2019 Updated Multi-Jurisdictional Hazard Mitigation Plan for Chickasaw County, Iowa

Adopted By:
Chickasaw County: November 19, 2018
Chickasaw County Emergency Management (XX)
City of Alta Vista (XX)
City of Fredericksburg (XX)
City of Ionia (XX)
City of Lawler (XX)
City of Nashua (XX)
City of New Hampton (XX)
City of North Washington (XX)
Nashua-Plainfield Community School District (XX)
New Hampton Community School District (XX)

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Chickasaw County's Emergency Management Commission

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

INRCOG

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HAZARD MITIGATION PLANNING COMMITTEE

Over the course of the planning process a number of individuals donated their time and efforts for the successful completion of this plan. This includes those who attended planning meetings as well as the city, county and educational staff and elected officials that spent time updating and reviewing the plan outside of meetings. The following is a list of people who participated in the hazard mitigation plan meetings:

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Larry Laures
Amy Laures
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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 2019 Chickasaw County Multi-Jurisdictional Hazard Mitigation Plan (M-J HMP) was developed to assist in making the entire planning area (Chickasaw County unincorporated and incorporated areas) less susceptible to these hazards. The planning area includes the cities of Alta Vista, Fredericksburg, Ionia, Lawler, Nashua, New Hampton, North Washington, Nashua-Plainfield Community Schools, and New Hampton Community School District as well as unincorporated Chickasaw County.

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

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.

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.

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
- Imposes an external discipline on the process.

PLANNING PROCESS

Chickasaw County's Emergency Management Commission funded the development of this updated Multi-Jurisdictional Hazard Mitigation Plan (M-J 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. The process was developed around the requirements laid out in FEMA's *Local Mitigation Planning Handbook (*March 2013) and *Local Mitigation Plan Review* Guide (October 2011). 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), Chickasaw County and the other communities of 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. Table 1.1 displays the name, jurisdiction, and position of the planning committee members.

TABLE 1.1: CHICKASAW COUNTY MJ-HMP PLANNING COMMITTEE MEMBERS					
Name	**Jurisdiction**	**Position**	**Name**	**Jurisdiction**	**Position**
Austen Seely	Chickasaw County EMA	Coordinator	Shain Kroenecke	Fredericksburg	Mayor
Eric Fibiker	Lawler	Fire Chief	Everett Tenge	Alta Vista	Mayor
Kevin Crooks	Alta Vista	Councilmember	Dale King	Lawler	Councilmember
Amy Laures	Alta Vista	Councilmember	Larry Laures	Alta Vista	Assistant Fire Chief
Reed Palo	Chickasaw County Sheriff's Office	Chief Deputy	Scott Cerwinske	Nashua	Councilmember
Randy Taylor	Ionia	Mayor	Derek Day	Ionia	Fire Chief
Randy Gorres	Mercy Medical Center, New Hampton	Safety Officer	Mark Mueterthies	Lawler	Mayor
Matthew Kuhn	New Hampton	Councilmember	Kathy Babcock	Chickasaw County Public Health	Administrator
Staci Schutte	Chickasaw County	Environmental Health	Jeremy Scheidel	Lawler	Councilmember
James Mitchell	Fredericksburg	Councilmember	Ray Armbrecht	Fredericksburg	Fire Chief
Suellen Kolbet	New Hampton	City Clerk	Steve Geerts	New Hampton	Fire Chief
Timothy Hanson	North Washington	Firefighter	Karen Clemens	New Hampton	Deputy City Clerk
Tom Johnson	Nashua	Fire Department	Dale King	Lawler	City Council
Deb Larsen	New Hampton	Mayor	Jay Jurrens	New Hampton Schools	Superintendent
Keith Turner	Nashua-Plainfield Schools	Superintendent			

This initial group of people invited to the planning meetings encompassed individuals representing local government, law enforcement, fire and rescue, public utilities, local schools, local non-profits and service providers, and citizen volunteers. Others invited to the meetings were surrounding county emergency management administrators, state officials from Iowa Homeland Security and the Department of Transportation and an official from FEMA Region 7. Once established, this assembly was considered the Hazard Mitigation Planning Committee.

Additionally, Brian Schoon and Ryan McKinley from INRCOG organized the meetings in conjunction with the County Emergency Management Coordinator and County Auditor. All sequential meetings were determined at committee meetings. INRCOG was also responsible for compiling information and writing the final document.

Beyond this core group of individuals, public notices for all committee meetings were published 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 Attachment 4.

Committee Meetings

Three public planning meetings were held at the Chickasaw County Communications Center in New Hampton 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. Attendance for each meeting was documented and can be found in Attachment 4. Table 1.2 provides a list of the public meetings.

TABLE 1.2: MEETINGS SUMMARY

Location	Group	Date	Topic
Chickasaw County Communications Center	Planning Committee	2/13/18	Introductions, Purpose of HMP, Community Profile, Explain Hazard Analysis/Risk Assessment, Conduct Hazard Analysis/Risk Assessment
Chickasaw County Communications Center	Planning Committee	3/13/18	Conduct and Review Hazard Analysis/Risk Assessment, Establish Goals, Start Mitigation Action/Activity Development
Chickasaw County Communications Center	Planning Committee	9/24/18	Finish and Review Mitigation Action/Activity Development, Review HMP Draft Document
Chickasaw County Courthouse	Board of Supervisors	11/19/18	Public Hearing for Adoption of M-J HMP
Various City Halls	City Councils	Various	Public Hearing and Adoption of MJ-HMP

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 Attachment 2.

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, INRCOG also investigated other previously prepared documents in order to garner supplementary relevant information and contacted each jurisdiction for relevant information. Information and data about emergency services, mitigation activities and response procedures are described in various levels of detail within these documents. These documents and data include:

- Chickasaw County's Current Hazard Mitigation Plan
- Comprehensive Plans for Chickasaw County, Fredericksburg, Lawler, Nashua, and New Hampton.
- 2013 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
- 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 2013 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 and 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, 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. Early in the planning process meeting attendees reconfirmed the 2012 plan goals 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.

