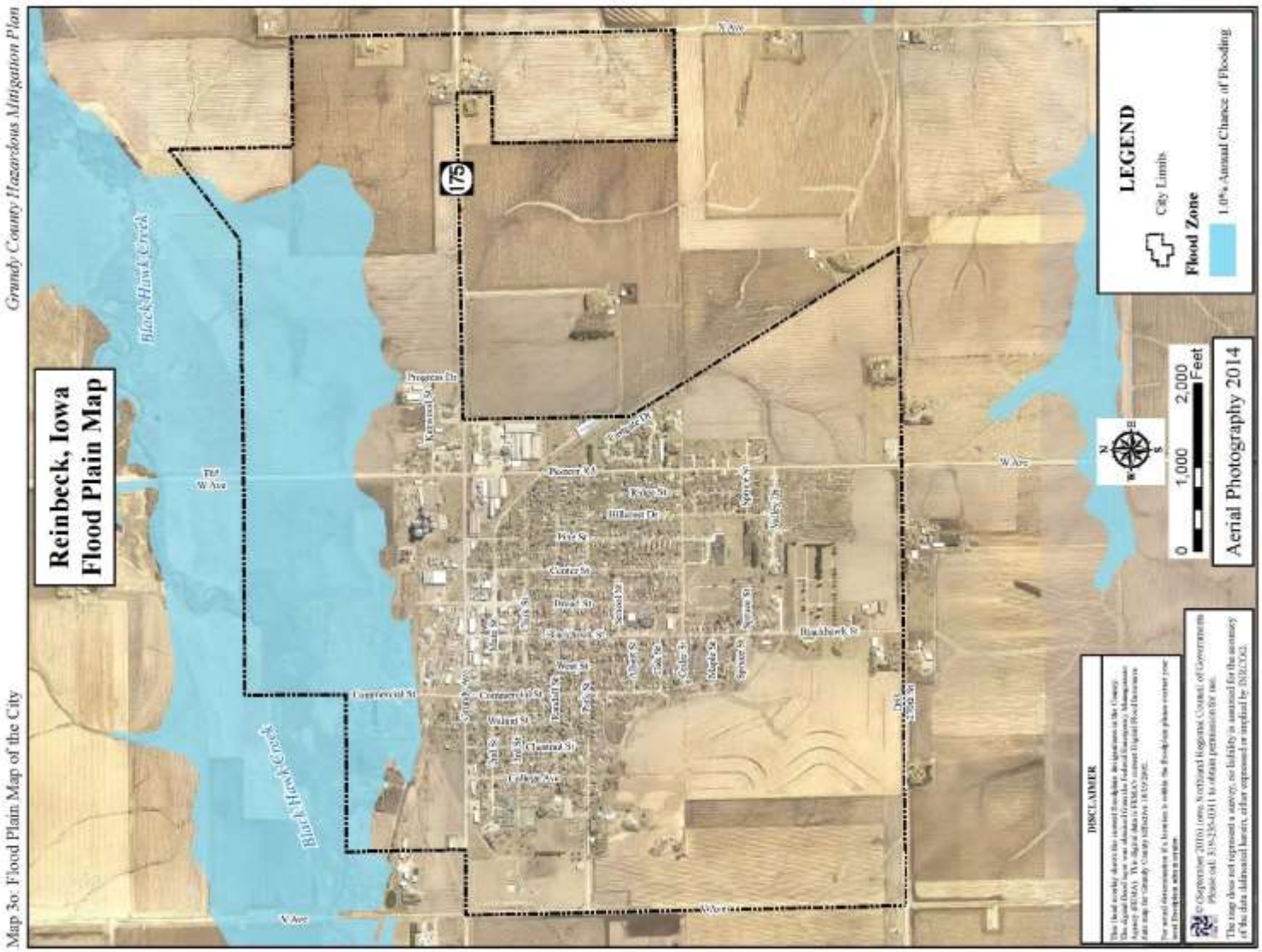


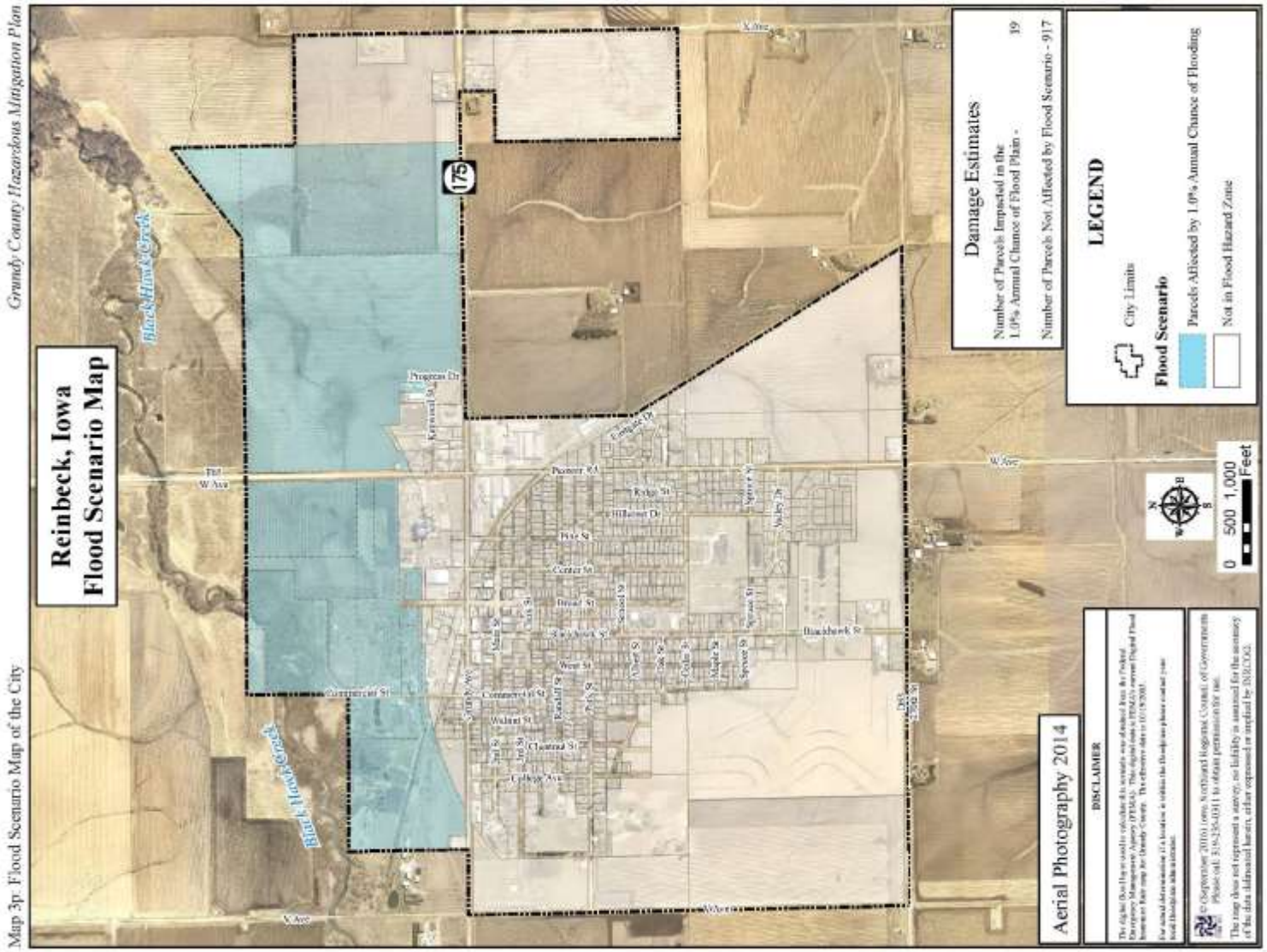
Grundy County Hazardous Mitigation Plan



Map 3m: Flood Plain Map of the City


Grundy County Hazardous Mitigation Plan
Map 3n. Flood Scenario Map of the City
Morrison, Iowa
Flood Scenario Map
Black Hawk Creek
T51
S Ave
S Ave
Railroad St
Broadway St
Broadway St
Sycamore St
Sycamore St
2nd St
3rd St
4th St
Elm St
250th St
175
Damage Estimates
Number of Parcels Impacted in the 1.0% Annual Chance of Flood Plain - 4
Number of Parcels Not Affected by Flood Scenario - 77
LEGEND
City Limits
Flood Scenario
Parcels Affected by 1.0% Annual Chance of Flooding
Not in Flood Hazard Zone
0
200
400
Feet
Aerial Photography 2014
DISCLAIMER

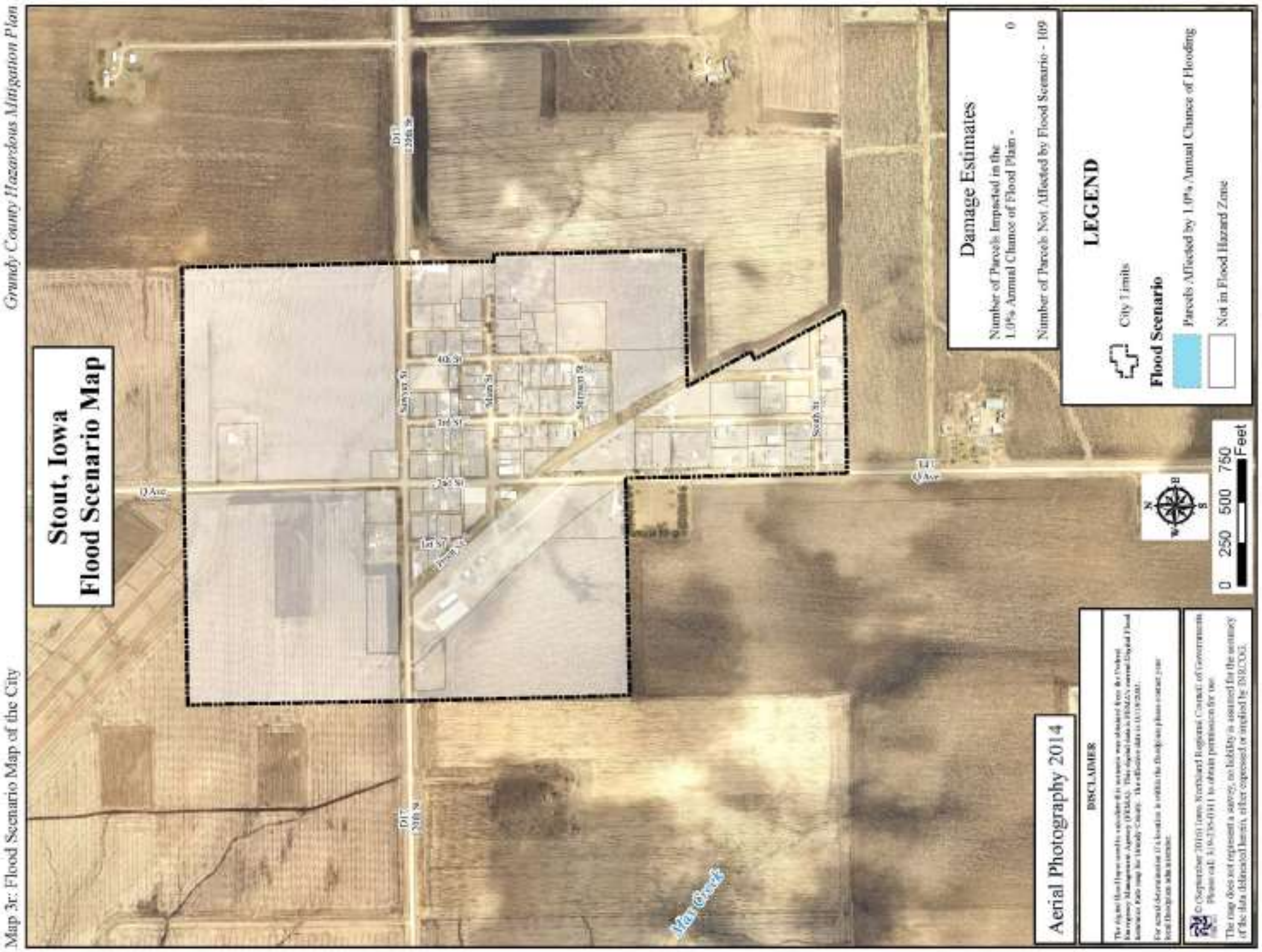

Grundy County Hazardous Mitigation Plan
Reinbeck, Iowa
Flood Plain Map
Map 3o: Flood Plain Map of the City
Black Hawk Creek
175
W Ave
LEGEND
City Limits
Flood Zone
1.0% Annual Chance of Flooding
0
1,000
2,000
Feet
Aerial Photography 2014
DISCLAIMER


Grundy County Hazardous Mitigation Plan
Map 3p. Flood Scenario Map of the City
Reinbeck, Iowa
Flood Scenario Map
Black Hawk Creek
175
Damage Estimates
Number of Parcels Impacted in the 1.0% Annual Chance of Flood Plain - 19
Number of Parcels Not Affected by Flood Scenario - 917
LEGEND
City Limits
Flood Scenario
Parcels Affected by 1.0% Annual Chance of Flooding
Not in Flood Hazard Zone
0 500 1,000 Feet
Aerial Photography 2014
DISCLAIMER

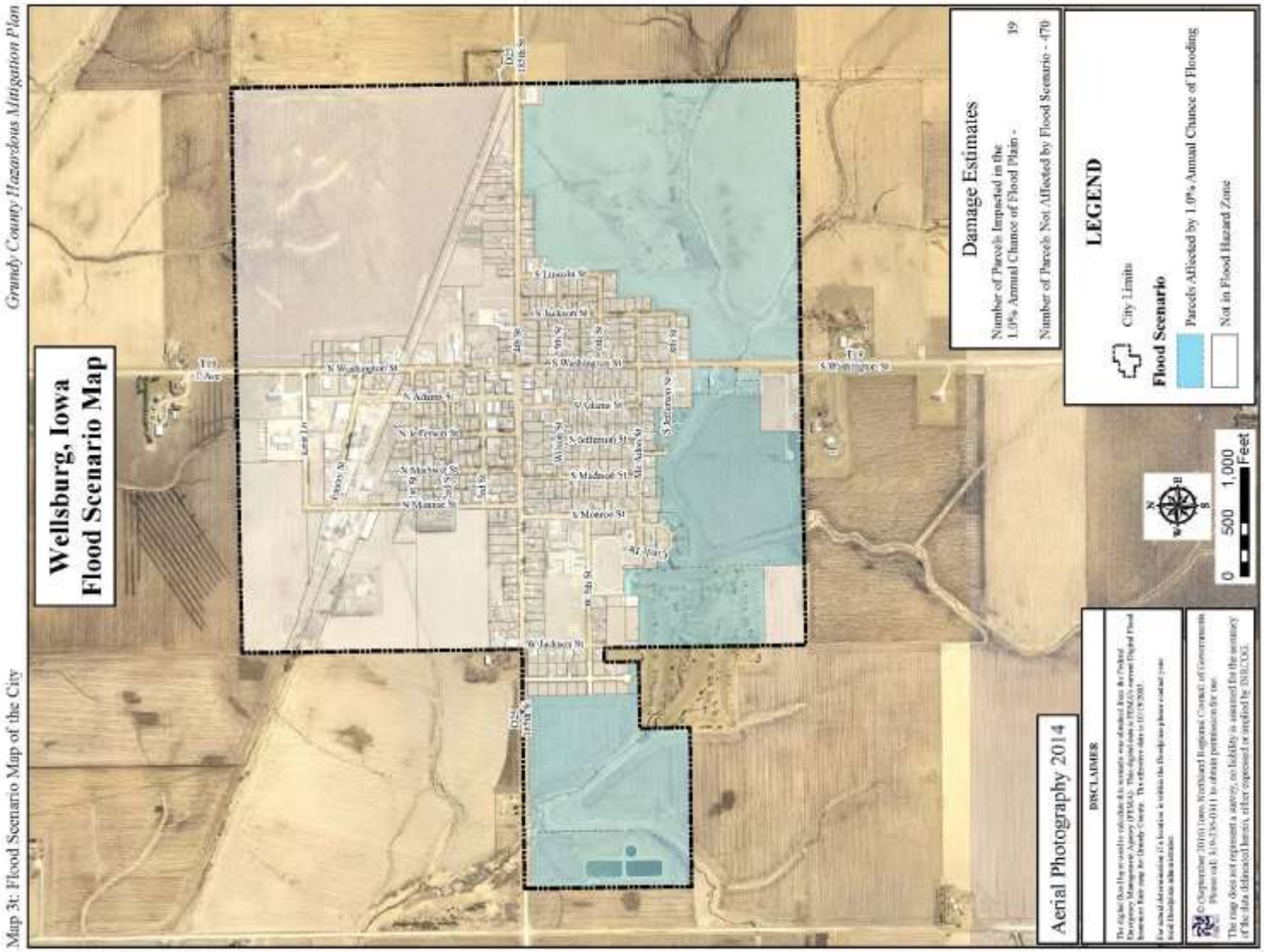

Grundy County Hazardous Mitigation Plan
Map 3q Flood Plain Map of the City
Stout, Iowa
Flood Plain Map
LEGEND
City Limits
Flood Zone
1.0% Annual Chance of Flooding
0
500
1,000
Feet
Aerial Photography 2014
DISCLAIMER
Van Orsdel

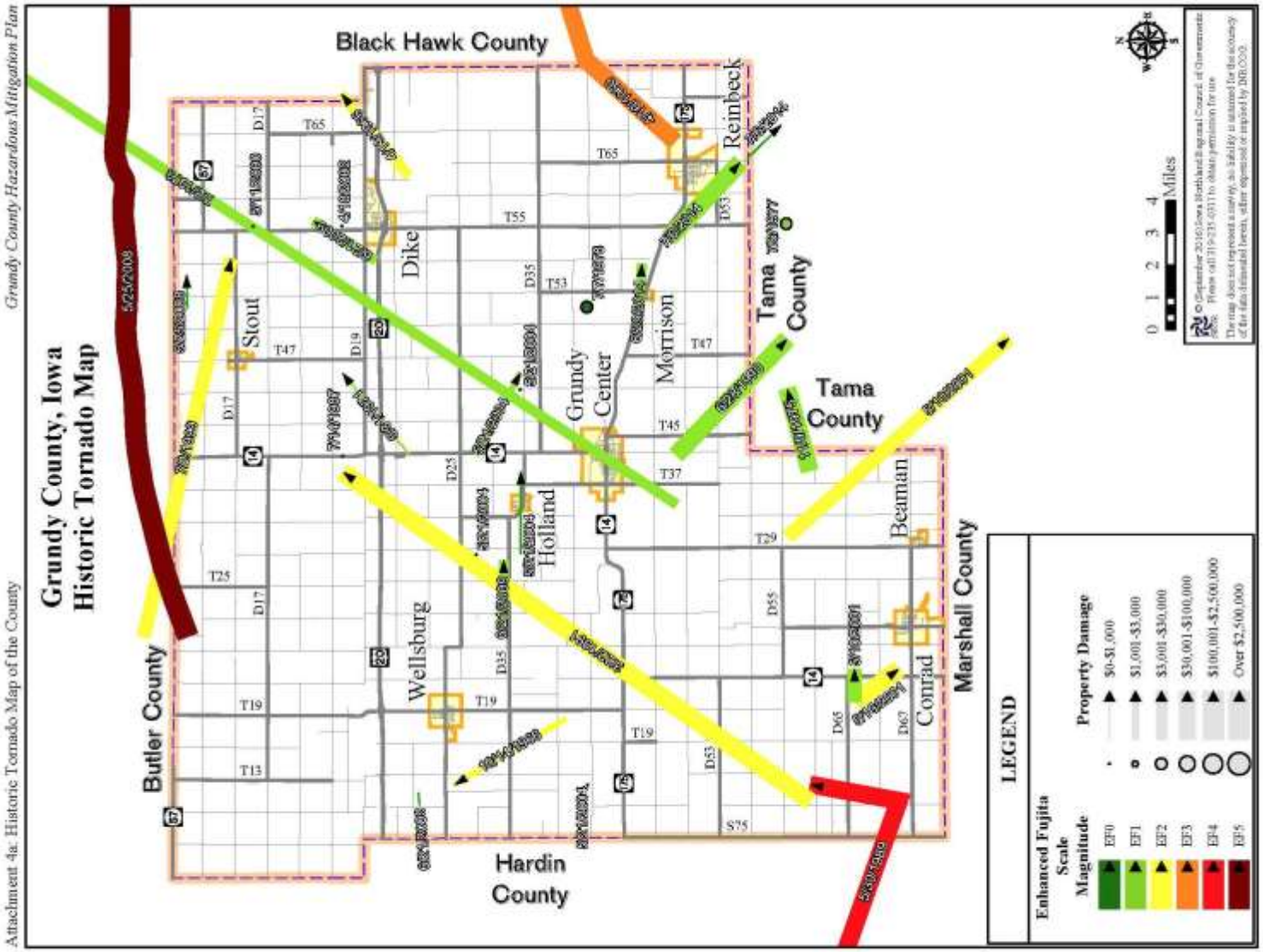
Map 3r: Flood Scenario Map of the City

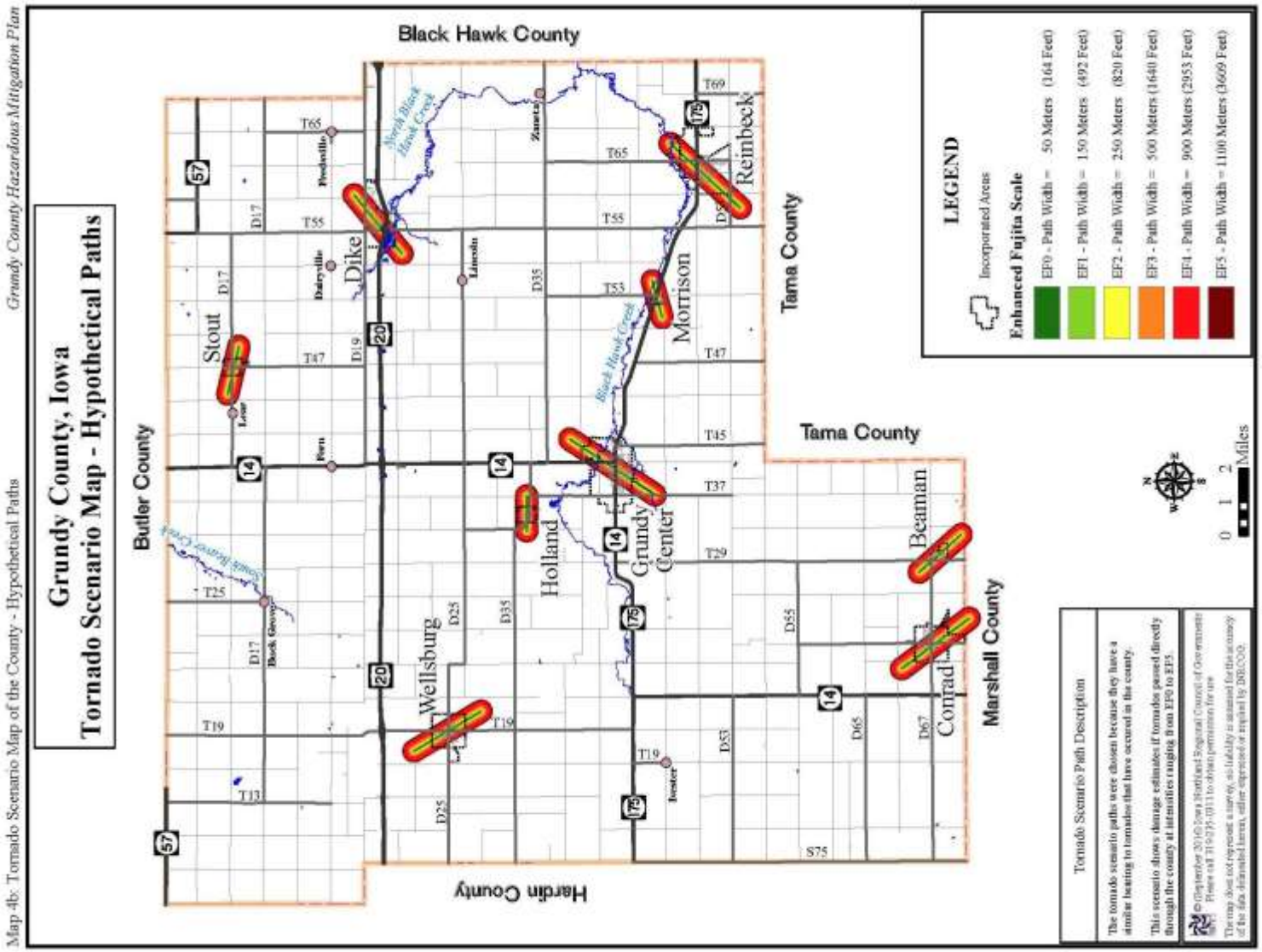
Grundy County Hazardous Mitigation Plan

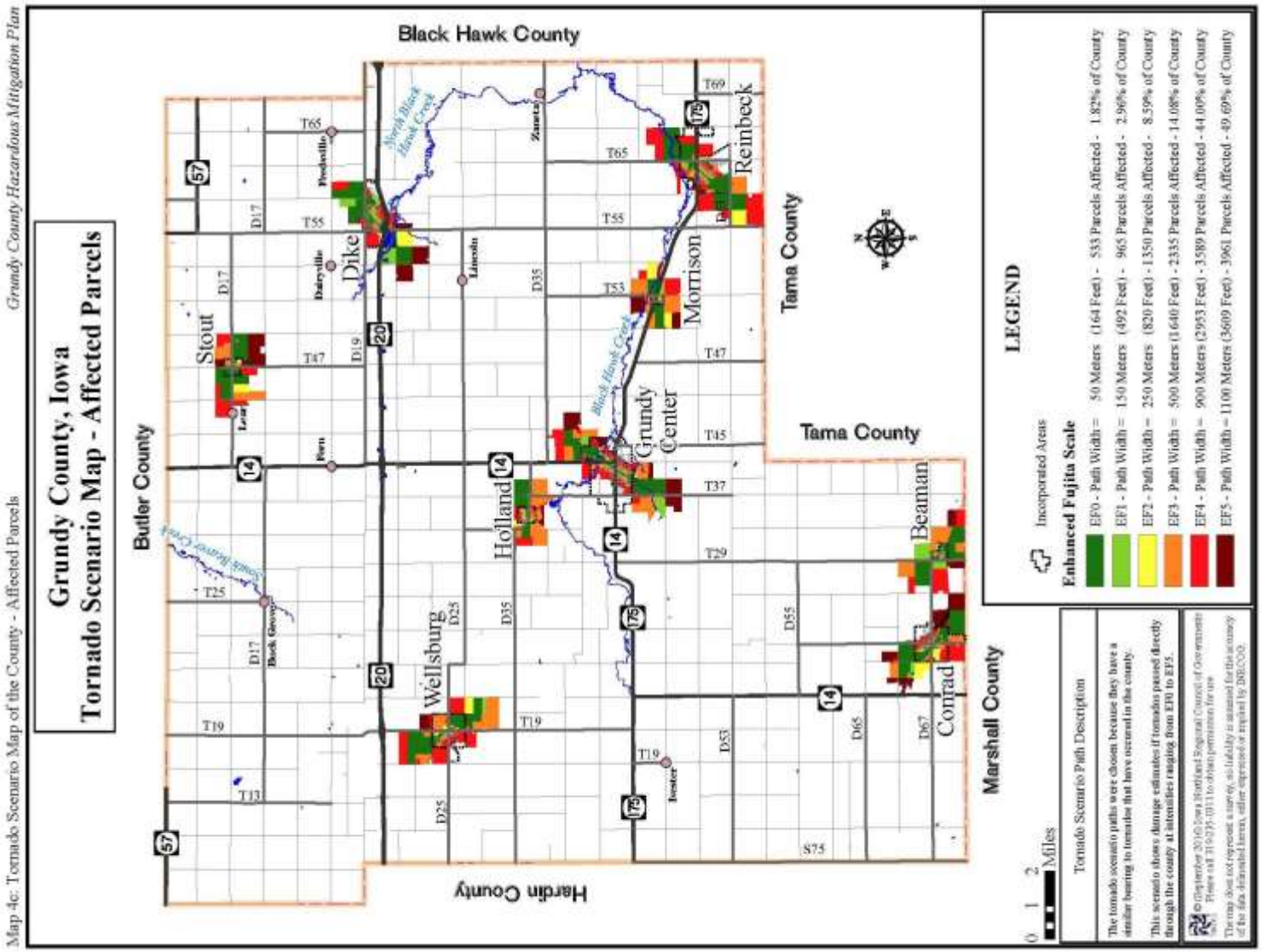


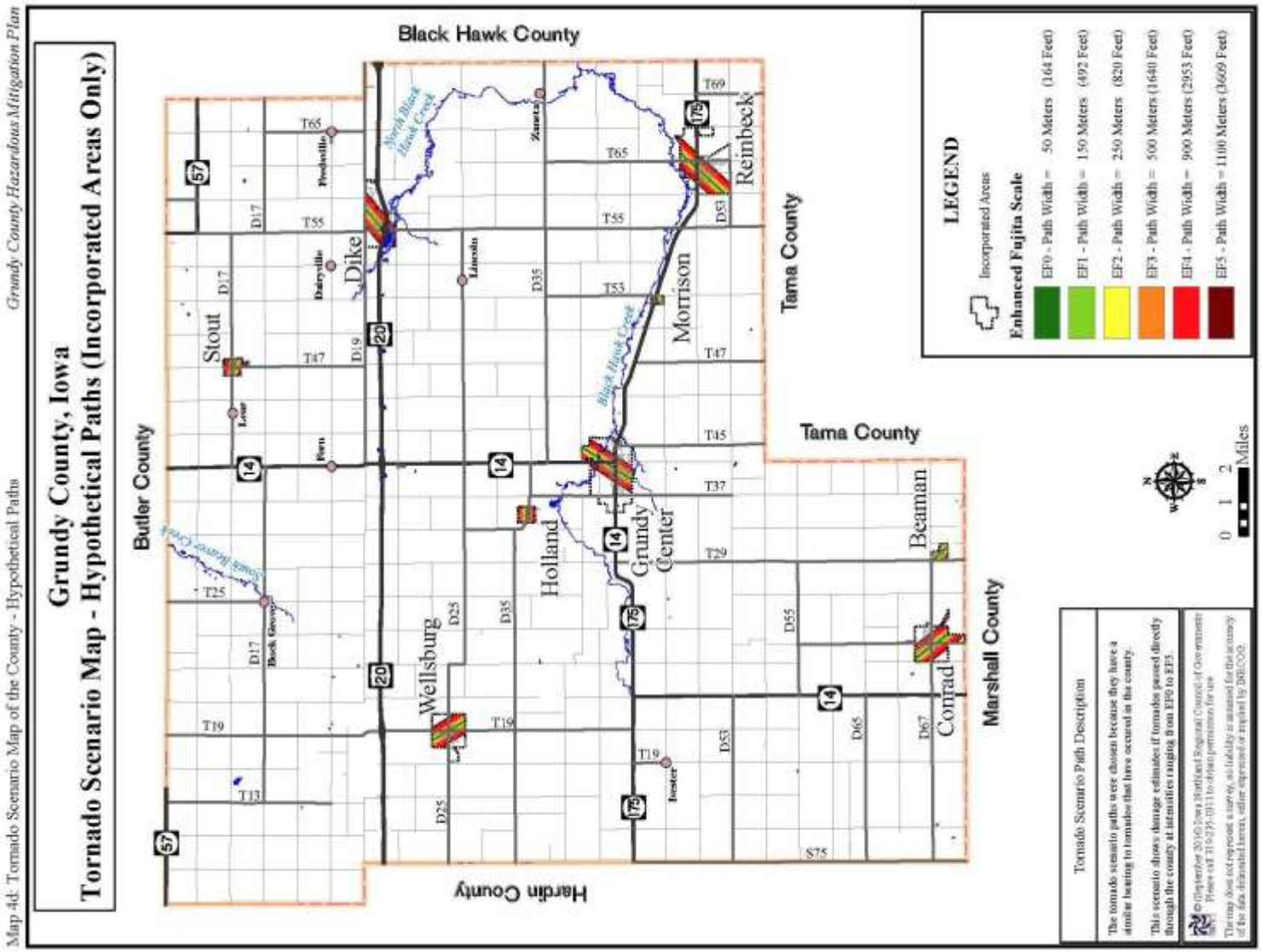
Map 3s: Flood Plain Map of the City

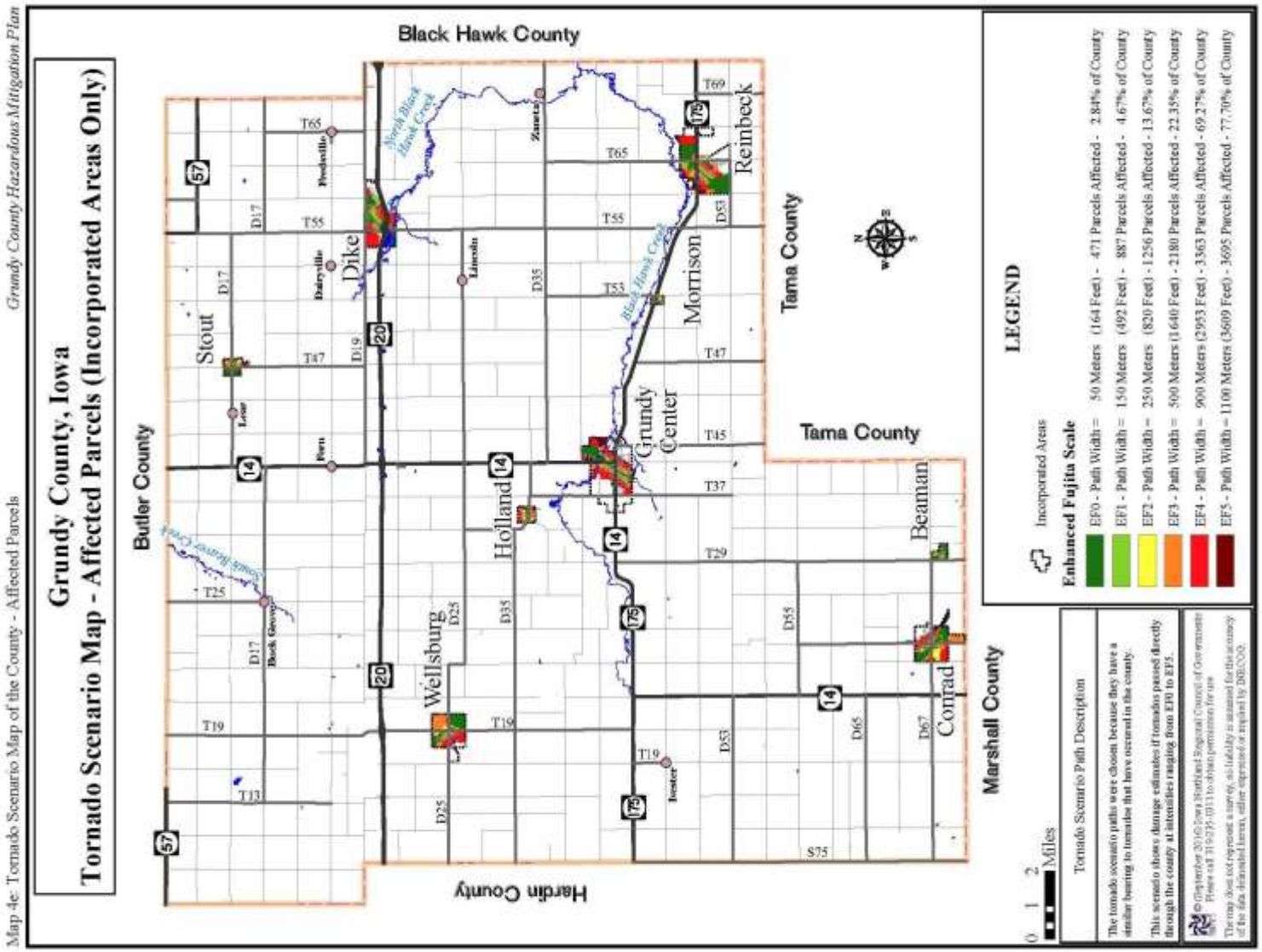

Grundy County Hazardous Mitigation Plan
Wellsburg, Iowa
Flood Scenario Map
Damage Estimates
Number of Parcels Impacted in the 1.0% Annual Chance of Flood Plain - 19
Number of Parcels Not Affected by Flood Scenario - 470
LEGEND
City Limits
Flood Scenario
Parcels Affected by 1.0% Annual Chance of Flooding
Not in Flood Hazard Zone
0 500 1,000 Feet
Aerial Photography 2014
DISCLAIMER
Map 3t: Flood Scenario Map of the City

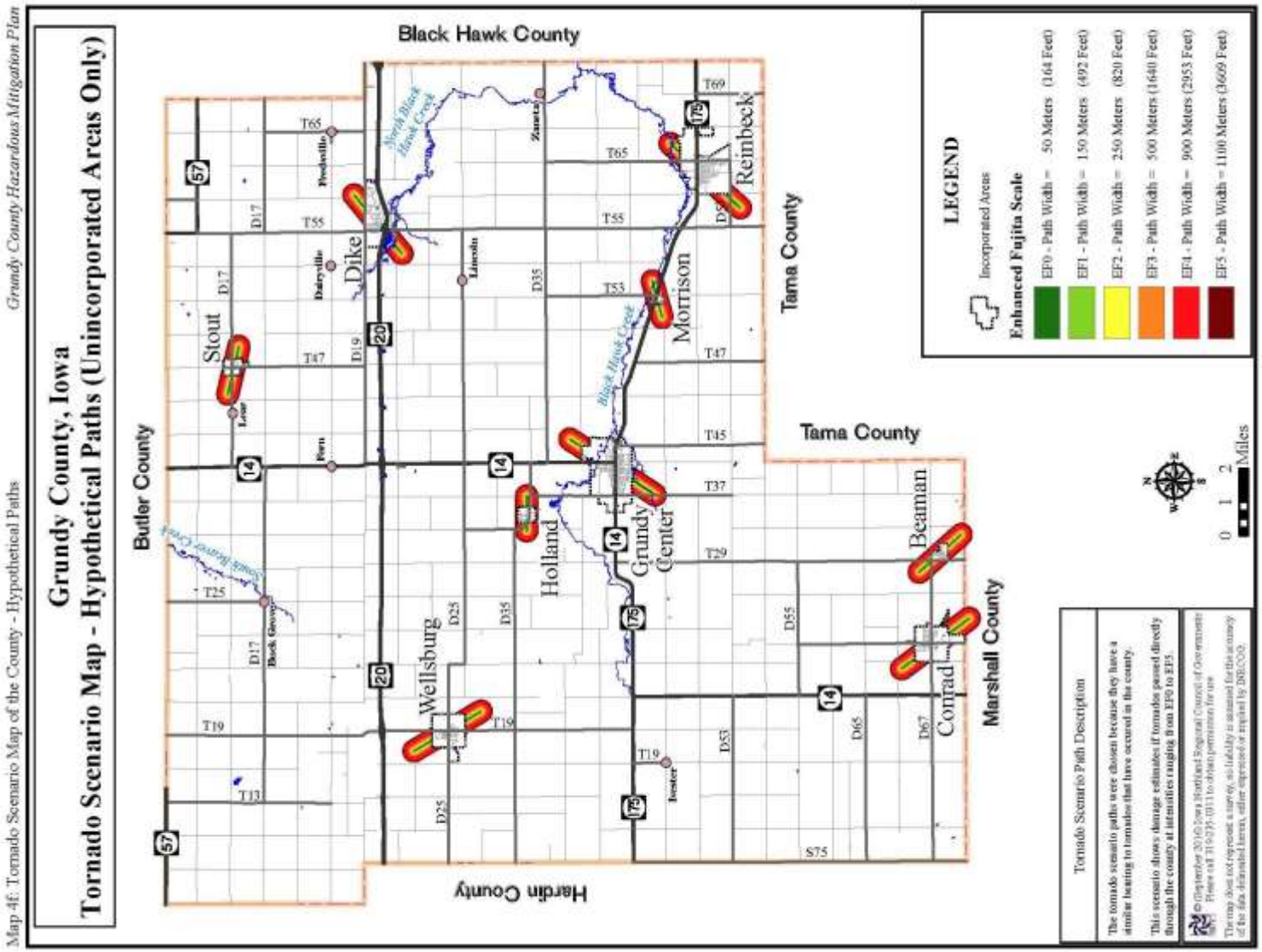

Grundy County Hazardous Mitigation Plan
Attachment 4a: Historic Tornado Map of the County
Grundy County, Iowa
Historic Tornado Map
Black Hawk County
Butler County
Hardin County
Tama County
Marshall County
Reinbeck
Dike
Stout
Grundy Center
Morrison
Holland
Wellsburg
Beaman
Conrad
LEGEND
Enhanced Fujita Scale Magnitude
Property Damage
EF0
EF1
EF2
EF3
EF4
EF5
$0-$1,000
$1,001-$3,000
$3,001-$30,000
$30,001-$100,000
$100,001-$2,500,000
Over $2,500,000
Miles