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 Chickasaw County

Chickasaw County is located in the northeastern quadrant of the State of Iowa. The County covers an area of 505 square miles, which is mostly gentle rolling glacial till. Incorporated cities within Chickasaw County include, in alphabetical order: Alta Vista, Bassett, Fredericksburg, Ionia, Lawler, Nashua, New Hampton, and North Washington. Chickasaw County is divided into twelve townships including, in alphabetical order: Bradford, Chickasaw, Dayton, Deerfield, Dresden, Fredericksburg, Jacksonville, New Hampton, Richland, Stapelton, Utica, and Washington. The population is the sixty-third largest in the state with 12,023 estimated residents (2016 ACS). New Hampton is the county seat. It is near the center of the county, near the US Highway 63/US Highway 18 junction Please refer to *Attachment #1: Location Map of the County*, which includes the locations of the aforementioned communities.

History

Prior to the settlement of the county, a tribe of Indians bearing the name of Chickasaw occupied it. The chief of this tribe was called Bradford. The county and the town of Chickasaw were named after this Indian tribe and the township of Bradford after its chief. The county was established in 1851 and originated in 1853. New Hampton Township was so named by Osgood Gowan, in honor of his old home, he having come from New Hampton, New Hampshire. At the time of its organization in 1854, the population of the county was about six hundred. In two years it had increased to two thousand and six hundred fifty one, due to emigration and settlements. Chickasaw County started out with seven townships, which at the present time this number has increased to twelve. Chickasaw County was first created as a political sub-division of the State of Iowa in 1851. On January 12, 1853, this county was attached to Fayette County for election, revenue and judicial purposes, but on the 31st of June 1853, in answer to a petition circulated by a number of residents of the county stating that on the first Monday in August an election was to be held in the town of Bradford for the sake of organizing Chickasaw County, and for the purpose of electing its officials. The officers were duly elected at this date, but due to some is understanding, they were not given the power to perform the functions of their respective offices.

In April 1854, another election was called at which time the officials were properly elected, including a county sheriff, county judge, clerk, treasurer, and recorder and prosecuting attorney. About the year 1856, the land upon which New Hampton is located was platted and a few houses were built. It was not much of a town at first, but at this time the question removing the county seat from Bradford to a more central location was seriously agitated. For several years this question was the source of serious trouble, as the towns of Fredericksburg, Forest City and Bradford were also fighting for it. New Hampton offered no special benefits for the county seat, with the exception of it being centrally located. The county seat was moved about at will, and it was not determined until New Hampton possession of it in the year of 1860, after a fight through the courts. During the years of contest over the location of the county seat the Chickasaw County courthouse was in a transitory state. For that reason, no suitable building was provided for the transaction of the county business.

The county seat in the early stages of the county was located at Bradford, named after the chief of the Chickasaw Indian tribe. A plain log cabin, erected at a cost

of $1,840, was used as the first courthouse. In the spring of 1857 the county seat was moved to New Hampton, a town more centrally located in the county. Following this there were several attempts to remove the county seat from New Hampton. Some county seat bidders were Fredericksburg, Bradford, and Forest City. All were unsuccessful in gaining the county seat.

In 1865, the first courthouse in New Hampton was completed. In 1876, an addition was completed on this building. The entire building was totally destroyed in a fire on March 26, 1880. Many irreplaceable documents were lost, but many more were saved with the help of the "Hook & Ladder Co.," and concerned citizens. With the help of a falling mist and buckets of water, the fire was finally extinguished, with total losses estimated at $2,000.

Due to towns fighting over the location of the county seat, it was not until 1881 that the central portion of a new courthouse was completed at New Hampton. The third courthouse cost $10,500 to complete; New Hampton paid $5,000 of the cost. The building was made of brick and stone. The inside was trimmed with black walnut and ash. In 1905 a wing was added on at a cost of $4,219, and one year later a second wing was completed with a cost of $200.

The current courthouse was completed in 1929 at a cost of $134,000. Architects for the courthouse were Ralston and Ralston of Waterloo, and it was constructed by Tarazar Construction Co. of Albert Lea, Minnesota in the Moderne and Art Deco styles.[1]

Government Structure

Chickasaw County is governed by a 5-member Board of Supervisors. Figure 2 is a map of the Supervisor jurisdictions. District 1 (green) is currently represented by David Tilkes. District 2 (dark blue) is currently represented by Tim Zoll. District 3 (yellow) is currently represented by Jacob Hackman. District 4 (light blue) is currently represented by Steve Geerts. District 5 (orange) is currently represented by Dan Carolan.
The eight incorporated cities in the county are represented by Mayor-City Council forms of government.

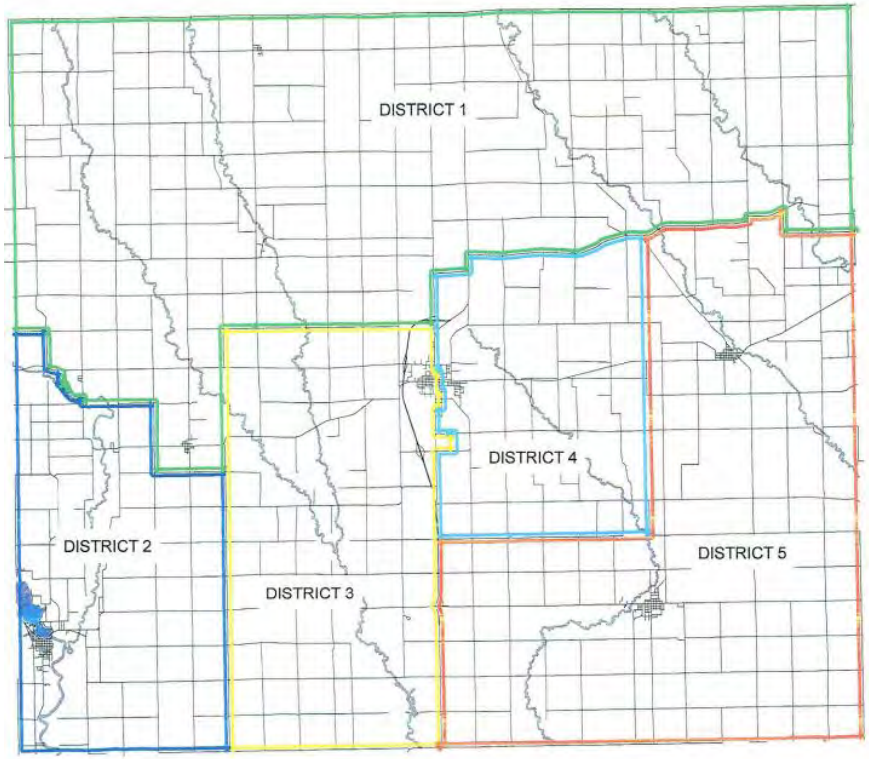


Figure 2.1: Chickasaw County Board of Supervisors District Map
Courtesy of Chickasaw County Website

[1] *History of County Governments in Iowa*, published in 1992 by Iowa State Association of Counties, with minor edits and additions.

NATURAL ENVIRONMENT

"The topography of the county generally is gently undulating. It is nearly level in some areas on upland divides. The county is dissected by 5 rivers and 10 streams. The drainage system generally flows from the northwest to the southeast. Because of the abundance and density of rivers and streams in the county, most areas have adequate surface drainage." According to the USDA in the 1996 *Soil Survey of Chickasaw County, Iowa*. The highest point in the county is located in the rural areas north of New Hampton and lies at approximately 1,316 feet above sea level. The lowest point in the county is located south of Nashua and lies at approximately 934 feet above sea level.

Soils

According to the Chickasaw County Soil Survey, which was issued in July 1996, the soils are the most important and valuable natural resource the county possesses. According to the Survey, the soils in the County are grouped into eight (8) soils associations, each of which has different characteristics. The associations, including a brief description of each, are as follows:

- Readlyn-Tripoli Association: Nearly level, somewhat poorly drained to poorly drained soils formed in loamy erosional sediments and underlying firm, loamy glacial till; on uplands.
- Oran-Bassett-Clyde Association: Nearly level to moderately sloping, moderately well drained to poorly drained, moderately dark and dark soils formed in loamy erosional sediments and the underlying firm, loamy glacial till; on uplands.
- Kenyon-Clyde-Floyd Association: Nearly level and moderately sloping, moderately well drained to poorly drained, dark soils formed in loamy erosional sediments and the underlying firm, loamy glacial till; on uplands.
- Ostrander-Lilah Association: Gently sloping to strongly sloping, excessively drained and well drained soils formed in loamy erosional sediments and the underlying friable, loamy glacial till and the underlying gravelly and sandy glacial outwash; on uplands and high benches.
- Dickinson-Rockton Association: Gently sloping and moderately sloping, somewhat excessively drained and well drained soils formed in loamy eolian or erosional sediments over sand or the underlying residuum and limestone; on uplands.
- Cresco-Protovin-Jamestown Association: Nearly level to moderately sloping, moderately well drained to poorly drained soils formed in loamy erosional sediments and the underlying firm, loamy glacial till; on uplands.
- Coland-Marshan-Hayfield Association: Nearly level, poorly drained and somewhat poorly drained soils formed in loamy alluvial deposits and in the underlying sandy and gravelly glacial outwash; on floodplains and stream terraces.
- Spillville-Wapsie Association: Nearly level to gently sloping, somewhat poorly drained and well-drained soils formed in loamy alluvium; on floodplains and stream terraces.

In addition to the Soil Survey itself, the county has established Corn Suitability Ratings (CSR) for the soils found in the county. CSR is a numerical rating, between five (5) and 100, of each soil type in the county. Accordingly, the CSR scale shows that the higher the CSR, the higher agricultural value of the soil type. The soils in the county are generally prime agricultural soils, ranging in CSR from 60 to 100, the current CSR rating is 81 in 2017.

Climate

The climate is identified as having cold, snowy winters with hot, humid 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 rainfall totals approximately 38.25 inches. Approximately 71 percent of a year's rainfall precipitation falls during the months of April to September. Rainfall 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 overload detention basins and small streams due to the extreme speed of onset of surface flow, thus causing flash flooding and potentially sewer backups into homes and businesses.

The annual temperature range is large, typical of a continental climate, with January, the coldest month, averaging 14.5 degrees Fahrenheit. July is the warmest month averaging 71 degrees Fahrenheit.

TABLE 2.1 : AVERAGE MONTHLY PRECIPITATION (INCHES)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Rainfall	1.1	1.1	2.28	4.09	4.65	5.47	4.88	4.76	3.35	2.6	2.4	1.57	38.25
Snowfall	8	7	5	2	0	0	0	0	0	0	4	9	35

Source: www.usclimatedata.com

TABLE 2.2 : AVERAGE MONTHLY TEMPERATURE RANGES

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
High °F	24	29	42	58	69	78	82	80	72	59	43	27	55
Mean °F	15	20	33	47	58	67	71	69	61	48	34	19	45
Low °F	5	10	23	35	46	56	60	58	49	37	24	10	34

Source: www.usclimatedata.com

Vegetation

Originally the land surrounding and within Chickasaw County was covered with deciduous forest; this vegetation is now predominant only along the banks and flood plains of watercourses. The original cover has been reduced to make room for additional cropland and construction of houses and businesses in suitable areas.

Tree cover can also be found throughout the county in residential areas, parks, and cemeteries. These remaining trees contribute to the aesthetics of the county and are viewed as an asset. Recreational areas are also important to the county, Chickasaw County Conservation Board currently manages 35 areas, comprising a total of 1,954 acres.

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:

- **Turkey Watershed** – The Turkey Watershed is present in the extreme southwestern portion of Chickasaw County. The watershed encompasses two states, Iowa and Wisconsin.
- **Upper Wapsipinicon Watershed** – The Wapsipinicon River flows through the majority of the Chickasaw County covering nearly approximately 75 percent of the county.
- **Upper Cedar Watershed** – The Upper Cedar watershed flows from north to south through Chickasaw County. Covering close to 25 percent of the County, the Upper Cedar Watershed encompasses two states, Iowa and Minnesota.

INFRASTRUCTURE

Transportation Systems

Chickasaw County has an elaborate system of roads and streets. Most of the roads were designed using the Rectangular Land Survey System. In total, there are over 842 miles of roads in the County road system, of which 140 are paved, 693 are gravel, and nine (9) are dirt. The County also maintains 270 structures, specifically bridges, across streams, creeks, rivers, and ditches.

U.S. Highways 63 and 218 traverse the County north and south. Chickasaw County also has access to highways from US 63 and 18, as well as from Iowa Highway 24 and 346. As for secondary roads, many are paved and provide access to most areas of the County. *Map 1: Location of the County* shows the highway and road network in Chickasaw County.