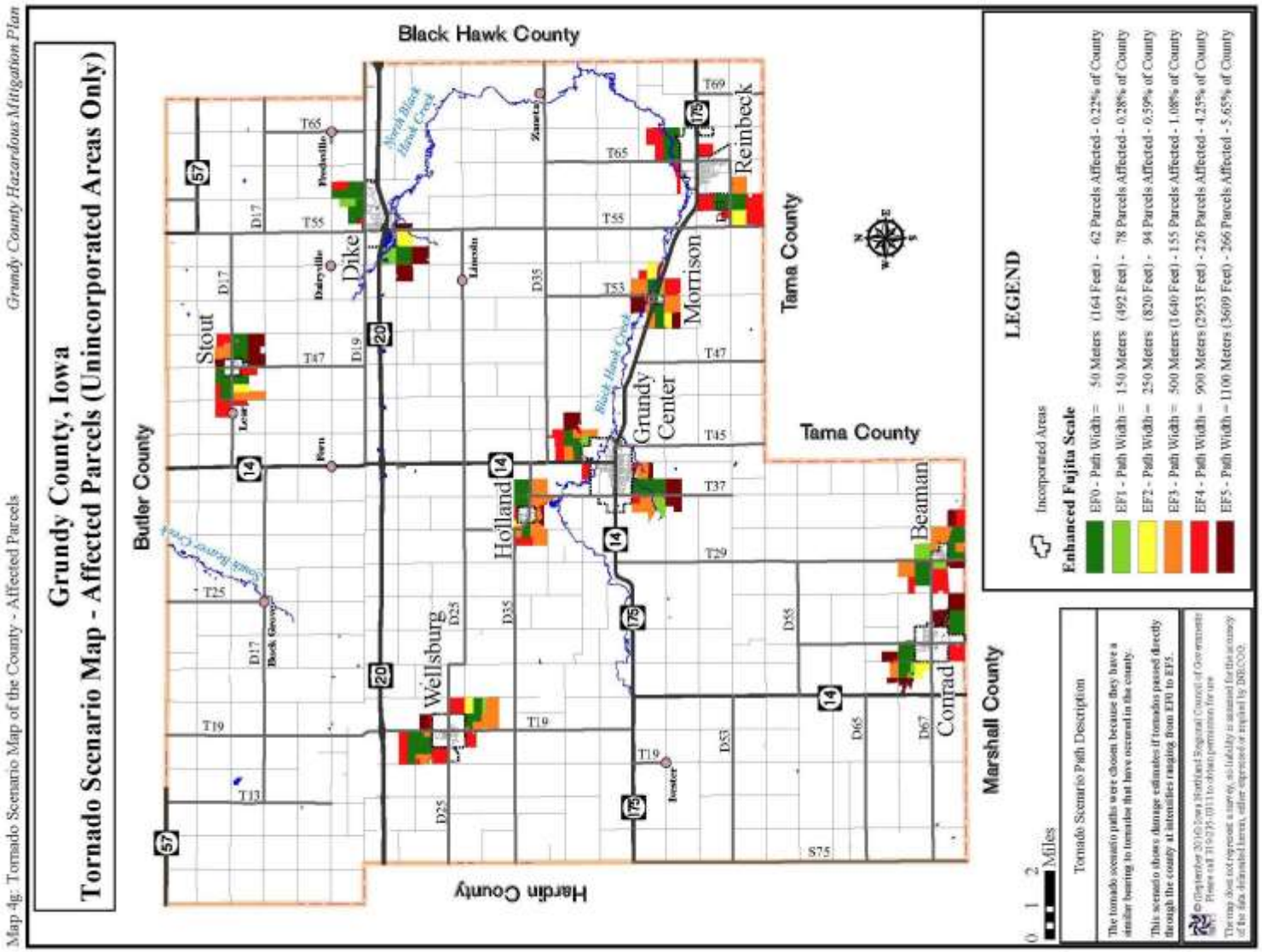

Grundy County Hazardous Mitigation Plan
Grundy County, Iowa
Tornado Scenario Map - Hypothetical Paths
Black Hawk County
Butler County
Tama County
Tama County
Marshall County
Hardin County
Stout
Dike
Morrison
Reinbeck
Holland
Grundy Center
Wellsburg
Beaman
Conrad
LEGEND
Incorporated Areas
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet)
EF1 - Path Width = 150 Meters (492 Feet)
EF2 - Path Width = 250 Meters (820 Feet)
EF3 - Path Width = 500 Meters (1640 Feet)
EF4 - Path Width = 900 Meters (2953 Feet)
EF5 - Path Width = 1100 Meters (3609 Feet)
Tornado Scenario Path Description
The tornado scenario paths were chosen because they have a similar bearing to tornadoes that have occurred in the county.
This scenario shows damage estimates if tornados passed directly through the county at intensities ranging from EF0 to EF5.
Miles
0 1 2
Map 4b: Tornado Scenario Map of the County - Hypothetical Paths

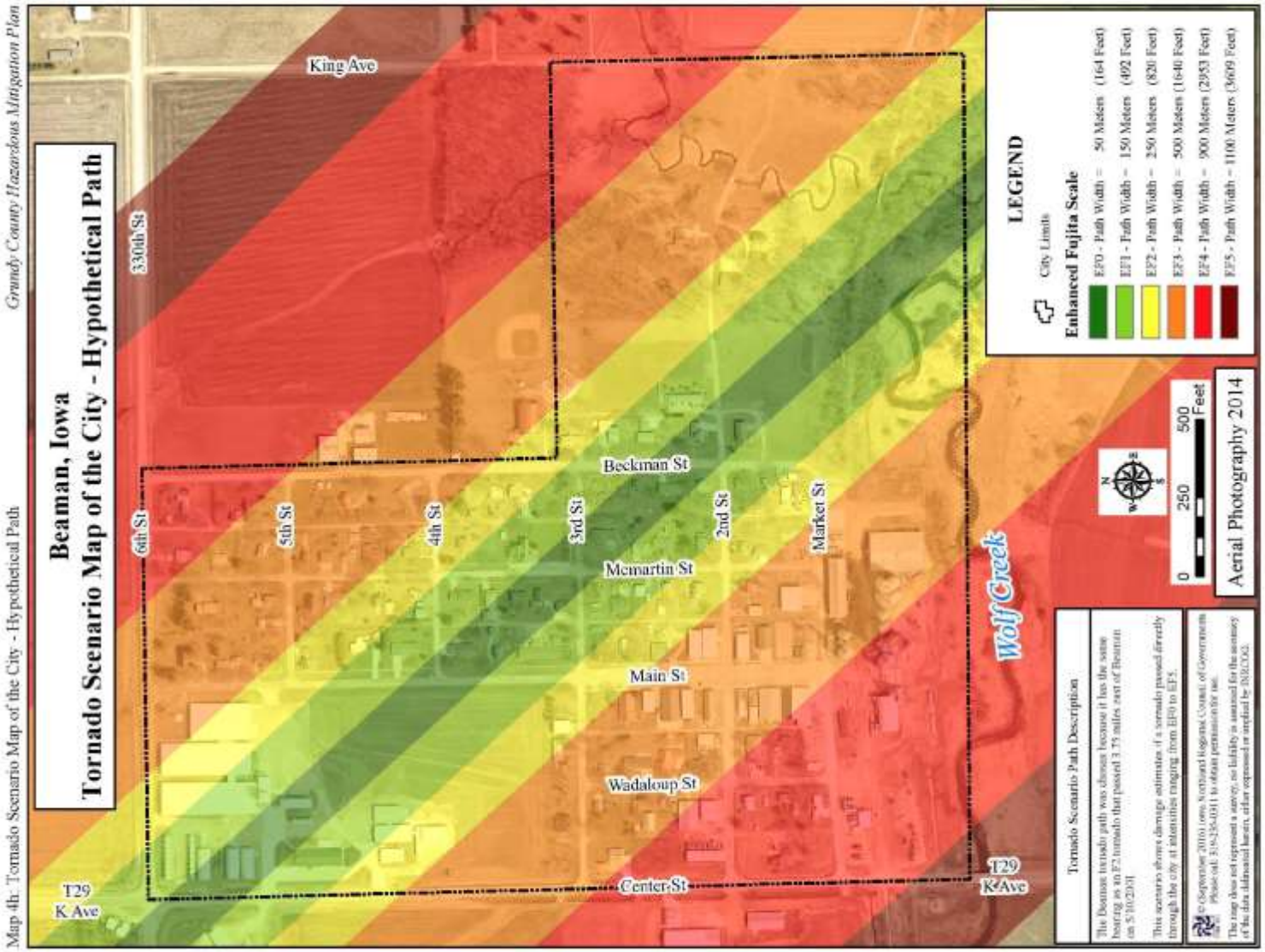

Grundy County, Iowa
Tornado Scenario Map - Affected Parcels
Black Hawk County
Butler County
Tama County
Tama County
Marshall County
Hardin County
Stout
Dike
Morrison
Reinbeck
Grundy Center
Holland
Wellsburg
Beaman
Conrad
LEGEND
Incorporated Areas
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet) - 533 Parcels Affected - 1.82% of County
EF1 - Path Width = 150 Meters (492 Feet) - 965 Parcels Affected - 2.96% of County
EF2 - Path Width = 250 Meters (820 Feet) - 1350 Parcels Affected - 8.59% of County
EF3 - Path Width = 500 Meters (1640 Feet) - 2335 Parcels Affected - 14.08% of County
EF4 - Path Width = 900 Meters (2953 Feet) - 3589 Parcels Affected - 44.00% of County
EF5 - Path Width = 1100 Meters (3609 Feet) - 3961 Parcels Affected - 49.69% of County
Tornado Scenario Path Description
The tornado scenario paths were chosen because they have a similar bearing to tornados that have occurred in the county.
This scenario shows damage estimates if tornados passed directly through the county at intensities ranging from EF0 to EF5.
Miles
Map 4c: Tornado Scenario Map of the County - Affected Parcels
Grundy County Hazardous Mitigation Plan

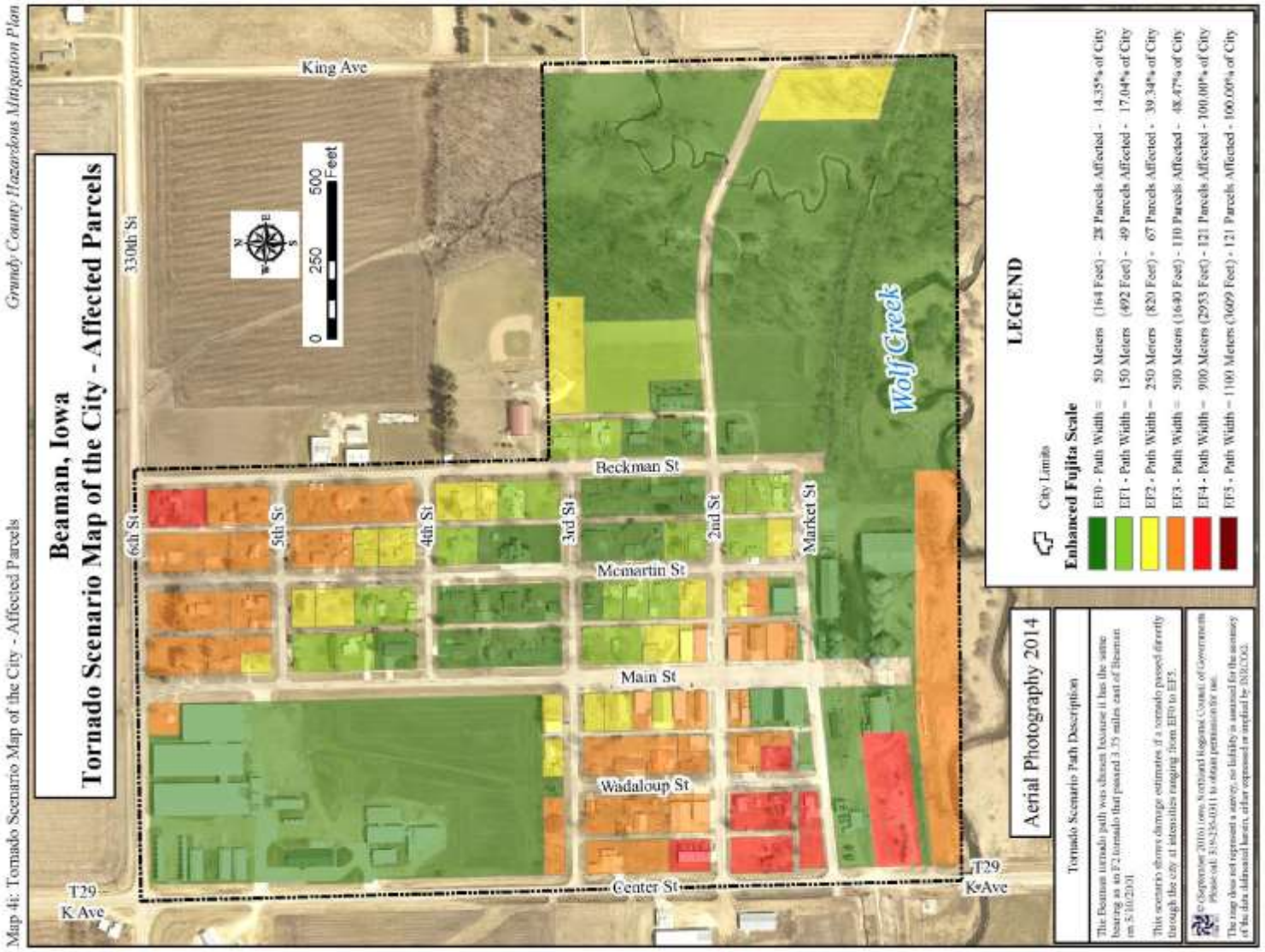

Grundy County, Iowa
Tornado Scenario Map - Hypothetical Paths (Incorporated Areas Only)
Map 4d: Tornado Scenario Map of the County - Hypothetical Paths
Grundy County Hazardous Mitigation Plan
Black Hawk County
Butler County
Tama County
Tama County
Marshall County
Hardin County
Stout
Dike
Morrison
Reinbeck
Holland
Grundy Center
Wellsburg
Beaman
Conrad
LEGEND
Incorporated Areas
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet)
EF1 - Path Width = 150 Meters (492 Feet)
EF2 - Path Width = 250 Meters (820 Feet)
EF3 - Path Width = 500 Meters (1640 Feet)
EF4 - Path Width = 900 Meters (2953 Feet)
EF5 - Path Width = 1100 Meters (3609 Feet)
Tornado Scenario Path Description
The tornado scenario paths were chosen because they have a similar bearing to tornadoes that have occurred in the county.
This scenario shows damage estimates if tornados passed directly through the county at intensities ranging from EF0 to EF5.
0 1 2 Miles


Grundy County Hazardous Mitigation Plan
Grundy County, Iowa
Tornado Scenario Map - Affected Parcels (Incorporated Areas Only)
Map 4e: Tornado Scenario Map of the County - Affected Parcels
Black Hawk County
Butler County
Tama County
Tama County
Marshall County
Hardin County
Stout
Dike
Reinbeck
Morrison
Grundy Center
Holland
Wellsburg
Beaman
Conrad
LEGEND
Incorporated Areas
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet) - 471 Parcels Affected - 2.84% of County
EF1 - Path Width = 150 Meters (492 Feet) - 887 Parcels Affected - 4.67% of County
EF2 - Path Width = 250 Meters (820 Feet) - 1256 Parcels Affected - 13.67% of County
EF3 - Path Width = 500 Meters (1640 Feet) - 2180 Parcels Affected - 22.35% of County
EF4 - Path Width = 900 Meters (2953 Feet) - 3363 Parcels Affected - 69.27% of County
EF5 - Path Width = 1100 Meters (3609 Feet) - 3695 Parcels Affected - 77.70% of County
Tornado Scenario Path Description
The tornado scenario paths were chosen because they have a similar bearing to tornados that have occurred in the county.
This scenario shows damage estimates if tornados passed directly through the county at intensities ranging from EF0 to EF5.
0 1 2 Miles


Grundy County Hazardous Mitigation Plan
Grundy County, Iowa
Tornado Scenario Map - Hypothetical Paths (Unincorporated Areas Only)
Map 4f: Tornado Scenario Map of the County - Hypothetical Paths
Black Hawk County
Butler County
Tama County
Tama County
Marshall County
Hardin County
Stout
Dike
Morrison
Reinbeck
Holland
Grundy Center
Wellsburg
Beaman
Conrad
LEGEND
Incorporated Areas
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet)
EF1 - Path Width = 150 Meters (492 Feet)
EF2 - Path Width = 250 Meters (820 Feet)
EF3 - Path Width = 500 Meters (1640 Feet)
EF4 - Path Width = 900 Meters (2953 Feet)
EF5 - Path Width = 1100 Meters (3609 Feet)
Tornado Scenario Path Description
The tornado scenario paths were chosen because they have a similar bearing to tornadoes that have occured in the county.
This scenario shows damage estimates if tornados passed directly through the county at intensities ranging from EF0 to EF5.
0 1 2 Miles


Grundy County, Iowa
Tornado Scenario Map - Affected Parcels (Unincorporated Areas Only)
Grundy County Hazardous Mitigation Plan
Map 4g: Tornado Scenario Map of the County - Affected Parcels
Black Hawk County
Butler County
Tama County
Tama County
Marshall County
Hardin County
Stout
Dike
Reinbeck
Morrison
Grundy Center
Holland
Wellsburg
Beaman
Conrad
LEGEND
Incorporated Areas
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet) - 62 Parcels Affected - 0.22% of County
EF1 - Path Width = 150 Meters (492 Feet) - 78 Parcels Affected - 0.28% of County
EF2 - Path Width = 250 Meters (820 Feet) - 94 Parcels Affected - 0.59% of County
EF3 - Path Width = 500 Meters (1640 Feet) - 155 Parcels Affected - 1.08% of County
EF4 - Path Width = 900 Meters (2953 Feet) - 226 Parcels Affected - 4.25% of County
EF5 - Path Width = 1100 Meters (3609 Feet) - 266 Parcels Affected - 5.65% of County
Miles
Tornado Scenario Path Description
The tornado scenario paths were chosen because they have a similar bearing to tornadoes that have occurred in the county.
This scenario shows damage estimates if tornados passed directly through the county at intensities ranging from EF0 to EF5.


Grundy County Hazardous Mitigation Plan
Beaman, Iowa
Tornado Scenario Map of the City - Hypothetical Path
King Ave
330th St
6th St
5th St
4th St
3rd St
2nd St
Market St
Beckman St
Mcmartin St
Main St
Wadaloup St
Center St
T29
K Ave
Wolf Creek
LEGEND
City Limits
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet)
EF1 - Path Width = 150 Meters (492 Feet)
EF2 - Path Width = 250 Meters (820 Feet)
EF3 - Path Width = 500 Meters (1640 Feet)
EF4 - Path Width = 900 Meters (2953 Feet)
EF5 - Path Width = 1100 Meters (3609 Feet)
0 250 500 Feet
Aerial Photography 2014
Tornado Scenario Path Description
Map 4h: Tornado Scenario Map of the City - Hypothetical Path


Grundy County Hazardous Mitigation Plan
Map 4i: Tornado Scenario Map of the City - Affected Parcels
Beaman, Iowa
Tornado Scenario Map of the City - Affected Parcels
King Ave
330th St
6th St
5th St
4th St
3rd St
2nd St
Market St
Beckman St
Mcmartin St
Main St
Wadaloup St
Center St
T29
K Ave
Wolf Creek
0
250
500
Feet
LEGEND
City Limits
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet) - 28 Parcels Affected - 14.35% of City
EF1 - Path Width = 150 Meters (492 Feet) - 49 Parcels Affected - 17.04% of City
EF2 - Path Width = 250 Meters (820 Feet) - 67 Parcels Affected - 39.34% of City
EF3 - Path Width = 500 Meters (1640 Feet) - 110 Parcels Affected - 48.47% of City
EF4 - Path Width = 900 Meters (2953 Feet) - 121 Parcels Affected - 100.00% of City
EF5 - Path Width = 1100 Meters (3609 Feet) - 121 Parcels Affected - 100.00% of City
Aerial Photography 2014
Tornado Scenario Path Description
The Beaman tornado path was chosen because it has the same bearing as an F2 tornado that passed 3.35 miles east of Beaman on 5/10/2001
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.
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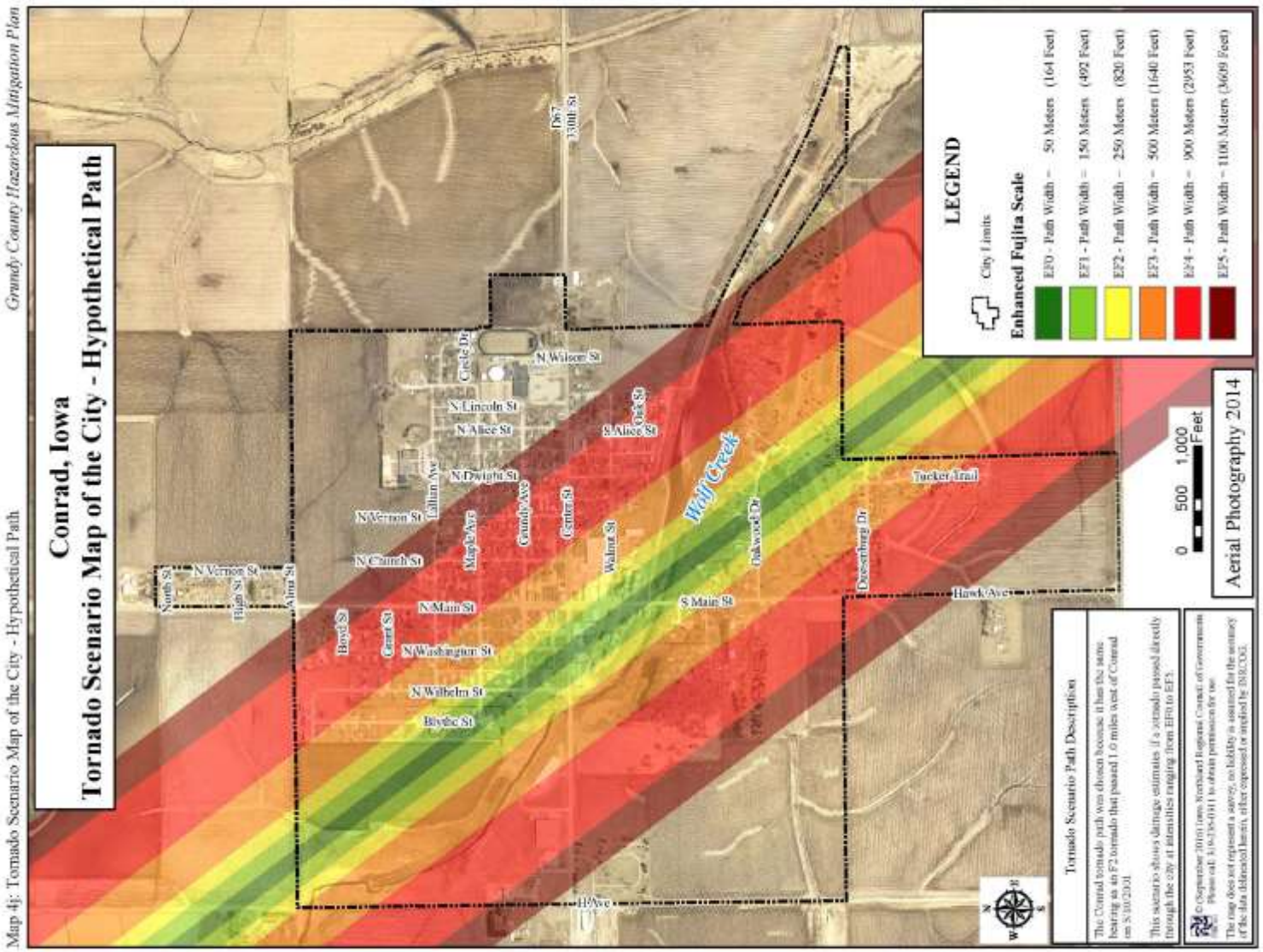
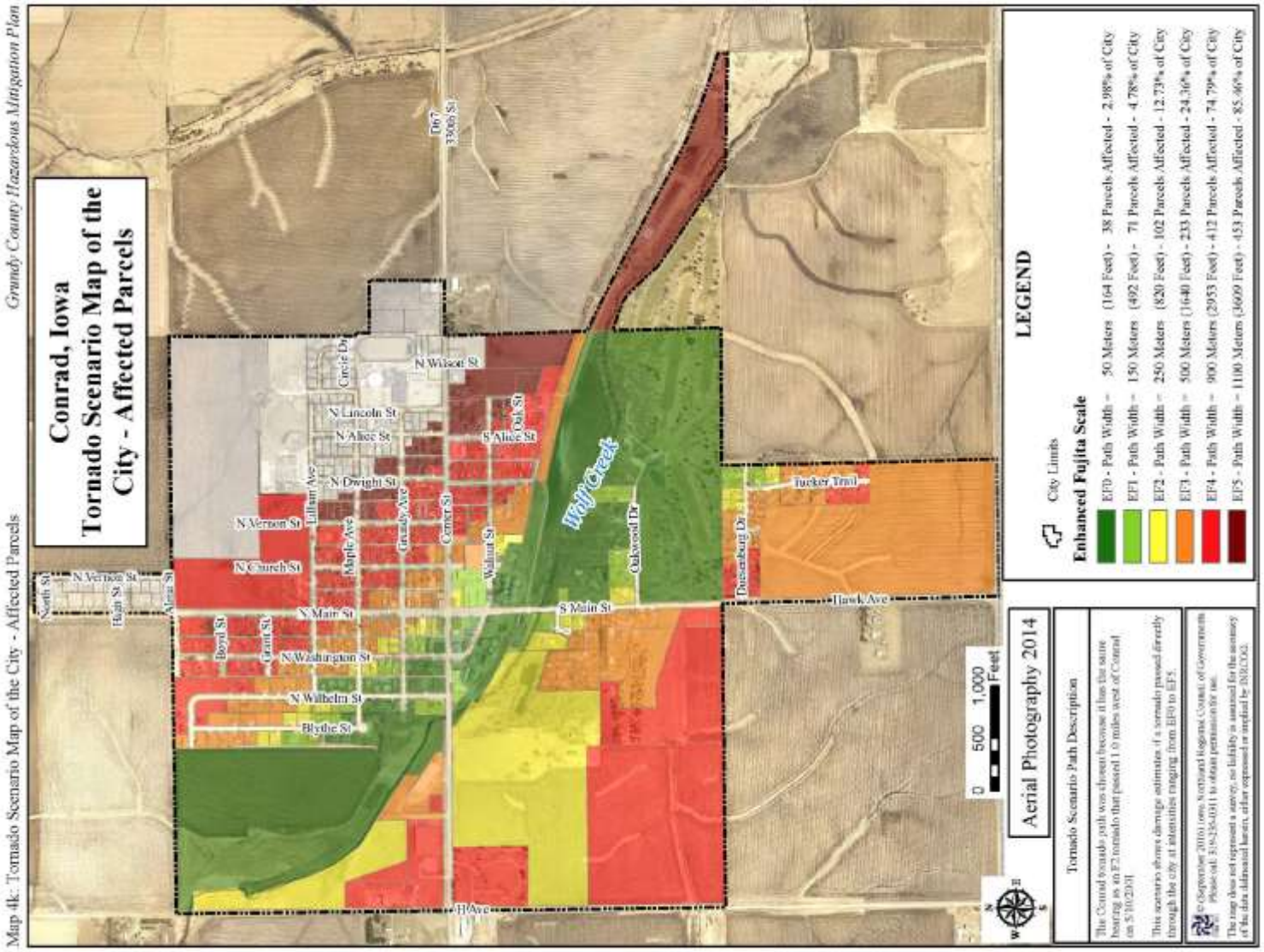
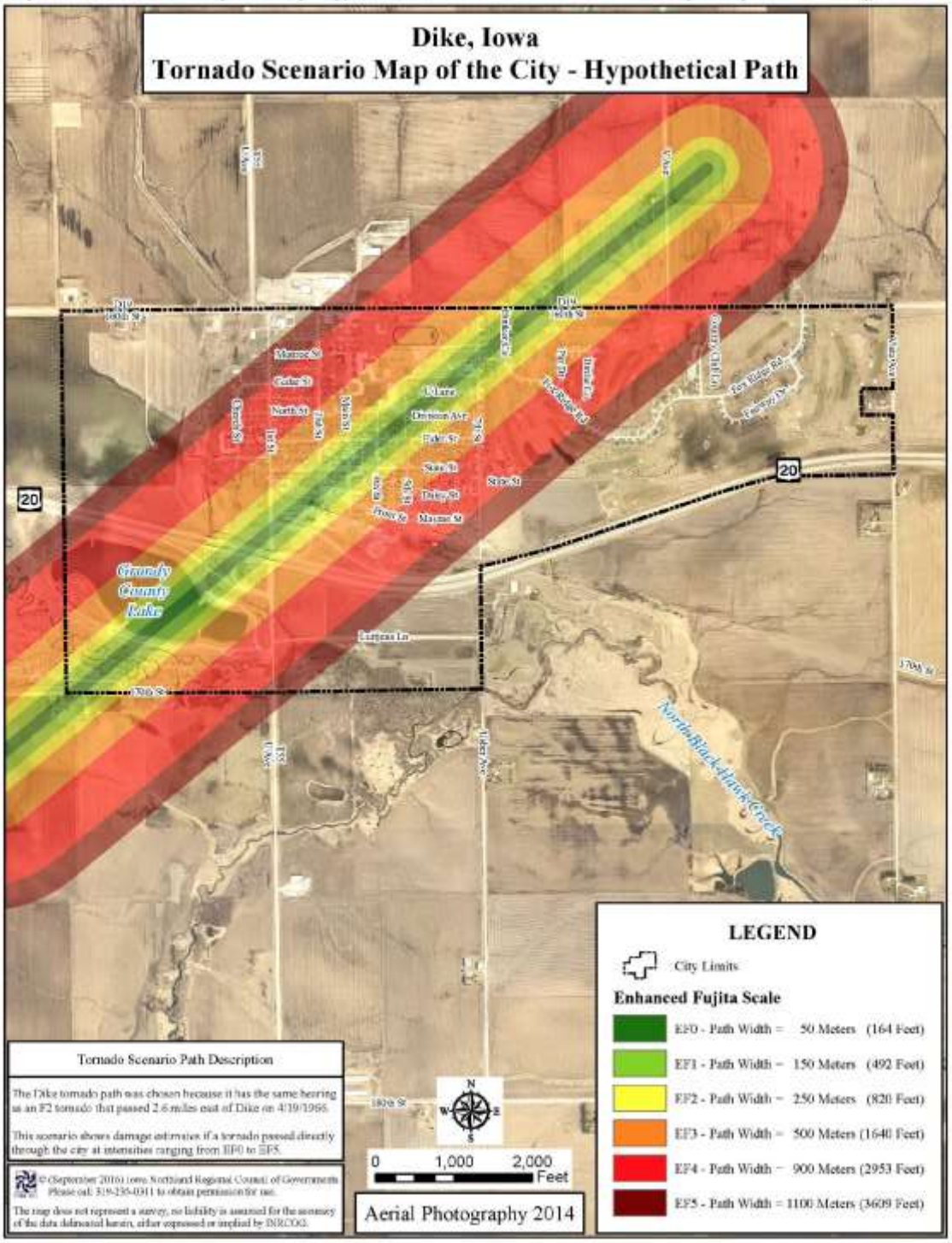
The map does not represent a survey; no liability is assumed for the accuracy of the data delineated hereon, either expressed or implied by NRCOG.

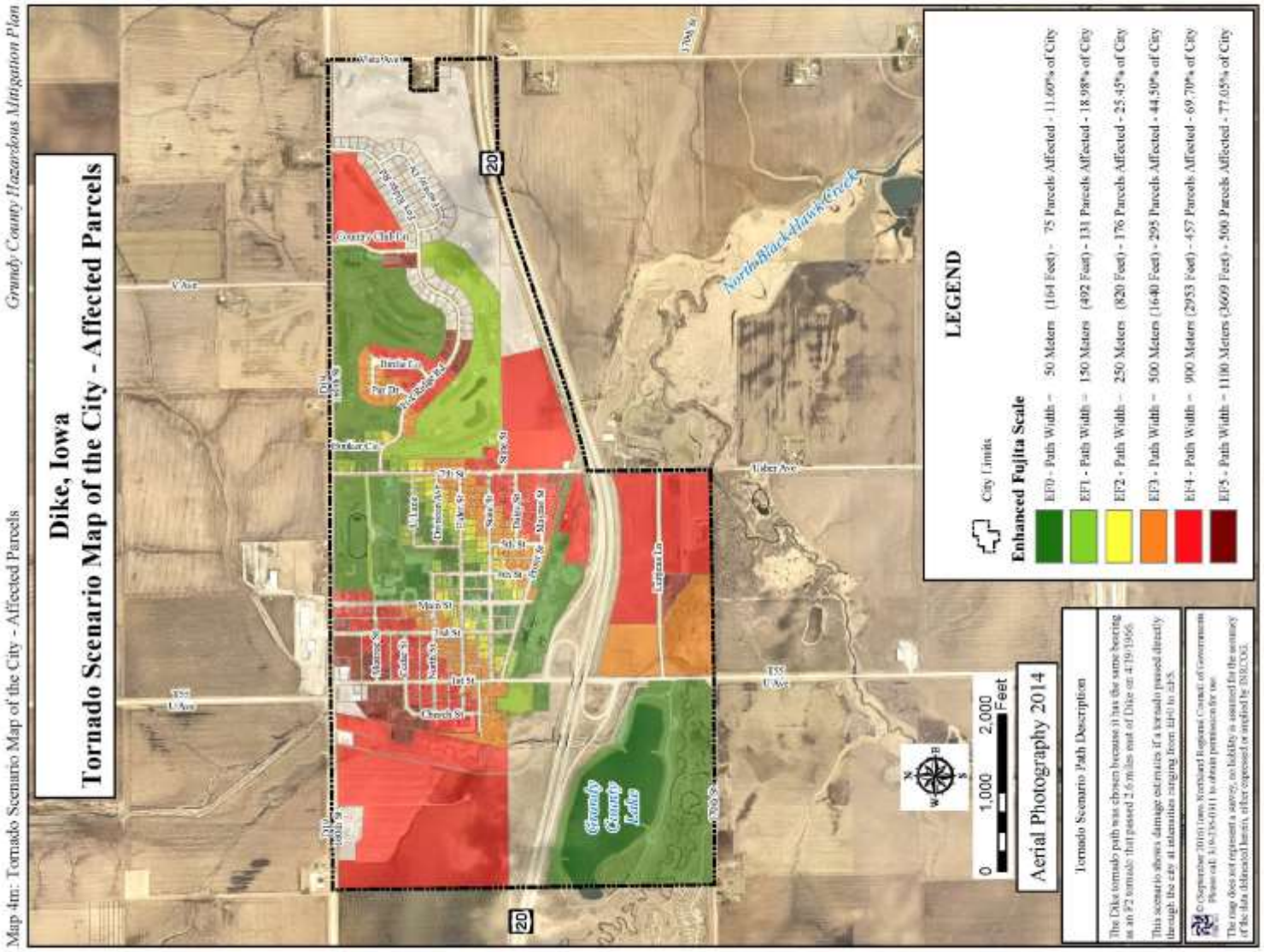

Grundy County Hazardous Mitigation Plan
Map 4j: Tornado Scenario Map of the City - Hypothetical Path
Conrad, Iowa
Tornado Scenario Map of the City - Hypothetical Path
LEGEND
City Limits
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet)
EF1 - Path Width = 150 Meters (492 Feet)
EF2 - Path Width = 250 Meters (820 Feet)
EF3 - Path Width = 500 Meters (1640 Feet)
EF4 - Path Width = 900 Meters (2953 Feet)
EF5 - Path Width = 1100 Meters (3609 Feet)
0 500 1,000 Feet
Aerial Photography 2014
Tornado Scenario Path Description
The Conrad tornado path was chosen because it has the same bearing as an F2 tornado that passed 1.6 miles west of Conrad on 5/30/2001
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.
Wolf Creek
N Vernon St
N Church St
N Main St
N Washington St
N Wilhelm St
Blythe St
S Main St
Hawk Ave
Tucker Trail
Deerenberg Dr
Oakwood Dr
Walnut St
Center St
Grundy Ave
Maple Ave
Lillian Ave
N Dwight St
N Alice St
N Lincoln St
N Wilson St
Circle Dr
S Alice St
S Oak St
D67
330th St
North St
High St
Alma St
Boyd St
Grant St


Grundy County Hazardous Mitigation Plan
Map 4k: Tornado Scenario Map of the City - Affected Parcels
Conrad, Iowa
Tornado Scenario Map of the City - Affected Parcels
LEGEND
City Limits
Enhanced Fujita Scale
EF0 - Path Width - 50 Meters (164 Feet) - 38 Parcels Affected - 2.98% of City
EF1 - Path Width - 150 Meters (492 Feet) - 71 Parcels Affected - 4.78% of City
EF2 - Path Width - 250 Meters (820 Feet) - 102 Parcels Affected - 12.73% of City
EF3 - Path Width - 500 Meters (1640 Feet) - 233 Parcels Affected - 24.36% of City
EF4 - Path Width - 900 Meters (2953 Feet) - 412 Parcels Affected - 74.79% of City
EF5 - Path Width - 1100 Meters (3609 Feet) - 453 Parcels Affected - 85.96% of City
Aerial Photography 2014
Tornado Scenario Path Description
The Conrad tornado path was chosen because it has the same bearing as an F2 tornado that passed 1.0 miles west of Conrad on 5/30/2001
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.
0 500 1,000 Feet
N
W
E
S
Hall Creek
N Vernon St
N Church St
N Main St
N Washington St
N Wilhelm St
Blythe St
H Ave
S Main St
Hawk Ave
Tucker Trail
N Lincoln St
N Alice St
N Dwight St
S Alice St
N Wilcox St
Circle Dr
Lillian Ave
Maple Ave
Grundy Ave
Center St
Walnut St
Oak St
Oakwood Dr
Duesenberg Dr
Boyd St
Grant St
North St
Holt St
Alice St
Dir7
330th St