Railway throughout the county includes routes owned by Canadian Pacific Railroad. The route runs east and west through New Hampton, Ionia, and Lawler.

Air service is available to Chickasaw County residents at a number of local, regional, and international airports. Locally, the New Hampton Airport serves the county, while other out-of-county regional air service is offered by the Waterloo, Cedar Rapids, and Dubuque Airports. International air service is available in Rochester, Minnesota; Minneapolis-St. Paul, Minnesota; and Des Moines, Iowa.

In Iowa, there are 13,033 miles of gas and liquid pipelines and 45 pipeline suppliers. Iowa's pipeline system provides the state with liquid petroleum, natural gas and anhydrous ammonia. In Chickasaw County, there are 67 miles of gas pipelines and 29 miles of liquid pipelines. This only represents 0.7% of all pipeline mileage in the state.

There are no major commercial watercraft routes in Chickasaw County. The Cedar and Wapsipinicon Rivers offer a location for recreational watercraft use by the public.

The Iowa Northland Regional Transit Commission (RTC) offers transit service to residents of Chickasaw County. Demand response service, which requires 24-hour notice, is offered. The remainder of 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 w ater 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 rural, unincorporated areas 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. The incorporated communities in the planning area own and operate their own wastewater collection and treatment systems. Further information for each community system can be in the Appendices.

See Attachment 1 for a location map of sanitary sewer treatment facilities within Chickasaw County.

Storm Water Systems

There are no established storm water systems in the planning area. Each city is in charge of its own program for managing storm water and pollution. Rural and unincorporated areas of the county often rely on open ditches to handle storm water.

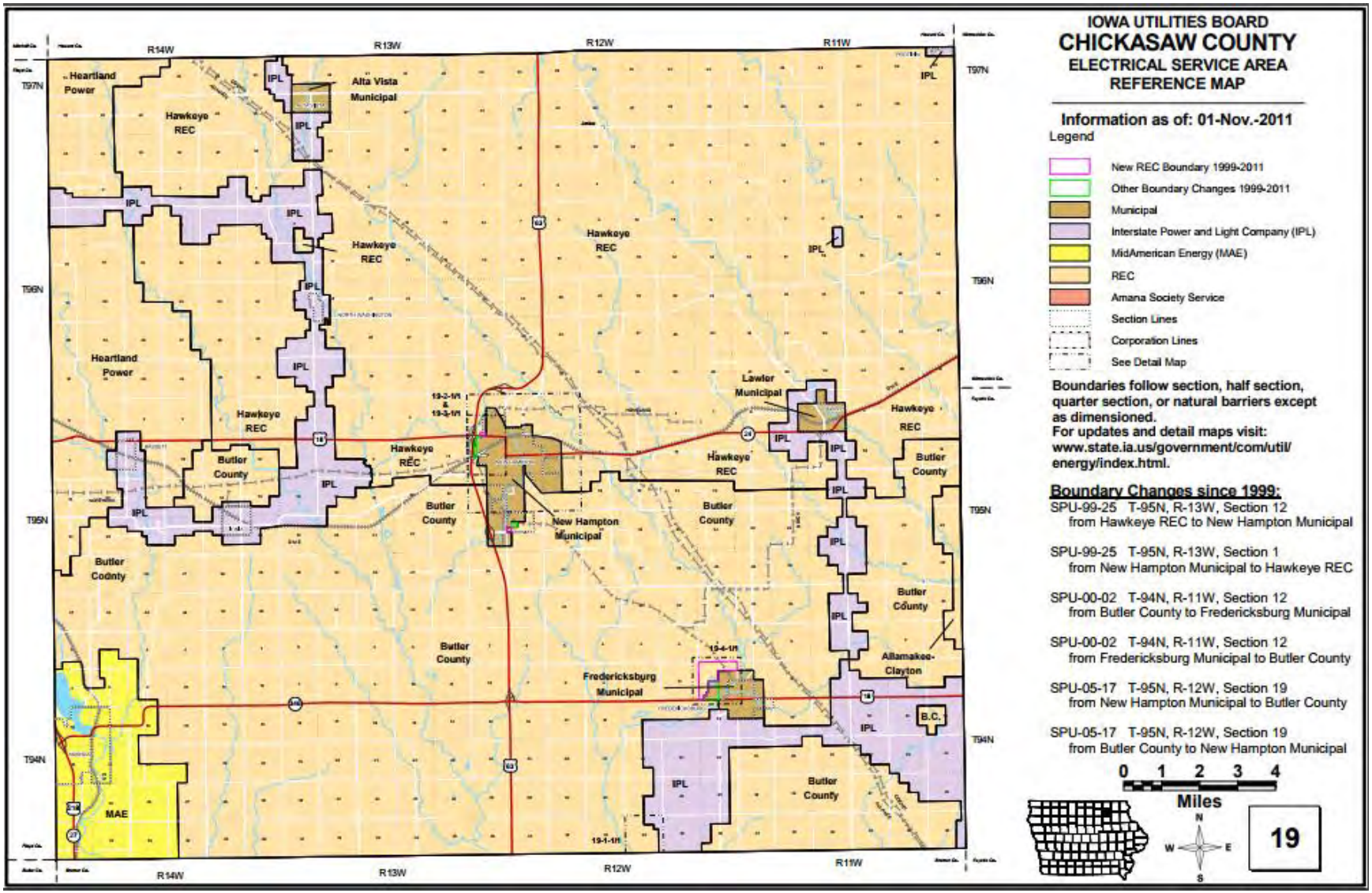
Other Utilities

The planning area is serviced by numerous utilities. Table 2.3 on the next page lists the utility providers for each jurisdiction. Figure 2.2 is an electrical service map of Chickasaw County.

TABLE 2.3: PRIMARY PROVIDERS FOR COMMUNITY UTILITIES WITHIN BREMER COUNTY

Community	Electric	Natural Gas	Telephone/ Internet	Cable	Water	Sewer	Sanitation
Chickasaw County (unincorporated)	Alliant Energy	Black Hills	Windstream	Direct	Wells	Septic	Contracted
City of Alta Vista	Alliant Energy	N/A	Windstream	Direct	City	City	Contracted
City of Fredericksburg	City	Black Hills	Windstream	Direct	City	City	Contracted
City of Ionia	Alliant Energy	Black Hills	Windstream	Direct	City	City	Contracted
City of Lawler	City	Black Hills	Windstream	Alpine Communications	City	City	Contracted
City of Nashua	MidAmerican Energy	MidAmerican Energy	Windstream	Butler-Bremer Communications	City	City	Contracted
City of New Hampton	New Hampton Municipal	Black Hills	Windstream	Mediacom	City	City	Contracted
City of North Washington	Alliant Energy	N/A	Windstream	Direct	City	City	Contracted

Source: Communities


IOWA UTILITIES BOARD
CHICKASAW COUNTY
ELECTRICAL SERVICE AREA
REFERENCE MAP
Information as of: 01-Nov.-2011
Legend
New REC Boundary 1999-2011
Other Boundary Changes 1999-2011
Municipal
Interstate Power and Light Company (IPL)
MidAmerican Energy (MAE)
REC
Amana Society Service
Section Lines
Corporation Lines
See Detail Map
Boundaries follow section, half section, quarter section, or natural barriers except as dimensioned.
For updates and detail maps visit: www.state.ia.us/government/com/util/energy/index.html.
Boundary Changes since 1999:
SPU-99-25 T-95N, R-13W, Section 12 from Hawkeye REC to New Hampton Municipal
SPU-99-25 T-95N, R-13W, Section 1 from New Hampton Municipal to Hawkeye REC
SPU-00-02 T-94N, R-11W, Section 12 from Butler County to Fredericksburg Municipal
SPU-00-02 T-94N, R-11W, Section 12 from Fredericksburg Municipal to Butler County
SPU-05-17 T-95N, R-12W, Section 19 from New Hampton Municipal to Butler County
SPU-05-17 T-95N, R-12W, Section 19 from Butler County to New Hampton Municipal
0 1 2 3 4
Miles
N
W
E
S
19
R14W
R13W
R12W
R11W
T97N
T96N
T95N
T94N
Heartland Power
Alta Vista Municipal
Hawkeye REC
IPL
Butler County
New Hampton Municipal
Lawler Municipal
Fredericksburg Municipal
Allamakee-Clayton
B.C.
MAE
19-2-1/1 & 19-3-1/1
19-4-1/1
19-1-1/1

Communication

Websites

Chickasaw County, the participating school districts, and several of the cities have websites to provide the public with information. Many of the jurisdictions also have social media accounts.

- Chickasaw County: http://www.chickasawcoia.org
- Alta Vista: N/A
- Fredericksburg: http://www.fredericksburgiowa.com/
- Ionia: N/A
- Lawler: http://www.lawleriowa.us
- Nashua: http://www.nashau-iowa.com
- New Hampton: http://www.newhamptonia.com
- North Washington: http://www.waverlyia.com

Newspapers

There are three newspapers published in Chickasaw County which residents follow for local news and announcements. These newspapers are:

- Fredericksburg Review
- Nashua Reporter
- New Hampton Tribune

Other regional newspapers, published outside of the planning area, include:

- Waterloo-Cedar Falls Courier
- The Charles City Press

DEMOGRAPHICS

Population

Table 2.4 illustrates the population trends for Chickasaw 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, some of the communities of Chickasaw County have recovered better than others, but none, including the County as a whole has recovered since the 1980's farm crisis.

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.

The following projections are based on the linear and geometric methods, which assume that future population will continue to change based on past trends. The linear method adds or subtracts from the population the average number from each ten-year period since 1950, while the geometric method uses an average growth or decline rate. Table 2.5 shows the actual number change and the growth or decline rate for each decade and their averages.

TABLE 2.4: POPULATION TRENDS FOR SELECTED COMMUNITIES IN CHICKASAW COUNTY, IOWA

Community	1980 Population	1990 Population	2000 Population	2010 Population	% Change 1980-2010
City of Alta Vista, IA	314	246	286	266	-15.29%
City of Bassett, IA	128	74	74	66	-48.44%
City of Fredericksburg, IA	1075	1011	984	931	-13.40%
City of Ionia, IA	350	304	277	291	-16.86%
City of Lawler, IA	534	517	461	439	-17.79%
City of Nashua, IA	1,846	1,476	1,614	1,663	-9.91%
City of New Hampton, IA	3,940	3,660	3,692	3,571	-9.37%
City of North Washington, IA	142	107	118	117	-17.61%
Chickasaw County (Unincorporated Area)	7,108	5,900	5,589	5,095	-28.32%
Chickasaw County (total)	15,437	13,295	13,095	12,439	-19.42%
State of Iowa	2,913,808	2,776,755	2,926,324	3,046,355	4.5

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

TABLE 2.5: HISTORIC POPULATION CHANGES FOR CHICKASAW COUNTY, IA

Year	Population	Number Change (Linear Method)	Growth/Decline Rate (Geometric Method)
1950	15,228	--	--
1960	15,034	-194	-1.27%
1970	14,969	-65	-0.43%
1980	15,437	468	3.13%
1990	13,295	-2,142	-13.88%
2000	13,095	-200	-1.50%
2010	12,439	-656	-5.01%
Average (1950-2010)		-2,789 / 6 = -465.83	-18.97% / 6 = -3.16%

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

TABLE 2.6: POPULATION PROJECTIONS FOR CHICKASAW COUNTY, IA

Year	Chickasaw County	State of Iowa
2020	12,024	3,172,237
2030	12,000	3,328,308
2040	11,988	3,487,942

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

Using the numbers derived in Table 2.5, population projections can be estimated using the two methods (Linear and Geometric). These projections are listed in Table 2.6 on the next page. It is important to note that these projections are just estimates based on past trends.

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 US Census data, there are 5,679 total housing units in the County (Table 2.7). More recent data indicate a total of 5,672 housing units (Table 2.7). Of these housing units, 4,113 are owner-occupied, 1,131 are renter-occupied, and 428 are vacant. Mobile homes make up 2.6 percent of the county's housing units. This is slightly less than the State's figure of 3.4 percent. Besides the unincorporated area, the communities of Nashua and New Hampton, have a large number of mobile homes within their jurisdiction (Table 2.8). Chickasaw County's total household population is 12,439, with an additional 183 in group quarters. Average household size for Chickasaw County is 2.36 persons.