Map 4L: Tornado Scenario Map of the City - Hypothetical Path

Grundy County Hazardous Mitigation Plan




Map 4m: Tornado Scenario Map of the City - Affected Parcels
Grundy County Hazardous Mitigation Plan
Dike, Iowa
Tornado Scenario Map of the City - Affected Parcels
LEGEND
City Limits
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet) - 75 Parcels Affected - 11.60% of City
EF1 - Path Width = 150 Meters (492 Feet) - 131 Parcels Affected - 18.98% of City
EF2 - Path Width = 250 Meters (820 Feet) - 176 Parcels Affected - 25.45% of City
EF3 - Path Width = 500 Meters (1640 Feet) - 295 Parcels Affected - 44.50% of City
EF4 - Path Width = 900 Meters (2953 Feet) - 457 Parcels Affected - 69.70% of City
EF5 - Path Width = 1100 Meters (3609 Feet) - 500 Parcels Affected - 77.05% of City
North Black Hawk Creek
Grundy County Lake
0 1,000 2,000 Feet
Aerial Photography 2014
Tornado Scenario Path Description
The Dike tornado path was chosen because it has the same bearing as an F2 tornado that passed 2.6 miles east of Dike on 4/19/1966.
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.
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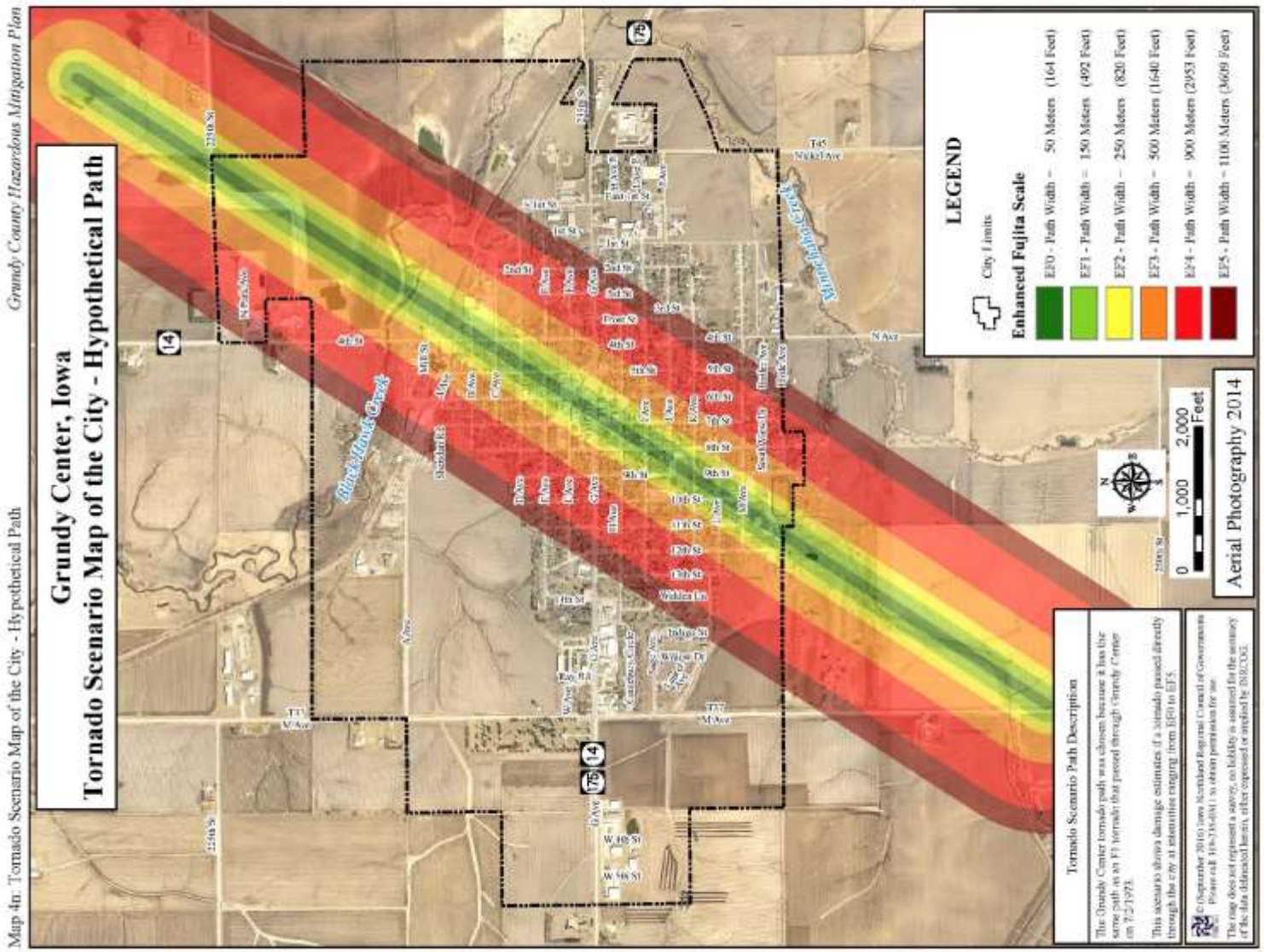
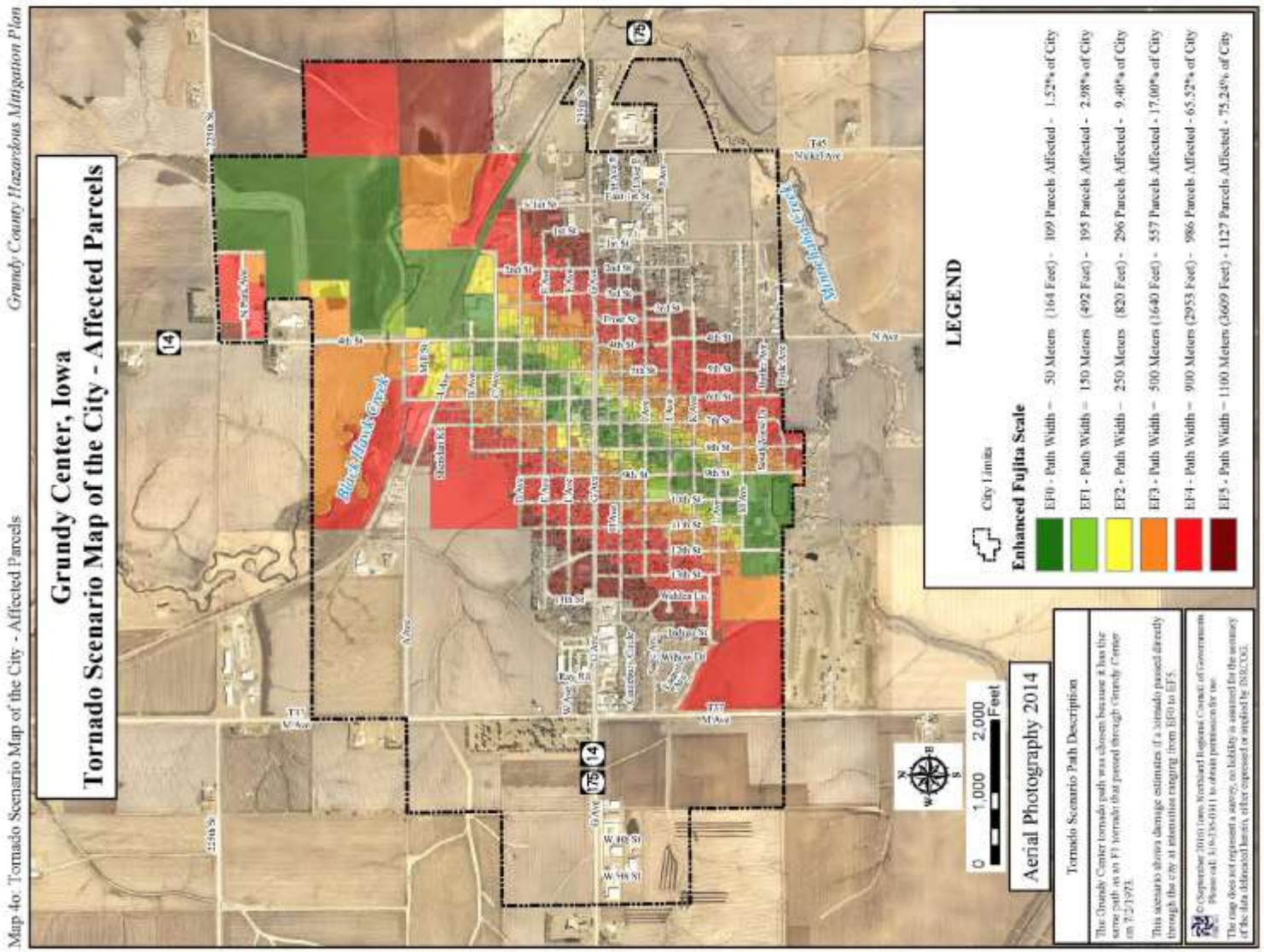
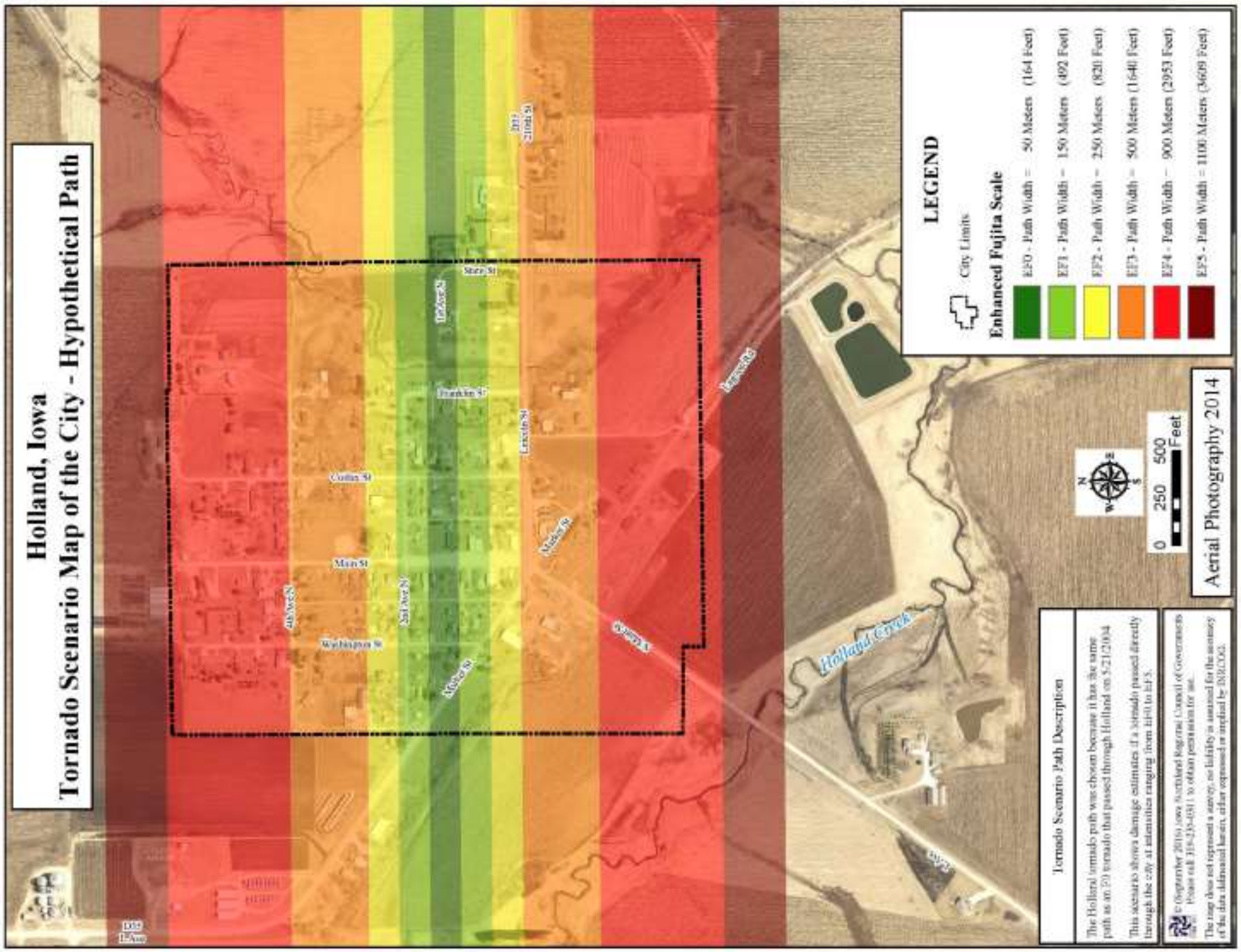
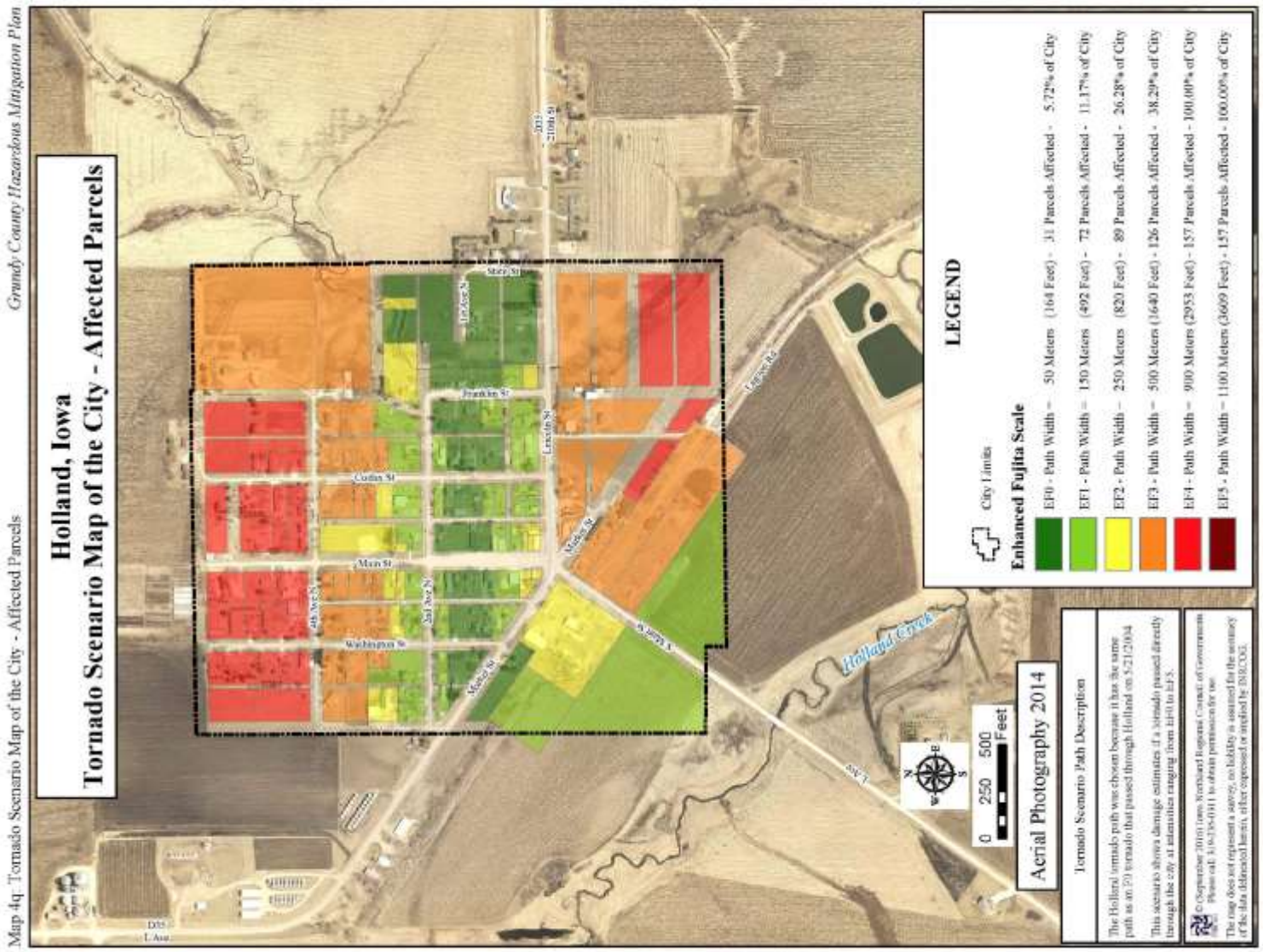

Grundy County Hazardous Mitigation Plan
Grundy Center, Iowa
Tornado Scenario Map of the City - Hypothetical Path
LEGEND
City Limits
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet)
EF1 - Path Width = 150 Meters (492 Feet)
EF2 - Path Width = 250 Meters (820 Feet)
EF3 - Path Width = 500 Meters (1640 Feet)
EF4 - Path Width = 900 Meters (2953 Feet)
EF5 - Path Width = 1100 Meters (3609 Feet)
Tornado Scenario Path Description
The Grundy Center tornado path was chosen because it has the same path as an F5 tornado that passed through Grundy Center on 7/21/1924.
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.
0 1,000 2,000 Feet
Aerial Photography 2014
Rock Creek
Middle Beaver Creek
Map 4n: Tornado Scenario Map of the City - Hypothetical Path

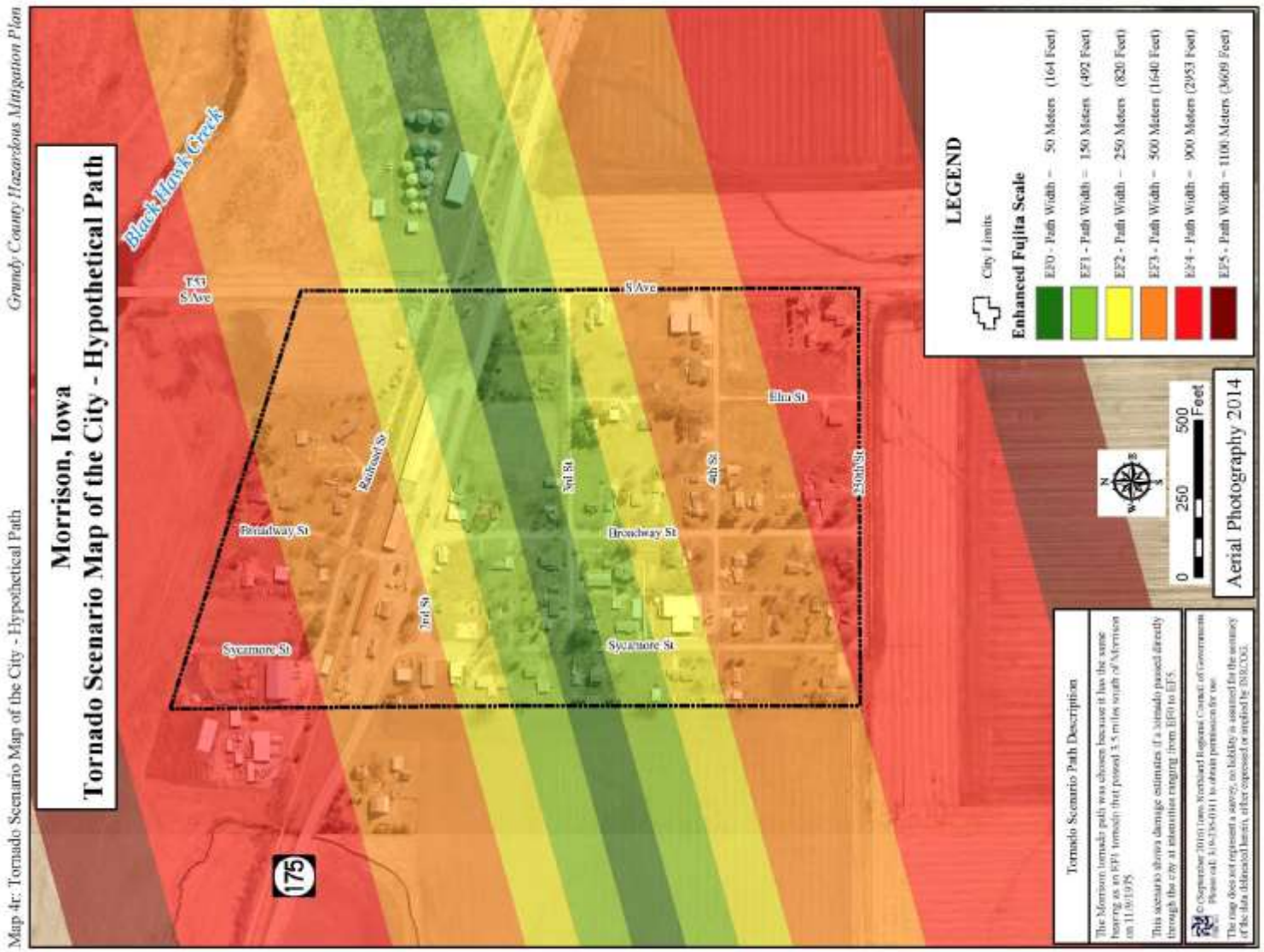

Grundy County Hazardous Mitigation Plan
Map 4o: Tornado Scenario Map of the City - Affected Parcels
Grundy Center, Iowa
Tornado Scenario Map of the City - Affected Parcels
LEGEND
City Limits
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet) - 109 Parcels Affected - 1.52% of City
EF1 - Path Width = 150 Meters (492 Feet) - 195 Parcels Affected - 2.98% of City
EF2 - Path Width = 250 Meters (820 Feet) - 296 Parcels Affected - 9.40% of City
EF3 - Path Width = 500 Meters (1640 Feet) - 537 Parcels Affected - 17.00% of City
EF4 - Path Width = 900 Meters (2953 Feet) - 986 Parcels Affected - 65.52% of City
EF5 - Path Width = 1100 Meters (3609 Feet) - 1127 Parcels Affected - 75.24% of City
0 1,000 2,000 Feet
Aerial Photography 2014
Tornado Scenario Path Description
The Grundy Center tornado path was chosen because it has the same path as an F3 tornado that passed through Grundy Center on 7/27/1973.
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.
Black Hawk Creek
Middle Beaver Creek

Map 4p: Tornado Scenario Map of the City - Hypothetical Path

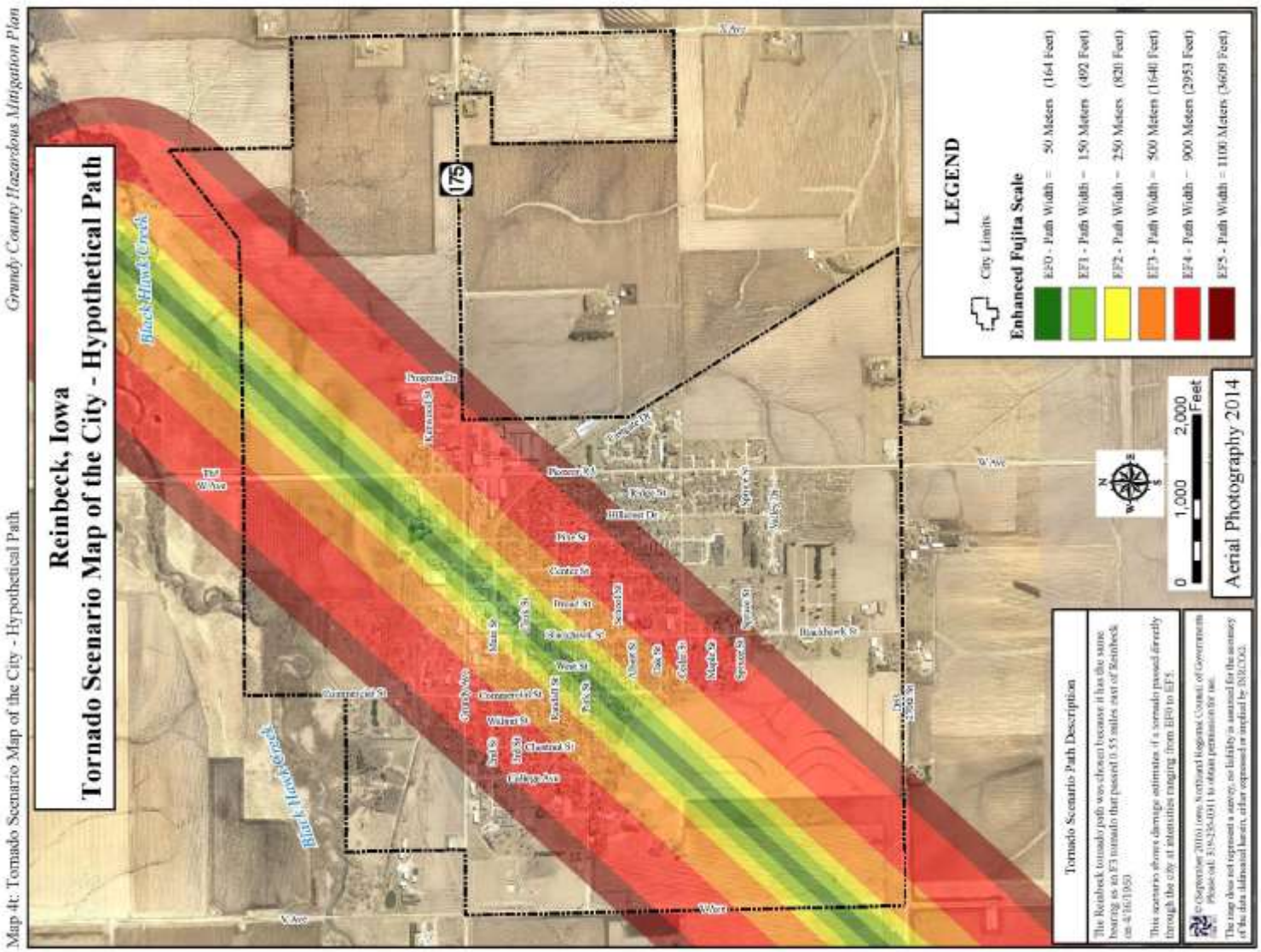
Grundy County Hazardous Mitigation Plan

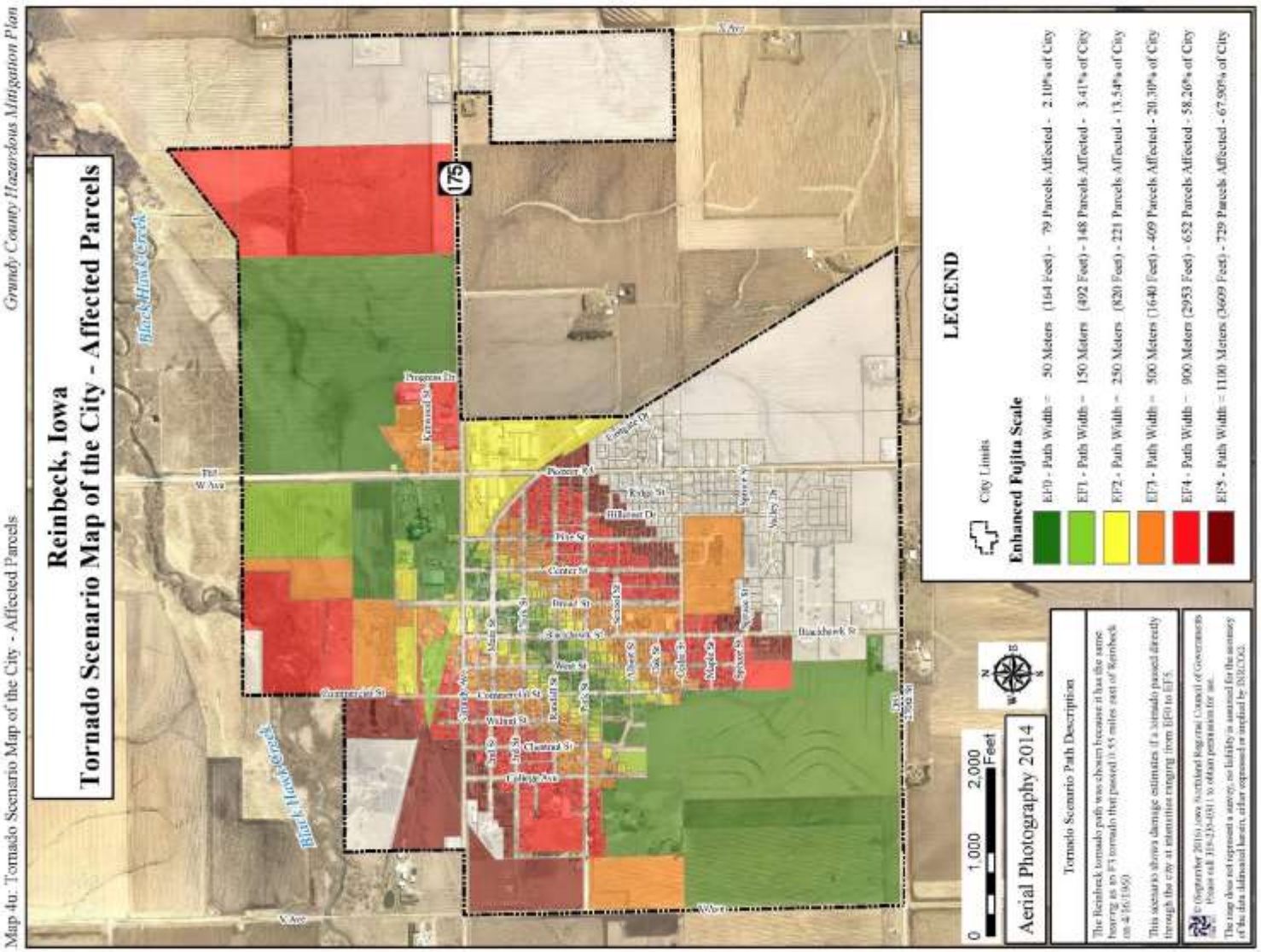

Holland, Iowa
Tornado Scenario Map of the City - Hypothetical Path
LEGEND
City Limits
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet)
EF1 - Path Width = 150 Meters (492 Feet)
EF2 - Path Width = 250 Meters (820 Feet)
EF3 - Path Width = 500 Meters (1640 Feet)
EF4 - Path Width = 900 Meters (2953 Feet)
EF5 - Path Width = 1100 Meters (3609 Feet)
0 250 500
Feet
Aerial Photography 2014
Tornado Scenario Path Description
Holland Creek
State St
Franklin St
Lincoln St
Colfax St
Main St
Washington St
Market St
Madison St
2nd Ave N
4th Ave N

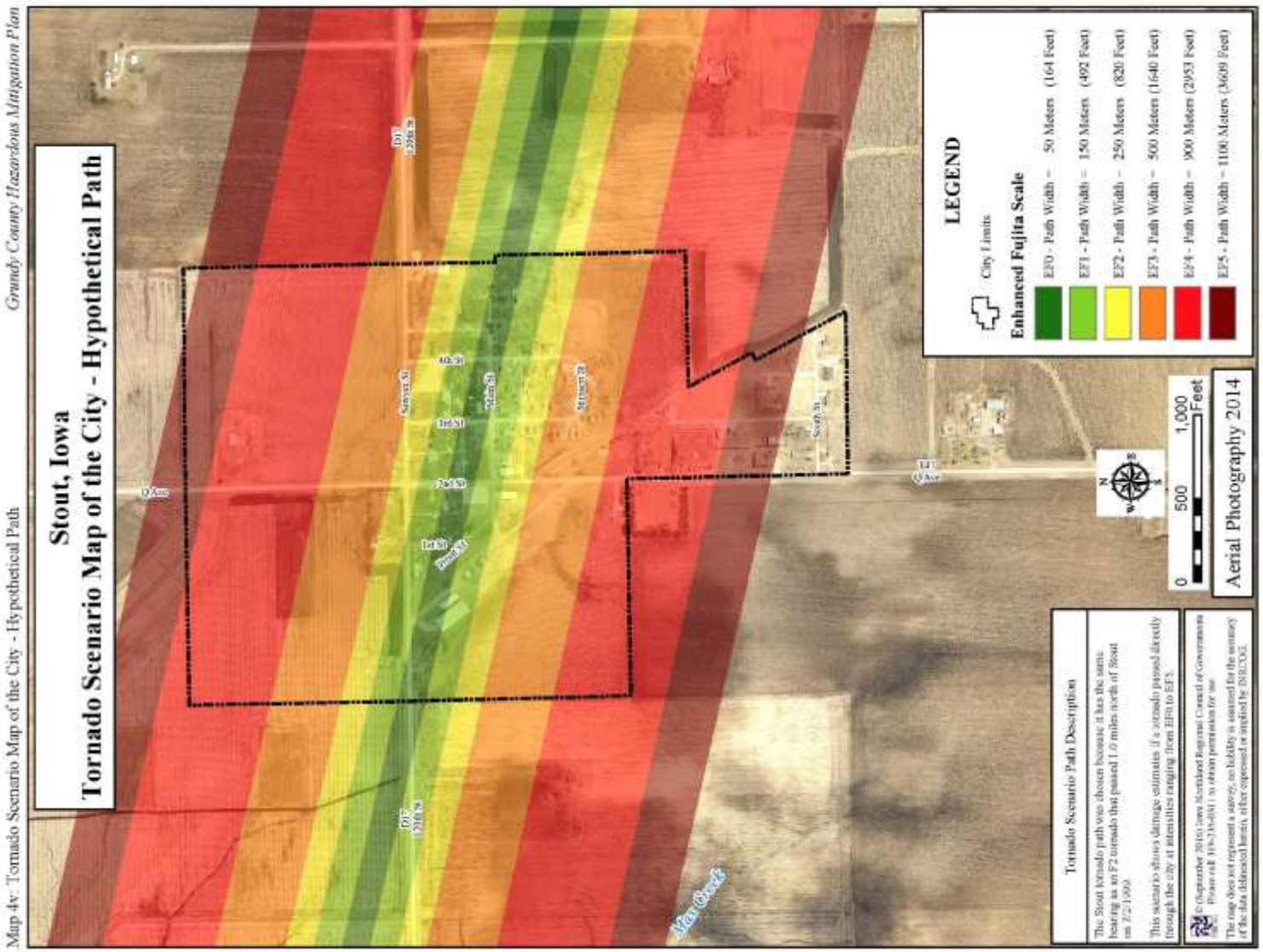

Map 4q: Tornado Scenario Map of the City - Affected Parcels
Grundy County Hazardous Mitigation Plan
Holland, Iowa
Tornado Scenario Map of the City - Affected Parcels
LEGEND
City Limits
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet) - 31 Parcels Affected - 5.72% of City
EF1 - Path Width = 150 Meters (492 Feet) - 72 Parcels Affected - 11.17% of City
EF2 - Path Width = 250 Meters (820 Feet) - 89 Parcels Affected - 26.28% of City
EF3 - Path Width = 500 Meters (1640 Feet) - 126 Parcels Affected - 38.29% of City
EF4 - Path Width = 900 Meters (2953 Feet) - 157 Parcels Affected - 100.00% of City
EF5 - Path Width = 1100 Meters (3609 Feet) - 157 Parcels Affected - 100.00% of City
Aerial Photography 2014
0 250 500 Feet
Tornado Scenario Path Description
The Holland tornado path was chosen because it has the same path as an EF3 tornado that passed through Holland on 5/21/2004
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.
Holland Creek
Main St
Washington St
Maple St
Cedar St
Franklin St
Lincoln St
Logan Rd
Story St
210th St
D55
L Ave.

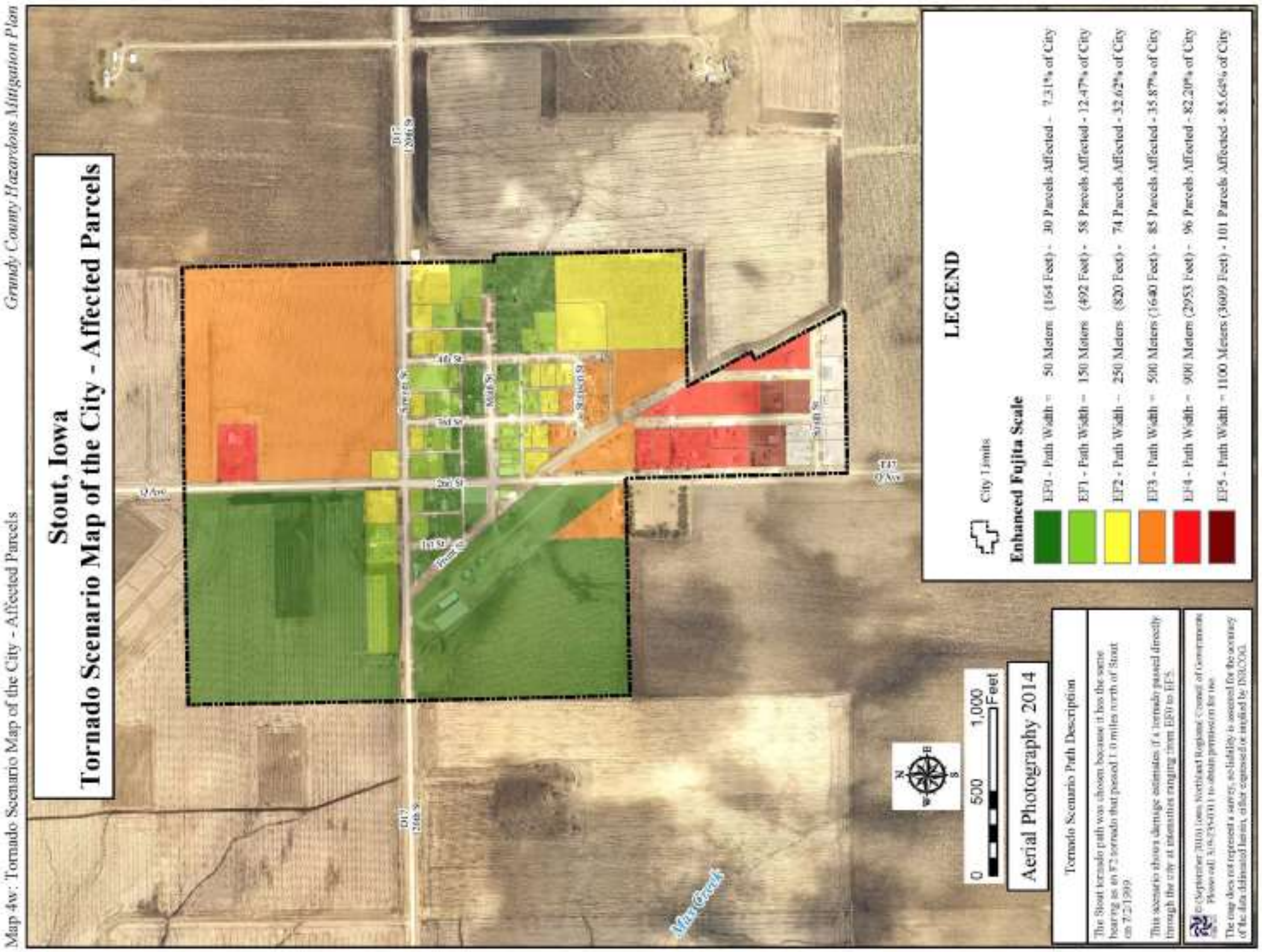

Grundy County Hazardous Mitigation Plan
Map 4r: Tornado Scenario Map of the City - Hypothetical Path
Morrison, Iowa
Tornado Scenario Map of the City - Hypothetical Path
Black Hawk Creek
T57
S Ave
S Ave
Railroad St
Broadway St
Sycamore St
3rd St
4th St
Elm St
250th St
175
LEGEND
City Limits
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet)
EF1 - Path Width = 150 Meters (492 Feet)
EF2 - Path Width = 250 Meters (820 Feet)
EF3 - Path Width = 500 Meters (1640 Feet)
EF4 - Path Width = 900 Meters (2953 Feet)
EF5 - Path Width = 1100 Meters (3609 Feet)
0 250 500 Feet
Aerial Photography 2014
Tornado Scenario Path Description
The Morrison tornado path was chosen because it has the same bearing as an EF5 tornado that passed 4.5 miles south of Morrison on 11/10/1905.
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.