TABLE 2.7: TOTAL HOUSING UNITS IN SELECTED COMMUNITIES IN CHICKASAW COUNTY, IA

Community	2000	2010	2016*
City of Alta Vista, IA	131	132	137
City of Bassett, IA	34	66	66
City of Fredericksburg, IA	444	462	584
City of Ionia, IA	135	133	158
City of Lawler, IA	217	214	191
City of Nashua, IA	739	787	766
City of New Hampton, IA	1658	1697	1665
City of North Washington, IA	49	45	57
Unincorporated Area	2,186	2,143	2,048
Chickasaw County (Total)	5,593	5,679	5,672
State of Iowa	1,232,511	1,336,417	1,362,619

*Source: U.S. Census Bureau * 2016 ACS US Census*

Age of Housing

Approximately 36.8 percent of the housing units in Chickasaw County were built in 1939 or earlier. In the decades following 1940, the largest numbers of housing units were built in the 1970s. Since the 1980's and 1990's witnessed a dramatic decline in the number of houses being built, the County has not had much steady growth for new housing. Table 2.9 shows the number of structures built in each decade 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 2.8: TOTAL MOBILE HOMES IN SELECTED COMMUNITIES IN CHICKASAW COUNTY, IA

Community	2016*
City of Alta Vista, IA	0
City of Bassett, IA	0
City of Fredericksburg, IA	0
City of Ionia, IA	2
City of Lawler, IA	2
City of Nashua, IA	13
City of New Hampton, IA	69
City of North Washington, IA	2
Unincorporated Area	48
Chickasaw County (Total)	136

Source: U.S. Census Bureau
** 2016 ACS US Census*

TABLE 2.9: AGE OF HOUSING UNITS IN CHICKASAW COUNTY, IA

Year Built	Chickasaw County		Iowa Percent (%)
	Number	Percent (%)	
2014 or Later	0	0.0%	0.5%
2010-2013	62	1.1%	2.2%
2000-2009	369	6.5%	11.7%
1990-1999	306	5.4%	10.8%
1980-1989	346	6.1%	7.3%
1970-1979	1,016	17.9%	14.7%
1960-1969	654	11.5%	10.6%
1950-1959	526	9.3%	10.4%
1940-1949	303	5.3%	5.5%
1939 or earlier	2,090	36.8%	26.3%
Total	5,672	100%	100%

Source: U.S. Census Bureau (2012-2016 5-Year Estimates)

Value of Housing

Housing value within Chickasaw County has been estimated to have increased since that of the previous decennial census. According to 2016 ACS, the median value for an owner-occupied unit in the county was $103,700.00, increased from $93,800 in 2010. While this value is lower than the State average, which aligns with most individual communities within the county still remain relatively low compared to State averages for owner occupied housing units.

The State of Iowa had a median housing value of $119,200 in 2010 and $132,800 according to Table 2.10.

Table 2.11 shows the number and percent of housing units in the county by type.

Table 2.12 provides a list of median gross rent for each community. Chickasaw County's median gross rent is $173 less than the State's. Of Chickasaw County's jurisdictions, Lawler has the lowest median gross rent, at $342.

TABLE 2.10: MEDIAN VALUE OF A SPECIFIED OWNER-OCCUPIED UNITS IN SELECTED COMMUNITIES

Community	2010	2016*
City of Alta Vista, IA	$60,900	$45,600
City of Fredericksburg, IA	$73,500	$76,400
City of Ionia, IA	$72,500	$74,000
City of Lawler, IA	$76,500	$75,700
City of Nashua, IA	$81,900	$90,400
City of New Hampton, IA	$93,100	$101,000
City of North Washington, IA	$75,600	$75,600
Chickasaw County (total)	$93,800	$103,700
State of Iowa	$119,200	$132,800
Source: U.S. Census Bureau		

TABLE 2.11: HOUSING UNITS BY TYPE IN CHICKASAW COUNTY

Units in Structure	Number of Units	Percent
1-unit, detached	4,578	87.3%
1-unit, attached	73	1.4%
2 units	11	0.2%
3 or 4 units	79	1.5%
5 to 9 units	173	3.3%
10 or more units	194	3.7%
Mobile Home	136	2.6%
Total Housing Units	**5,244**	**100%**
Source: 2012-2016 5-year ACS		

TABLE 2.12: MEDIAN GROSS RENT FOR SELECTED COMMUNITIES

Community	2010	2016*
City of Alta Vista, IA	$425	$383
City of Fredericksburg, IA	$440	$563
City of Ionia, IA	$513	$425
City of Lawler, IA	$444	$342
City of Nashua, IA	$465	$491
City of New Hampton, IA	$435	$566
City of North Washington, IA	N/A	$575
Chickasaw County(total)	$468	$542
State of Iowa	$617	$715
Source: U.S. Census Bureau		

TABLE 2.13: PER CAPITA & MEDIAN HOUSEHOLD INCOME FOR SELECTED COMMUNITIES

Community	Per Capita Income			Median Household Income		
	2000	2010	2016*	2000	2010	2016*
City of Alta Vista, IA	15,378	15,175	19,641	26,786	29,205	40,909
City of Fredericksburg, IA	15,956	20,445	20,128	31,938	38,182	37,083
City of Ionia, IA	17,355	18,615	24,546	35,357	41,250	48,750
City of Lawler, IA	21,268	25,874	27,225	30,500	43,182	48,750
City of Nashua, IA	16,031	18,261	25,431	31,713	32,600	46,402
City of New Hampton, IA	20,255	23,636	23,371	40,082	38,908	39,455
City of North Washington, IA	15,611	18,266	27,205	38,542	37,083	70,625
Chickasaw County(total)	18,237	22,447	26,915	37,649	41,372	48,013
State of Iowa	19,674	25,335	28,872	39,469	48,872	54,570