Map 4s: Tornado Scenario Map of the City - Affected Parcels
Grundy County Hazardous Mitigation Plan
Morrison, Iowa
Tornado Scenario Map of the City - Affected Parcels
Black Hawk Creek
T53
S Ave
Railroad St
Broadway St
Sycamore St
2nd St
3rd St
4th St
Elm St
175
LEGEND
City Limits
Enhanced Fujita Scale
EF0 - Path Width - 50 Meters (164 Feet) - 16 Parcels Affected - 5.09% of City
EF1 - Path Width - 150 Meters (492 Feet) - 31 Parcels Affected - 9.30% of City
EF2 - Path Width - 250 Meters (820 Feet) - 43 Parcels Affected - 24.80% of City
EF3 - Path Width - 500 Meters (1640 Feet) - 71 Parcels Affected - 42.60% of City
EF4 - Path Width - 900 Meters (2953 Feet) - 80 Parcels Affected - 100.00% of City
EF5 - Path Width - 1100 Meters (3609 Feet) - 80 Parcels Affected - 100.00% of City
0 250 500
Feet
Aerial Photography 2014
Tornado Scenario Path Description


Grundy County Hazardous Mitigation Plan
Map 4t: Tornado Scenario Map of the City - Hypothetical Path
Reinbeck, Iowa
Tornado Scenario Map of the City - Hypothetical Path
LEGEND
City Limits
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet)
EF1 - Path Width = 150 Meters (492 Feet)
EF2 - Path Width = 250 Meters (820 Feet)
EF3 - Path Width = 500 Meters (1640 Feet)
EF4 - Path Width = 900 Meters (2953 Feet)
EF5 - Path Width = 1100 Meters (3609 Feet)
Tornado Scenario Path Description
The Reinbeck tornado path was chosen because it has the same bearing as an F3 tornado that passed 0.55 miles east of Reinbeck on 4/26/1950.
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.
0 1,000 2,000 Feet
Aerial Photography 2014
Black Hawk Creek
175
W Ave
Progress Dr
Kimball St
Commercial St
Pioneer St
Hillcrest Dr
Pete St
Center St
Broad St
Blackhawk St
Wilmot St
Chestnut St
Ridge Ave
Cedar St
Maple St
Spruce St
School St
Park St
Main St
Oak St
Walnut St
Randall St
West St
Elm St
Valley Dr


Map 4u: Tornado Scenario Map of the City - Affected Parcels
Grundy County Hazardous Mitigation Plan
Reinbeck, Iowa
Tornado Scenario Map of the City - Affected Parcels
LEGEND
City Limits
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet) - 79 Parcels Affected - 2.10% of City
EF1 - Path Width = 150 Meters (492 Feet) - 148 Parcels Affected - 3.41% of City
EF2 - Path Width = 250 Meters (820 Feet) - 221 Parcels Affected - 13.54% of City
EF3 - Path Width = 500 Meters (1640 Feet) - 469 Parcels Affected - 20.30% of City
EF4 - Path Width = 900 Meters (2953 Feet) - 652 Parcels Affected - 58.26% of City
EF5 - Path Width = 1100 Meters (3609 Feet) - 729 Parcels Affected - 67.90% of City
0 1,000 2,000 Feet
Aerial Photography 2014
Tornado Scenario Path Description
The Reinbeck tornado path was chosen because it has the same bearing as an F3 tornado that passed 0.45 miles east of Reinbeck on 4/26/1969.
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.
Black Hawk Creek
175
W Ave
Progress Dr
Kimmel St
Commercial St
Center St
Broad St
Second St
Blackhawk St
Wilmot St
Chestnut St
Ridge St
Pioneer St
Hillcrest Dr
Valley Dr
Spruce St
Maple St
Cedar St
Oak St
Elm St
Walnut St
Locust St
Ash St
Linden Ave


Map 4v: Tornado Scenario Map of the City - Hypothetical Path
Grundy County Hazardous Mitigation Plan
Stout, Iowa
Tornado Scenario Map of the City - Hypothetical Path
LEGEND
City Limits
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet)
EF1 - Path Width = 150 Meters (492 Feet)
EF2 - Path Width = 250 Meters (820 Feet)
EF3 - Path Width = 500 Meters (1640 Feet)
EF4 - Path Width = 900 Meters (2953 Feet)
EF5 - Path Width = 1100 Meters (3609 Feet)
Tornado Scenario Path Description
The Stout tornado path was chosen because it has the same bearing as an F2 tornado that passed 1.0 miles north of Stout on 7/27/1960.
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.
0 500 1,000 Feet
Aerial Photography 2014
Van Cleek


Map 4w: Tornado Scenario Map of the City - Affected Parcels
Grundy County Hazardous Mitigation Plan
Stout, Iowa
Tornado Scenario Map of the City - Affected Parcels
LEGEND
City Limits
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet) - 30 Parcels Affected - 7.31% of City
EF1 - Path Width = 150 Meters (492 Feet) - 58 Parcels Affected - 12.47% of City
EF2 - Path Width = 250 Meters (820 Feet) - 74 Parcels Affected - 32.62% of City
EF3 - Path Width = 500 Meters (1640 Feet) - 85 Parcels Affected - 35.87% of City
EF4 - Path Width = 900 Meters (2953 Feet) - 96 Parcels Affected - 82.20% of City
EF5 - Path Width = 1100 Meters (3609 Feet) - 101 Parcels Affected - 85.64% of City
0 500 1,000 Feet
Aerial Photography 2014
Tornado Scenario Path Description
The Stout tornado path was chosen because it has the same bearing as an F2 tornado that passed 1.0 miles north of Stout on 7/2/1999.
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.
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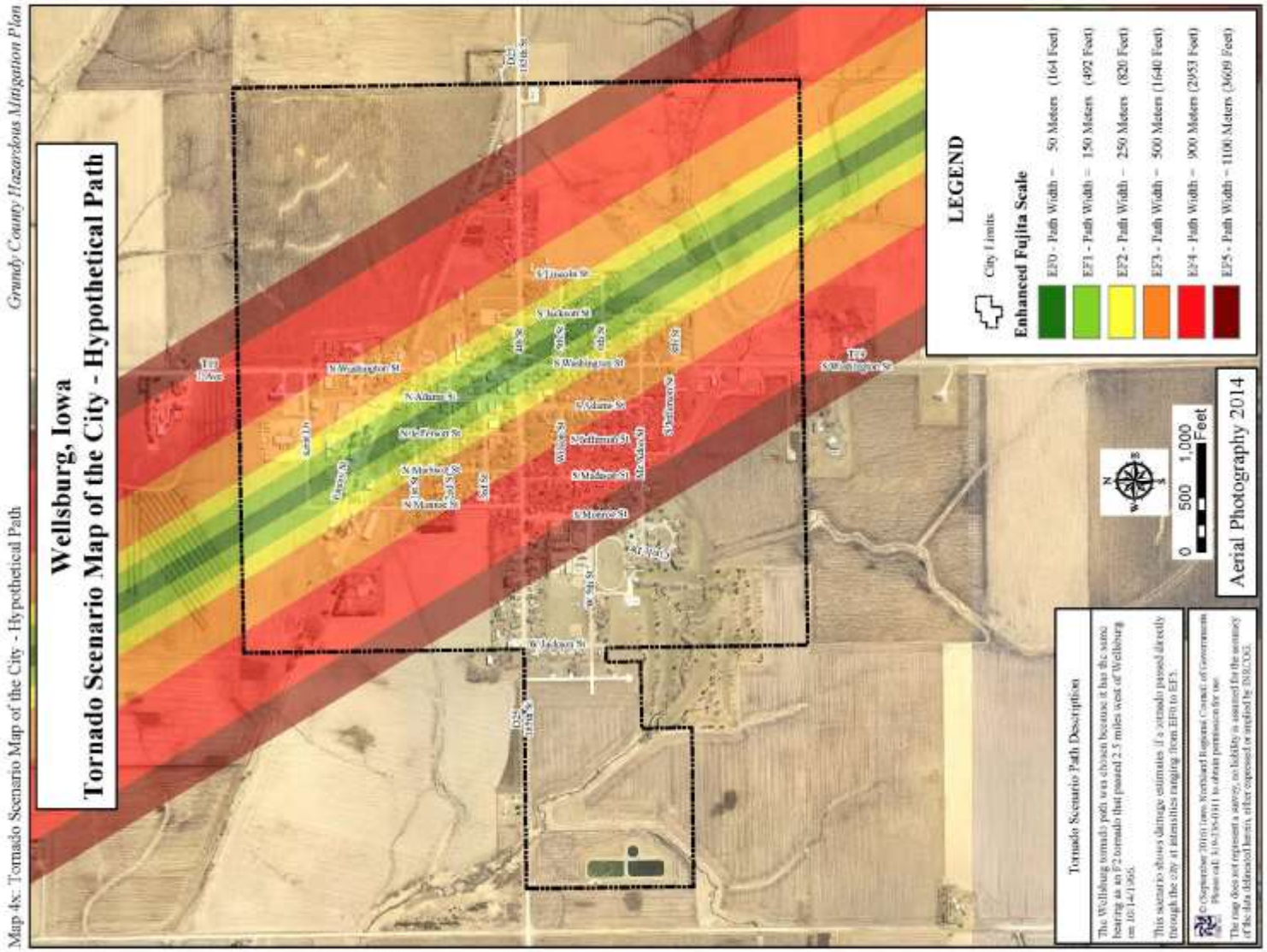
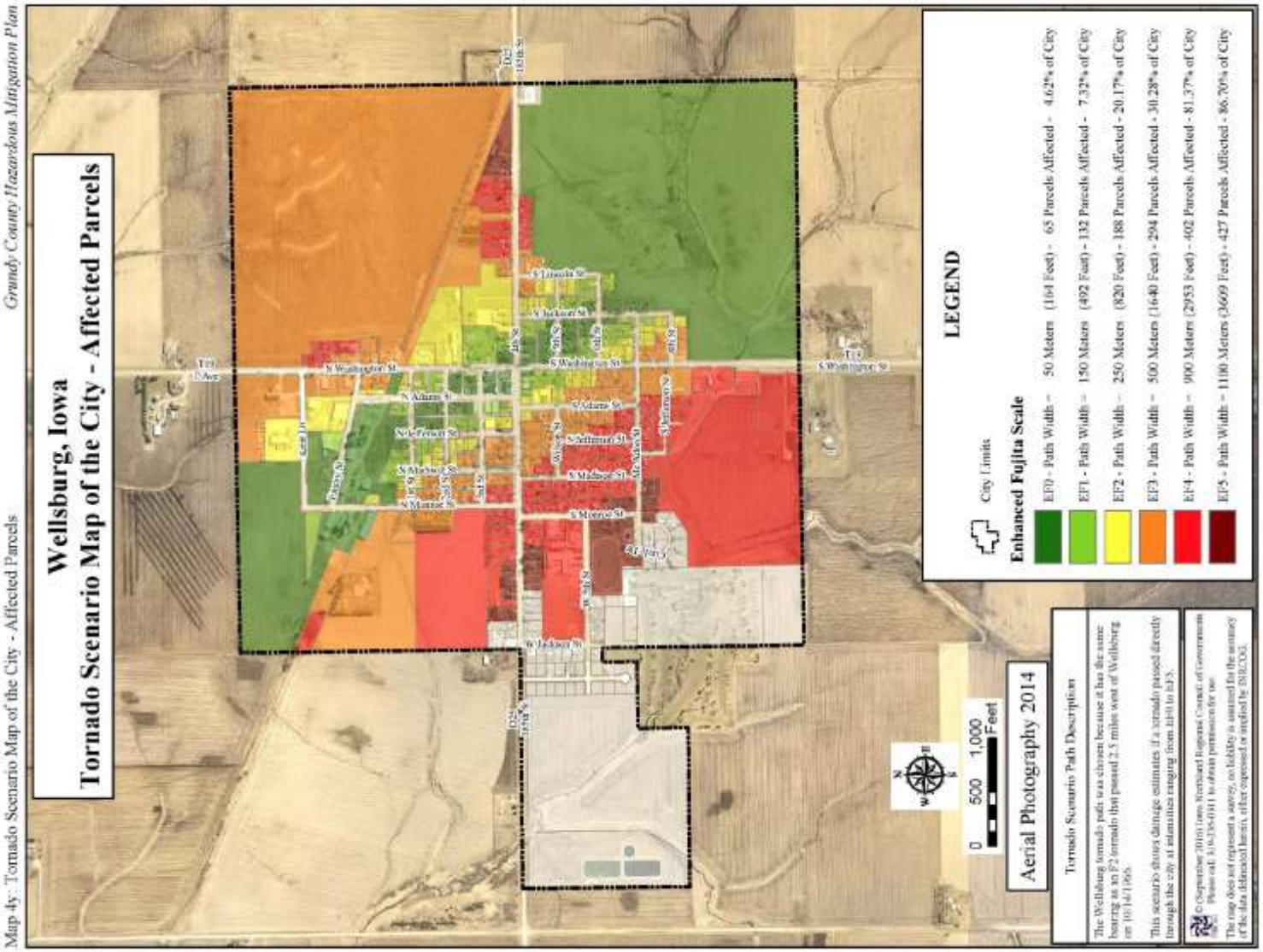

Map 4x: Tornado Scenario Map of the City - Hypothetical Path
Grundy County Hazardous Mitigation Plan
Wellsburg, Iowa
Tornado Scenario Map of the City - Hypothetical Path
LEGEND
City Limits
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet)
EF1 - Path Width = 150 Meters (492 Feet)
EF2 - Path Width = 250 Meters (820 Feet)
EF3 - Path Width = 500 Meters (1640 Feet)
EF4 - Path Width = 900 Meters (2953 Feet)
EF5 - Path Width = 1100 Meters (3609 Feet)
Tornado Scenario Path Description
The Wellsburg tornado path was chosen because it has the same bearing as an F2 tornado that passed 2.5 miles west of Wellsburg on 10/14/1965.
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.
0 500 1,000 Feet
Aerial Photography 2014


Map 4y: Tornado Scenario Map of the City - Affected Parcels
Grundy County Hazardous Mitigation Plan
Wellsburg, Iowa
Tornado Scenario Map of the City - Affected Parcels
LEGEND
City Limits
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet) - 65 Parcels Affected - 4.62% of City
EF1 - Path Width = 150 Meters (492 Feet) - 132 Parcels Affected - 7.32% of City
EF2 - Path Width = 250 Meters (820 Feet) - 188 Parcels Affected - 20.17% of City
EF3 - Path Width = 500 Meters (1640 Feet) - 294 Parcels Affected - 30.28% of City
EF4 - Path Width = 900 Meters (2953 Feet) - 402 Parcels Affected - 81.37% of City
EF5 - Path Width = 1100 Meters (3609 Feet) - 427 Parcels Affected - 86.70% of City
0 500 1,000 Feet
Aerial Photography 2014
Tornado Scenario Path Description
The Wellsburg tornado path was chosen because it has the same bearing as an F2 tornado that passed 2.5 miles west of Wellsburg on 10/14/1965.
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.
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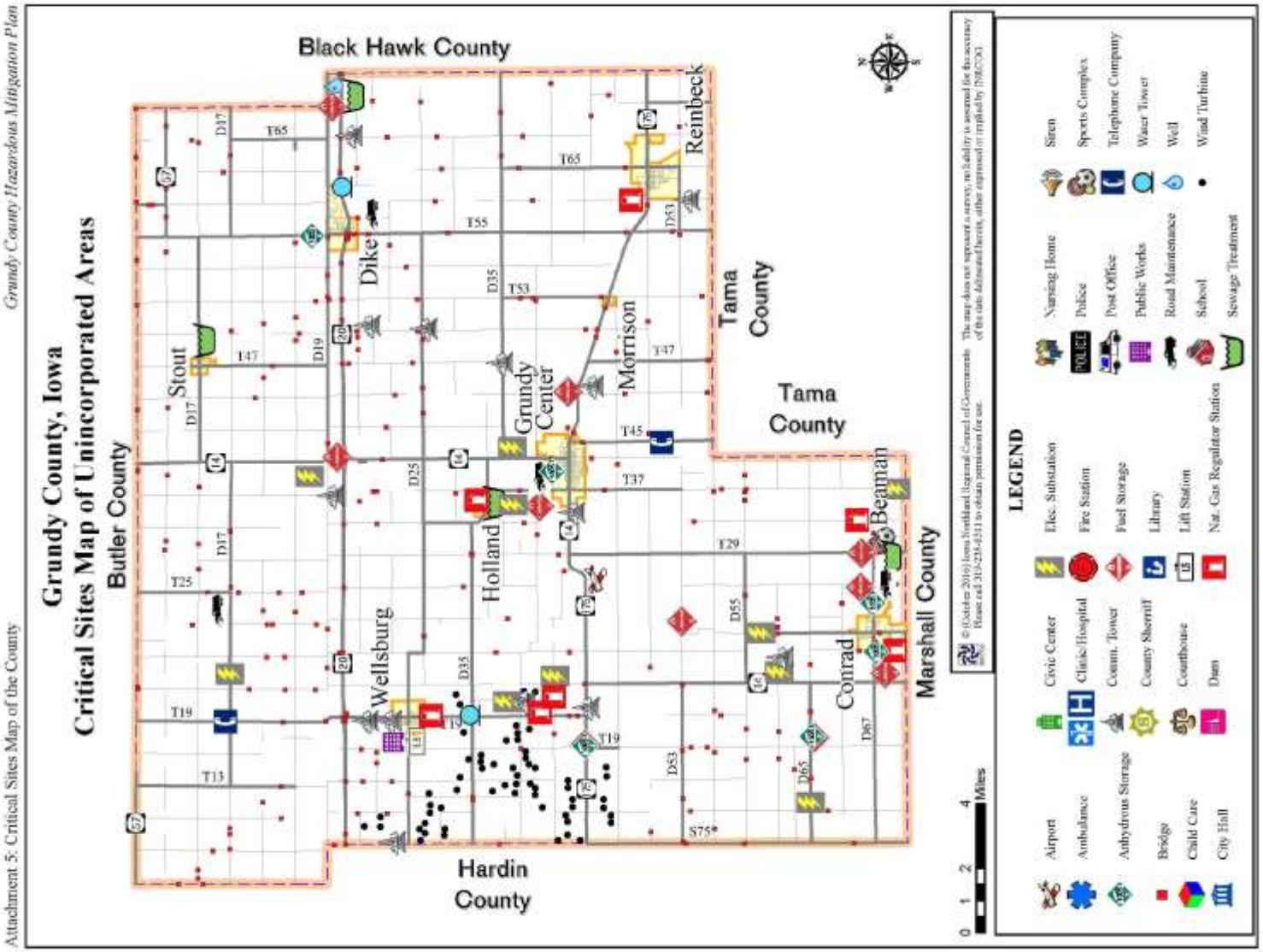
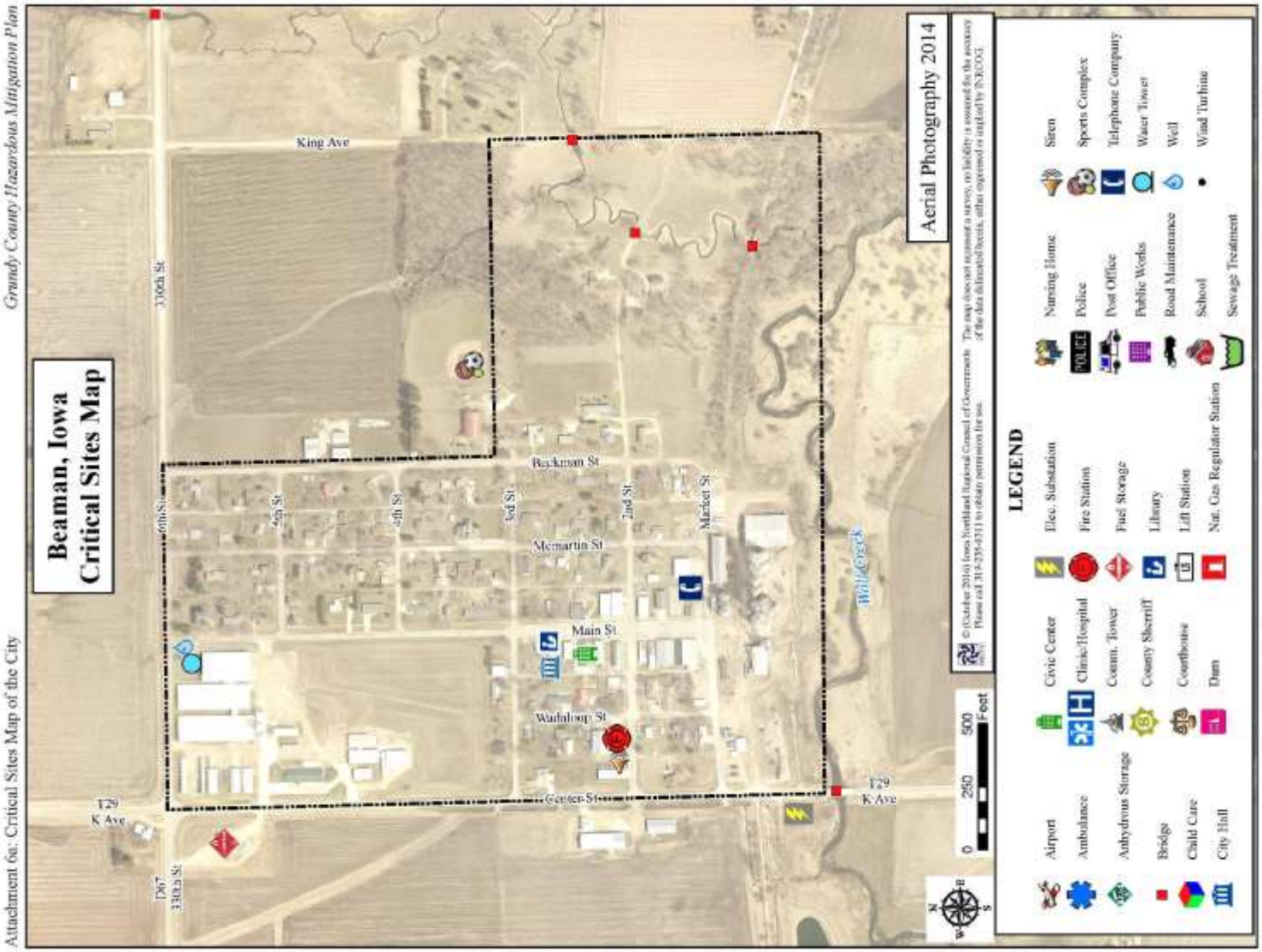
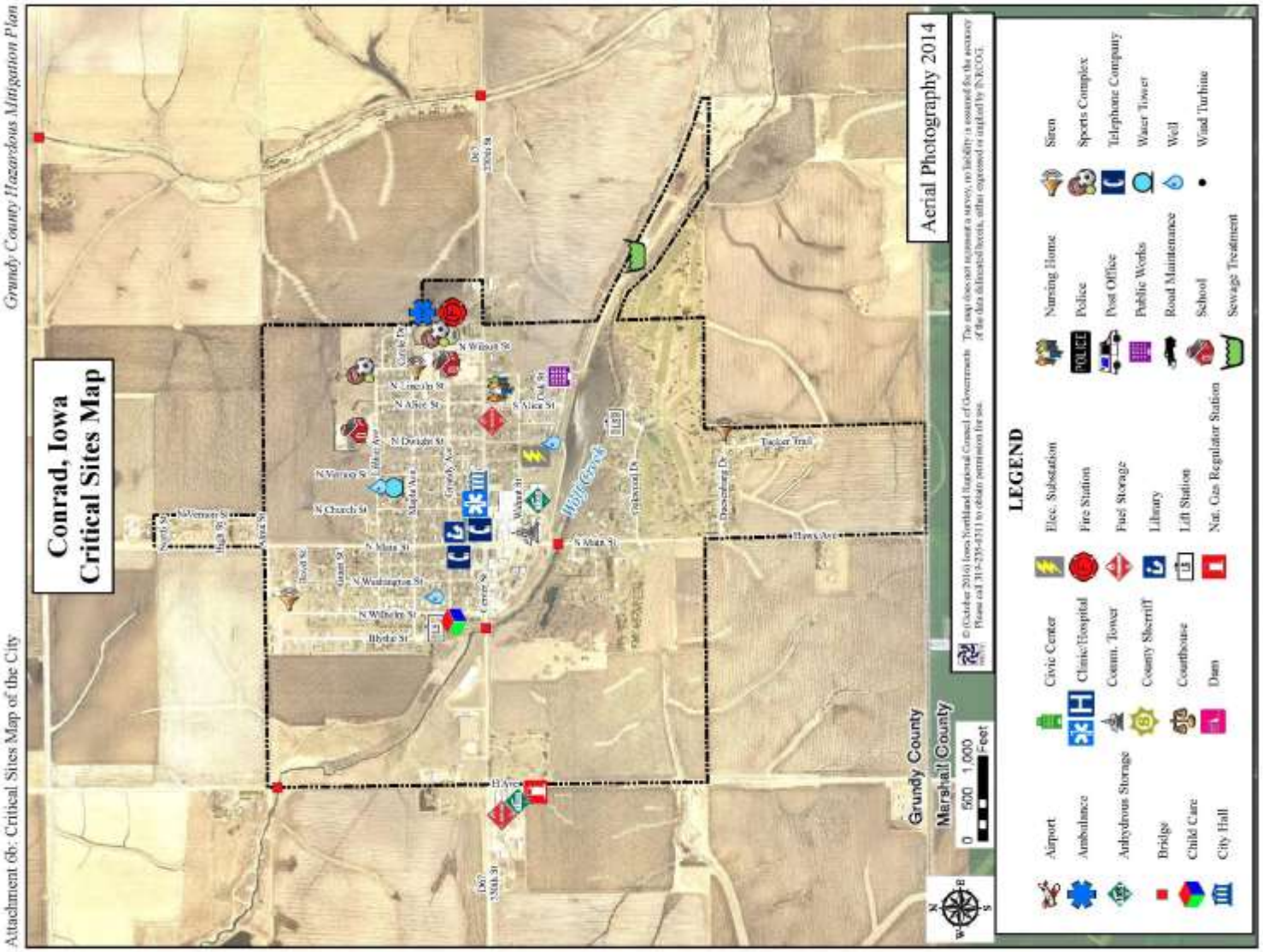
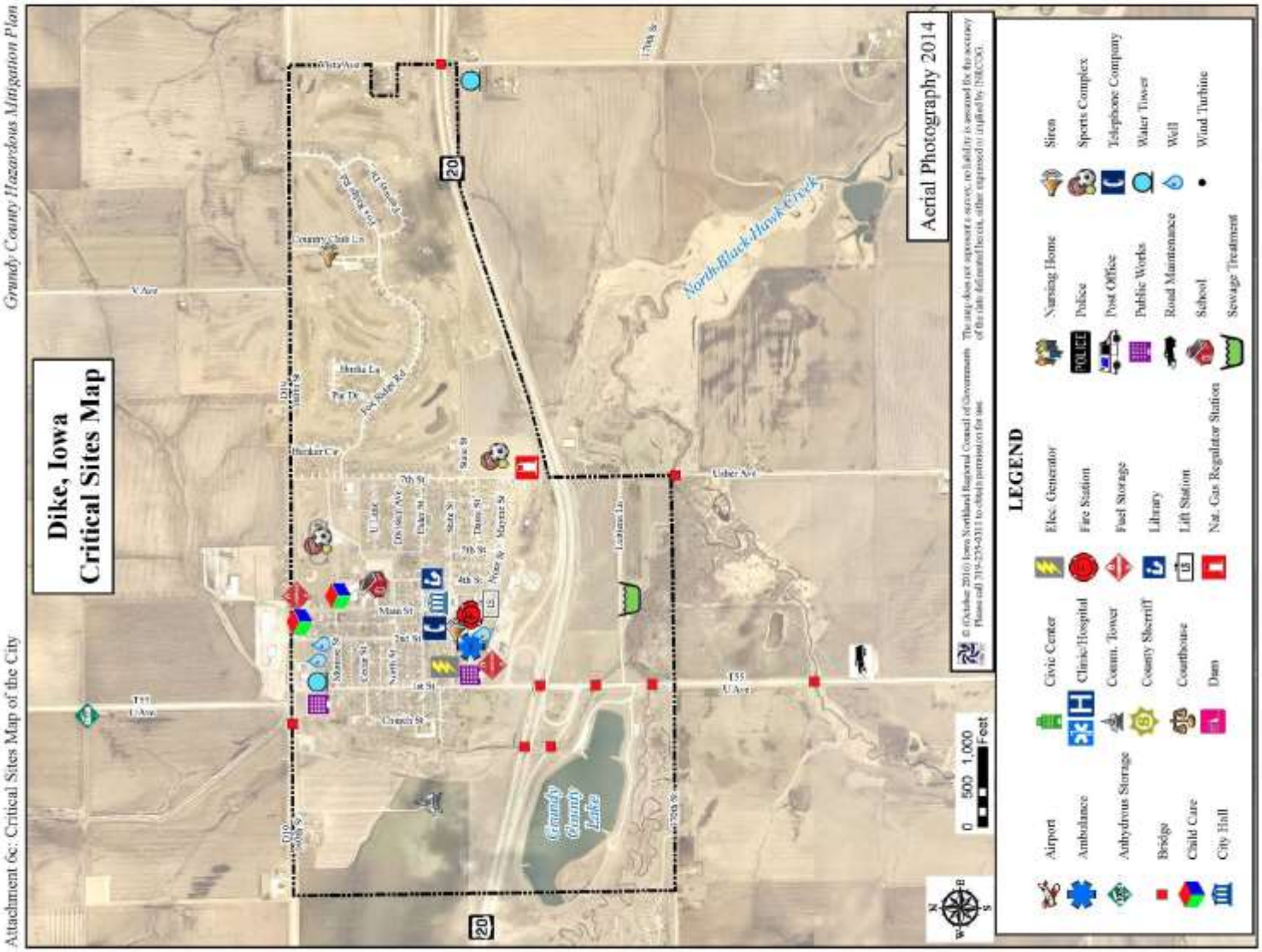
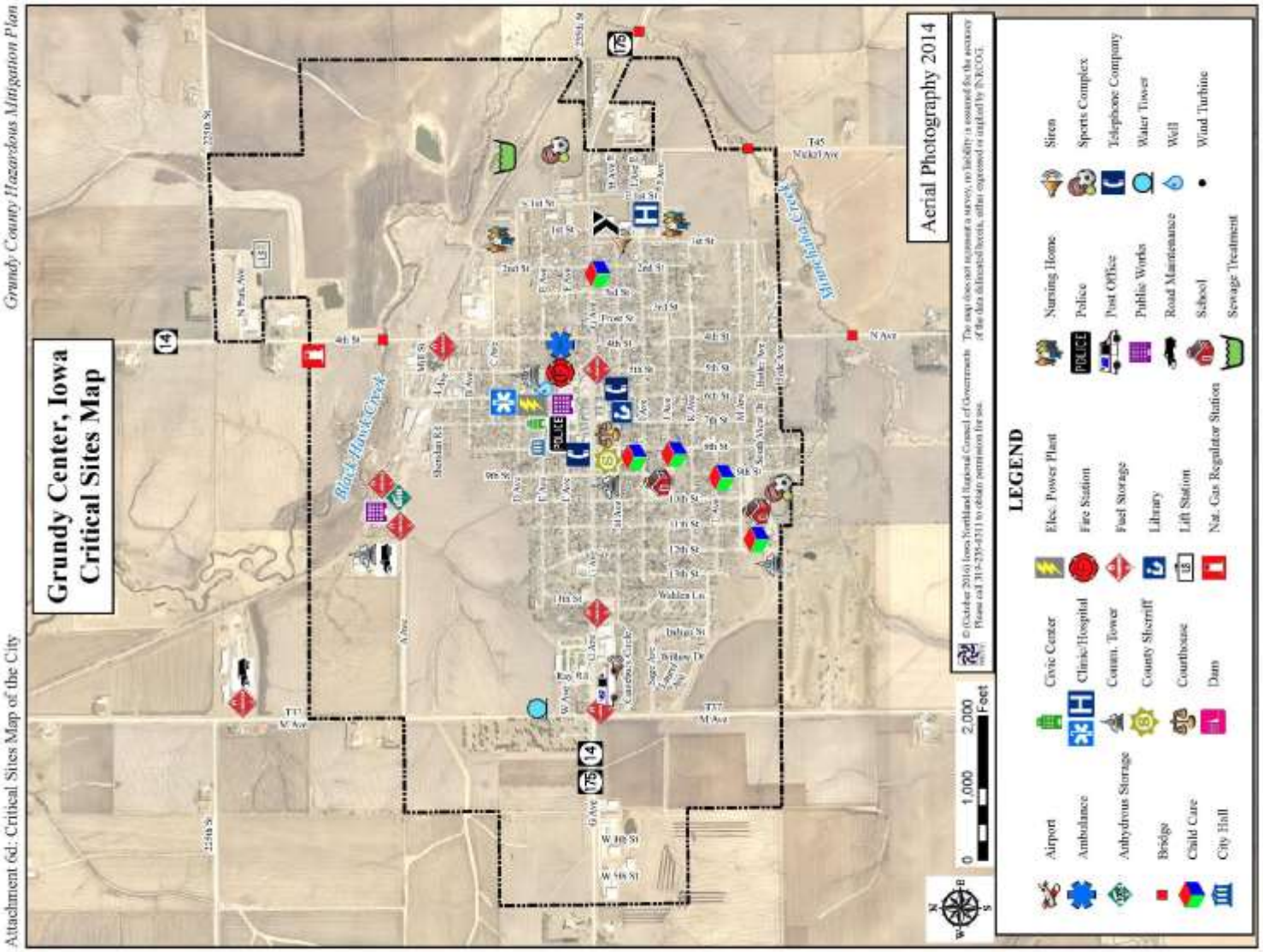

Grundy County Hazardous Mitigation Plan
Attachment 5: Critical Sites Map of the County
Grundy County, Iowa
Critical Sites Map of Unincorporated Areas
Black Hawk County
Butler County
Tama County
Hardin County
Marshall County
Reinbeck
Dike
Stout
Grundy Center
Morrison
Holland
Wellsburg
Conrad
Beaman
LEGEND
Airport
Ambulance
Anhydrous Storage
Bridge
Child Care
City Hall
Civic Center
Clinic/Hospital
Comm. Tower
County Sheriff
Courthouse
Dam
Elec. Substation
Fire Station
Fuel Storage
Library
Lift Station
Nat. Gas Regulator Station
Nursing Home
Police
Post Office
Public Works
Road Maintenance
School
Sewage Treatment
Siren
Sports Complex
Telephone Company
Water Tower
Well
Wind Turbine
Miles


Grundy County Hazardous Mitigation Plan
Attachment 6a: Critical Sites Map of the City
Beaman, Iowa
Critical Sites Map
Aerial Photography 2014
LEGEND
Airport
Ambulance
Anhydrous Storage
Bridge
Child Care
City Hall
Civic Center
Clinic/Hospital
Comm. Tower
County Sheriff
Courthouse
Dam
Elec. Substation
Fire Station
Fuel Storage
Library
Lift Station
Nat. Gas Regulator Station
Nursing Home
Police
Post Office
Public Works
Road Maintenance
School
Sewage Treatment
Siren
Sports Complex
Telephone Company
Water Tower
Well
Wind Turbine
King Ave
330th St
6th St
5th St
4th St
3rd St
2nd St
Beckman St
Memartin St
Market St
Main St
Wadaloop St
Grover St
Wolf Creek
D67
330th St
T29
K Ave
0
250
500
Feet

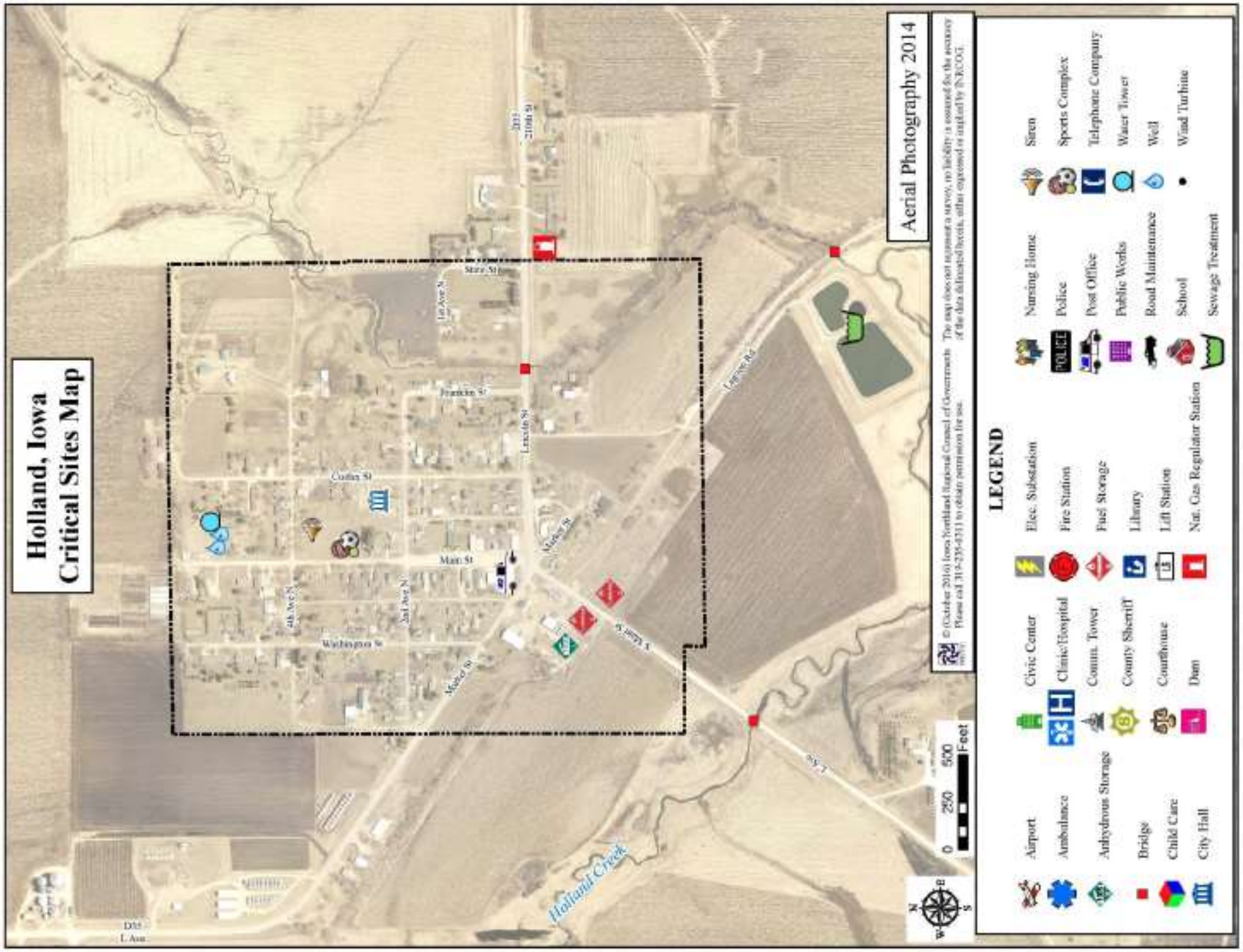

Grundy County Hazardous Mitigation Plan
Attachment 6b: Critical Sites Map of the City
Conrad, Iowa
Critical Sites Map
Aerial Photography 2014
Grundy County
Marshall County
0 500 1,000 Feet
LEGEND
Airport
Ambulance
Anhydrous Storage
Bridge
Child Care
City Hall
Civic Center
Clinic/Hospital
Comm. Tower
County Sheriff
Courthouse
Dam
Elec. Substation
Fire Station
Fuel Storage
Library
Lift Station
Nat. Gas Regulator Station
Nursing Home
Police
Post Office
Public Works
Road Maintenance
School
Sewage Treatment
Siren
Sports Complex
Telephone Company
Water Tower
Well
Wind Turbine

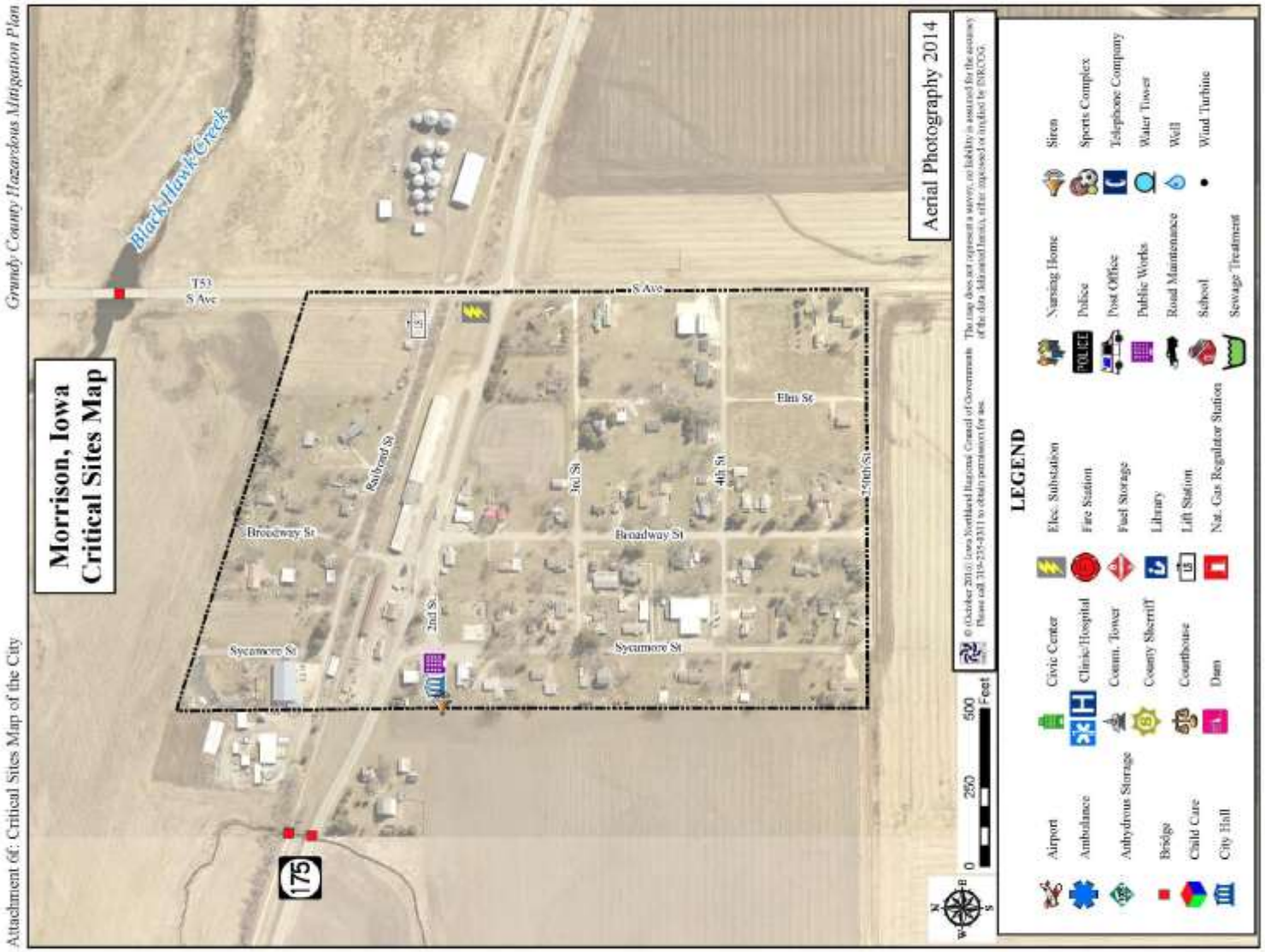

Grundy County Hazardous Mitigation Plan
Attachment 6c: Critical Sites Map of the City
Dike, Iowa
Critical Sites Map
Aerial Photography 2014
North Black Hawk Creek
Grundy County Lake
LEGEND
Airport
Ambulance
Anhydrous Storage
Bridge
Child Care
City Hall
Civic Center
Clinic/Hospital
Comm. Tower
County Sheriff
Courthouse
Dam
Elec. Generator
Fire Station
Fuel Storage
Library
Lift Station
Nat. Gas Regulator Station
Nursing Home
Police
Post Office
Public Works
Road Maintenance
School
Sewage Treatment
Siren
Sports Complex
Telephone Company
Water Tower
Well
Wind Turbine
0 500 1,000 Feet


Grundy County Hazardous Mitigation Plan
Attachment 6d: Critical Sites Map of the City
Grundy Center, Iowa
Critical Sites Map
Aerial Photography 2014
LEGEND
Airport
Ambulance
Anhydrous Storage
Bridge
Child Care
City Hall
Civic Center
Clinic/Hospital
Comm. Tower
County Sheriff
Courthouse
Dam
Elec. Power Plant
Fire Station
Fuel Storage
Library
Lift Station
Nat. Gas Regulator Station
Nursing Home
Police
Post Office
Public Works
Road Maintenance
School
Sewage Treatment
Siren
Sports Complex
Telephone Company
Water Tower
Well
Wind Turbine
Black Hawk Creek
Miner Indian Creek
0
1,000
2,000 Feet

Attachment 6e: Critical Sites Map of the City

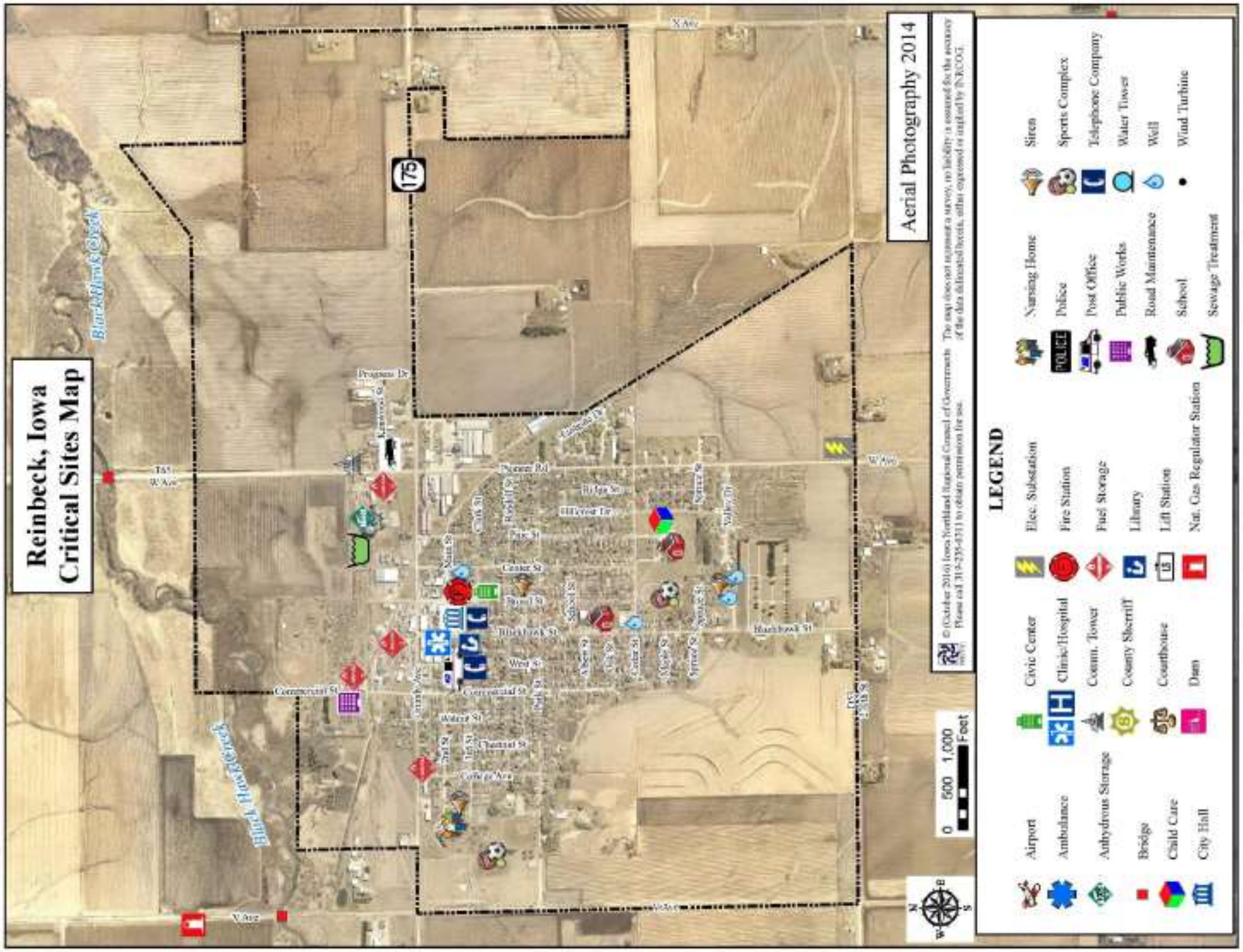
Grundy County Hazardous Mitigation Plan

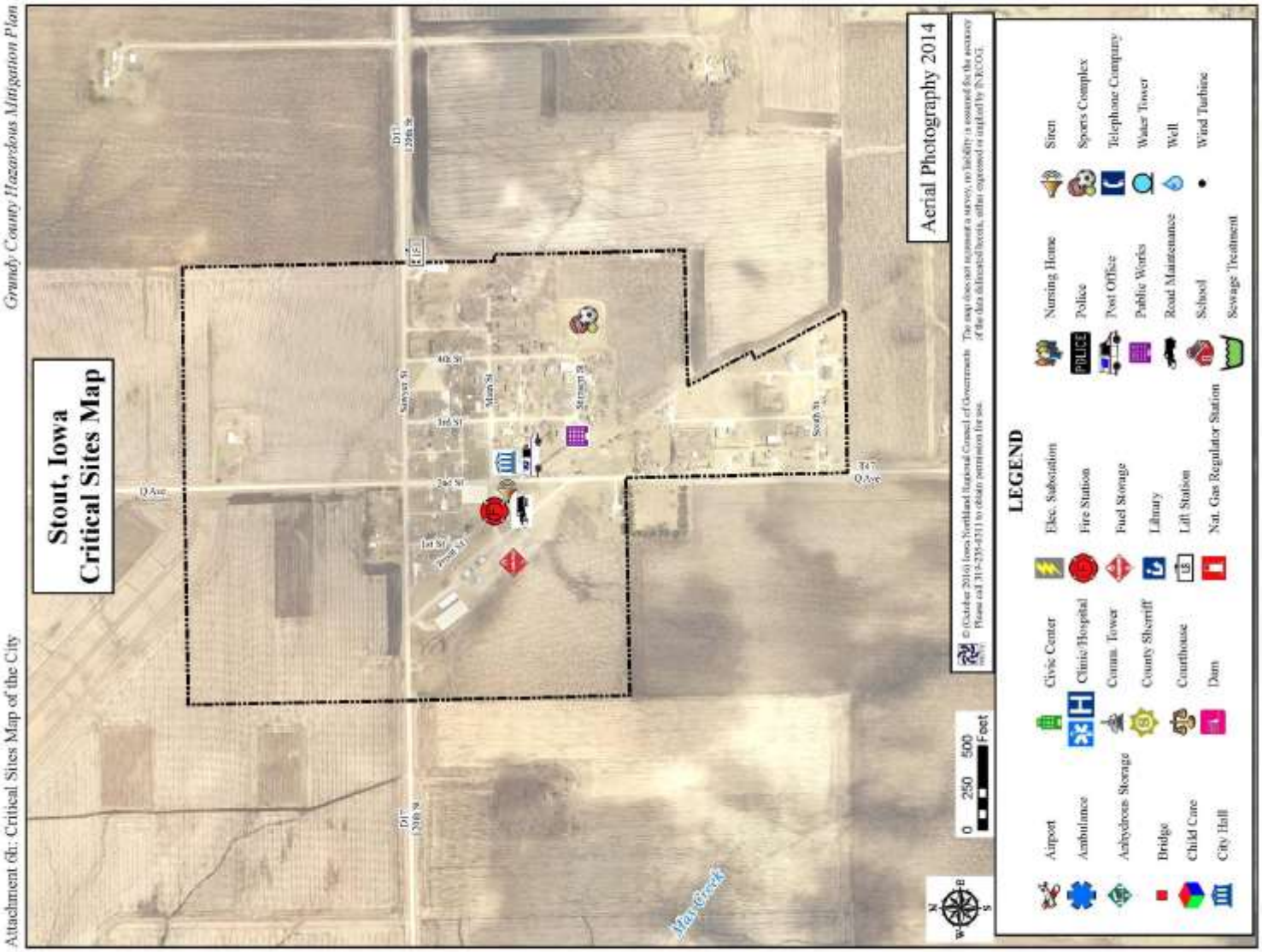

Holland, Iowa
Critical Sites Map
Aerial Photography 2014
LEGEND
Airport
Ambulance
Anhydrous Storage
Bridge
Child Care
City Hall
Civic Center
Clinic/Hospital
Comm. Tower
County Sheriff
Courthouse
Dam
Elec. Substation
Fire Station
Fuel Storage
Library
Lift Station
Nat. Gas Regulator Station
Nursing Home
Police
Post Office
Public Works
Road Maintenance
School
Sewage Treatment
Siren
Sports Complex
Telephone Company
Water Tower
Well
Wind Turbine
0 250 500 Feet
Main St
Washington St
Franklin St
Lincoln St
Holland Creek

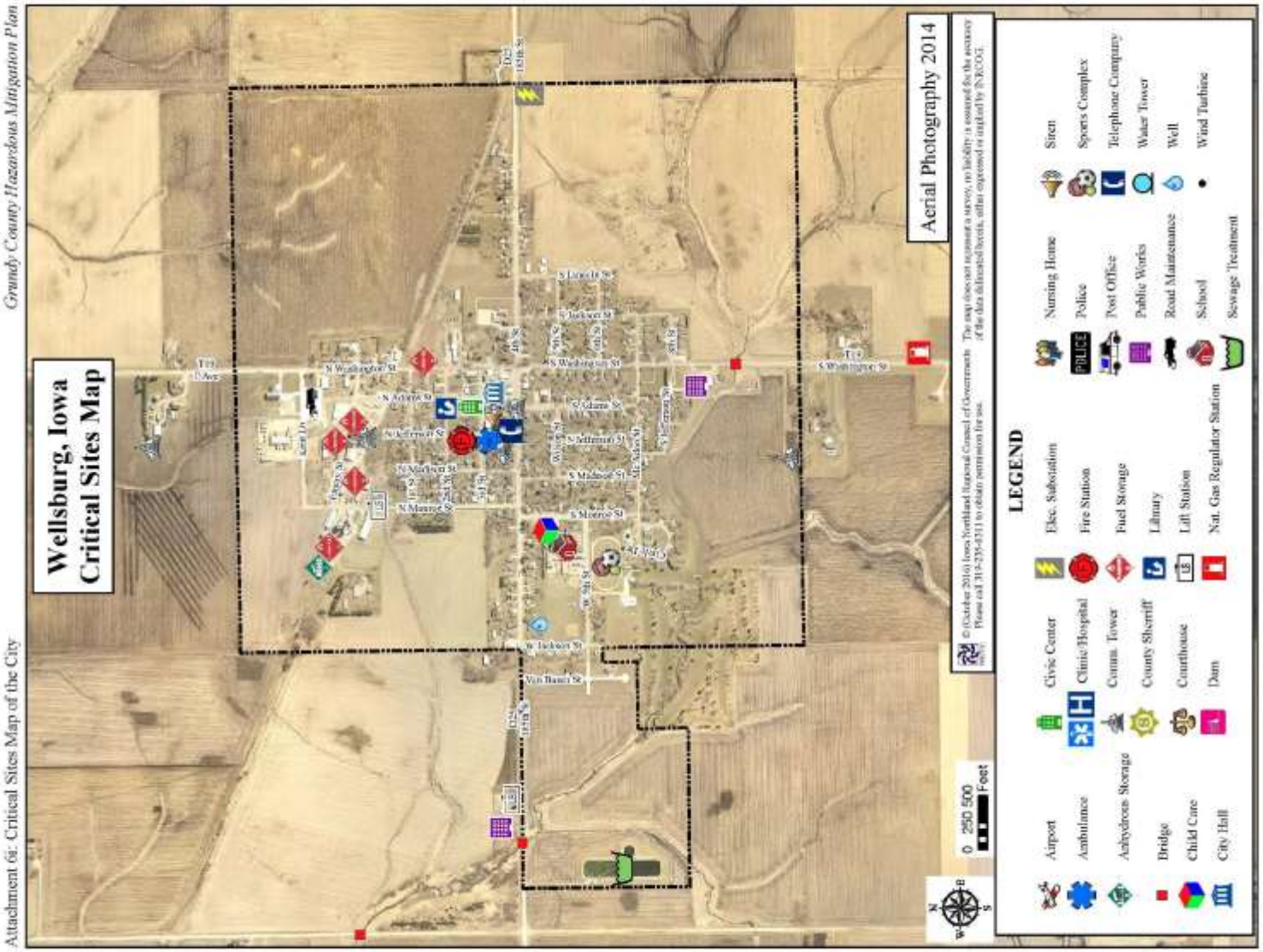

Grundy County Hazardous Mitigation Plan
Attachment 6f: Critical Sites Map of the City
Morrison, Iowa
Critical Sites Map
Aerial Photography 2014
Black Hawk Creek
T53
S Ave
Broadway St
Railroad St
2nd St
3rd St
4th St
Elm St
Sycamore St
175
0
250
500
Feet
LEGEND
Airport
Ambulance
Anhydrous Storage
Bridge
Child Care
City Hall
Civic Center
Clinic/Hospital
Comm. Tower
County Sherriff
Courthouse
Dam
Elec. Substation
Fire Station
Fuel Storage
Library
Lift Station
Nat. Gas Regulator Station
Nursing Home
Police
Post Office
Public Works
Road Maintenance
School
Sewage Treatment
Siren
Sports Complex
Telephone Company
Water Tower
Well
Wind Turbine

Attachment 6g: Critical Sites Map of the City

Grundy County Hazardous Mitigation Plan


Reinbeck, Iowa
Critical Sites Map
Aerial Photography 2014
LEGEND
Airport
Ambulance
Anhydrous Storage
Bridge
Child Care
City Hall
Civic Center
Clinic/Hospital
Comm. Tower
County Sheriff
Courthouse
Dam
Elec. Substation
Fire Station
Fuel Storage
Library
Lift Station
Nat. Gas Regulator Station
Nursing Home
Police
Post Office
Public Works
Road Maintenance
School
Sewage Treatment
Siren
Sports Complex
Telephone Company
Water Tower
Well
Wind Turbine
0 500 1,000 Feet
Black Hawk Creek


Grundy County Hazardous Mitigation Plan
Attachment 6h: Critical Sites Map of the City
Stout, Iowa
Critical Sites Map
Aerial Photography 2014
LEGEND
Airport
Ambulance
Anhydrous Storage
Bridge
Child Care
City Hall
Civic Center
Clinic/Hospital
Comm. Tower
County Sheriff
Courthouse
Dam
Elec. Substation
Fire Station
Fuel Storage
Library
Lift Station
Nat. Gas Regulator Station
Nursing Home
Police
Post Office
Public Works
Road Maintenance
School
Sewage Treatment
Siren
Sports Complex
Telephone Company
Water Tower
Well
Wind Turbine
0 250 500 Feet
Max Creek


Grundy County Hazardous Mitigation Plan
Attachment 6a: Critical Sites Map of the City
Wellsburg, Iowa
Critical Sites Map
Aerial Photography 2014
LEGEND
Airport
Ambulance
Anhydrous Storage
Bridge
Child Care
City Hall
Civic Center
Clinic/Hospital
Comm. Tower
County Sheriff
Courthouse
Dam
Elec. Substation
Fire Station
Fuel Storage
Library
Lift Station
Nat. Gas Regulator Station
Nursing Home
Police
Post Office
Public Works
Road Maintenance
School
Sewage Treatment
Siren
Sports Complex
Telephone Company
Water Tower
Well
Wind Turbine
0 250 500 Feet

ATTACHMENT 7: PLAN ADOPTION RESOLUTIONS

JURISDICTION	DATE OF PLAN ADOPTION
Grundy County	06/19/2017
City of Beaman	10/11/2017
City of Conrad	10/12/2017
City of Dike	10/11/2017
City of Grundy Center	09/18/2017
City of Holland	10/03/2017
City of Morrison	10/09/2017
City of Reinbeck	10/02/2017
City of Stout	10/02/2017
City of Wellsburg	10/02/2017
Grundy Center Community School District	10/18/2017

GRUNDY COUNTY

RESOLUTION #49-2016/2017

A RESOLUTION OF THE BOARD OF SUPERVISORS, OF GRUNDY COUNTY, IOWA, ADOPTING A MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN FOR GRUNDY COUNTY.

WHEREAS, the Board of Supervisors of Grundy County, Iowa has authorized the development of a Multi-Jurisdictional Hazard Mitigation Plan for Grundy County; and

WHERAS, Grundy County, Iowa has received funding through the Hazard Mitigation Grant Program; and

WHEREAS, the Multi-Jurisdictional Hazard Mitigation Planning Committee of the Grundy County has participated in the formulation of said Plan; and has recommended the adoption of said Multi-Jurisdictional Hazard Mitigation Plan; and

WHEREAS, a Public Hearing has been held in the County Courthouse for the purpose of obtaining citizen input on the Multi-Jurisdictional Hazard Mitigation Plan; and

NOW THEREFORE BE IT RESOLVED THAT the Board of Supervisors of Grundy County, Iowa herewith adopts the Grundy County Multi-Jurisdictional Hazard Mitigation Plan, incorporating into the Plan citizen comment and future FEMA and IHSEMD recommendations.

Passed and adopted this 19th day of June, 2017.

Charles Bakker, Chairperson
Grundy County Board of Supervisors

ATTEST:

Rhonda R. Deters, County Auditor

CITY OF BEAMAN

RESOLUTION 208-18

A RESOLUTION OF THE CITY COUNCIL OF BEAMAN, IOWA, ADOPTING A MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN FOR GRUNDY COUNTY.

WHEREAS, the City Council of the Beaman, Iowa has authorized the development of a Multi-Jurisdictional Hazard Mitigation Plan for Grundy County; and

WHERAS, Grundy County, Iowa has received funding through the Hazard Mitigation Grant Program; and

WHEREAS, the Multi-Jurisdictional Hazard Mitigation Planning Committee of the Grundy County has participated in the formulation of said Plan; and has recommended the adoption of said Multi-Jurisdictional Hazard Mitigation Plan; and

WHEREAS, a Public Hearing has been held in the City Hall for the purpose of obtaining citizen input on the Multi-Jurisdictional Hazard Mitigation Plan; and

NOW THEREFORE BE IT RESOLVED THAT the City Council of Beaman, Iowa herewith adopts the Grundy County Multi-Jurisdictional Hazard Mitigation Plan, incorporating into the Plan citizen comment and future FEMA and IHSEMD recommendations.

Passed and adopted this 11th day of October 2017.

Mayor

ATTEST:

City Clerk

CITY OF CONRAD

RESOLUTION 2017-25

A RESOLUTION OF THE CITY COUNCIL OF CONRAD, IOWA, ADOPTING A MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN FOR GRUNDY COUNTY.

WHEREAS, the City Council of the Conrad, Iowa has authorized the development of a Multi-Jurisdictional Hazard Mitigation Plan for Grundy County; and

WHERAS, Grundy County, Iowa has received funding through the Hazard Mitigation Grant Program; and

WHEREAS, the Multi-Jurisdictional Hazard Mitigation Planning Committee of the Grundy County has participated in the formulation of said Plan; and has recommended the adoption of said Multi-Jurisdictional Hazard Mitigation Plan; and

WHEREAS, a Public Hearing has been held in the County Courthouse for the purpose of obtaining citizen input on the Multi-Jurisdictional Hazard Mitigation Plan; and

NOW THEREFORE BE IT RESOLVED THAT the City Council Conrad, Iowa herewith adopts the Grundy County Multi-Jurisdictional Hazard Mitigation Plan, incorporating into the Plan citizen comment and future FEMA and IHSEMD recommendations.

Passed and adopted this 12th day of October 2017.

Jeff Martin, Mayor

CITY OF DIKE

RESOLUTION 10111703

A RESOLUTION OF THE CITY COUNCIL OF DIKE, IOWA, ADOPTING A MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN FOR GRUNDY COUNTY.

WHEREAS, the City Council of the Dike, Iowa has authorized the development of a Multi-Jurisdictional Hazard Mitigation Plan for Grundy County; and

WHERAS, Grundy County, Iowa has received funding through the Hazard Mitigation Grant Program; and

WHEREAS, the Multi-Jurisdictional Hazard Mitigation Planning Committee of the Grundy County has participated in the formulation of said Plan; and has recommended the adoption of said Multi-Jurisdictional Hazard Mitigation Plan; and

WHEREAS, a Public Hearing has been held in the County Courthouse for the purpose of obtaining citizen input on the Multi-Jurisdictional Hazard Mitigation Plan; and

NOW THEREFORE BE IT RESOLVED THAT the City Council of Dike, Iowa herewith adopts the Grundy County Multi-Jurisdictional Hazard Mitigation Plan, incorporating into the Plan citizen comment and future FEMA and IHSEMD recommendations.

Passed and adopted this 11 day of October 2017.

Michael Soppe, Mayor

ATTEST:

Lindsay Nielsen

CITY OF GRUNDY CENTER

RESOLUTION 2017-37

A RESOLUTION OF THE CITY COUNCIL OF GRUNDY CENTER, IOWA, ADOPTING A MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN FOR GRUNDY COUNTY.

WHEREAS, the City Council of the City of Grundy Center, Iowa has authorized the development of a Multi-Jurisdictional Hazard Mitigation Plan for Grundy County; and

WHERAS, Grundy County, Iowa has received funding through the Hazard Mitigation Grant Program; and

WHEREAS, the Multi-Jurisdictional Hazard Mitigation Planning Committee of the Grundy County has participated in the formulation of said Plan; and has recommended the adoption of said Multi-Jurisdictional Hazard Mitigation Plan; and

WHEREAS, a Public Hearing has been held in the County Courthouse for the purpose of obtaining citizen input on the Multi-Jurisdictional Hazard Mitigation Plan; and

NOW THEREFORE BE IT RESOLVED THAT the City Council of the City of Grundy Center, Iowa herewith adopts the Grundy County Multi-Jurisdictional Hazard Mitigation Plan, incorporating into the Plan citizen comment and future FEMA and IHSEMD recommendations.

Passed and adopted this 18th day of September, 2017.

Brian Buhrow, Mayor

ATTEST:

Kristy Sawyer, City Clerk

CITY OF HOLLAND

RESOLUTION 2017-14

A RESOLUTION OF THE CITY COUNCIL OF HOLLAND, IOWA, ADOPTING A MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN FOR GRUNDY COUNTY.

WHEREAS, the City Council of the Holland, Iowa has authorized the development of a Multi-Jurisdictional Hazard Mitigation Plan for Grundy County; and

WHERAS, Grundy County, Iowa has received funding through the Hazard Mitigation Grant Program; and

WHEREAS, the Multi-Jurisdictional Hazard Mitigation Planning Committee of the Grundy County has participated in the formulation of said Plan; and has recommended the adoption of said Multi-Jurisdictional Hazard Mitigation Plan; and

WHEREAS, a Public Hearing has been held in the County Courthouse for the purpose of obtaining citizen input on the Multi-Jurisdictional Hazard Mitigation Plan; and

NOW THEREFORE BE IT RESOLVED THAT the City Council of Holland, Iowa herewith adopts the Grundy County Multi-Jurisdictional Hazard Mitigation Plan, incorporating into the Plan citizen comment and future FEMA and IHSEMD recommendations.

Passed and adopted this 3rd day October of 2017.

Scott Borchardt, Mayor

ATTEST:

Kristy Sawyer, City Clerk

CITY OF MORRISON

Town of Morrison
October 9, 2017
Resolution 17-06

Be it resolved by the Morrison Town Council on the date of October 9, 2017.

The Housing Mitigation Plan compiled by Iowa Northland Regional Council of Governments and presented by Ryan McKinley be adopted by the Morrison Town Council.

Peggy L. Husmann, Clerk

Peggy L. Husmann, Clerk

CITY OF REINBECK

RESOLUTION #2017-33R

A RESOLUTION OF THE CITY COUNCIL OF REINBECK, IOWA, ADOPTING A MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN FOR GRUNDY COUNTY.

WHEREAS, the City Council of the Reinbeck, Iowa has authorized the development of a Multi-Jurisdictional Hazard Mitigation Plan for Grundy County; and

WHERAS, Grundy County, Iowa has received funding through the Hazard Mitigation Grant Program; and

WHEREAS, the Multi-Jurisdictional Hazard Mitigation Planning Committee of the Grundy County has participated in the formulation of said Plan; and has recommended the adoption of said Multi-Jurisdictional Hazard Mitigation Plan; and

WHEREAS, a Public Hearing has been held in the County Courthouse for the purpose of obtaining citizen input on the Multi-Jurisdictional Hazard Mitigation Plan; and

NOW THEREFORE BE IT RESOLVED THAT the City Council of Reinbeck, Iowa herewith adopts the Grundy County Multi-Jurisdictional Hazard Mitigation Plan, incorporating into the Plan citizen comment and future FEMA and IHSEMD recommendations.

Passed and adopted this 2nd day of October 2017.

Mayor

ATTEST:

City Administrator/Clerk

CITY OF STOUT

RESOLUTION 10.02.17.01

A RESOLUTION OF THE CITY COUNCIL OF STOUT, IOWA, ADOPTING A MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN FOR GRUNDY COUNTY.

WHEREAS, the City Council of the Stout, Iowa has authorized the development of a Multi-Jurisdictional Hazard Mitigation Plan for Grundy County; and

WHERAS, Grundy County, Iowa has received funding through the Hazard Mitigation Grant Program; and

WHEREAS, the Multi-Jurisdictional Hazard Mitigation Planning Committee of the Grundy County has participated in the formulation of said Plan; and has recommended the adoption of said Multi-Jurisdictional Hazard Mitigation Plan; and

WHEREAS, a Public Hearing has been held in the County Courthouse for the purpose of obtaining citizen input on the Multi-Jurisdictional Hazard Mitigation Plan; and

NOW THEREFORE BE IT RESOLVED THAT the City Council of Stout, Iowa herewith adopts the Grundy County Multi-Jurisdictional Hazard Mitigation Plan, incorporating into the Plan citizen comment and future FEMA and IHSEMD recommendations.

Passed and adopted this 2nd day of October 2017.

Mayor

ATTEST:

City Clerk

CITY OF WELLSBURG

RESOLUTION 10-2017

A RESOLUTION OF THE CITY COUNCIL OF WELLSBURG, IOWA, ADOPTING A MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN FOR GRUNDY COUNTY.

WHEREAS, the City Council of the Wellsburg, Iowa has authorized the development of a Multi-Jurisdictional Hazard Mitigation Plan for Grundy County; and

WHERAS, Grundy County, Iowa has received funding through the Hazard Mitigation Grant Program; and

WHEREAS, the Multi-Jurisdictional Hazard Mitigation Planning Committee of the Grundy County has participated in the formulation of said Plan; and has recommended the adoption of said Multi-Jurisdictional Hazard Mitigation Plan; and

WHEREAS, a Public Hearing has been held in the County Courthouse for the purpose of obtaining citizen input on the Multi-Jurisdictional Hazard Mitigation Plan; and

NOW THEREFORE BE IT RESOLVED THAT the City Council of Wellsburg, Iowa herewith adopts the Grundy County Multi-Jurisdictional Hazard Mitigation Plan, incorporating into the Plan citizen comment and future FEMA and IHSEMD recommendations.

Passed and adopted this 2nd day of October 2017.

Mayor Pro tem

ATTEST:

City Clerk

GRUNDY CENTER COMMUNITY SCHOOL DISTRICT

RESOLUTION

A RESOLUTION OF THE SCHOOL BOARD OF GRUNDY CENTER, IOWA, ADOPTING A MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN FOR GRUNDY COUNTY.

WHEREAS, the School Board of Grundy Center, Iowa has authorized the development of a Multi-Jurisdictional Hazard Mitigation Plan for Grundy County; and

WHERAS, Grundy County, Iowa has received funding through the Hazard Mitigation Grant Program; and

WHEREAS, the Multi-Jurisdictional Hazard Mitigation Planning Committee of the Grundy County has participated in the formulation of said Plan; and has recommended the adoption of said Multi-Jurisdictional Hazard Mitigation Plan; and

WHEREAS, a Public Hearing has been held in the County Courthouse for the purpose of obtaining citizen input on the Multi-Jurisdictional Hazard Mitigation Plan; and

NOW THEREFORE BE IT RESOLVED THAT the School Board of Grundy Center, Iowa herewith adopts the Grundy County Multi-Jurisdictional Hazard Mitigation Plan, incorporating into the Plan citizen comment and future FEMA and IHSEMD recommendations.

Passed and adopted this 18th day of October 2017.

Robert J Johnson
School Board President

ATTEST:

Becki Smith
Board Secretary

ATTACHMENT 8: STATUS OF 2012 HAZARD MITIGATION PLAN

All of the jurisdiction's that participated in the 2017 plan update were also part of the county's first multi-jurisdictional hazard mitigation plan developed in
2012. The first step in the planning process was for each participating jurisdiction reviewed the County's 2012 MJ-HMP. Needed updates were identified by each jurisdiction, including: development, status of mitigation actions, and assessment of hazards. Relevant county and city data was also researched and updated regarding population and infrastructure totals and vulnerabilities. The table below displays a summary of updates by section.

OVERALL HMP UPDATE CHANGES

Each participating jurisdiction reviewed the County's 2012 MJ-HMP. Needed updates were identified by each jurisdiction, including: development, status of mitigation actions, and assessment of hazards. Relevant county and city data was also researched and updated regarding population and infrastructure totals and vulnerabilities. The table below displays a summary of updates by section.

Overall MJ-HMP Updates		
Section	**Update**	**Comments**
Section 1 – Introduction	Yes	• Updated planning process, participants and schedule • Updated identified hazards and assessment to reflect hazards and assessment criteria of State of Iowa's 2013 HMP
Section 2 – Composite Community Profile	Yes	• Updated Infrastructure information, including transportation and utilities • Updated Census and American Community Survey data • Updated housing, income, and economy data • Updated local jurisdictional information • Updated all tables and local information
Section 3 - Hazard Analysis & Risk Assessment (includes Vulnerability Assessment)	Yes	• Identified new list of hazards (2013 State HMP hazards) • Identified new list of hazards • Scored new hazard list with new scoring criteria for each jurisdiction • Updated composite assessment scores for Grundy County and all jurisdictions • Updated disaster historical occurrences • Updated average assessment scores for Grundy County and all jurisdictions • Redefined subcategories describing individual hazards • Updated and completed vulnerability assessments (identifying critical facilities and social assets) affected by flooding (river and flash) and tornados. • Updated the estimating potential property losses and repetitive loss properties with available data • Updated NFIP status • Updated vulnerability assessment, including shelters, values in floodplains, and "at-risk"

		population data
Section 4 – Mitigation Strategy	Yes	• Reviewed and confirmed existing mitigation goals for the planning area • Removed completed or no longer applicable projects/actions/activities, if any • Changed format from listing mitigation activities repeatedly under each hazard to once under the FEMA's six categories for mitigation activities – prevention, property protection, natural resource protection, emergency management, structural, and public education and awareness • Updated planning and regulatory documents • Updated public education and awareness mitigation actions • Updated emergency services mitigation actions • Updated to include new warning system in place • Reviewed, added and deleted mitigation activities analysis from the previous menu of potential strategies. • Identified agencies responsible for implementation of mitigation activities • Reorganized Mitigation Action Steps into subgroups
Section 5 - Plan Maintenance, Review, & Amendment	Yes	• Updated how the MJ-HMP should be updated, evaluated and reviewed, incorporated into other planning mechanisms, and continued public participation should be met

Appendices/Attachments	Yes	• Reorganized maps/city profiles into appendixes and attachments
		• Updated all city appendices from 2012 plan
		  ○ Community Profiles, transportation, developments, and utility providers
		  ○ Demographic data
		  ○ New list of hazards and analysis criteria
		  ○ Vulnerability analysis of critical facilities, populations, and estimated property loss
		  ○ NFIP status and repetitive loss status, where applicable
		  ○ Current mitigation activities
		  ○ Reviewed, added and deleted mitigation activities analysis from the previous menu of potential strategies
		• Added tornado scenario maps
		• Updated historic tornado map
		• Updated city flood scenario and county floodplain maps
		• Added city floodplain maps
		• Updated city critical site maps
		• Updated county-wide critical site maps and divided into individual maps for each critical site
		• Added status update of previous hazard mitigation activities

In addition to the general plan updates described above, each jurisdiction documented the status of their community's action steps identified in the 2012 plan. The following tables state the status of the actions in the 2012 plan.

GRUNDY COUNTY – STATUS OF 2012 HAZARD MITIGATION ACTIVITIES	
Mitigation Action	**Committee Determination/Comments**
Educate the public	Active – On Going. Booth at public events promoting storm safety, preparedness kits, etc. Storm spotter classes hosted by EMA every other year.
Continue training and education for fire departments, law enforcement agencies and ambulance crew personnel	Active – On Going. Training is continually put on for first responders in the county
Maintain and acquire materials and equipment for fire departments, law enforcement agencies and ambulance crew personnel	Active – On Going. Purchases are made for equipment and given to departments throughout the county for various emergencies
Provide emergency shelters for evacuees	Implemented as needed
Maintain mutual aid agreements	Completed. To be reviewed again in a few years
Maintain tree trimming program	Active - Ongoing – Secondary Roads
Determine locations for potential heating shelters and volunteer organization	Active – Ongoing. Identified in the communities on need basis.
Encourage utility providers and developers to place all utilities underground	Active – Ongoing. Utilities are burying in ground except Electrical.
Purchase and maintain backup generators	Completed. Generators are maintained on monthly basis
Maintain public works equipment	Active – Ongoing. Completed by Secondary Roads department
Notify the media on shelter locations	Active – Ongoing. Occurs during event
Make sure residents keep sidewalks clear of snow and ice	Not Applicable for Unincorporated Areas
Maintain use of snow fences in the city/county	Active – Ongoing. Are used along troubled areas of highway to prevent large drifts/whiteouts during snow storms
Use surge protectors to prevent electrical damage to critical and sensitive equipment	Active – Ongoing. All computer based systems are on battery backup/surge protected supplies.
Backup all digital data	Active – Ongoing. Grundy Co IT Dept. maintains all backup data and servers.
Purchase NOAA weather radios	Completed. NOAA weather radios were purchased and given to all critical infrastructure facilities in mid-2000's
Enforce and update building codes, as needed	Active – Ongoing. Grundy County Zoning enforces building codes in unincorporated areas
Maintain storm spotter training for local fire departments/deputies and EMS crews	Active – Ongoing. Grundy County hosts Storm Spotter training every other year. Most Recent being March 9th 2017.

Continue enforcement of city sump pump discharge ordinance	Not Applicable for Unincorporated Areas
Maintain a list of potential storm sewer projects	Not Applicable for unincorporated Areas
Make available a cleanup crew for after a storm	Active – Ongoing. First Responders and Secondary Road Crews, Utility workers are called out for post storm cleanup of roadways and necessary Utilities
Maintain law enforcement monitoring of large storage supplies	Active – Ongoing
Acquire necessary response and detection equipment for city/county employees	Active – Ongoing
Encourage lead based paint and asbestos removal	Active – Ongoing
Provide a local hazardous waste drop-off site	Active – Ongoing. Grundy County Landfill takes some Hazardous Waste
Maintain mutual aid agreements with the Northeast Iowa response group	Active – Ongoing. Agreements just renewed and will again when current agreement expires
Keep HAZMAT manuals/information current and easily accessible	Active – Ongoing. New ERG books issued last year. Recertification occur every year.
Maintain, test, and replace warning sirens	Not applicable for unincorporated area. Warning Sirens are tested however in communities on regular basis. Grundy CO EMA participates in Statewide Tornado Drill as well
Install new warning sirens where needed or replace warning sirens with insufficient decibel levels	Not Applicable for Unincorporated areas
Encourage and maintain enrollment in emergency notification system	Active – Ongoing. Grundy Co EMA utilizes and promotes signups for Alert Iowa
Construct or designate a safe room or storm shelter	Not Applicable or Unincorporated area
Encourage home owners to keep emergency kits	Active – Ongoing. EMA participates in public events where citizens are encouraged to build emergency kits
Encourage backup power generation for local telephone systems and cellular operations	Active – Ongoing
Maintain or install GPS units in all emergency service and city/county vehicles	Active – Ongoing. GCSO is equipped.
Maintain automatic TTY TDD machines for emergency personnel and city/county employees	Active – Ongoing. 911 is capable of TDD and Text to 911
Enhance Standard Operating Procedures for dissemination of information/press releases in the event of a disaster	Active – Ongoing.
Continue training and promotion of the Incident Command System	Active – Ongoing.
Complete continuity of government plan	Completed. This is covered in our Basic and ESF Plans
Encourage use of Iowa One Call before digging	Active – Ongoing.
Upgrade radio communications equipment as needed	Active – Ongoing. GCSO and Grundy Co 911 in process of P25 digital upgrade to be completed late 2017

Regularly review and amend fire and medical HAZMAT response standard operating procedures	Active – Ongoing. Work with first responders on training in new methods of response
Improve standard operating procedures for schools	Active – Ongoing. Assist schools in reviewing their protective measures and plans
Seek to improve communications with other agencies	Active – Ongoing.
Keep supply of backup radios and cellphones	Active -Ongoing.
Maintain list of county emergency contacts	Active – Ongoing. See Basic Plans and ESF's
Keep the county updated on personnel changes	Active – Ongoing. Personnel Changes are shared among department heads within the County departments
Continue cooperation between city roads department and local fire departments during snow emergencies	Active – Ongoing
Pursue partnership with rural water as the system expands	Active – Ongoing. Rural water supplies most infrastructures within the county
Encourage residents to keep smoke detectors, sprinkler systems and fire extinguishers maintained in their homes	Active – Ongoing.
Continue an annual inspection program for commercial and industrial properties	Active – Ongoing. First responders conduct preplan inspections of commercial and industrial properties
Continue fire prevention program	Active – Ongoing. Fire departments continue public educational programs
Improve water system to enhance firefighting capacity/ability	Inactive not capable in unincorporated area
Maintain membership in NFIP	Up to each fire department.
Maintain, enforce and update floodplain ordinance	No ordinance is established, but Floodplains are set and meetings are held.
Acquire more water pumps	Unavailable, lack of funding
Continue with improvement to the storm water system	Ongoing. Secondary Roads continues to keep ditches cleared and established to channel storm water
Prevent inflow and infiltration into the sanitary sewer	Unavailable for unincorporated area
Educate the public on maintaining their sump pumps	Not established for rural districts
Maintain and keep storm drains clear of debris	Unavailable in rural areas
Stockpile sand and sandbags	There is short supply on hand, however Grundy County only has flash flooding of roadways never flooding into critical infrastructure or residential areas.
Identify, purchase and remove structures from flood hazard areas	Not available due to funding
Initiate and enforce burn ban in times of drought or as needed	As needed, Fire Chiefs and EMA work together and establish times of Burn bans with Fire Marshalls office

Maintain and improve signals/signage along roadways and at railroad crossings	Active – Ongoing. Signs replaced on as needed regular basis
Establish alternative transportation routes should a road need to be closed	As needed. Detours are well marked when needed.
Purchase emergency signs to be used in case of an incident	Secondary Roads has signs in case of need.
Enforce no parking designations at special events	As needed
Identify fallout shelter locations	Not Completed
Keep communication lines open with Nuclear Plant in Palo, IA	Not Completed
Maintain and/or develop a wellhead protection program	Not Completed
Monitor wells in areas of identified contamination	Active – ongoing. Grundy County Sanitarian performs this task
Monitor the drinking water supply	Unavailable for Unincorporated area
Identify and map areas of past contamination	Not Capable
Maintain and/or develop storm water management program	Not Completed for Rural areas
Eliminate and cap private and abandoned wells in the city	Not Applicable
Eliminate the use of septic tank systems in the city limits	Not Applicable
Follow monitoring requirements set forth by the Iowa DNR	Not completed.
Carry out conservation measures such as erosion control and work with the following organizations: Extension, NRCS, Farm Bureau, EPA, DNR, and Soil and Water Conservation District	Active – Ongoing
Maintain and update anti-virus software	Ongoing task preformed but Grundy Co IT dept.
Secure vulnerable targets, as identified by the LEPC and County EMA with alarms, security cameras and fences	Ongoing, most anhydrous sites are secured
Review and update fire codes as necessary	No Fire codes in unincorporated areas
Continue to cooperate with pipeline owners and operators to ensure locations are marked	Active – Ongoing
Purchase a new tanker and/or pumper	Lack of Funding, Departments replace as needed.
Encourage community to plant shade trees	Not Completed
Provide fans and/or cooling shelter	As needed when heat emergency in place shelters are established.
Maintain air conditioner(s) in community buildings	Unavailable
Keep a supply of drinking water to distribute	Not Completed.
Encourage the public to receive vaccinations	Ongoing, completed by Public Health Department

Cooperate with any countywide mass vaccination plan	Ongoing, Established in Public Health emergency plans
Monitor disease outbreak news from the CDC and Iowa Department of Public Health	Ongoing, keep open line communication with IDPH epidemiologist.
Restrict water usage should it be necessary	Not applicable to Rural areas
Encourage the use of proper materials and construction techniques	Not Completed
Educate city personnel to identify risk areas	Unavailable
Install tiling to help water move away from structures	Not Completed
Enforce a curfew	No Ordinance available for Rural area
Continue regular bridge inspections	Ongoing, task performed by Grundy Co Engineer
Place barricades to close dangerous bridges	As needed when bridge has not passed inspection
Maintain embargos/weight limits as necessary	Ongoing, Grundy Co Engineer authority
Identify and inventory potential sinkhole sites	Ongoing. Marked by red flag by Secondary Roads dept.
Educate city personnel to handle a sinkhole situation	Not Applicable
Secure the area (around a sinkhole)	As needed, performed by Secondary Roads Dept.
Inspect any utility lines that are near a sinkhole	Ongoing
Enforce the local zoning ordinances	Ongoing, Grundy Co Zoning administrator authority
Clear ditches, streams, and waterways on a regular basis	Ongoing, Secondary Roads clears ditches when needed.
Encourage floodproofing/elevating structures in the floodplain	Ongoing. Property owners in identified floodplains are encouraged to take preventative measures
Update flood maps/flood studies for areas throughout the county	Ongoing.
Identify bridges and culverts that can cost effectively be reengineered to reduce future flooding	Ongoing task performed by Grundy County Engineer.
Establish transportation evacuation routes and protocols	Completed in Basic plan and Emergency Support Functions
Develop sandbagging procedures for the community	Not Completed, Risk for Sandbagging in Grundy County is very unlikely
Develop and maintain staging area for dumping during cleanup	As needed, areas are established during need.
Continue cooperation with county in developing flood mitigation efforts	Ongoing.
Purchase additional parkland in order to increase green space and reducing surface flow	Not Completed
Set a designated number of people to be trained in post-disaster record keeping/damage assessments	Active Ongoing, Members of other departments are trained in Disaster Assessment software

Inform the public of reputable and ill reputable contractors following disasters	Not Completed
Encourage all communities to participate in their Local Emergency Planning Commission (LEPC)	Grundy County is a member of the Northeast Iowa Regional Planning Committee
Maintain and update emergency response plans	Active – Ongoing, task is completed every year. 20% of the plan and the HAZMAT plan
Maintain lists of personnel and equipment available to use with response plans	Completed
Maintain communication with county contacts	Active Ongoing / Completed
Maintain NIMS compliance	Active – Ongoing, Public officials, first responders are all trained and comply with NIMS guidelines.