Source: U.S. Census Bureau

TABLE 2.14: NUMBER OF EMPLOYEES BY EMPLOYMENT SECTOR/INDUSTRY

Industry	Chickasaw County		State of Iowa	
	#	%	#	%
Agriculture, Forestry, Fishing & Hunting, and Mining	562	9.20%	61,676	3.90%
Construction	365	6.00%	98,744	6.20%
Manufacturing	1,636	26.70%	241,775	15.20%
Wholesale Trade	230	3.80%	45,637	2.90%
Retail Trade	590	9.60%	184,920	11.70%
Transportation & Warehousing, and Utilities	263	4.30%	73,083	4.60%
Information	42	0.70%	27,781	1.80%
Finance, Insurance, Real Estate, and Rental & Leasing	234	3.80%	120,220	7.60%
Professional, Scientific, Management, Administrative, and Waste Management Services	241	3.90%	114,113	7.20%
Education, Health and Social Services	1,164	19.00%	386,743	24.40%
Arts, Entertainment, Recreation, Accommodations and Food Services	317	5.20%	115,726	7.30%
Other Services (except public administration)	222	3.60%	67,384	4.20%
Public Administration	266	4.30%	49,376	3.10%

Source: U.S. Census Bureau (2012-2016 5-Year Estimates)

Economy

Income

The per capita and median household income for the county and its communities are listed in Table 2.13. The county, as a whole, has a per capita income in 2016 dollars of $26,915. The median household income for the entire county, in 2016 dollars, is $48,013. The City of Alta Vista has the smallest per capita income, $19,641, while Fredericksburg has the smallest median household income, $37,083.

Employment Sectors

As Table 2.14 reveals, Chickasaw County has a large percentage of its residents employed in manufacturing (26.70%), higher than the State (15.20%). The education, health and social services is the second highest industry employing 19.00% of the county. The table also shows the rural environment of the county, with 9.20% employment in the agricultural, forestry, fishing and hunting, and

mining industry. The retail trade sector is also slightly higher percentage than the rest of the County.

Major Employers

There are a few manufacturing type employers in Chickasaw County which would be the top employers for the area. Amongst the top are: TriMark, Five Star Co-op, and Precision. Mercy Medical Center in New Hampton would be a top employer in the education, health, and social services industry.

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 Chickasaw 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 for Chickasaw County 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 County's 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. This section includes steps 3 and 4 from above.

HAZARD IDENTIFICATION

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. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

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 may not include all of or the same hazards identified for preparedness, response or recovery.

The Committee reviewed the recognized hazards in the 2013 Chickasaw County Multi-Jurisdictional Hazard Mitigation Plan, the 2013 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 2013 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 Chickasaw County and its communities are listed in Table 3.1.

TABLE 3.1: CHICKASAW 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	
River Flooding	
Severe Winter Storm	
Sinkholes	
Thunderstorm/Lighting/Hail	
Tornado/Windstorm	

The identified hazards are discussed at length on the following pages. The discussion will include known historical occurrence, probability of future occurrence, magnitude/severity, warning time, and duration. The overall average results of the Committee's scoring efforts will be provided following this discussion, under Vulnerability Assessment. The individual community scores can be found in each respective appendix.

A large portion of a community's risk and vulnerability to a specific hazard is affected by the geographic location of that community. In fact, some of the 20 hazards from the state's 2013 plan may not be applicable to certain communities.

However, to be sure a comprehensive approach was undertaken, all communities conducted a hazard assessment for each of the 20 hazards.

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 3.2 lists state and federal disaster declarations received by Chickasaw County. Many of the disaster events were regional or statewide; therefore, reported costs are not accurate reflections of losses to Chickasaw County and its jurisdictions.

TABLE 3.2: PRESIDENTIAL DISASTER DECLARATION HISTORY FOR CHICKASAW COUNTY

Declared Date	Type	Declaration #
08/14/1969	Heavy Rains and Flooding	269
09/06/1990	Severe Storms and Flooding	879
07/12/1991	Severe Storms and Flooding	911
07/09/1993	Severe Storms and Flooding	996
07/02/1998	Severe Storms, Tornadoes and Flooding	1230
07/22/1999	Severe Storms and Flooding	1282
05/21/1999	Severe Storms, Tornadoes and Flooding	1277
05/25/2004	Severe Storms, Tornadoes and Flooding	1518
09/10/2005	Hurricane Katrina Evacuation	3239
03/14/2007	Severe Winter Storms	1688
05/27/2008	Severe Storms, Tornadoes and Flooding	1769
07/02/2013	Severe Storms, Tornadoes and Flooding	4126
07/24/2014	Severe Storms, Tornadoes, Straight-Line Winds and Flooding	4184
09/29/2016	Severe Storms, Tornadoes, Straight-Line Winds and Flooding	4281
10/31/2016	Severe Storms and Flooding	4289
2017	Severe Storms and Flooding	PENDING

Source: FEMA, as of

HAZARD PROFILES

Once hazards were identified and profiled, a vulnerability assessment was conducted. The vulnerability assessment identifies how people, properties, and structures will 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 planning area decide what mitigation measure should be undertaken and how to implement the activities they select.

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.

TABLE 3.3 : PROBABILITY

Score	Description	
1	Unlikely	Less than 10% probability in any given year (up to 1 in 10 chance 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 chance 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 chance 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.

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 of the hazard are more difficult to estimate the probability of future occurrence. If a hazard or its impacts have been mitigated against, 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 3.3 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 3.4 shows the Magnitude / Severity scoring criteria.

TABLE 3.4 : MAGNITUDE / SEVERITY

Rating	Description	
1	Negligible	Less than 10% of property severely damaged, shutdown of facilities and services for less than 24 hours, and/or injuries/illnesses treatable with first aid
2	Limited	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 3.5 shows the warning time criteria.

TABLE 3.5: 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 3.6 shows the duration scoring criteria.

TABLE 3.6 : DURATION

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

Table 3.7 lists the average scores for all jurisdictions in the planning area. Individual assessment scores for each jurisdiction can be found in their respective appendix.

The hazard assessment scores for unincorporated Buchanan County, whose appendix is served by this section of the plan's overview of the county, is shown in Table 3.8.

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.