CITY OF BEAMAN – STATUS OF 2012 HAZARD MITIGATION ACTIVITIES	
Mitigation Action	**Committee Determination/Comments**
Educate the public	To be implemented. Plans are being developed for a city Facebook page which will be used to alert citizens, as well as to the city's website.
Continue training and education for fire departments, law enforcement agencies and ambulance crew personnel	Fire Department is active; education is available. Law enforcement and EMS are based out of town.
Maintain and acquire materials and equipment for fire departments, law enforcement agencies and ambulance crew personnel	Fire dept. has updated personal protective gear. Monsanto grant provided grain bin safety and rescue equipment
Provide emergency shelters for evacuees	Active when needed. Community Hall can be opened as a shelter. Has generator, restroom, kitchen, heating and cooling.
Maintain mutual aid agreements	Active. Fire dept. mutual aid with other cities in Grundy County.
Maintain tree trimming program	Active, when needed. After storms or upon evacuation.
Determine locations for potential heating shelters and volunteer organization	Memorial Hall, Active. As Needed
Encourage utility providers and developers to place all utilities underground	To be implemented, as needed as lines are replaced or added
Purchase and maintain backup generators	Active. 3 generators at fire dept., community hall, and lift station. Tested monthly.
Maintain public works equipment	To be implemented as needed. Lift station updated from2015, ongoing work at lagoon site at DNR recommendation. Maintenance contract for water and annual water tower upkeep.
Notify the media on shelter locations	To be implemented as needed. Notification on city website, Marshalltown radio station
Make sure residents keep sidewalks clear of snow and ice	Active, ongoing. Ordinance, notify if not done. City contracts for business district sidewalk snow removal
Maintain use of snow fences in the city/county	Dropped, determined to not be effective in city's situation
Use surge protectors to prevent electrical damage to critical and sensitive equipment	Completed, surge protectors are in place
Backup all digital data	Completed, backed up by the Heart of Iowa
Purchase NOAA weather radios	Completed, sheriff's dept. provided for city hall/library
Enforce and update building codes, as needed	Not completed, Beaman has never had building codes
Maintain storm spotter training for local fire departments/deputies and EMS crews	Active, Fire Dept. maintains spotter training
Continue enforcement of city sump pump discharge ordinance	No city sump pump discharge ordinance

Maintain a list of potential storm sewer projects	To be implemented as needed. Projects addressed as needed
Make available a cleanup crew for after a storm	To be implemented as needed. Citizens are responsible for their own clean up. Volunteer and city personnel assist by situation. A city burn site may be arranged
Maintain law enforcement monitoring of large storage supplies	Completed. Law enforcement contracts with Grundy county
Acquire necessary response and detection equipment for city/county employees	Completed, local fire dept. does not deal with HAZMET situations. Waterloo dept. is called in
Encourage lead based paint and asbestos removal	Low priority, ongoing
Provide a local hazardous waste drop-off site	Low priority, take to county or regional drop-off
Maintain mutual aid agreements with the Northeast Iowa response group	Ongoing, high priority
Keep HAZMAT manuals/information current and easily accessible	Active, high priority. Kept up to date and stored at city clerk's office, fire dept.
Maintain, test, and replace warning sirens	Active, ongoing, tested monthly by the fire department
Install new warning sirens where needed or replace warning sirens with insufficient decibel levels	Completed, new siren installed in 2014
Encourage and maintain enrollment in emergency notification system	Ongoing implemented by the Grundy county ME
Construct or designate a safe room or storm shelter	Not completed, the holdup is lack of funding
Encourage home owners to keep emergency kits	Grundy County EMA does this
Encourage backup power generation for local telephone systems and cellular operations	Completed, telephone and cellular providers do this
Maintain or install GPS units in all emergency service and city/county vehicles	Ongoing, medium priority. City is so small, not a concern for city vehicles.
Maintain automatic TTY TDD machines for emergency personnel and city/county employees	Low priority, dropped. Not within the scope of city services
Enhance Standard Operating Procedures for dissemination of information/press releases in the event of a disaster	Active, rely on Grundy County EMA
Continue training and promotion of the Incident Command System	Active, rely on Grundy County EMA
Complete continuity of government plan	Active, city council developed plan. Required personnel to take training
Encourage use of Iowa One Call before digging	Active, council and clerk remind residents with permits to call. Utilities and Iowa One Call also send reminders.
Upgrade radio communications equipment as needed	Active, rely on Grundy County EMA with the local updates
Regularly review and amend fire and medical HAZMAT response standard operating procedures	Active, high priority of Grundy County EMA
Improve standard operating procedures for schools	Does not apply, Grundy County EMA and BCLUW
Seek to improve communications with other agencies	Not completed, city council has not actively pursued this.

Keep supply of backup radios and cellphones	Not completed, low priority. Funding and storage space are barriers
Maintain list of county emergency contacts	Not completed, a list exists but not reliably notified of content changes
Keep the county updated on personnel changes	Active and ongoing. City clerk makes notifications
Continue cooperation between city roads department and local fire departments during snow emergencies	Active and ongoing, many overlapping personnel
Pursue partnership with rural water as the system expands	Active, the city water is supplied by Iowa Rural Water
Encourage residents to keep smoke detectors, sprinkler systems and fire extinguishers maintained in their homes	Active, rely on Grundy County EMA
Continue an annual inspection program for commercial and industrial properties	Low priority, the city does not make inspections
Continue fire prevention program	Grundy County EMA, high priority
Improve water system to enhance firefighting capacity/ability	Completed. Iowa Rural Water services the community and City well (not used for drinking) good flow
Maintain membership in NFIP	Grundy County EMA
Maintain, enforce and update floodplain ordinance	Active, ordinance reviewed fall 2016 by FEMA representative. No changes made
Acquire more water pumps	To be implemented as needed. Pumps maintained and stored by public works
Continue with improvement to the storm water system	Active and ongoing, maintenance and additional culvers 2014 and 2016.
Prevent inflow and infiltration into the sanitary sewer	Active and ongoing, ordinance against infiltration managed by public works, sewer, water maintenance.
Educate the public on maintaining their sump pumps	Active, privately upon request by sewer water maintenance.
Maintain and keep storm drains clear of debris	To be implemented as needed. City maintenance keep storm drains clear as needed. Regularly monitored
Stockpile sand and sandbags	Historically have never sandbagged. Small area subject to flash flooding
Identify, purchase and remove structures from flood hazard areas	Completed, will be continued. Mid Iowa Co-op has removed structure from their property as needed. That is the only area that floods
Initiate and enforce burn ban in times of drought or as needed	To be implemented as needed
Maintain and improve signals/signage along roadways and at railroad crossings	Roads department and county sheriff
Establish alternative transportation routes should a road need to be closed	To be implemented as needed
Purchase emergency signs to be used in case of an incident	To be implemented as needed. Low priority, signs are on hand and stored at city shed.
Enforce no parking designations at special events	To be implemented as needed for special events city personnel sign area designated by council actions

Identify fallout shelter locations	Dropped, no locations meet specifications
Keep communication lines open with Nuclear Plant in Palo, IA	City council depends on Grundy County EMA for this
Maintain and/or develop a wellhead protection program	Completed, unused wells have had pumps pulled and wells filled, ongoing for 5 years
Monitor wells in areas of identified contamination	Not completed, 1 well remaining not used for drinking water. Available for fire protection and agricultural use.
Monitor the drinking water supply	Active ongoing, monthly test by certified lab
Identify and map areas of past contamination	Completed, use of Iowa Rural Water began in 1980's and discontinued use of wells for drinking water
Maintain and/or develop storm water management program	To be implemented as needed. Public works responsible to needed changes
Eliminate and cap private and abandoned wells in the city	Completed, wells have been capped and filled for the last 10 years
Eliminate the use of septic tank systems in the city limits	Completed, one septic tank in city limits at edge of rural area now served by sewer. All others disconnected
Follow monitoring requirements set forth by the Iowa DNR	Active, ongoing. Followed by water sewer maintenance.
Carry out conservation measures such as erosion control and work with the following organizations: Extension, NRCS, Farm Bureau, EPA, DNR, and Soil and Water Conservation District	To be implemented as needed. Mainly DNR recommendations at lagoon site
Maintain and update anti-virus software	Active, agreement with Heart of Iowa to update as new protection is available
Secure vulnerable targets, as identified by the LEPC and County EMA with alarms, security cameras and fences	Active, security camera and alarms at city hall/library
Review and update fire codes as necessary	No city fire codes. Has not been addressed in ordinance
Continue to cooperate with pipeline owners and operators to ensure locations are marked	No pipelines in city limits/
Purchase a new tanker and/or pumper	Not completed, in long term fire department plans for next 5 years. Funds are being raised and saved.
Encourage community to plant shade trees	Low priority, Branching Out grant in past 10 years and Trees Forever grant.
Provide fans and/or cooling shelter	Completed, memorial hall designated as needed. Generator in site for cooling if necessary
Maintain air conditioner(s) in community buildings	Completed, memorial hall designated as needed. Generator in site for cooling if necessary
Keep a supply of drinking water to distribute	Completed, water tower holds supply. No bottled water stored.
Encourage the public to receive vaccinations	Grundy County EMA and Public Health
Cooperate with any countywide mass vaccination plan	Grundy County EMA
Monitor disease outbreak news from the CDC and Iowa Department of Public Health	Grundy County EMA and sheriff

Restrict water usage should it be necessary	To be implemented as needed, city council
Encourage the use of proper materials and construction techniques	Dropped, city council does not have the capacity to monitor this.
Educate city personnel to identify risk areas	Dropped, city council does not have the capacity to monitor this.
Install tiling to help water move away from structures	To be implemented as needed. Installed as part of new construction
Enforce a curfew	No city curfew, not perceived as needed
Continue regular bridge inspections	Active ongoing, one bridge in city limits inspected annually by inspector
Place barricades to close dangerous bridges	To be implemented, barricades are stored in city shed. When needed, placed by city workers
Maintain embargos/weight limits as necessary	Active, weight limit determined by bridge inspector; posted by county secondary roads
Identify and inventory potential sinkhole sites	Implemented as needed, only one recorded sink hole; caused by water leak
Educate city personnel to handle a sinkhole situation	Implemented as needed, educated by engineer when sink hole developed
Secure the area (around a sinkhole)	Implemented as needed, barricaded by city personnel
Inspect any utility lines that are near a sinkhole	Implement as needed, Aliant energy inspected site of only sinkhole
Enforce the local zoning ordinances	Active, residential ordinance enforced
Clear ditches, streams, and waterways on a regular basis	To be implanted as needed, ditches are kept clean. Streams and waterways do not apply
Encourage floodproofing/elevating structures in the floodplain	Completed, Mid Iowa Co-op has flood proofed their facilities. No other structures in flood plain
Update flood maps/flood studies for areas throughout the county	State keeps up flood maps. No change in local flood map
Identify bridges and culverts that can cost effectively be reengineered to reduce future flooding	Implemented as needed. Only bridge in
Establish transportation evacuation routes and protocols	To be implemented as needed. All streets lead to county hard surfaced roads
Develop sandbagging procedures for the community	Dropped. No river flood potential
Develop and maintain staging area for dumping during cleanup	No river flood potential
Continue cooperation with county in developing flood mitigation efforts	, City Council, very low priority Flash flood, Grundy County EMA
Purchase additional parkland in order to increase green space and reducing surface flow	Very low river flooding potential, no rivers
Set a designated number of people to be trained in post-disaster record keeping/damage assessments	To be implemented as needed. Record keeping procedure established with clerk with FEMA project
Inform the public of reputable and ill reputable contractors following disasters	Grundy County EMA

Encourage all communities to participate in their Local Emergency Planning Commission (LEPC)	Grundy County EMA
Maintain and update emergency response plans	Active, emergency response plan in place guided by INRCOG
Maintain lists of personnel and equipment available to use with response plans	Active, plan indicates each department contributes available equipment and personnel
Maintain communication with county contacts	To be implemented as needed, protocol in place through emergency plan
Maintain NIMS compliance	Implemented as needed, fire department and council trained as needed. New personnel trained.

CITY OF CONRAD – STATUS OF 2012 HAZARD MITIGATION ACTIVITIES	
Mitigation Action	**Committee Determination/Comments**
Educate the public	Ongoing through the website, Facebook and local radio stations. Public Notices are published in the Grundy Register.
Continue training and education for fire departments, law enforcement agencies and ambulance crew personnel	Ongoing annual training. Training is done on a monthly basis.
Maintain and acquire materials and equipment for fire departments, law enforcement agencies and ambulance crew personnel	Ongoing, the pumper gets a pressure test once a year from a third-party vendor and annual test on the hoses. They maintain a maintenance schedule on all other equipment.
Provide emergency shelters for evacuees	The new fire station that was completed in February 2017 is equipped with a generator and will have a fully furnished kitchen. In case of emergency, the emergency fire vehicles and can be housed outside and the bay area is large enough to handle cots or whatever else when be needed on a temporary basis.
Maintain mutual aid agreements	Officially the City has written agreements for law enforcement, fire and EMS. Informally the various small cities in the County have sharing agreements when they will lend out equipment they own to other small cities that may not have that equipment.
Maintain tree trimming program	The public works department has an annual budget and goes through on an annual basis to analyze which streets are the worst and trims those they can and contract out the taller trees.
Determine locations for potential heating shelters and volunteer organization	The new fire station is available in the case of a disaster. It is not open just for a heating issue within a person's residential place.
Encourage utility providers and developers to place all utilities underground	Electrical lines are above ground. In new developments when possible they are put underground. Gas, water, sewer and telephone are underground. Cable is underground as much as possible.
Purchase and maintain backup generators	The fire department just purchased a new generator for the fire station in February 2017. The public works department has one portable generator that they move to the various lift stations. The wastewater plant has a stationary generator.
Maintain public works equipment	This is an annual repetitive process where maintenance is done routinely with major maintenance done as needed. Everything is serviced annually.
Notify the media on shelter locations	Notification will be done with the local radio stations, Facebook and word of mouth. Currently the fire station is the main location in a disaster.
Make sure residents keep sidewalks clear of snow and ice	The City has an ordinance and the public works staff enforces the clearing of the snow and ice.
Maintain use of snow fences in the city/county	Snow fences are available but have not been used in recent years. If there is a substantial amount of snow the City contracts with someone

	to snow blow the snow out.
Use surge protectors to prevent electrical damage to critical and sensitive equipment	Surge protectors are on the entire electronic equipment city wide in all buildings.
Backup all digital data	Financial software is backed up nightly to a cloud based server.
Purchase NOAA weather radios	All city buildings have them in their locations. Citizens can purchase through various county agencies.
Enforce and update building codes, as needed	Ongoing the City Zoning Administrator inspects for setbacks, height, location etc.
Maintain storm spotter training for local fire departments/deputies and EMS crews	The fire department has a training once a year.
Continue enforcement of city sump pump discharge ordinance	Ongoing, the public works always enforce and have them remove when it is being pumped into the sanitary sewer system.
Maintain a list of potential storm sewer projects	Ongoing, the City is currently in the process of doing a five-year capital improvement plan to address and prioritize these projects.
Make available a cleanup crew for after a storm	The public works department cleans up all streets and ROWS. The last big storm, the City had a lot of volunteers that came together to help private citizens, the Park Board volunteered to clean up the parks. The fire department helped residents and helped clear streets to open back up. The City lined up private contractors for all city property.
Maintain law enforcement monitoring of large storage supplies	Not applicable
Acquire necessary response and detection equipment for city/county employees	Tornado sirens are in place and set off by either the fire department or the County in the case of storms. The fire department is the process of replacing all their radios and antenna as part of the fundraising for the new fire station. They are also looking long term into getting a text paging system through firetextresponse.com
Encourage lead based paint and asbestos removal	Not completed because of limited resources.
Provide a local hazardous waste drop-off site	Marshall County has an annual drop-off site that residents can utilize.
Maintain mutual aid agreements with the Northeast Iowa response group	Active the City does have an agreement.
Keep HAZMAT manuals/information current and easily accessible	Ongoing, they get an updated HAZMAT manual whenever they are updated by a third-party vendor. The manuals are kept in the trucks.
Maintain, test, and replace warning sirens	In spring, summer and fall the sirens are tested once a month. Any malfunctions are further tested and repaired if needed. The City relocated one siren to the east side of town and installed two new ones (one on the south side and one on the north side) to insure adequate coverage. All of the backup batteries were replaced in 2016.
Install new warning sirens where needed or replace warning sirens with insufficient decibel levels	Two new sirens were installed approximately five years ago to make sure the City had adequate coverage.
Encourage and maintain enrollment in emergency notification system	This is going to be in the future. The fire department is currently looking at a Fire Text Response system so that a text could be sent out

	to whoever is signed up under the program. The City also maintains three sirens. Alert Iowa is another resource.
Construct or designate a safe room or storm shelter	With the construction of the new fire station, it can be used as a storm shelter. In the middle of the building they have installed a safe room that have re-enforced concrete walls.
Encourage home owners to keep emergency kits	To be investigated, an emergency kit list can be compiled to put on the bulletin board in the future.
Encourage backup power generation for local telephone systems and cellular operations	All backup generation is provided by the telephone and cellular companies.
Maintain or install GPS units in all emergency service and city/county vehicles	NO GPS is installed in the vehicles. Most vehicle operators have a GPS app on their phones.
Maintain automatic TTY TDD machines for emergency personnel and city/county employees	Active - Grundy County Sheriff maintains this system.
Enhance Standard Operating Procedures for dissemination of information/press releases in the event of a disaster	Local television stations monitor the weather radar and notify citizens of impending potential disaster. If the disaster hits the City it is small enough that word of mouth gets to various citizens, information can be posted on the City's Facebook page and local radio stations are contacted.
Continue training and promotion of the Incident Command System	Ongoing. Training is done once a year.
Complete continuity of government plan	The City would work with the EMA Coordinator but for Conrad the Mayor would be the individual in charge. He would be the central coordinator for the public works department, fire and EMS. The Chiefs for the fire and EMS department would be the central coordinator for their activities. The new fire department would be the most important and would be used as the central command center.
Encourage use of Iowa One Call before digging	All citizens that will be digging are informed that they must call Iowa One Call prior to the dig.
Upgrade radio communications equipment as needed	The City currently has new radios and antenna on their list to purchase as part of the construction of the new fire station.
Regularly review and amend fire and medical HAZMAT response standard operating procedures	The fire department follows a manual provided by Zack Tripp of Grundy County Sheriff's Department. He is the Grundy County Coordinator.
Improve standard operating procedures for schools	The BCLUW maintains all operating procedures and updates on a regular basis.
Seek to improve communications with other agencies	All City departments regularly communicate with both local and state agencies on a regular basis via verbal, written and electronic communication.
Keep supply of backup radios and cellphones	The fire department has a radio for each volunteer. They are looking at replacing the existing in their five-year plan but they do not have extra's on hand due to cost. Most city staff have a personal cell phone they have access to if the City issued phone malfunctions.
Maintain list of county emergency contacts	The City has a list of these contacts.

Keep the county updated on personnel changes	The County is updated when there is a change.
Continue cooperation between city roads department and local fire departments during snow emergencies	Ongoing, communication is regular whether there is a snow emergency or not.
Pursue partnership with rural water as the system expands	The City has rural water through Central Iowa Rural Water.
Encourage residents to keep smoke detectors, sprinkler systems and fire extinguishers maintained in their homes	The school system takes field trips to the fire department where they are taught these are fundamental items to have in the home. Then local television has ads during fire prevention week. The local radio stations were advertising to replace batteries during daylight savings time.
Continue an annual inspection program for commercial and industrial properties	Not applicable - The County has a program in place.
Continue fire prevention program	This is done through the school system and field trips to the local fire station.
Improve water system to enhance firefighting capacity/ability	Part of the five-year plan, the main goal is to install a looped water system to increase the flow for firefighting and water pressure for the citizens.
Maintain membership in NFIP	The City is a member of the NFIP.
Maintain, enforce and update floodplain ordinance	Active the City is a member of the NFIP (National Flood Insurance Program).
Acquire more water pumps	The City currently has adequate number of water trash pumps plus the County has various options to use in the case of flooding.
Continue with improvement to the storm water system	Ongoing, with analysis being done on the storm water needs throughout the system. The City currently has a storm water utility ordinance in which they charge all residential, commercial and industrial customers a flat monthly service fee. This fee helps to fund storm sewer projects.
Prevent inflow and infiltration into the sanitary sewer	The City monitors and enforces the sump pump ordinance. Within the last ten years, the City has done a lot of televising and lining of sewer mains to prevent inflow and infiltration of the sewer system.
Educate the public on maintaining their sump pumps	The Public Works department works with citizens on where to locate sump pumps for the best discharge without going into the sewer system.
Maintain and keep storm drains clear of debris	The Public Works department identifies and maintains the drains throughout the year.
Stockpile sand and sandbags	The City does not stockpile but would utilize a county resource if needed. The City is not located near a river. When the local creek does flood it does not affect any buildings.
Identify, purchase and remove structures from flood hazard areas	Structures are not in a flood hazard area.
Initiate and enforce burn ban in times of drought or as needed	The City has an ordinance stating when burning can occur. Facebook will be updated if a burn ban is enforced. Currently Facebook has over

	600 people that are signed up that like Conrad's page.
Maintain and improve signals/signage along roadways and at railroad crossings	There are no railroads crossing in town. The Public Works department maintains all street signage and replaces when needed.
Establish alternative transportation routes should a road need to be closed	Barriers are installed on non-County road. The County maintains alternative routes for the two main farm to market roads.
Purchase emergency signs to be used in case of an incident	The City has road closed signs, barricades and detour signs.
Enforce no parking designations at special events	The City contracts with the Grundy County Sheriff's office and they have the ability to write tickets or two a vehicle.
Identify fallout shelter locations	Not applicable no location present. Future considerations could possibly be the new fire station.
Keep communication lines open with Nuclear Plant in Palo, IA	Not applicable.
Maintain and/or develop a wellhead protection program	The City has a program through the State. The City uses these programs.
Monitor wells in areas of identified contamination	The City does not have any identified contamination areas.
Monitor the drinking water supply	Water testing is done daily.
Identify and map areas of past contamination	The city does not have any identified contamination areas.
Maintain and/or develop storm water management program	There is not an official program but the city does have a sump pump ordinance so that local residents do not discharge into the storm sewer system. The City also charges a storm water fee on all the local utility bills that will be used to replace/maintain storm sewer systems in the future.
Eliminate and cap private and abandoned wells in the city	Ongoing, wells are capped on both private and city property when they are no longer used.
Eliminate the use of septic tank systems in the city limits	There are some septic tank systems on the out skirts of town. There is a city ordinance that does require residents to hook up to the City sewer system if it is available.
Follow monitoring requirements set forth by the Iowa DNR	The public works department does this on a daily basis.
Carry out conservation measures such as erosion control and work with the following organizations: Extension, NRCS, Farm Bureau, EPA, DNR, and Soil and Water Conservation District	The City works with these departments on an as needed basis.
Maintain and update anti-virus software	This is updated automatically on computer systems.
Secure vulnerable targets, as identified by the LEPC and County EMA with alarms, security cameras and fences	Not applicable – no targets in city limits.
Review and update fire codes as necessary	The fire department follows the State fire codes. The State reviews and updates as necessary.
Continue to cooperate with pipeline owners and operators to ensure locations are marked	The City does not have any pipeline owners.
Purchase a new tanker and/or pumper	The City will purchase one when funds are available and the trucks need replaced.

Encourage community to plant shade trees	Not applicable.
Provide fans and/or cooling shelter	The City has the library, city hall and fire station that could be used in an emergency. The fire station is equipped with a new generator.
Maintain air conditioner(s) in community buildings	Ongoing, all air conditioners are maintained in all city buildings.
Keep a supply of drinking water to distribute	Will be provided as needed in an emergency.
Encourage the public to receive vaccinations	The County Public Health does this.
Cooperate with any countywide mass vaccination plan	If one is put into place and encourage by the County the City could provide a location.
Monitor disease outbreak news from the CDC and Iowa Department of Public Health	Grundy County EMA monitors this and will notify the City if applicable.
Restrict water usage should it be necessary	The City could issue a boil issue if needed.
Encourage the use of proper materials and construction techniques	The City follows the State building code. There are no programs in place. The City relies on the contracts but through word of mouth reputable contractors are known and they are on a list of people that perform various duties.
Educate city personnel to identify risk areas	City staff utilizes risk assessment training as available.
Install tiling to help water move away from structures	With the construction of the new fire station additional tiling was installed.
Enforce a curfew	This is done through the contract with the County law enforcement.
Continue regular bridge inspections	Bridget inspections are done by the County.
Place barricades to close dangerous bridges	Bridge closure is done by the County.
Maintain embargos/weight limits as necessary	This is done by Grundy County.
Identify and inventory potential sinkhole sites	Not applicable.
Educate city personnel to handle a sinkhole situation	Not applicable.
Secure the area (around a sinkhole)	Not applicable.
Inspect any utility lines that are near a sinkhole	Not applicable,
Enforce the local zoning ordinances	The Zoning Administrator enforces the Ordinances.
Clear ditches, streams, and waterways on a regular basis	The Public Works maintains an annual observation and clears as needed.
Encourage floodproofing/elevating structures in the floodplain	The land around the creek is in farm land or the golf course.
Update flood maps/flood studies for areas throughout the county	In compliance and updated through FEMA.

Identify bridges and culverts that can cost effectively be reengineered to reduce future flooding	The County identifies those bridges.
Establish transportation evacuation routes and protocols	There are several streets that can take you out of town in all directions.
Develop sandbagging procedures for the community	Not applicable.
Develop and maintain staging area for dumping during cleanup	The City has a burn site.
Continue cooperation with county in developing flood mitigation efforts	Active and ongoing.
Purchase additional parkland in order to increase green space and reducing surface flow	The City has sufficient parks for a City of Conrad's size.
Set a designated number of people to be trained in post-disaster record keeping/damage assessments	EMA is trained and will be liaison for City staff. They also have a disaster relief team and will be used in a disaster situation.
Inform the public of reputable and ill reputable contractors following disasters	The City has a list of six to eight reputable companies that can be used in the case of a disaster.
Encourage all communities to participate in their Local Emergency Planning Commission (LEPC)	The City of Conrad does participate in LEPC and any interested citizen can participate in addition to the Council and city staff.
Maintain and update emergency response plans	The fire department has emergency response plans that they review and updates every couple of years.
Maintain lists of personnel and equipment available to use with response plans	All public works, fire and EMS staff is available. All City owned equipment and equipment that can be borrowed from local communities can be used.
Maintain communication with county contacts	This is ongoing.
Maintain NIMS compliance	The City of Conrad is currently in compliance.

CITY OF DIKE – STATUS OF 2012 HAZARD MITIGATION ACTIVITIES	
Mitigation Action	**Committee Determination/Comments**
Educate the public	Active-ongoing
Continue training and education for fire departments, law enforcement agencies and ambulance crew personnel	Active-repetitive every month 2 training meetings, during the winter months the EMS have training, yearly HAZMAT training
Maintain and acquire materials and equipment for fire departments, law enforcement agencies and ambulance crew personnel	Active-ongoing
Provide emergency shelters for evacuees	Active-city hall/community center if needed
Maintain mutual aid agreements	Active-ongoing
Maintain tree trimming program	Active-ongoing, city maintenance has been trimming/removing trees when needed
Determine locations for potential heating shelters and volunteer organization	Not completed
Encourage utility providers and developers to place all utilities underground	Ongoing project for the city
Purchase and maintain backup generators	Active, city has generator for its electric only, not Aliant
Maintain public works equipment	Active-ongoing- repairs/purchases when needed.
Notify the media on shelter locations	Active, if something would occur, we notify along with EMS/Sheriff
Make sure residents keep sidewalks clear of snow and ice	Active, ordinance in place about snow removal
Maintain use of snow fences in the city/county	Active, city puts up snow fence during winter months
Use surge protectors to prevent electrical damage to critical and sensitive equipment	Active, surge protectors are used
Backup all digital data	Active, computers are backed up every day offsite
Purchase NOAA weather radios	Active, city has a NOAA Radio
Enforce and update building codes, as needed	Active-ongoing- have codes in place
Maintain storm spotter training for local fire departments/deputies and EMS crews	Active, fire and EMS has training very year and discusses procedures
Continue enforcement of city sump pump discharge ordinance	Active-ongoing Ordinance in place
Maintain a list of potential storm sewer projects	Active-ongoing City superintendent works on this
Make available a cleanup crew for after a storm	Active-ongoing City and EMS
Maintain law enforcement monitoring of large storage supplies	Active, City utilizes Grundy County Law Enforcement

Acquire necessary response and detection equipment for city/county employees	Active
Encourage lead based paint and asbestos removal	Not completed
Provide a local hazardous waste drop-off site	Not completed
Maintain mutual aid agreements with the Northeast Iowa response group	Active
Keep HAZMAT manuals/information current and easily accessible	Active, fire department stays up to date on HAZMAT
Maintain, test, and replace warning sirens	Active, tests are run every month during summer
Install new warning sirens where needed or replace warning sirens with insufficient decibel levels	Active, fox ridge has siren and so does the fire department
Encourage and maintain enrollment in emergency notification system	Ongoing
Construct or designate a safe room or storm shelter	Researching possibilities
Encourage home owners to keep emergency kits	Ongoing, EMA
Encourage backup power generation for local telephone systems and cellular operations	Not completed
Maintain or install GPS units in all emergency service and city/county vehicles	Active-ongoing, update as needed
Maintain automatic TTY TDD machines for emergency personnel and city/county employees	Done by Grundy County, do not have local resources
Enhance Standard Operating Procedures for dissemination of information/press releases in the event of a disaster	Active-ongoing
Continue training and promotion of the Incident Command System	Active –fire department handles this
Complete continuity of government plan	Active-ongoing
Encourage use of Iowa One Call before digging	Active-ongoing
Upgrade radio communications equipment as needed	Active, when needed fire/ems upgrades
Regularly review and amend fire and medical HAZMAT response standard operating procedures	Active-ongoing
Improve standard operating procedures for schools	Active-ongoing works with school administration
Seek to improve communications with other agencies	Active, keep updated on changes
Keep supply of backup radios and cellphones	Completed
Maintain list of county emergency contacts	Active, updated when changes are made
Keep the county updated on personnel changes	Active, update county when changes happen
Continue cooperation between city roads department and local fire departments during snow emergencies	Active-ongoing work together

Pursue partnership with rural water as the system expands	Active, city works with central Iowa water association to receive water from them
Encourage residents to keep smoke detectors, sprinkler systems and fire extinguishers maintained in their homes	Active, ongoing education
Continue an annual inspection program for commercial and industrial properties	No need/resources
Continue fire prevention program	Active, yearly
Improve water system to enhance firefighting capacity/ability	Ongoing
Maintain membership in NFIP	Active
Maintain, enforce and update floodplain ordinance	Active, ordinance in place
Acquire more water pumps	Ongoing
Continue with improvement to the storm water system	Ongoing
Prevent inflow and infiltration into the sanitary sewer	Active, ongoing, building improving sewer plant beginning march 2017
Educate the public on maintaining their sump pumps	Active, ordinance in place
Maintain and keep storm drains clear of debris	Active, ongoing. City staff checks/maintains as needed
Stockpile sand and sandbags	Ongoing, city has sand
Identify, purchase and remove structures from flood hazard areas	Ongoing
Initiate and enforce burn ban in times of drought or as needed	Active, ordinance in place about burning
Maintain and improve signals/signage along roadways and at railroad crossings	None
Establish alternative transportation routes should a road need to be closed	Active-ongoing, city superintendent works on this
Purchase emergency signs to be used in case of an incident	Active, city has some signs
Enforce no parking designations at special events	Active, city places signs/blocks when needed for events
Identify fallout shelter locations	Active, city hall/community hall
Keep communication lines open with Nuclear Plant in Palo, IA	Ongoing
Maintain and/or develop a wellhead protection program	None In place
Monitor wells in areas of identified contamination	Ongoing, city superintendent checks water daily
Monitor the drinking water supply	Active, ongoing, water is checked daily
Identify and map areas of past contamination	Ongoing, city keeps log

Maintain and/or develop storm water management program	Active
Eliminate and cap private and abandoned wells in the city	Not completed
Eliminate the use of septic tank systems in the city limits	Not completed
Follow monitoring requirements set forth by the Iowa DNR	Active, ongoing, city works with DNR
Carry out conservation measures such as erosion control and work with the following organizations: Extension, NRCS, Farm Bureau, EPA, DNR, and Soil and Water Conservation District	Active
Maintain and update anti-virus software	Active-ongoing, update daily
Secure vulnerable targets, as identified by the LEPC and County EMA with alarms, security cameras and fences	Sheriff checks
Review and update fire codes as necessary	Active-ongoing
Continue to cooperate with pipeline owners and operators to ensure locations are marked	No pipelines in area
Purchase a new tanker and/or pumper	Not completed
Encourage community to plant shade trees	Ongoing, city tried to plant trees
Provide fans and/or cooling shelter	Ongoing, open city hall/ community center if need
Maintain air conditioner(s) in community buildings	Always making sure is working
Keep a supply of drinking water to distribute	Not completed
Encourage the public to receive vaccinations	Not completed
Cooperate with any countywide mass vaccination plan	Not completed
Monitor disease outbreak news from the CDC and Iowa Department of Public Health	Active-ongoing, EMS
Restrict water usage should it be necessary	Active-ongoing, city would post and let citizens know
Encourage the use of proper materials and construction techniques	Active-ongoing, building code is enforced
Educate city personnel to identify risk areas	Active
Install tiling to help water move away from structures	Public works is involved if needed
Enforce a curfew	Active-ongoing, ordinance in place
Continue regular bridge inspections	Grundy County does this
Place barricades to close dangerous bridges	Grundy County does this
Maintain embargos/weight limits as necessary	Grundy County does this

Identify and inventory potential sinkhole sites	Active-ongoing, public works handles this
Educate city personnel to handle a sinkhole situation	Active-ongoing, public works handles this
Secure the area (around a sinkhole)	Active-ongoing, public works would be the lead
Inspect any utility lines that are near a sinkhole	Active-ongoing, public works handles this
Enforce the local zoning ordinances	Active-ongoing, ordinance in place
Clear ditches, streams, and waterways on a regular basis	Active-ongoing, public works
Encourage floodproofing/elevating structures in the floodplain	Active-ongoing,
Update flood maps/flood studies for areas throughout the county	Active-ongoing, handled by FEMA
Identify bridges and culverts that can cost effectively be reengineered to reduce future flooding	Active-ongoing, handled by county
Establish transportation evacuation routes and protocols	Active-ongoing, work with county, EMS, and city if needed
Develop sandbagging procedures for the community	Unknown if anything is in place
Develop and maintain staging area for dumping during cleanup	Public works would possibly handle this
Continue cooperation with county in developing flood mitigation efforts	Active-ongoing
Purchase additional parkland in order to increase green space and reducing surface flow	Not completed
Set a designated number of people to be trained in post-disaster record keeping/damage assessments	Ongoing, update as needed
Inform the public of reputable and ill reputable contractors following disasters	Active-ongoing, use media outlets to keep citizens up to date
Encourage all communities to participate in their Local Emergency Planning Commission (LEPC)	Active-ongoing,
Maintain and update emergency response plans	Ongoing as needed
Maintain lists of personnel and equipment available to use with response plans	Updated as needed
Maintain communication with county contacts	Active-ongoing,
Maintain NIMS compliance	Active-ongoing,

CITY OF GRUNDY CENTER – STATUS OF 2012 HAZARD MITIGATION ACTIVITIES	
Mitigation Action	**Committee Determination/Comments**
Educate the public	Active/Ongoing
Continue training and education for fire departments, law enforcement agencies and ambulance crew personnel	Active/Ongoing, City council will continue to support as required or as needed
Maintain and acquire materials and equipment for fire departments, law enforcement agencies and ambulance crew personnel	Active/Ongoing, City council will continue to support as required or as needed
Provide emergency shelters for evacuees	Active/Ongoing, school has tornado safe room, city offers residents the se of the community center during storms
Maintain mutual aid agreements	Active/Ongoing, mutual aid agreements with neighboring fire and EMS crews
Maintain tree trimming program	Active/Ongoing, city staff trims trees as needed
Determine locations for potential heating shelters and volunteer organization	Active/Ongoing
Encourage utility providers and developers to place all utilities underground	Active/Ongoing
Purchase and maintain backup generators	Active/Ongoing; Grundy Center Municipal Utilities owns and operates power plant as needed
Maintain public works equipment	Active/Ongoing, equipment is maintained and updated/replaced as needed
Notify the media on shelter locations	Active/Ongoing
Make sure residents keep sidewalks clear of snow and ice	Active/Ongoing, ordinance in place
Maintain use of snow fences in the city/county	Active/Ongoing, as needed
Use surge protectors to prevent electrical damage to critical and sensitive equipment	Completed/ongoing
Backup all digital data	Active/Ongoing; completed nightly
Purchase NOAA weather radios	Active/Ongoing
Enforce and update building codes, as needed	Active/Ongoing, recently updated codes and also has an inspector for building projects
Maintain storm spotter training for local fire departments/deputies and EMS crews	Active/Ongoing
Continue enforcement of city sump pump discharge ordinance	Active/Ongoing
Maintain a list of potential storm sewer projects	Active/Ongoing, as needed
Make available a cleanup crew for after a storm	Active/Ongoing, as needed

Maintain law enforcement monitoring of large storage supplies	Active/Ongoing, currently have multiple gas detection units
Acquire necessary response and detection equipment for city/county employees	Active/Ongoing
Encourage lead based paint and asbestos removal	Active/Ongoing, some materials may be dropped off at Grundy County Transfer Station
Provide a local hazardous waste drop-off site	Active/Ongoing
Maintain mutual aid agreements with the Northeast Iowa response group	Active/Ongoing
Keep HAZMAT manuals/information current and easily accessible	Active/Ongoing
Maintain, test, and replace warning sirens	Active/Ongoing, city and fire department does this
Install new warning sirens where needed or replace warning sirens with insufficient decibel levels	Active/Ongoing, city and fire department does this
Encourage and maintain enrollment in emergency notification system	Active/Ongoing, active with sheriff's office
Construct or designate a safe room or storm shelter	Completed
Encourage home owners to keep emergency kits	Active/Ongoing
Encourage backup power generation for local telephone systems and cellular operations	Active/Ongoing
Maintain or install GPS units in all emergency service and city/county vehicles	Active/Ongoing
Maintain automatic TTY TDD machines for emergency personnel and city/county employees	Active/Ongoing
Enhance Standard Operating Procedures for dissemination of information/press releases in the event of a disaster	Active/Ongoing, social media and emergency management notifications
Continue training and promotion of the Incident Command System	Active/Ongoing
Complete continuity of government plan	Active/Ongoing
Encourage use of Iowa One Call before digging	Active/Ongoing
Upgrade radio communications equipment as needed	Active/Ongoing, as needed
Regularly review and amend fire and medical HAZMAT response standard operating procedures	Active/Ongoing
Improve standard operating procedures for schools	Active/Ongoing
Seek to improve communications with other agencies	Active/Ongoing
Keep supply of backup radios and cellphones	Active/Ongoing, some are available
Maintain list of county emergency contacts	Active/Ongoing
Keep the county updated on personnel changes	Active/Ongoing

Continue cooperation between city roads department and local fire departments during snow emergencies	Active/Ongoing, in good communications with
Pursue partnership with rural water as the system expands	Active/Ongoing, good working relationship
Encourage residents to keep smoke detectors, sprinkler systems and fire extinguishers maintained in their homes	Active/Ongoing
Continue an annual inspection program for commercial and industrial properties	Active/Ongoing
Continue fire prevention program	Active/Ongoing, fire dept. runs this continuously
Improve water system to enhance firefighting capacity/ability	Active/Ongoing
Maintain membership in NFIP	Active/Ongoing
Maintain, enforce and update floodplain ordinance	Active/Ongoing
Acquire more water pumps	Active/Ongoing, as needed
Continue with improvement to the storm water system	Active/Ongoing
Prevent inflow and infiltration into the sanitary sewer	Active/Ongoing, recently completed a sanitary sewer study
Educate the public on maintaining their sump pumps	Active/Ongoing
Maintain and keep storm drains clear of debris	Active/Ongoing, as needed
Stockpile sand and sandbags	Active/Ongoing, as needed
Identify, purchase and remove structures from flood hazard areas	Active/Ongoing
Initiate and enforce burn ban in times of drought or as needed	Active, under direction of the fire chief
Maintain and improve signals/signage along roadways and at railroad crossings	Active/Ongoing
Establish alternative transportation routes should a road need to be closed	Active/Ongoing
Purchase emergency signs to be used in case of an incident	Active, Completed
Enforce no parking designations at special events	Active, Completed
Identify fallout shelter locations	Active/Ongoing
Keep communication lines open with Nuclear Plant in Palo, IA	Active/Ongoing
Maintain and/or develop a wellhead protection program	Wells are not active
Monitor wells in areas of identified contamination	Wells are not active
Monitor the drinking water supply	Active/Ongoing, daily

Identify and map areas of past contamination	Active/Ongoing
Maintain and/or develop storm water management program	Active/Ongoing, storm water utility
Eliminate and cap private and abandoned wells in the city	Completed
Eliminate the use of septic tank systems in the city limits	Active/Ongoing
Follow monitoring requirements set forth by the Iowa DNR	Active/Ongoing
Carry out conservation measures such as erosion control and work with the following organizations: Extension, NRCS, Farm Bureau, EPA, DNR, and Soil and Water Conservation District	Active/Ongoing
Maintain and update anti-virus software	Active/Ongoing, daily
Secure vulnerable targets, as identified by the LEPC and County EMA with alarms, security cameras and fences	Active/Ongoing
Review and update fire codes as necessary	Active/Ongoing
Continue to cooperate with pipeline owners and operators to ensure locations are marked	Active/Ongoing
Purchase a new tanker and/or pumper	Active/Ongoing, fire dept. purchases as needed
Encourage community to plant shade trees	Active/Ongoing
Provide fans and/or cooling shelter	Active/Ongoing
Maintain air conditioner(s) in community buildings	Active/Completed
Keep a supply of drinking water to distribute	Active/Ongoing, could supply if needed
Encourage the public to receive vaccinations	Active/Ongoing
Cooperate with any countywide mass vaccination plan	Active/Ongoing
Monitor disease outbreak news from the CDC and Iowa Department of Public Health	Active/Ongoing
Restrict water usage should it be necessary	Active/Ongoing, available if needed
Encourage the use of proper materials and construction techniques	Active/Ongoing, active –code enforcement
Educate city personnel to identify risk areas	Active/Ongoing
Install tiling to help water move away from structures	Active/Ongoing
Enforce a curfew	Active/Ongoing, in ordinance
Continue regular bridge inspections	Not Applicable
Place barricades to close dangerous bridges	Not Applicable

Maintain embargos/weight limits as necessary	Not Applicable
Identify and inventory potential sinkhole sites	Active/Ongoing
Educate city personnel to handle a sinkhole situation	Active/Ongoing
Secure the area (around a sinkhole)	Active/Ongoing
Inspect any utility lines that are near a sinkhole	Active/Ongoing
Enforce the local zoning ordinances	Active/Ongoing
Clear ditches, streams, and waterways on a regular basis	Active/Ongoing
Encourage floodproofing/elevating structures in the floodplain	Active/Ongoing
Update flood maps/flood studies for areas throughout the county	Active/Ongoing
Identify bridges and culverts that can cost effectively be reengineered to reduce future flooding	Active/Ongoing
Establish transportation evacuation routes and protocols	Active/Ongoing
Develop sandbagging procedures for the community	Active/Ongoing
Develop and maintain staging area for dumping during cleanup	Active/Ongoing- available if needed
Continue cooperation with county in developing flood mitigation efforts	Active/Ongoing
Purchase additional parkland in order to increase green space and reducing surface flow	Active/Ongoing
Set a designated number of people to be trained in post-disaster record keeping/damage assessments	Active/Ongoing
Inform the public of reputable and ill reputable contractors following disasters	Active/Ongoing
Encourage all communities to participate in their Local Emergency Planning Commission (LEPC)	Active/Ongoing
Maintain and update emergency response plans	Active/Ongoing
Maintain lists of personnel and equipment available to use with response plans	Active/Ongoing
Maintain communication with county contacts	Active/Ongoing
Maintain NIMS compliance	Active/Ongoing

CITY OF HOLLAND – STATUS OF 2012 HAZARD MITIGATION ACTIVITIES	
Mitigation Action	**Committee Determination/Comments**
Educate the public	Active; Grundy County EMA; Added Social Media Page
Continue training and education for fire departments, law enforcement agencies and ambulance crew personnel	On-going; Training kept current
Maintain and acquire materials and equipment for fire departments, law enforcement agencies and ambulance crew personnel	Active; City Council oversees
Provide emergency shelters for evacuees	On-going; Grundy County EMA provides
Maintain mutual aid agreements	Active; City Council reviews
Maintain tree trimming program	Active; City ordinance covers
Determine locations for potential heating shelters and volunteer organization	On-going; Grundy County EMA
Encourage utility providers and developers to place all utilities underground	Active; Always required by City Council for new line to be placed underground
Purchase and maintain backup generators	Not Complete; Grundy County EMA; City has no building for this
Maintain public works equipment	Active; Public Works Dept.
Notify the media on shelter locations	As Needed; City Council, Grundy County Sheriff
Make sure residents keep sidewalks clear of snow and ice	Active; Public works/city clerk
Use surge protectors to prevent electrical damage to critical and sensitive equipment	Active; City clerk and City Council
Backup all digital data	Active; City Clerk
Purchase NOAA weather radios	Not Completed; Grundy County EMA
Enforce and update building codes, as needed	Active; City Council and city clerk
Maintain storm spotter training for local fire departments/deputies and EMS crews	Active; Fire Department tracks all training
Continue enforcement of city sump pump discharge ordinance	Active; City Council by city ordinance
Maintain a list of potential storm sewer projects	Ongoing; Public Works and City Council
Make available a cleanup crew for after a storm	Active; Grundy County EMA or Public Works
Maintain law enforcement monitoring of large storage supplies	Not Applicable; Grundy County Sheriff oversees
Acquire necessary response and detection equipment for city/county employees	Active; Grundy County EMA

Encourage lead based paint and asbestos removal	Active; City Council and City Ordinance
Provide a local hazardous waste drop-off site	Active; Grundy County Landfill
Maintain mutual aid agreements with the Northeast Iowa response group	Active; City Council
Keep HAZMAT manuals/information current and easily accessible	Active; Fire Department Maintains
Maintain, test, and replace warning sirens	Not Applicable; Grundy County EMA tests
Install new warning sirens where needed or replace warning sirens with insufficient decibel levels	Not Applicable; Grundy County EMA
Encourage and maintain enrollment in emergency notification system	Active; Grundy County EMA
Construct or designate a safe room or storm shelter	Not Completed; Grundy County EMA
Encourage home owners to keep emergency kits	Not Completed; Grundy County EMA
Encourage backup power generation for local telephone systems and cellular operations	Not Completed; Grundy County EMA
Maintain or install GPS units in all emergency service and city/county vehicles	Ongoing; Volunteer Department Staff
Maintain automatic TTY TDD machines for emergency personnel and city/county employees	Active; Department Staff
Enhance Standard Operating Procedures for dissemination of information/press releases in the event of a disaster	Active; Grundy County EMA
Continue training and promotion of the Incident Command System	Active; Grundy County EMA
Complete continuity of government plan	Active; City Council and Mayor
Encourage use of Iowa One Call before digging	Active; Always needed before building permit
Upgrade radio communications equipment as needed	As Needed; By Department/Grundy County EMA
Regularly review and amend fire and medical HAZMAT response standard operating procedures	On-going; Grundy County EMA
Improve standard operating procedures for schools	On-going; Local School District
Seek to improve communications with other agencies	Active; City Council and Mayor
Keep supply of backup radios and cellphones	Active; Department heads – most use personal
Maintain list of county emergency contacts	Active; All Staff track their own
Keep the county updated on personnel changes	Active; City Clerk
Continue cooperation between city roads department and local fire departments during snow emergencies	Active; Public Works and Streets Department
Pursue partnership with rural water as the system expands	Not Completed; Has been looked into by City Council

Encourage residents to keep smoke detectors, sprinkler systems and fire extinguishers maintained in their homes	Active; Grundy County EMA
Continue an annual inspection program for commercial and industrial properties	Active; Fire Department does this
Continue fire prevention program	On-going; Grundy County EMA goes to schools
Improve water system to enhance firefighting capacity/ability	Active; City Council
Maintain membership in NFIP	Active; City Council; City covers cost
Maintain, enforce and update floodplain ordinance	Active; City Council and City Ordinance
Acquire more water pumps	Not Completed; Grundy County EMA; no budget for City to cover
Continue with improvement to the storm water system	On-going; City
Prevent inflow and infiltration into the sanitary sewer	Active; City Council
Educate the public on maintaining their sump pumps	On-going; City Council and Mayor
Maintain and keep storm drains clear of debris	Active; Public Works employee
Stockpile sand and sandbags	Active; Grundy County EMA holds for City
Identify, purchase and remove structures from flood hazard areas	On-going; City Council
Initiate and enforce burn ban in times of drought or as needed	Active; City Council and Fire Chief
Maintain and improve signals/signage along roadways and at railroad crossings	On-going; County Roads Department
Establish alternative transportation routes should a road need to be closed	On-going; County Roads Department and Grundy County Sheriff
Purchase emergency signs to be used in case of an incident	Active; City has some; Grundy County and Sheriff have more
Enforce no parking designations at special events	Active; County Sheriff
Identify fallout shelter locations	On-going; City Council
Keep communication lines open with Nuclear Plant in Palo, IA	On-going; City Clerk and City Council
Monitor wells in areas of identified contamination	Active; Public Works Department
Monitor the drinking water supply	Active; City Council with Central Iowa Water Association
Identify and map areas of past contamination	As needed; City Council if needed
Maintain and/or develop storm water management program	Active; City Council and Public Works
Eliminate and cap private and abandoned wells in the city	Active; City Council Monitors

Eliminate the use of septic tank systems in the city limits	Active; City Council and City Ordinance
Follow monitoring requirements set forth by the Iowa DNR	On-going; County Engineer
Carry out conservation measures such as erosion control and work with the following organizations: Extension, NRCS, Farm Bureau, EPA, DNR, and Soil and Water Conservation District	On-going
Maintain and update anti-virus software	Active; City Clerk
Secure vulnerable targets, as identified by the LEPC and County EMA with alarms, security cameras and fences	Active; Grundy County Sheriff maintains
Review and update fire codes as necessary	As Needed; Fire Department, Sheriff, and Staff
Continue to cooperate with pipeline owners and operators to ensure locations are marked	As Needed; City Council
Purchase a new tanker and/or pumper	As Needed; City Council
Encourage community to plant shade trees	Active; City Council by ordinance
Provide fans and/or cooling shelter	Not Completed; Grundy County EMA
Maintain air conditioner(s) in community buildings	Active; Public Works and City Council
Keep a supply of drinking water to distribute	Not Completed; Grundy County EMA
Encourage the public to receive vaccinations	Active; Grundy County Public Health Department cover
Cooperate with any countywide mass vaccination plan	Active; Grundy County Public Health Department
Monitor disease outbreak news from the CDC and Iowa Department of Public Health	Active; Grundy County Public Health Department
Restrict water usage should it be necessary	Active; City Council and Grundy County
Encourage the use of proper materials and construction techniques	Active; City Council - Building Permits
Educate city personnel to identify risk areas	Active; City Council and Mayor
Install tiling to help water move away from structures	Active; Public Works Department
Enforce a curfew	On-going; Grundy County Sheriff
Continue regular bridge inspections	Active; Grundy County Engineer and City Council
Place barricades to close dangerous bridges	As Needed; Grundy County Sheriff and City Council
Maintain embargos/weight limits as necessary	Active; Public Works Department
Identify and inventory potential sinkhole sites	On-going; City Council and Grundy County Engineer
Educate city personnel to handle a sinkhole situation	Active; Public Works

Secure the area (around a sinkhole)	Active; Public Works
Inspect any utility lines that are near a sinkhole	Active; City Council
Enforce the local zoning ordinances	Active; City Council and Public Works
Clear ditches, streams, and waterways on a regular basis	Not Applicable; Grundy County EMA
Encourage floodproofing/elevating structures in the floodplain	Active; City Council
Update flood maps/flood studies for areas throughout the county	Active; Grundy County Engineer
Identify bridges and culverts that can cost effectively be reengineered to reduce future flooding	Active; Grundy County Sheriff and City Council
Establish transportation evacuation routes and protocols	Active; City Council and Public Works
Develop sandbagging procedures for the community	Active; City Council and Public Works
Develop and maintain staging area for dumping during cleanup	Active; City Council
Continue cooperation with county in developing flood mitigation efforts	Active; City Council
Purchase additional parkland in order to increase green space and reducing surface flow	Active; City Council and Grundy County Engineer
Set a designated number of people to be trained in post-disaster record keeping/damage assessments	Active; City Council and Grundy County EMA
Inform the public of reputable and ill reputable contractors following disasters	Active; City Council and Grundy County EMA
Encourage all communities to participate in their Local Emergency Planning Commission (LEPC)	Active; City Council and city clerk
Maintain and update emergency response plans	Active; City Council
Maintain lists of personnel and equipment available to use with response plans	Active; City Council and Mayor
Maintain communication with county contacts	On-going; City Council and city clerk
Maintain NIMS compliance	Active; Grundy County EMA and City Council

CITY OF MORRISON – STATUS OF 2012 HAZARD MITIGATION ACTIVITIES	
Mitigation Action	**Committee Determination/Comments**
Educate the public	Not Applicable - to be deleted. Town of only 94 people
Continue training and education for fire departments, law enforcement agencies and ambulance crew personnel	Contract with Grundy County Sheriff's Department and Reinbeck Fire Department.
Maintain and acquire materials and equipment for fire departments, law enforcement agencies and ambulance crew personnel	Contract with Grundy County Sheriff's Department and Reinbeck Fire Department.
Provide emergency shelters for evacuees	Not Completed; No facilities available
Maintain mutual aid agreements	Not Completed; No resources
Maintain tree trimming program	Tree trimming as needed
Determine locations for potential heating shelters and volunteer organization	Town hall could be used
Encourage utility providers and developers to place all utilities underground	Currently being done gradually
Purchase and maintain backup generators	Not Completed; No resources
Maintain public works equipment	Privately contracted
Notify the media on shelter locations	No facilities available
Make sure residents keep sidewalks clear of snow and ice	Not Applicable - to be deleted. No Sidewalks.
Maintain use of snow fences in the city/county	This is done in the fall and taken down in the spring. Volunteers of the City Council or by the Mayor
Use surge protectors to prevent electrical damage to critical and sensitive equipment	Not Completed
Backup all digital data	Not Applicable - to be deleted.
Purchase NOAA weather radios	Siren set off by Reinbeck Fire Department
Enforce and update building codes, as needed	Not Applicable - to be deleted.
Maintain storm spotter training for local fire departments/deputies and EMS crews	Have no fire department or EMS crews
Continue enforcement of city sump pump discharge ordinance	Not Applicable - to be deleted.
Maintain a list of potential storm sewer projects	Not Applicable - to be deleted.
Make available a cleanup crew for after a storm	Volunteers from town helped in previous tornados, along with high school students from Reinbeck. Food and water was donated by a private business

Maintain law enforcement monitoring of large storage supplies	Not Applicable - to be deleted.
Acquire necessary response and detection equipment for city/county employees	Not Applicable - to be deleted.
Encourage lead based paint and asbestos removal	Not Applicable - to be deleted.
Provide a local hazardous waste drop-off site	Not Applicable - to be deleted.
Maintain mutual aid agreements with the Northeast Iowa response group	Active
Keep HAZMAT manuals/information current and easily accessible	Active; in Town Hall
Maintain, test, and replace warning sirens	Active; civil defense siren is maintained by City
Install new warning sirens where needed or replace warning sirens with insufficient decibel levels	Not Applicable - to be deleted.
Encourage and maintain enrollment in emergency notification system	Active; currently doing this.
Construct or designate a safe room or storm shelter	Not Applicable - to be deleted.
Encourage home owners to keep emergency kits	Not Applicable - to be deleted.
Encourage backup power generation for local telephone systems and cellular operations	Not Applicable - to be deleted.
Maintain or install GPS units in all emergency service and city/county vehicles	Not Applicable - to be deleted.
Maintain automatic TTY TDD machines for emergency personnel and city/county employees	Not Applicable - to be deleted.
Enhance Standard Operating Procedures for dissemination of information/press releases in the event of a disaster	Not Applicable - to be deleted.
Continue training and promotion of the Incident Command System	Not Applicable - to be deleted.
Complete continuity of government plan	Not Applicable - to be deleted.
Encourage use of Iowa One Call before digging	Not Applicable - to be deleted.
Upgrade radio communications equipment as needed	Not Applicable - to be deleted.
Regularly review and amend fire and medical HAZMAT response standard operating procedures	Not Applicable - to be deleted.
Improve standard operating procedures for schools	No school; Not Applicable - to be deleted.
Seek to improve communications with other agencies	Active; Good communication with Reinbeck Fire Department and Grundy County Sheriff.
Keep supply of backup radios and cellphones	Not Applicable - to be deleted.
Maintain list of county emergency contacts	Active
Keep the county updated on personnel changes	Active

Continue cooperation between city roads department and local fire departments during snow emergencies	Not Applicable - to be deleted.
Pursue partnership with rural water as the system expands	Active; each person has independent contract with rural water.
Encourage residents to keep smoke detectors, sprinkler systems and fire extinguishers maintained in their homes	Not Applicable - to be deleted.
Continue an annual inspection program for commercial and industrial properties	Not Completed; No resources
Continue fire prevention program	Not Applicable - to be deleted.
Improve water system to enhance firefighting capacity/ability	Active; have facilities to assist fire department
Maintain membership in NFIP	Active
Maintain, enforce and update floodplain ordinance	Active
Acquire more water pumps	Not Applicable - to be deleted.
Continue with improvement to the storm water system	Not Applicable - to be deleted.
Prevent inflow and infiltration into the sanitary sewer	Active; Done by private contractor
Educate the public on maintaining their sump pumps	Not Applicable - to be deleted.
Maintain and keep storm drains clear of debris	Not Applicable - to be deleted.
Stockpile sand and sandbags	Active; Stockpile behind City Hall if needed.
Identify, purchase and remove structures from flood hazard areas	Not Completed
Initiate and enforce burn ban in times of drought or as needed	Active; enforced by Grundy County Sheriff
Maintain and improve signals/signage along roadways and at railroad crossings	Active
Establish alternative transportation routes should a road need to be closed	Not Applicable - to be deleted.
Purchase emergency signs to be used in case of an incident	Active; Signs located in Town Hall
Enforce no parking designations at special events	Active; enforced by Grundy County Sheriff
Identify fallout shelter locations	Not Applicable - to be deleted.
Keep communication lines open with Nuclear Plant in Palo, IA	Not Active
Maintain and/or develop a wellhead protection program	Not Applicable - to be deleted.
Monitor wells in areas of identified contamination	Not Applicable - to be deleted.
Monitor the drinking water supply	Active; Done by private contractor

Identify and map areas of past contamination	Not Applicable - to be deleted.
Maintain and/or develop storm water management program	Not Applicable - to be deleted.
Eliminate and cap private and abandoned wells in the city	Not Applicable - to be deleted.
Eliminate the use of septic tank systems in the city limits	Completed; This was completed when private contractor installed rural water.
Follow monitoring requirements set forth by the Iowa DNR	Active; Completed by private rural water contractor
Carry out conservation measures such as erosion control and work with the following organizations: Extension, NRCS, Farm Bureau, EPA, DNR, and Soil and Water Conservation District	Not Applicable - to be deleted.
Maintain and update anti-virus software	Not Applicable - to be deleted.
Secure vulnerable targets, as identified by the LEPC and County EMA with alarms, security cameras and fences	Not Applicable - to be deleted.
Review and update fire codes as necessary	Not Applicable - to be deleted.
Continue to cooperate with pipeline owners and operators to ensure locations are marked	Not Applicable - to be deleted.
Purchase a new tanker and/or pumper	Not Applicable - to be deleted.
Encourage community to plant shade trees	Not Applicable - to be deleted.
Provide fans and/or cooling shelter	Not Applicable - to be deleted.
Maintain air conditioner(s) in community buildings	Not Applicable - to be deleted.
Keep a supply of drinking water to distribute	Not Applicable - to be deleted.
Encourage the public to receive vaccinations	Not Applicable - to be deleted.
Cooperate with any countywide mass vaccination plan	Not Applicable - to be deleted.
Monitor disease outbreak news from the CDC and Iowa Department of Public Health	Not Applicable - to be deleted.
Restrict water usage should it be necessary	Active; If needed
Encourage the use of proper materials and construction techniques	Active
Educate city personnel to identify risk areas	Not Applicable - to be deleted.
Install tiling to help water move away from structures	Not Applicable - to be deleted.
Enforce a curfew	Not Applicable - to be deleted.
Continue regular bridge inspections	Not Applicable - to be deleted.
Place barricades to close dangerous bridges	Not Applicable - to be deleted.

Maintain embargos/weight limits as necessary	Not Applicable - to be deleted.
Identify and inventory potential sinkhole sites	Not Applicable - to be deleted.
Educate city personnel to handle a sinkhole situation	Not Applicable - to be deleted.
Secure the area (around a sinkhole)	Not Applicable - to be deleted.
Inspect any utility lines that are near a sinkhole	Not Applicable - to be deleted.
Enforce the local zoning ordinances	Not Applicable - to be deleted.
Clear ditches, streams, and waterways on a regular basis	Not Applicable - to be deleted.
Encourage floodproofing/elevating structures in the floodplain	Not Applicable - to be deleted.
Update flood maps/flood studies for areas throughout the county	Active; Done by FEMA
Identify bridges and culverts that can cost effectively be reengineered to reduce future flooding	Not Applicable - to be deleted.
Establish transportation evacuation routes and protocols	Not Applicable - to be deleted.
Develop sandbagging procedures for the community	Not Applicable - to be deleted.
Develop and maintain staging area for dumping during cleanup	Not Applicable - to be deleted.
Continue cooperation with county in developing flood mitigation efforts	Not Applicable - to be deleted.
Purchase additional parkland in order to increase green space and reducing surface flow	Not Applicable - to be deleted.
Set a designated number of people to be trained in post-disaster record keeping/damage assessments	Not Applicable - to be deleted.
Inform the public of reputable and ill reputable contractors following disasters	Not Applicable - to be deleted.
Encourage all communities to participate in their Local Emergency Planning Commission (LEPC)	Not Applicable - to be deleted.
Maintain and update emergency response plans	Active; Contracted by with County
Maintain lists of personnel and equipment available to use with response plans	Active; Contracted by with County
Maintain communication with county contacts	Active; Grundy County Sheriff, EMA, and Reinbeck Fire Department
Maintain NIMS compliance	Not Completed

CITY OF REINBECK – STATUS OF 2012 HAZARD MITIGATION ACTIVITIES	
Mitigation Action	**Committee Determination/Comments**
Educate the public	Active; Operation Edith - School education
Continue training and education for fire departments, law enforcement agencies and ambulance crew personnel	Active; Fire and EMS training is done once a month. Law Enforcement is through the county
Maintain and acquire materials and equipment for fire departments, law enforcement agencies and ambulance crew personnel	Active; Materials and equipment are purchased and updated on a timely basis
Provide emergency shelters for evacuees	Active; the Community Building and churches serve as emergency shelters.
Maintain mutual aid agreements	Active; agreements are with Township and surrounding towns
Maintain tree trimming program	Active; ordinance in place. Notification is sent to homeowners as needed. City trims if left undone.
Determine locations for potential heating shelters and volunteer organization	Active; Memorial Building, Schools, Churches
Encourage utility providers and developers to place all utilities underground	Active; Some are underground. Alliant has upgraded the town
Purchase and maintain backup generators	Active; Generators are serviced every year. Recently purchased a new generator for the water plant - replacing a very old generator
Maintain public works equipment	Equipment is updated as budget will allow. Just purchased skid loader attachments and looking to purchase a new dump truck this fall.
Notify the media on shelter locations	Active; when needed and as happens
Make sure residents keep sidewalks clear of snow and ice	Active ordinance in place. Homeowners are notified and the City clears if they are left undone
Maintain use of snow fences in the city/county	Not Applicable, done by County
Use surge protectors to prevent electrical damage to critical and sensitive equipment	Active; surge protectors are used
Backup all digital data	Active; Backups are made in the cloud and on a daily rotating basis locally
Purchase NOAA weather radios	In Progress
Enforce and update building codes, as needed	Not Applicable; Do not have building enforcer
Maintain storm spotter training for local fire departments/deputies and EMS crews	Active; The county has classes every year, Reinbeck is hosting one a in March 2017
Continue enforcement of city sump pump discharge ordinance	Not Completed; In consideration
Maintain a list of potential storm sewer projects	Active; Snyder and Associates have been hired to prepare a storm sewer survey for the entire town
Make available a cleanup crew for after a storm	Active; City crew and Fire Department.

Maintain law enforcement monitoring of large storage supplies	Not Applicable; Contracts with Grundy County Sheriff
Acquire necessary response and detection equipment for city/county employees	Active; Fire and EMS equipment is upgraded when needed. Police is contract with Grundy County Sheriff
Encourage lead based paint and asbestos removal	Not Completed Marshalltown has a program
Provide a local hazardous waste drop-off site	Not Completed
Maintain mutual aid agreements with the Northeast Iowa response group	Active
Keep HAZMAT manuals/information current and easily accessible	Active; Materials are at City Hall
Maintain, test, and replace warning sirens	Active Tests are done the last Monday of each month at 7:00 from March through October
Install new warning sirens where needed or replace warning sirens with insufficient decibel levels	Active; A new warning siren is being installed on the south end of town the week of 5-16-16
Encourage and maintain enrollment in emergency notification system	Not Completed
Construct or designate a safe room or storm shelter	Not Completed
Encourage home owners to keep emergency kits	Not Completed
Encourage backup power generation for local telephone systems and cellular operations	Active; Reinbeck k telecommunications has backup
Maintain or install GPS units in all emergency service and city/county vehicles	Not completed
Maintain automatic TTY TDD machines for emergency personnel and city/county employees	Not Completed
Enhance Standard Operating Procedures for dissemination of information/press releases in the event of a disaster	Active; In Emergency Management Plan
Continue training and promotion of the Incident Command System	Active
Complete continuity of government plan	Active
Encourage use of Iowa One Call before digging	Active; All city digs are called in to One Call. Out building permits state to call One Call before digging.
Upgrade radio communications equipment as needed	Active; Requirement
Regularly review and amend fire and medical HAZMAT response standard operating procedures	Active; yearly
Improve standard operating procedures for schools	Completed by school
Seek to improve communications with other agencies	Active
Keep supply of backup radios and cellphones	Active; extra radios, cell phone stays in ambulance
Maintain list of county emergency contacts	Active
Keep the county updated on personnel changes	Active

Continue cooperation between city roads department and local fire departments during snow emergencies	Active
Pursue partnership with rural water as the system expands	Active; rural water is our city's water supply backup
Encourage residents to keep smoke detectors, sprinkler systems and fire extinguishers maintained in their homes	Active; Have put alarms in homes
Continue an annual inspection program for commercial and industrial properties	Not Applicable
Continue fire prevention program	Active; every October
Improve water system to enhance firefighting capacity/ability	Active; on-going
Maintain membership in NFIP	Active
Maintain, enforce and update floodplain ordinance	Active
Acquire more water pumps	Active; City owns trash pumps
Continue with improvement to the storm water system	Active; working with Snyder and Associates to do an assessment of storm sewers in the city
Prevent inflow and infiltration into the sanitary sewer	In progress; Slip lining slowly
Educate the public on maintaining their sump pumps	Not Applicable
Maintain and keep storm drains clear of debris	Active; City crew cleans storm drains
Stockpile sand and sandbags	Active; have sand and bags
Identify, purchase and remove structures from flood hazard areas	On-going; have identified said structures
Initiate and enforce burn ban in times of drought or as needed	Active; City issues burn bans during drought
Maintain and improve signals/signage along roadways and at railroad crossings	Not Applicable; No rail crossings
Establish alternative transportation routes should a road need to be closed	Active; through county and state
Purchase emergency signs to be used in case of an incident	Active
Enforce no parking designations at special events	Active
Identify fallout shelter locations	Not applicable
Keep communication lines open with Nuclear Plant in Palo, IA	Not Complete
Maintain and/or develop a wellhead protection program	Active; Wellhead protection program is in ordinance
Monitor wells in areas of identified contamination	Active; Wells are inspected and not in an area of contamination
Monitor the drinking water supply	Active; daily tests are taken according to DNR standards

Identify and map areas of past contamination	Not applicable; no past incidents
Maintain and/or develop storm water management program	Active; Hired Snyder and Associates to prepare storm water assessment of whole town
Eliminate and cap private and abandoned wells in the city	Not Applicable
Eliminate the use of septic tank systems in the city limits	In progress
Follow monitoring requirements set forth by the Iowa DNR	Active
Carry out conservation measures such as erosion control and work with the following organizations: Extension, NRCS, Farm Bureau, EPA, DNR, and Soil and Water Conservation District	Not Completed
Maintain and update anti-virus software	Active; Anti-virus software is on computer and updated
Secure vulnerable targets, as identified by the LEPC and County EMA with alarms, security cameras and fences	Not Completed; In consideration
Review and update fire codes as necessary	Not Applicable
Continue to cooperate with pipeline owners and operators to ensure locations are marked	Not Applicable
Purchase a new tanker and/or pumper	On-going; purchases when needed
Encourage community to plant shade trees	Not Applicable
Provide fans and/or cooling shelter	Active; Memorial Building
Maintain air conditioner(s) in community buildings	Active; New AC has been installed at the Memorial Building
Keep a supply of drinking water to distribute	Active; Local businesses
Encourage the public to receive vaccinations	Not Applicable; County Nurse
Cooperate with any countywide mass vaccination plan	On-going; As needed
Monitor disease outbreak news from the CDC and Iowa Department of Public Health	On-going; As needed
Restrict water usage should it be necessary	Active
Encourage the use of proper materials and construction techniques	Active
Educate city personnel to identify risk areas	Active
Install tiling to help water move away from structures	Active; have in some areas
Enforce a curfew	Active
Continue regular bridge inspections	Not Applicable
Place barricades to close dangerous bridges	Not Applicable

Maintain embargos/weight limits as necessary	Not Applicable
Identify and inventory potential sinkhole sites	Not Applicable
Educate city personnel to handle a sinkhole situation	Not Applicable
Secure the area (around a sinkhole)	Not Applicable
Inspect any utility lines that are near a sinkhole	Not Applicable
Enforce the local zoning ordinances	Active; the City is working on a new zoning ordinance with Snyder and Associates to bring it up to date and make enforcement easier
Clear ditches, streams, and waterways on a regular basis	Not Applicable
Encourage floodproofing/elevating structures in the floodplain	Active
Update flood maps/flood studies for areas throughout the county	Active
Identify bridges and culverts that can cost effectively be reengineered to reduce future flooding	Not Applicable
Establish transportation evacuation routes and protocols	Not Applicable
Develop sandbagging procedures for the community	Active
Develop and maintain staging area for dumping during cleanup	Active
Continue cooperation with county in developing flood mitigation efforts	Active
Purchase additional parkland in order to increase green space and reducing surface flow	Not Complete; No plans
Set a designated number of people to be trained in post-disaster record keeping/damage assessments	Not Applicable
Inform the public of reputable and ill reputable contractors following disasters	Active
Encourage all communities to participate in their Local Emergency Planning Commission (LEPC)	Not Complete
Maintain and update emergency response plans	Active
Maintain lists of personnel and equipment available to use with response plans	Active
Maintain communication with county contacts	Active
Maintain NIMS compliance	Active

CITY OF STOUT – STATUS OF 2012 HAZARD MITIGATION ACTIVITIES	
Mitigation Action	**Committee Determination/Comments**
Educate the public	Ongoing
Continue training and education for fire departments, law enforcement agencies and ambulance crew personnel	Active/Ongoing. Contracts with Grundy County for Police
Maintain and acquire materials and equipment for fire departments, law enforcement agencies and ambulance crew personnel	Active/Ongoing. Contracts with Grundy County for Police
Provide emergency shelters for evacuees	Not Completed
Maintain mutual aid agreements	Ongoing
Maintain tree trimming program	Not Applicable, no ordinance.
Determine locations for potential heating shelters and volunteer organization	Not Completed
Encourage utility providers and developers to place all utilities underground	Ongoing, when new are added
Purchase and maintain backup generators	Not Completed
Maintain public works equipment	Ongoing
Notify the media on shelter locations	Not Completed
Make sure residents keep sidewalks clear of snow and ice	Ongoing, in ordinance
Maintain use of snow fences in the city/county	Ongoing
Use surge protectors to prevent electrical damage to critical and sensitive equipment	Ongoing
Backup all digital data	Ongoing
Purchase NOAA weather radios	Not Completed
Enforce and update building codes, as needed	Not Applicable, no ordinance.
Maintain storm spotter training for local fire departments/deputies and EMS crews	Ongoing, done by fire department
Continue enforcement of city sump pump discharge ordinance	Not Completed
Maintain a list of potential storm sewer projects	Not Completed
Make available a cleanup crew for after a storm	Ongoing
Maintain law enforcement monitoring of large storage supplies	Not Applicable, completed by county.

Acquire necessary response and detection equipment for city/county employees	Not Applicable, completed by county.
Encourage lead based paint and asbestos removal	Not Completed
Provide a local hazardous waste drop-off site	Not Applicable, completed by county.
Maintain mutual aid agreements with the Northeast Iowa response group	Ongoing
Keep HAZMAT manuals/information current and easily accessible	Ongoing
Maintain, test, and replace warning sirens	Ongoing, done by fire dept.
Install new warning sirens where needed or replace warning sirens with insufficient decibel levels	As Needed
Encourage and maintain enrollment in emergency notification system	County uses AlertIowa
Construct or designate a safe room or storm shelter	Not Completed
Encourage home owners to keep emergency kits	Not Completed
Encourage backup power generation for local telephone systems and cellular operations	Ongoing
Maintain or install GPS units in all emergency service and city/county vehicles	Not Completed
Maintain automatic TTY TDD machines for emergency personnel and city/county employees	Not Applicable, completed by county.
Enhance Standard Operating Procedures for dissemination of information/press releases in the event of a disaster	Not Applicable, completed by county.
Continue training and promotion of the Incident Command System	Not Completed
Complete continuity of government plan	Not Completed
Encourage use of Iowa One Call before digging	Ongoing
Upgrade radio communications equipment as needed	As Needed
Regularly review and amend fire and medical HAZMAT response standard operating procedures	As Needed
Improve standard operating procedures for schools	Not Applicable
Seek to improve communications with other agencies	Ongoing
Keep supply of backup radios and cellphones	Not Completed
Maintain list of county emergency contacts	Ongoing
Keep the county updated on personnel changes	Ongoing
Continue cooperation between city roads department and local fire departments during snow emergencies	Ongoing

Pursue partnership with rural water as the system expands	Ongoing
Encourage residents to keep smoke detectors, sprinkler systems and fire extinguishers maintained in their homes	Ongoing
Continue an annual inspection program for commercial and industrial properties	Not Completed
Continue fire prevention program	Not Completed
Improve water system to enhance firefighting capacity/ability	Ongoing
Maintain membership in NFIP	Not Completed
Maintain, enforce and update floodplain ordinance	Not Applicable
Acquire more water pumps	Not Completed
Continue with improvement to the storm water system	Completed, 2015
Prevent inflow and infiltration into the sanitary sewer	Completed, 2015
Educate the public on maintaining their sump pumps	Ongoing
Maintain and keep storm drains clear of debris	Completed, 2015
Stockpile sand and sandbags	Not Completed
Identify, purchase and remove structures from flood hazard areas	Not Completed
Initiate and enforce burn ban in times of drought or as needed	Not Completed
Maintain and improve signals/signage along roadways and at railroad crossings	Not Applicable
Establish alternative transportation routes should a road need to be closed	Ongoing
Purchase emergency signs to be used in case of an incident	Ongoing
Enforce no parking designations at special events	Not Completed
Identify fallout shelter locations	Not Completed
Keep communication lines open with Nuclear Plant in Palo, IA	Not Completed
Maintain and/or develop a wellhead protection program	Not Completed
Monitor wells in areas of identified contamination	Not Completed
Monitor the drinking water supply	Not Completed
Identify and map areas of past contamination	Not Applicable

Maintain and/or develop storm water management program	Not Completed
Eliminate and cap private and abandoned wells in the city	Not Completed
Eliminate the use of septic tank systems in the city limits	Not Completed
Follow monitoring requirements set forth by the Iowa DNR	Ongoing
Carry out conservation measures such as erosion control and work with the following organizations: Extension, NRCS, Farm Bureau, EPA, DNR, and Soil and Water Conservation District	Ongoing
Maintain and update anti-virus software	Ongoing
Secure vulnerable targets, as identified by the LEPC and County EMA with alarms, security cameras and fences	Not Applicable
Review and update fire codes as necessary	Done by fire dept.
Continue to cooperate with pipeline owners and operators to ensure locations are marked	Not Applicable
Purchase a new tanker and/or pumper	As needed
Encourage community to plant shade trees	Not Completed
Provide fans and/or cooling shelter	Not Completed
Maintain air conditioner(s) in community buildings	Ongoing
Keep a supply of drinking water to distribute	Not Completed
Encourage the public to receive vaccinations	Not Completed
Cooperate with any countywide mass vaccination plan	Not Completed
Monitor disease outbreak news from the CDC and Iowa Department of Public Health	Not Completed
Restrict water usage should it be necessary	Not Completed
Encourage the use of proper materials and construction techniques	Not Completed
Educate city personnel to identify risk areas	Not Completed
Install tiling to help water move away from structures	Not Completed
Enforce a curfew	Not Completed
Continue regular bridge inspections	Not Applicable, completed by county.
Place barricades to close dangerous bridges	Not Applicable, completed by county.
Maintain embargos/weight limits as necessary	Not Applicable, completed by county.

Identify and inventory potential sinkhole sites	Not Applicable
Educate city personnel to handle a sinkhole situation	Not Applicable
Secure the area (around a sinkhole)	Not Applicable
Inspect any utility lines that are near a sinkhole	Not Applicable
Enforce the local zoning ordinances	Not Applicable
Clear ditches, streams, and waterways on a regular basis	Not Completed
Encourage floodproofing/elevating structures in the floodplain	Not Completed
Update flood maps/flood studies for areas throughout the county	Done by FEMA
Identify bridges and culverts that can cost effectively be reengineered to reduce future flooding	Not Applicable, completed by county.
Establish transportation evacuation routes and protocols	Not Applicable, completed by county.
Develop sandbagging procedures for the community	Not Completed
Develop and maintain staging area for dumping during cleanup	Not Completed
Continue cooperation with county in developing flood mitigation efforts	Not Completed
Purchase additional parkland in order to increase green space and reducing surface flow	Not Completed
Set a designated number of people to be trained in post-disaster record keeping/damage assessments	Not Completed
Inform the public of reputable and ill reputable contractors following disasters	Ongoing
Encourage all communities to participate in their Local Emergency Planning Commission (LEPC)	Ongoing
Maintain and update emergency response plans	Ongoing
Maintain lists of personnel and equipment available to use with response plans	Not Completed
Maintain communication with county contacts	Ongoing
Maintain NIMS compliance	Not Completed, currently researching options

CITY OF WELLSBURG – STATUS OF 2012 HAZARD MITIGATION ACTIVITIES	
Mitigation Action	**Committee Determination/Comments**
Educate the public	On-Going; As needed
Continue training and education for fire departments, law enforcement agencies and ambulance crew personnel	Active; Fire and EMS are trained on a scheduled basis
Maintain and acquire materials and equipment for fire departments, law enforcement agencies and ambulance crew personnel	Active; All fire and ambulance equipment are maintained or replaced as needed. The City contracts law enforcement with Grundy Count Sheriff. All maintenance and replacement of equipment is determined by Sheriff.
Provide emergency shelters for evacuees	Memorial Building is designated as shelter; Fire department is notified - has cots and supplies available for setup
Maintain mutual aid agreements	Active; agreements in place with surrounding communities and townships
Maintain tree trimming program	All street trees are maintained as needed. Any deceased or dead street trees are removed as needed.
Determine locations for potential heating shelters and volunteer organization	Completed; Memorial Building is designated as shelter; Fire department is notified - has cots and supplies available for setup
Encourage utility providers and developers to place all utilities underground	Not completed
Purchase and maintain backup generators	Backup generators for the community located at fire department. Shared generator for fire department and memorial building. The lift station also has a backup generator
Maintain public works equipment	Active; maintenance of all public works equipment and vehicles
Notify the media on shelter locations	Media is to be notified on an as needed basis
Make sure residents keep sidewalks clear of snow and ice	Active; all snow removed requirements are set by the ordinance.
Maintain use of snow fences in the city/county	Snow fences are placed in areas as needed
Use surge protectors to prevent electrical damage to critical and sensitive equipment	Active
Backup all digital data	City Hall and Library data are backed up offsite daily
Purchase NOAA weather radios	No active program at this time
Enforce and update building codes, as needed	Active; have revised building permits and imposed penalties for not acquiring prior to building
Maintain storm spotter training for local fire departments/deputies and EMS crews	Active
Continue enforcement of city sump pump discharge ordinance	House to house inspections was completed; currently working through additional measures

Maintain a list of potential storm sewer projects	No projects at this time
Make available a cleanup crew for after a storm	Active; cleanup is handled by public works
Maintain law enforcement monitoring of large storage supplies	Active
Acquire necessary response and detection equipment for city/county employees	On-Going.
Encourage lead based paint and asbestos removal	On-Going.
Provide a local hazardous waste drop-off site	On-Going.
Maintain mutual aid agreements with the Northeast Iowa response group	Active member
Keep HAZMAT manuals/information current and easily accessible	On-Going.
Maintain, test, and replace warning sirens	On-Going; warning sirens are tested once per month during severe weather season.
Install new warning sirens where needed or replace warning sirens with insufficient decibel levels	On-going; warning siren will be replaced as needed
Encourage and maintain enrollment in emergency notification system	On-going; notification through city website and Facebook pages
Construct or designate a safe room or storm shelter	Active; Shelter is available at the Wellsburg Memorial Building
Encourage home owners to keep emergency kits	Not completed
Encourage backup power generation for local telephone systems and cellular operations	Not completed
Maintain or install GPS units in all emergency service and city/county vehicles	Not completed; Lack of funding
Maintain automatic TTY TDD machines for emergency personnel and city/county employees	Grundy County maintains their own equipment
Enhance Standard Operating Procedures for dissemination of information/press releases in the event of a disaster	Not Complete; Talked about/discussed
Continue training and promotion of the Incident Command System	Not Complete; Talked about/discussed
Complete continuity of government plan	Not Complete; Talked about/discussed
Encourage use of Iowa One Call before digging	Active; City Clerk reminds people
Upgrade radio communications equipment as needed	Active; Upgrades coming - upgrade as seen necessary
Regularly review and amend fire and medical HAZMAT response standard operating procedures	Active; Reviewed annually
Improve standard operating procedures for schools	Active; Reviewed as needed
Seek to improve communications with other agencies	Active; Communications with Grundy County departments are clear
Keep supply of backup radios and cellphones	Active; Radios are used, only personal cell phones used

Maintain list of county emergency contacts	Active; Contract with Grundy County Sheriff - they do dispatch and handle calls
Keep the county updated on personnel changes	On-Going; Updated as needed.
Continue cooperation between city roads department and local fire departments during snow emergencies	Active
Pursue partnership with rural water as the system expands	Completed -Contract with CIWA for the purchase of water
Encourage residents to keep smoke detectors, sprinkler systems and fire extinguishers maintained in their homes	Not Completed - could be easily implemented through use of social media
Continue an annual inspection program for commercial and industrial properties	Not Completed - No funding available to hire inspectors
Continue fire prevention program	Active - Presented annually during fire protection week.
Improve water system to enhance firefighting capacity/ability	Completed - in 2007 the system was updated
Maintain membership in NFIP	Active - City maintains a membership with NFIP
Maintain, enforce and update floodplain ordinance	Active - Ordinance in place and enforced through the building permit process
Acquire more water pumps	Completed
Continue with improvement to the storm water system	Not Completed
Prevent inflow and infiltration into the sanitary sewer	Active
Educate the public on maintaining their sump pumps	Not Completed
Maintain and keep storm drains clear of debris	Active; Completed as needed
Stockpile sand and sandbags	On-going; as needed - will purchase and fill in an emergency. City currently does have a small supply available.
Identify, purchase and remove structures from flood hazard areas	N/A - To be deleted (City does not have structures in flood plain)
Initiate and enforce burn ban in times of drought or as needed	As necessary; Determined by County Fire Chief
Maintain and improve signals/signage along roadways and at railroad crossings	As Necessary; Signs are updated/replaced according to requirements
Establish alternative transportation routes should a road need to be closed	As Necessary; Barricades will be put in place and detour signs placed where needed.
Purchase emergency signs to be used in case of an incident	Active; Some signage has been purchased, others will be purchased as necessary.
Enforce no parking designations at special events	Active; enforced by Sheriff's Department
Identify fallout shelter locations	Not Complete; None in area
Keep communication lines open with Nuclear Plant in Palo, IA	Done through Grundy County Sheriff

Maintain and/or develop a wellhead protection program	Not Applicable; City no longer has a well, water purchased from Central Iowa Water Association.
Monitor wells in areas of identified contamination	Not Applicable; City no longer has a well, water purchased from Central Iowa Water Association.
Monitor the drinking water supply	Active; Test completed as required by DNR permits
Identify and map areas of past contamination	Not Applicable; No past contamination present
Maintain and/or develop storm water management program	Not completed; Lack of funding
Eliminate and cap private and abandoned wells in the city	Active; No private wells as of now and ordinance in place prohibiting the construction of new wells.
Eliminate the use of septic tank systems in the city limits	Not completed; Lack of funding
Follow monitoring requirements set forth by the Iowa DNR	Active
Carry out conservation measures such as erosion control and work with the following organizations: Extension, NRCS, Farm Bureau, EPA, DNR, and Soil and Water Conservation District	To be implemented as necessary
Maintain and update anti-virus software	Active; Scheduled updates and renewals
Secure vulnerable targets, as identified by the LEPC and County EMA with alarms, security cameras and fences	Not applicable; no vulnerable targets identified.
Review and update fire codes as necessary	Active; Completed as needed
Continue to cooperate with pipeline owners and operators to ensure locations are marked	Not applicable; no pipeline in area
Purchase a new tanker and/or pumper	On-going; completed as needed and when funds are available
Encourage community to plant shade trees	Not Completed
Provide fans and/or cooling shelter	Active; Memorial Building has been designated as a shelter
Maintain air conditioner(s) in community buildings	Active; All air conditioners are maintained on an annual basis
Keep a supply of drinking water to distribute	Not Completed
Encourage the public to receive vaccinations	Not Completed
Cooperate with any countywide mass vaccination plan	Not Completed
Monitor disease outbreak news from the CDC and Iowa Department of Public Health	On-going
Restrict water usage should it be necessary	To be implemented as necessary
Encourage the use of proper materials and construction techniques	Active; building permits follow Iowa Building Code
Educate city personnel to identify risk areas	Not Completed
Install tiling to help water move away from structures	Not Completed

Enforce a curfew	Not Completed
Continue regular bridge inspections	Active; Conducted by Grundy County Engineer
Place barricades to close dangerous bridges	As Necessary
Maintain embargos/weight limits as necessary	On-going; Done by Grundy County Engineer as needed
Identify and inventory potential sinkhole sites	Not Applicable; No sinkholes
Educate city personnel to handle a sinkhole situation	Not Applicable; No sinkholes
Secure the area (around a sinkhole)	Not Applicable; No sinkholes
Inspect any utility lines that are near a sinkhole	Not Applicable; No sinkholes
Enforce the local zoning ordinances	Active; Building permits are issued
Clear ditches, streams, and waterways on a regular basis	As needed
Encourage floodproofing/elevating structures in the floodplain	Active; NFIP - No construction in flood plain per ordinance
Update flood maps/flood studies for areas throughout the county	On-going; completed by FEMA
Identify bridges and culverts that can cost effectively be reengineered to reduce future flooding	Active; completed by Grundy County
Establish transportation evacuation routes and protocols	To be implemented as necessary
Develop sandbagging procedures for the community	Not Completed
Develop and maintain staging area for dumping during cleanup	To be implemented as necessary
Continue cooperation with county in developing flood mitigation efforts	Not Completed
Purchase additional parkland in order to increase green space and reducing surface flow	Not Completed
Set a designated number of people to be trained in post-disaster record keeping/damage assessments	Not Completed
Inform the public of reputable and ill reputable contractors following disasters	To be implemented as necessary
Encourage all communities to participate in their Local Emergency Planning Commission (LEPC)	Not Completed
Maintain and update emergency response plans	Not Completed
Maintain lists of personnel and equipment available to use with response plans	Not Completed
Maintain communication with county contacts	Active
Maintain NIMS compliance	Not Completed

OVERALL HMP UPDATE CHANGES

Each participating jurisdiction reviewed the County's 2012 MJ-HMP. Needed updates were identified by each jurisdiction, including: development, status of mitigation actions, and assessment of hazards. Relevant county and city data was also researched and updated regarding population and infrastructure totals and vulnerabilities. The table below displays a summary of updates by section.

Overall MJ-HMP Updates		
Section	**Update**	**Comments**
Section 1 – Introduction	Yes	• Updated planning process, participants and schedule • Updated identified hazards and assessment to reflect hazards and assessment criteria of State of Iowa's 2013 HMP
Section 2 – Composite Community Profile	Yes	• Updated Infrastructure information, including transportation and utilities • Updated Census and American Community Survey data • Updated housing, income, and economy data • Updated local jurisdictional information • Updated all tables and local information
Section 3 - Hazard Analysis & Risk Assessment (includes Vulnerability Assessment)	Yes	• Identified new list of hazards (2013 State HMP hazards) • Identified new list of hazards • Scored new hazard list with new scoring criteria for each jurisdiction • Updated composite assessment scores for Grundy County and all jurisdictions • Updated disaster historical occurrences • Updated average assessment scores for Grundy County and all jurisdictions • Redefined subcategories describing individual hazards • Updated and completed vulnerability assessments (identifying critical facilities and social assets) affected by flooding (river and flash) and tornados. • Updated the estimating potential property losses and repetitive loss properties with available data • Updated NFIP status • Updated vulnerability assessment, including shelters, values in floodplains, and "at-risk" population data
Section 4 – Mitigation Strategy	Yes	• Reviewed and confirmed existing mitigation goals for the planning area • Removed completed or no longer applicable projects/actions/activities, if any • Changed format from listing mitigation activities repeatedly under each hazard to once under the FEMA's six categories for mitigation activities – prevention, property protection, natural resource protection, emergency management, structural, and public education and awareness • Updated planning and regulatory documents

		• Updated public education and awareness mitigation actions • Updated emergency services mitigation actions • Updated to include new warning system in place • Reviewed, added and deleted mitigation activities analysis from the previous menu of potential strategies. • Identified agencies responsible for implementation of mitigation activities • Reorganized Mitigation Action Steps into subgroups
Section 5 - Plan Maintenance, Review, & Amendment	Yes	• Updated how the MJ-HMP should be updated, evaluated and reviewed, incorporated into other planning mechanisms, and continued public participation should be met

Appendices/Attachments	Yes	• Reorganized maps/city profiles into appendixes and attachments
		• Updated all city appendices from 2012 plan
		  ○ Community Profiles, transportation, developments, and utility providers
		  ○ Demographic data
		  ○ New list of hazards and analysis criteria
		  ○ Vulnerability analysis of critical facilities, populations, and estimated property loss
		  ○ NFIP status and repetitive loss status, where applicable
		  ○ Current mitigation activities
		  ○ Reviewed, added and deleted mitigation activities analysis from the previous menu of potential strategies
		• Added tornado scenario maps
		• Updated historic tornado map
		• Updated city flood scenario and county floodplain maps
		• Added city floodplain maps
		• Updated city critical site maps
		• Updated county-wide critical site maps and divided into individual maps for each critical site
		• Added status update of previous hazard mitigation activities

ATTACHMENT 9: PLANNING COMMITTEE & PUBLIC INVOLVMENT MATERIALS

Committee Meeting #1: April 6th, 2016

- PUBLIC MEETING AGENDA-

Grundy County Multi-Jurisdictional
Hazard Mitigation Plan Meeting #1

Date: Wednesday, April 6, 2016

Time: 6:30 PM

Place: Grundy Center Fire Department Building
507 F Avenue, Grundy Center, Iowa

1. Welcome and Introductions
2. The planning process, scope of work, and schedule
3. Review and update Community Profiles
4. Review existing Mitigation Action Steps
5. Discuss evaluation standards for updating Action Steps
6. Adjourn

THIS IS A PUBLIC MEETING

MEMBERS OF THE COMMUNITY ARE INVITED TO ATTEND AND PARTICIPATE IN THIS MEETING

Grundy County Multi-Jurisdictional HMP Planning Session #1 Minutes
Grundy Center Fire Department Building
Grundy Center, Iowa
April 6, 2016

The Hazard Mitigation Kick-off Meeting was called to order by Sidney Noyce of the Iowa Northland Regional Council of Governments (INRCOG) at 6:30 pm.

The following persons were in attendance: Larry Hunt, Dike-New Hartford School District Superintendent; Zach Tripp, Grundy County EMA Coordinator; Jeff Martin, Conrad; Dan Bangasser, Grundy Center Public Works Director; and Sidney Noyce, INRCOG.

The following jurisdictions were represented at the meeting: Grundy County, Conrad, Grundy Center, and Dike-New Hartford School District.

After calling the meeting to order Noyce provided an overview of the agenda for the evening, how the planning process will work, scope of work and plan, and the future dates, times, and locations of scheduled meetings.

Noyce also explained the definition of mitigation and how it relates to hazards in each city and the county. He commented on the HMP's purpose is two-fold, which is to become and remain eligible for FEMA mitigation grant funding and more importantly to reduce negative impacts and each community's vulnerability to natural and man-made hazards.

He then reviewed the "What is a Hazard Mitigation Plan?" handout and information that will be needed for Community Profile updates, as well as the process and criteria for updating existing plan action steps. Jurisdictions were then given time to work amongst themselves to update action steps.

The meeting adjourned at 7:25 pm.

Respectfully Submitted,
Sidney Noyce
Community Planner

AFFIDAVIT

State of Iowa,
County of Grundy, ss:

I, LeAnn Siemens, being first duly sworn, under oath, depose and say that I am the Accounting Assistant of the Times Republica REINBECK COURIER, a weekly newspaper, published at Reinbeck, Grundy County, Iowa, and entered at the Reinbeck, Iowa Post Office as second-class mail matter under the Act of Congress, March 1879, and that the printed-

INRCOG
Hazard Mitigation

hereto attached was published in said newspaper 1 consecutive week(s) and publications was/were:

April 1, 2016

LeAnn Siemens, Accounting Assistant, Times-Republican

Subscribed and sworn to before me, a Notary Public in and for Grundy Cou Plummer, this May 6, 2016. Witness my hand and notorial seal.

Sandra Plummer
Notary Public
State of Iowa

SANDRA PLUMMER
MY COMMISSION EXPIRES
1-14-17

Fee: 18.95

ACCT: #L51200

PUBLIC NOTICE
GRUNDY COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION KICK-OFF PLANNING SESSION MEETING

The Federal Emergency Management Agency (FEMA) recently awarded Grundy County a Hazard Mitigation Planning Grant. Funds will be used to update the multi-jurisdictional Hazard Mitigation Plan. The purpose of the plan is two-fold. The plan is a federal requisite to remain eligible for other mitigation grant programs offered by FEMA. FEMA mandates the plan be updated every five (5) years. Second, the plan is designed to create hazard mitigation strategies which can reduce negative impacts caused by natural and man-made hazards within the county and the incorporated jurisdictions.

This first meeting will review the purpose and benefits of a multi-jurisdictional hazard mitigation plan, project budget, planning process/scope of work, updating information from the

ing plan, and the dates and locations of future meetings. The meeting will take place on Wednesday, April 6, 2016 at 6:30 PM at the Grundy Center Fire Department Building, 907 F Avenue, Grundy Center, Iowa.

If you have any questions, please feel free to contact Sidney Noyce at INRCOG, (319) 235-0311.

Published in the Reinbeck Courier on April 1, 2016
---20939

GRUNDY COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION
KICK-OFF PLANNING SESSION MEETING
The Federal Emergency Management Agency (FEMA) recently awarded Grundy County a Hazard Mitigation Planning Grant. Funds will be used to update the multi-jurisdictional Hazard Mitigation Plan. The purpose of the plan is two-fold. The plan is a federal requisite to remain eligible for other mitigation grant programs offered by FEMA. FEMA mandates the plan be updated every five (5) years. Second, the plan is designed to create hazard mitigation strategies which can reduce negative impacts caused by natural and man-made hazards within the county and the incorporated jurisdictions.
This kick-off meeting will review the purpose and benefits of a multi-jurisdictional hazard mitigation plan, project budget, planning process, scope of work, existing information from the existing plan, and the dates and locations of future meetings. The meeting will take place on Wednesday, April 6, 2016 at 6:00 PM at the Grundy Center Fire Department Building, 507 F Avenue, Grundy Center, Iowa.
If you have any questions, please feel free to contact Sidney Noyce at INRCOG, (319) 235-0311.

PROOF OF PUBLICATION

STATE OF IOWA
Grundy County } ss.

I, the undersigned, being duly sworn, depose and say, that I am Ryan Harvey, President of the Grundy Register, a weekly newspaper printed in the English language, published at Grundy Center in Grundy County, State of Iowa, and that the annexed

Grundy County Multi-Jurisdictional Hazard Mitigation Kick-off Planning Session Meeting April 6, 2016

notice was published in said paper once each week for 1 consecutive weeks, the first publication thereof was on the 31st day of March, 2016, the second on the ____ day of _____, 20__, the third on the ____ day of _____, 20__, the fourth on the ____ day of _____, 20__,

Ryan Harvey, President

Subscribed and sworn to before me and in my presence the 31st day of March, 2016

Kathleen E. Fisher
Notary Public, In and for the State of Iowa

KATHLEEN E. FISHER
Commission Number 171758
My Commission Expires Nov 4, 2018

Printer's Fees, $ 15.06

AFFIDAVIT

State of Iowa.
County of Grundy, ss:

I, LeAnn Siemens, being first duly sworn, under oath, depose and say that I am the Accounting Assistant Republican dba
REINBECK COURIER, a weekly newspaper,
published at Reinbeck, Grundy County, Iowa, and
entered at the Reinbeck, Iowa Post Office as second-class mail matter under the Act of Congress, March 1879, and that the printed-

INRCOG
Hazard Mitigation

hereto attached was published in said newspaper 1 consecutive the dates(s) of publications was/were:

April 22, 2016

LeAnn Siemens
LeAnn Siemens, Accounting Assistant, Times-Republican

PUBLIC NOTICE
GRUNDY COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN 2nd PLANNING MEETING
The Federal Emergency Management Agency (FEMA) recently awarded Grundy County a Hazard Mitigation Planning Grant. Funds will be used to update the multi-jurisdictional Hazard Mitigation Plan. The purpose of the plan is two-fold. The plan is a federal requisite to remain eligible for other mitigation grant programs offered by FEMA. FEMA mandates the plan be updated every five (5) years. Second, the plan is designed to create hazard mitigation strategies which can reduce negative impacts caused by natural and man-made hazards within the county and the incorporated jurisdictions.
This second meeting will review material discussed at the first meeting, determine goals, begin identifying potential mitigation activities, and discuss and assess potential hazards. The meeting will take place on Wednesday, April 27, 2016 at 3:30 PM at the Grundy Center Fire Department Building, 507 F Avenue, Grundy Center, Iowa.
If you have any questions, please feel free to contact Sidney Noyce at INRCOG, (319) 235-0311.
Published in the Reinbeck Courier on April 22, 2016
—21048

Subscribed and sworn to before me, a Notary Public in and for Grundy County, Iowa by Sandra Plummer, this May 6, 2016. Witness my hand and notorial seal.

Sandra Plummer
Notary Public
State of Iowa

SANDRA PLUMMER
MY COMMISSION EXPIRES
1-14-17

Fee: 17.72

ACCT: #LS1200

Committee Meeting #2: April 27th, 2016

- PUBLIC MEETING AGENDA-

Grundy County Multi-Jurisdictional
Hazard Mitigation Plan Meeting #2

Date: Wednesday, April 27, 2016

Time: 6:30 PM

Place: Grundy Center Fire Department Building
507 F Avenue, Grundy Center, IA

1. Welcome and Introductions
2. Review Kick-Off Meeting Information
3. Review and update status of Mitigation Action Steps
4. Introduction to defined 2016 Hazards
5. Review definitions, hazard analysis and scoring
6. Adjourn

THIS IS A PUBLIC MEETING

MEMBERS OF THE COMMUNITY ARE INVITED TO ATTEND AND PARTICIPATE IN THIS MEETING

Grundy County Multi-Jurisdictional Hazard Mitigation Plan Update
Wednesday, April 27th, 2016 at 6:30 PM – Grundy Center Fire Department
Meeting 2 - Attendance Sign-In Sheet

	Name (please print & sign)	Position/Title Agency/Department	Jurisdiction/ Organization	Email Address	Volunteer or Non-Volunteer
1	Dan Bergesse	Public Works Director	City of Grundy Center	publicworks@gcmuni.net	
2	Zach Tripp	Coordinator Grundy County Emergency Management	Grundy County	ztripp@grundysheriff.org	Non-Volunteer
3					
4					
5					
6					
7					

Grundy County Multi-Jurisdictional HMP Planning Session #2 Minutes
Grundy Center Fire Department Building
Grundy Center, Iowa
April 27, 2016

The Hazard Mitigation Kick-off Meeting was called to order by Sidney Noyce of the Iowa Northland Regional Council of Governments (INRCOG) at 6:30 pm.

The following persons were in attendance: Zach Tripp, Grundy County EMA Coordinator; Dan Bangasser, Grundy Center Public Works Director; and Sidney Noyce, INRCOG.

The following jurisdictions were represented at the meeting: Grundy County and Grundy Center.

After calling the meeting to order, Noyce provided an overview of the agenda for the evening and reviewed the materials from last meeting. The jurisdictions also used this time to ask any outstanding questions about the first meeting's assignments.

Noyce then provided an explanation of the community profile and hazard assessment assignments for the jurisdictions to complete. He reviewed the information required for the community profile, the list of hazards and their definitions, and the scoring criteria used for the plan. Jurisdictions were then given time to work amongst themselves to complete the community profile and hazard assessment.

The meeting adjourned at 7:15 pm.

Respectfully Submitted,
Sidney Noyce
Community Planner

AFFIDAVIT

State of Iowa.
County of Grundy, ss:

I, LeAnn Siemens, being first duly sworn, under oath, depose and say that I am the Accounting Assistant of the Times Republica REINBECK COURIER, a weekly newspaper, published at Reinbeck, Grundy County, Iowa, and entered at the Reinbeck, Iowa Post Office as second-class mail matter under the Act of Congress, March 1879, and that the printed-

INRCOG
Hazard Mitigation

hereto attached was published in said newspaper 1 consecutive week(s) and publications was/were:

April 1, 2016

LeAnn Siemens [signature]
LeAnn Siemens, Accounting Assistant, Times-Republican

Subscribed and sworn to before me, a Notary Public in and for Grundy Cou Plummer, this May 6, 2016. Witness my hand and notorial seal.

Sandra Plummer [signature]
Sandra Plummer
Notary Public
State of Iowa

SANDRA PLUMMER
MY COMMISSION EXPIRES
1-14-17

Fee: 18.95

ACCT: #L51200

PUBLIC NOTICE
GRUNDY COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION KICK-OFF PLANNING SESSION MEETING

The Federal Emergency Management Agency (FEMA) recently awarded Grundy County a Hazard Mitigation Planning Grant. Funds will be used to update the multi-jurisdictional Hazard Mitigation Plan. [illegible]

[illegible] meeting will take place on Wednesday, [illegible] at 6:30 PM at the Grundy Center Fire Department Building, [illegible] Avenue, Grundy Center, Iowa.

If you have any questions, please feel free to contact Sidney Noyce at INRCOG, (319) 235-0311.

Published in the Reinbeck Courier on April 1, 2016.
—20939

AFFIDAVIT

State of Iowa.
County of Grundy, ss:

I, LeAnn Siemens, being first duly sworn, under oath, depose and say that I am the Accounting Assistant Republican dba
REINBECK COURIER, a weekly newspaper,
published at Reinbeck, Grundy County, Iowa, and
entered at the Reinbeck, Iowa Post Office as second-class mail matter under the Act of Congress, March 1879, and that the printed-

INRCOG
Hazard Mitigation

hereto attached was published in said newspaper 1 consecutive the dates(s) of publications was/were:

April 22, 2016

LeAnn Siemens

LeAnn Siemens, Accounting Assistant, Times-Republican

PUBLIC NOTICE
GRUNDY COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN 2nd PLANNING MEETING

The Federal Emergency Management Agency (FEMA) recently awarded Grundy County a Hazard Mitigation Planning Grant. Funds will be used to update the multi-jurisdictional Hazard Mitigation Plan. The purpose of the plan is two-fold. The plan is a federal requisite to remain eligible for other mitigation grant programs offered by FEMA. FEMA mandates the plan be updated every five (5) years. Second, the plan is designed to create hazard mitigation strategies which can reduce negative impacts caused by natural and man-made hazards within the county and the incorporated jurisdictions.

This second meeting will review material discussed at the first meeting, determine goals, begin identifying potential mitigation activities, and discuss and assess potential awards. The meeting will take place on Wednesday, April 27, 2016 at 5:30 PM at the Grundy Center Fire Department Building, 507 F Avenue, Grundy Center, Iowa.

If you have any questions, please feel free to contact Sidney Noyce at INRCOG, (319) 235-0311.

Published in the Reinbeck Courier on April 22, 2016
--21068

Subscribed and sworn to before me, a Notary Public in and for Grundy County, Iowa by Sandra Plummer, this May 6, 2016. Witness my hand and notorial seal.

Sandra Plummer

Sandra Plummer
Notary Public
State of Iowa

SANDRA PLUMMER
MY COMMISSION EXPIRES
2-24-17

Fee: 17.72

ACCT: #L51200

PROOF OF PUBLICATION

STATE OF IOWA } ss.
Grundy County

I, the undersigned, being duly sworn, depose and say, that I am Ryan Harvey, President of the Grundy Register, a weekly newspaper printed in the English language, published at Grundy Center in Grundy County, State of Iowa, and that the annexed

Grundy County Multi-Jurisdictional Hazard Mitigation Plan 2nd Planning Meeting April 27 2016

notice was published in said paper once each week for 1 consecutive weeks, the first publication thereof was on the 21st day of April, 2016
the second on the ____ day of ____, 20__
the third on the ____ day of ____, 20__
the fourth on the ____ day of ____, 20__

Ryan Harvey, President

Subscribed and sworn to before me and in my presence the 21st day of April, 2016

Kathleen E. Fisher
Notary Public, in and for the State of Iowa

KATHLEEN E. FISHER
Commission Number 171758
My Commission Expires Nov. 4, 2016

Printer's Fees, $ 14.53

Committee Meeting #3: May 11th, 2016

- PUBLIC MEETING AGENDA-

Grundy County Multi-Jurisdictional Hazard Mitigation Plan Meeting #3

Date: Wednesday, May 11, 2016

Time: 6:30 PM

Place: Grundy Center Fire Station
507 F Street, Grundy Center, IA

1. Welcome and Introductions
2. Review previous meeting information and timeline
3. Provide updates on previously identified mitigation action steps
4. Review and Update Community Profiles (plans, policies, developments, maps, etc.)
5. Set Future Meeting Dates
6. Adjourn

THIS IS A PUBLIC MEETING

MEMBERS OF THE COMMUNITY ARE INVITED TO ATTEND AND PARTICIPATE IN THIS MEETING

For Questions of Comments, contact:
Jacob Tjaden / INRCOG / (319) 235-0311 / jtjaden@inrcog.org

Grundy County Multi-Jurisdictional Hazard Mitigation Plan Update
Wednesday, May 11, 2016 at 6:30 PM – Grundy Center Fire Department
Meeting 3 - Attendance Sign-In Sheet

	Name (please print & sign)	Position/Title Agency/Department	Jurisdiction/ Organization	Email Address	Volunteer or Non-Volunteer
1	Camie Nederhoff	Mayor Wellsburg	Wellsburg	camie.nederhoff@emerson.com	
2	Julie Wilkerson	City Administrator	Reinbeck	cityhall@reinbeck.net	
3	Chris Heerlyn	Fire Chief	Dike	chiefdike@gmail.com	
4	Jacob Tjaden	Planner	INRCOG		
5					
6					

Grundy County Multi-Jurisdictional HMP Planning Session #3 Minutes
Grundy Center Fire Department Building
Grundy Center, Iowa
May 11, 2016

The third Grundy County MJ-HMP planning meeting was called to order by Jacob Tjaden of the Iowa Northland Regional Council of Governments (INRCOG) at 6:30 pm at the Grundy Center Fire Station.

The following persons were in attendance: Zach Tripp, Grundy County EMA Coordinator; Cammie Nederhoff, Mayor of City of Wellsburg; Julie Wilkerson, City Administer of City of Reinbeck; Chris Heerkes, City of Dike Fire Chief; and Jacob Tjaden, Community Planner, INRCOG.

The following jurisdictions were represented at the meeting: Cities of Wellsburg, Reinbeck, and Dike as well as Buchanan County.

After calling the meeting to order, Tjaden provided an overview of the agenda for the evening and reviewed the materials from last meeting.

Noyce then provided an explanation of the community profile and hazard assessment assignments for the jurisdictions to complete. He reviewed the information required for the community profile, the list of hazards and their definitions, and the scoring criteria used for the plan. Jurisdictions were then given time to work amongst themselves to complete the community profile and hazard assessment. The jurisdictions also used this time to ask any outstanding questions about the first meeting's assignments. Jurisdiction's took planning worksheets with them to complete.

The meeting adjourned at 7:00 pm.

Respectfully Submitted,
Jacob Tjaden
Community Planner

GRUNDY COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN 3rd PLANNING MEETING
The Federal Emergency Management Agency (FEMA) recently awarded Grundy County a Hazard Mitigation Planning Grant. Funds will be used to update the multi-jurisdictional Hazard Mitigation Plan. The purpose of the plan is two-fold. The plan is a federal requisite to remain eligible for other mitigation grant programs offered by FEMA. FEMA mandates the plan be updated every five (5) years. Second, the plan is designed to create [illegible] strategies which can reduce negative impacts caused by natural and [illegible] hazards within the county and the incorporated jurisdictions. This third meeting will review material discussed at previous meetings, discuss and update potential hazards and their risk assessment, identify vulnerable buildings and populations, update community profile, and review current and possible future mitigation strategies. The meeting will take place on Wednesday, May 11, 2016 at 6:30 PM at the Grundy Center Fire Department Building, 501 F Avenue, Grundy Center, Iowa
If you have any questions, please feel free to contact Sidney Noyce at INRCOG, (319) 235-[illegible].

PROOF OF PUBLICATION

STATE OF IOWA
Grundy County } ss.

I, the undersigned, being duly sworn, depose and say, that I am Ryan Harvey, President of the Grundy Register, a weekly newspaper printed in the English language, published at Grundy Center in Grundy County, State of Iowa, and that the annexed _____
Grundy County Multi-Jurisdictional Hazard Mitigation Plan 3rd Planning Meeting May 11, 2016
notice was published in said paper once each week for
1 consecutive weeks, the first publication thereof
was on the 12th day of May, 2016
the second on the ____ day of _____, 20__
the third on the ____ day of _____, 20__
the fourth on the ____ day of _____, 20__

Ryan Harvey, President

Subscribed and sworn to before me and in my presence
the 12th day of May, 2016
Kathleen E. Fisher
Notary Public, In and for the State of Iowa

KATHLEEN E. FISHER
Commission Number 171758
My Commission Expires Nov 4, 2018

Printer's Fees, $ 15.60

ATTACHMENT 10 : PLAN EVALUATION FORMS

WORKSHEET # 1: PROGRESS REPORT

Progress Report Period: _____ (Date) to _____ (Date)

Project Title: _____ Project ID#: _____

Responsible Agency: _____

Address: _____

City/County: _____

Contact Person: _____ Title: _____

Phone #(s): _____ e-mail address: _____

List Supporting Agencies and Contacts: _____

_____

Total Project Cost: $_____ Anticipated Cost Overrun/Under run: _____

Date of Project Approval: _____ Start date of the project: _____

Anticipated completion date: _____

Description of the Project (include a description of each phase, if applicable, and the time frame for completing each phase).

_____

_____

_____

_____

_____

Milestones	Complete	Projected Date of Completion

Plan Goal(s)/Objective(s) Addressed:

Goal: _____

Objective: _____

Indicator of Success (e.g., losses avoided as a result of the acquisition program):
In most cases, you will list losses avoided as the indicator. In cases where it is difficult to quantify the benefits in dollar amounts, you will use other indicators, such as the number of people who now know about mitigation or who are taking mitigation actions to reduce their vulnerability to hazards.

_____

_____

_____

Status *(Please checks pertinent information and provide explanations for items with an asterisk. For completed or canceled projects, see Worksheet #2 — to complete a project evaluation):*

Project Status	Project Cost Status
(1) ☐ Project on schedule	(1) ☐ Cost unchanged
(2) ☐ Project completed	(2) ☐ Cost overrun*

*explain: _____

(3) ☐ Project delayed*
*explain: _____

(3) ☐ Cost under run*
*explain: _____

_____

(4) ☐ Project canceled

Summary of progress on project for this report:

A. What was accomplished during this reporting period?

B. What obstacles, problems, or delays did you encounter, if any?

C. How was each problem resolved?

Next Steps: What is/are the next step(s) to be accomplished over the next reporting period?

Other comments:

WORKSHEET #2: EVALUATING YOUR PLANNING TEAM

When gearing up for the plan evaluation, the planning team should reassess its composition and ask the following questions:

	YES	NO
Have there been local staffing changes that would warrant inviting different members to the planning team? **Comments/Proposed Action:**		
Are there organizations that have been invaluable to the planning process or to project implementation that should be represented on the planning team? **Comments/Proposed Action:**		
Are there any representatives of essential organizations who have not fully participated in the planning and implementation of actions? If so, can someone else from this organization commit to the planning team? **Comments/Proposed Action:**		
Are there procedures (e.g., signing of MOAs, commenting on submitted progress reports, distributing meeting minutes, etc.) that can be done more efficiently? **Comments/Proposed Action:**		
Are there ways to gain more diverse and widespread cooperation? **Comments/Proposed Action:**		
Are there different or additional resources (financial, technical, and human) that are now available for mitigation planning? **Comments/Proposed Action:**		

If the planning team determines the answer to any of these questions is "yes," some changes may be necessary.

WORKSHEET #3: EVALUATE YOUR PROJECT RESULTS

Project Name and Number:		*Insert location map* *include before and after photos if appropriate*
Project Budget:		
Project Description:		
Associated Goal and Objective (s):		
Indicator of Success (e.g., losses avoided):		

Was the action implemented?

IF YES ↓ **IF NO** ↓

What were the results of the implemented action?	**Why not?**		
	Was there political support for the action?	**YES**	**NO**
	Were enough funds available?	**YES**	**NO**
	Were workloads equitably or realistically distributed?	**YES**	**NO**
	Was new information discovered about the risks or community that made implementation difficult or no longer sensible?	**YES**	**NO**
	Was the estimated time of implementation reasonable?	**YES**	**NO**

↓

Were sufficient resources (for example staff and technical assistance) available?	**YES**	**NO**

Were the outcomes as expected? **If No, please explain:**	**YES**	**NO**	**Additional comments or other outcomes:**
Did the results achieve the goal and objective (s)? **Explain how:**	**YES**	**NO**	
Was the action cost-effective? **Explain how or how not:**	**YES**	**NO**	
What were the losses avoided after having completed the project?			
If it was a structural project, how did it change the hazard profile?			Date:
			Prepared by:

WORKSHEET #4: REVISIT YOUR RISK ASSESSMENT

If you answered "Yes" to any of the above questions, review your data and update your risk assessment information accordingly

Risk Assessment Steps	Questions	YES	NO	COMMENTS
IDENTIFY HAZARDS	Are there new hazards that can affect your community?			
Profile hazard events	Are new historical records available?			
	Are additional maps or new hazard studies available?			
	Have chances of future events (along with their magnitude, extent, etc.) changed?			
	Have recent and future development in the community been checked for their effect on hazard areas?			
Inventory assets	Have inventories of existing structures in hazard areas been updated?			
	Are future developments foreseen and accounted for in the inventories?			
	Are there any new special high-risk populations?			
Estimate losses	Have loss estimates been updated to account for recent changes?			

WORKSHEET #5: REVISE THE PLAN

Prepare to update the plan.

When preparing to update the plan:	Check the box when addressed ✓
1. Gather information, including project evaluation worksheets, progress reports, studies, related plans, etc.	
Comments:	
2. Reconvene the planning team, making changes to the team composition as necessary (see results from *Worksheet #2*).	
Comments:	

Consider the results of the evaluation and new strategies for the future.

When examining the community consider:	Check the box when addressed ✓
1. The results of the planning and outreach efforts.	
Comments:	
2. The results of the mitigation efforts.	
Comments:	
3. Shifts in development trends.	
Comments:	

4. Areas affected by recent disasters.	
Comments:	
5. The recent magnitude, location, and type of the most recent hazard or disaster.	
Comments:	
6. New studies or technologies.	
Comments:	
7. Changes in local, state, or federal laws, policies, plans, priorities, or funding.	
Comments:	
8. Changes in the socioeconomic fabric of the community.	
Comments:	
9. Other changing conditions.	
Comments:	

Incorporate your findings into the plan.

When examining the plan:	Check the box when addressed ✓
1. Revisit the risk assessment.	
Comments:	
2. Update your goals and strategies.	
Comments:	
3. Recalculate benefit-cost analyses of projects to prioritize action items.	
Comments:	

Use the following criteria to evaluate the plan:

Criteria	YES	NO	Solution
Are the goals still applicable?			
Have any changes in the state or community made the goals obsolete or irrelevant?			
Do existing actions need to be reprioritized for implementation?			
Do the plan's priorities correspond with state priorities?			
Can actions be implemented with available resources?			

Comments:

ATTACHMENT 11: HAZARD MITIGATION PLAN REVIEW TOOL

HAZARD MITIGATION PLAN REVIEW TOOL
GRUNDY COUNTY, IOWA
FEMA Region VII
Approved

Jurisdiction: Grundy County; Cities of Beaman, Conrad, Dike, Grundy Center, Holland, Morrison, Reinbeck, Stout, Wellsburg, ~~& Grundy Schools~~	**Title of Plan:** 2017 Updated Multi-Jurisdictional Hazard Mitigation Plan for Grundy County, Iowa	**Date of Plan:** May 2017
Local Point of Contact: Ryan McKinley **Title:** Community Planner **Agency:** INRCOG **Phone Number:** 319-235-0311	**Address:** 229 E. Park Ave. Waterloo, IA 50703 **E-Mail:** rmckinley@inrcog.org	
Funding Source: FEMA, HLSEM, Local		
State Reviewer: Mat Noble	**Title:** Planner	**Date:** 7.5.17
FEMA Reviewer: Michelle Wolfe	**Title:** Plan Reviewer	**Date:** 11 July 2017 17 Oct 2017
Date Received in FEMA Region VII	5 July 2017, 7 September 2017	
Plan Not Approved	Technical Assistance 14 July 2017	
Plan Approvable Pending Adoption		
Plan Approved	17 October 2017	

Jurisdiction:	NFIP Status* Y	NP
1. Grundy County (resolution dated 6/19/2017)	✓	
2. Beaman	✓	
3. Conrad	✓	
4. Dike	✓	
5. Grundy Center	✓	
6. Holland	✓	
7. Morrison	✓	
8. Reinbeck	✓	
9. Stout		✓
10. Wellsburg	✓	
~~11. Grundy Center Community School District~~		✓

*** Notes: Y = Participating NP = Not Participating in NFIP S- Sanctioned R-Rescinded**

HAZARD MITIGATION PLAN REVIEW TOOL
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SECTION 1: REGULATION CHECKLIST

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT A. PLANNING PROCESS			
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))	Pages 1-8, Attachment 8	✓	
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))	Page 4	✓	
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	Pages 4-8, Attachment 10	✓	
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	Page 6	✓	
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	Pages 4-8, 90-99	✓	
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))	Pages 4-8, 90-99	✓	

ELEMENT A: REQUIRED REVISIONS

Comments:

- The Grundy Center Community School District should be included as a plan participant. They have participated in the planning committee; they have a risk assessment; they have mitigation actions. If they submit an adoption resolution or letter, then they would be eligible to pursue grant applications.
- The Dike New Hartford Schools could also be plan participants if a risk assessment, mitigation actions and resolution were similarly developed.
- P. 6/p. 20 The most recent Iowa State Hazard Mitigation Plan was approved in 2013, and would have been the most appropriate document to reference.

1. REGULATION CHECKLIST Regulation (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT			
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))	Pages 19-89, Appendices A-J	✓	
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))	Pages 19-89, Appendices A-J	✓	
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))	Pages 19-89, Appendices A-J	✓	
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	Pages 89 Appendices A-J	✓	

ELEMENT B: REQUIRED REVISIONS

Comments:

Continue to be cautious about conflating probability with the magnitude or impact of a hazard. Probability is **not** changed by magnitude or impact as suggested by the text below. **Risk is what would be limited rather than probability**.

It is highly likely human disease as defined will affect Grundy County residents on an annual basis. However, there is a far less likely probability of a human disease event making a severe impact on the county-wide level. Many safeguards from the Department of Public Health and other agencies are in place that mitigates the occurrence of a human disease epidemic. Grundy County Memorial Hospital is the main service provider for the area, but there are numerous hospitals and clinics in the surrounding areas that are available to provide care as well. Balancing the array of type of disease and impact, the probability has determined to be unlikely. (p. 45)

The tornado risk assessment/scenario analysis is among the best that we've seen in Region VII. Very nicely done.

The tables summarizing losses in each of the community profiles also represent a "best practice."

The duration of an event needs to be distinguished from the expected recovery times. These concepts should not be considered one and the same and should not be "mashed together." For instance, the duration of a tornado would be less than an hour. Recovery efforts following a tornado could easily take weeks, or even months.

Note as well that land/land value does not change after most natural hazard events: buildings and other infrastructure may be destroyed, but the ground itself remains, so its value should not be included in potential loss assessments. (It would be reasonable to make exceptions for landslide or sinkhole areas where any use of the land could be dangerous.)

It would be helpful to locate Grundy County on the national map on pdf p. 39, and it would be helpful to have a map showing the proximity of fault lines to and within Grundy County.

HAZARD MITIGATION PLAN REVIEW TOOL
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1. REGULATION CHECKLIST Regulation (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT C. MITIGATION STRATEGY			
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))	Pages 90, Appendices A-J	✓	
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))	Pages 89 Appendices A-J	✓	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	Page 92-94, Appendices A-J	✓	
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))	Appendices A-J	✓	
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))	Pages 95-99 Appendices A-J	✓	
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))	Pages 100-101 Appendices A-J	✓	

ELEMENT C: REQUIRED REVISIONS

Comments:

We suggest capturing the many, excellent "evergreen," or maintenance, mitigation actions in separate tables where they could all be noted as being locally funded through annual budgets, and done on a periodic annual/quarterly/monthly basis. This is fantastic information, and critically important work, and it is so rarely documented. Follow the "evergreen" table with a much shorter, separate table capturing fundable mitigation projects that could be quickly accessed when funding becomes available.

Timeline language (on-going, short-term, mid-term, long-term) does not appear to be used as most actions are designated "active". "On-going" and "active" do not reflect what work has been, or is being, done, but tables from p. 355 on do manage to provide the needed information for most (but not all) participants.

Also, try to avoid actions that "encourage" or "consider." Actions should be measurable or quantifiable and should have outcomes.

1. REGULATION CHECKLIST Regulation (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION (applicable to plan updates only)			
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))	Pages 90-99 Appendices A-J; Attachment 9	✓	
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	Attachment 9	✓	
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	Page 90-99, Appendices A-J	✓	
ELEMENT D: REQUIRED REVISIONS			
ELEMENT E. PLAN ADOPTION			
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))	Attachment 8	✓	
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))	Attachment 8		✓
ELEMENT E: REQUIRED REVISIONS A resolution for Grundy County dated 6/19/2017 has been submitted. Written proof that all jurisdictions' governing bodies have formally adopted the plan (usually a resolution) must be submitted to FEMA. *See Local Multi-Hazard mitigation Planning Guidance (July 2008) pages 17-18.* **Note:** If the plan is not adopted by a participating jurisdiction, that jurisdiction would not be eligible for project grants under the following hazard mitigation assistance programs: HMGP, PDM, FMA, and SRL.			

HAZARD MITIGATION PLAN REVIEW TOOL
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SECTION 2: PLAN ASSESSMENT

A. Plan Strengths and Opportunities for Improvement

See Comments in Section 1.

B. Resources for Implementing Your Approved Plan

A variety of mitigation resources are available to communities. The Iowa Homeland Security & Emergency Management website: http://www.iowahomelandsecurity.org/disasters/hazard_mitigation.html provides planning and project related information as well as details on how major FEMA mitigation programs are implemented in the State.

HSEMD's training website provides information on upcoming training opportunities within the State: http://homelandsecurity.iowa.gov/training/.

Review of the FEMA HMA guidance (FY11 is the most current) is also encouraged as guidance provides information about application and eligibility requirements. This guidance is available from http://www.iowahomelandsecurity.org/grants/HMA.html or through FEMA's grant applicant resources page at http://www.fema.gov/government/grant/hma/grant_resources.shtm.

The FEMA Hazard mitigation planning site http://www.fema.gov/plan/mitplanning/index.shtm contains the official guidance to meet the requirements of the Stafford Act, as well as other resources and procedures for the development of hazard mitigation plans.

Various funding programs are available from several state and federal agencies to assist local jurisdictions in accomplishing their mitigation activities and goals. A detailed listing of programs, information on each program, and contact information is also available from the 2013 State Hazard Mitigation Plan.