TABLE 3.7: COMPOSITE HAZARD ASSESSMENT SCORES OF ALL JURISDICTIONS

Hazard Rank	Hazard	Probability	Magnitude/ Severity	Warning Time	Duration	Final Score
1	Thunderstorm/Lightning/Hail	3.50	2.40	3.40	2.50	3.06
2	Tornado/Windstorm	2.60	3.20	3.50	3.00	2.96
3	Severe Winter Storm	3.10	2.20	1.90	2.90	2.63
4	Flash Flood	2.70	2.20	3.20	2.60	2.62
5	River Flooding	2.20	2.60	2.00	2.80	2.35
6	Animal/Plant/Crop Disease	2.50	1.40	2.10	3.40	2.20
7	HAZMAT Incident	1.50	2.20	3.80	2.20	2.13
8	Transportation Incident	1.90	1.80	3.40	1.40	2.05
9	Grass/Wild Fire	1.60	1.60	3.20	1.80	1.86
10	Infrastructure Failure	1.40	1.40	3.00	2.60	1.76
11	Drought	1.80	1.40	1.10	3.40	1.74
12	Extreme Heat	1.90	1.50	1.10	2.30	1.70
13	Dam / Levee Failure	1.33	1.67	2.11	2.22	1.64
14	Human Disease	1.30	1.70	1.10	3.00	1.56
15	Terrorism	0.90	1.80	2.40	1.90	1.50
16	Earthquake	0.90	1.30	3.00	1.80	1.43
17	Expansive Soils	1.00	1.20	1.60	2.50	1.30
18	Radiological Incident	1.00	1.00	1.90	1.80	1.22
19	Sinkholes	0.78	0.78	2.00	1.78	1.06
20	Landslide	0.78	0.78	1.78	1.67	1.02

TABLE 3.8: HAZARD ASSESSMENT SCORES FOR UNINCORPORATED CHICKASAW COUNTY						
Hazard Rank	**Hazard**	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**Final Score**
1	River Flooding	4	4	3	4	**3.85**
2	Thunderstorm/Lightning/Hail	4	2	4	4	**3.4**
3	Tornado/Windstorm	3	3	4	4	**3.25**
4	Flash Flood	3	3	3	4	**3.1**
5	Severe Winter Storm	3	3	1	4	**2.8**
6	Transportation Incident	3	1	4	2	**2.45**
7	Drought	2	3	1	4	**2.35**
8	Terrorism	1	3	4	3	**2.25**
9	Grass/Wild Fire	2	2	4	1	**2.2**
10	Extreme Heat	2	2	1	4	**2.05**
11	HAZMAT Incident	1	2	4	3	**1.95**
12	Earthquake	1	1	4	4	**1.75**
13	Infrastructure Failure	1	1	4	3	**1.65**
14	Animal/Plant/Crop Disease	1	2	1	4	**1.6**
14	Human Disease	1	2	1	4	**1.6**
16	Expansive Soils	1	1	1	4	**1.3**
17	Radiological Incident	1	1	1	3	**1.2**

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. In recent years, Avain Bird Flu has shown up throughout the state.

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 Chickasaw County and many of its cities. According to the Iowa Department of Natural Resources, Chickasaw County has confirmed Emerald Ash Borer infestations. The damage caused by this invasive species is comparable to diseases such as Dutch elm disease.

Historical Occurrence

Instances of plant, crop, or animal disease are common across Iowa and Chickasaw County. However, according to available data and input, there have been no widespread recorded occurrences of plant, crop, or animal diseases having a long-term 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 3.7) determined the probability of this hazard event to be likely (up to 20% to 33% chance occurring). Unincorporated Chickasaw County concluded the probability of this hazard to occasional – representing a 10% to 20% chance of occurring each year.

Magnitude / Severity

As discussed earlier in the profile, agriculture, primarily corn, soybeans, and livestock, is a major contributor to Chickasaw County's economy. According to the 2016 American Community Survey, Agriculture, forestry, fishing and hunting, and mining make up 562 jobs, or 9.2% of the job industry in Chickasaw County.

The severity of a plant, crop, or animal disease depends largely on the disease itself. Effects from a widespread crop disease in Chickasaw 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.

Dam / Levee 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.

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.

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 3.9 shows these classifications.

TABLE 3.9: 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	

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.

According to data from the National Inventory of Dams and the Iowa Department of Natural Resources, there are five dams in Chickasaw County, as shown in Table 3.10. See Attachment 1 for a map of the locations of these dams.

TABLE 3.10: DAMS IN CHICKASAW COUNTY			
Dam Name	**River**	**Owner Name**	**Type & Purpose**
Split Rock Dam	TR-East Wapsipinicon	Chickasaw Co. Conservation Board	Recreation
Airport Park Lake Dam	TR-Little Wapsipinicon	Chickasaw Co. Conservation Board	Recreation
Tomson Dam	TR- Cedar River	O. Jay Tomson	Fire Protection, Stock, or Small Fish Pond
Nashua Milldam	Cedar River	City of Nashua	Recreation
Wahl Dam	TR-Crane Creek	Roger W. Wahl	Irrigation, Fire Protection, Stock, or Small Fish Pond
Source: U.S. Army Corps of Engineers, National Inventory of Dams & Iowa DNR			

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.

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.

According to information available from the Army Corps of Engineers National Levee Database, there is one levee registered with the agency, within the planning area, located in the City of Nashua.

Historical Occurrence

There have been no documented dam or levee failures in the planning area. The Dam in Nashua, located near downtown, has never failed before, but has been overtopped with flood waters.

According to information available from the Army Corps of Engineers National Levee Database, there is one levee, registered with the agency, within the planning area. However, the planning area likely has numerous rural, agricultural-related man-made levees, dikes, or berms to protection primary agricultural lands and communities.

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. The hazard risk for the dams in unincorporated Chickasaw County was removed due to no dams or levees being in the county. The probability of a catastrophic dam failure or other dam-related hazard was determined to be unlikely.

There are likely additional levees and berms in the planning area which are not listed in the Army Corps of Engineers database. The likelihood of these levees and berms failing may be higher since there is no official inspection, maintenance, or design on record. These levees and berms are likely built by landowners and farmers.

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. The planning area's vulnerability and severity of a dam failure is considered critical.

All levees, dikes, berms, and floodwalls give a false sense of security. People feel that these devices will protect them and their property against any future flooding. While this is usually true, the hazard is only temporarily contained. Therefore, people, property, and utilities located on the other side of the levee are most at risk.

Floodwaters breaching a levee are usually contained in the historic floodplain. Interestingly enough, levee failure in one area may prevent flooding in another area. A levee breach or overtopping occurring along one segment may drop the level of water along other segments of the stream.

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.

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.

TABLE 3.11: CHICKASAW COUNTY DROUGHT EVENTS, 1995-2018

Month/Year of Declaration	Deaths	Injuries	Property Damage	Crop Damage
August 1995	0	0	0	0
August 2001	0	0	0	0
August 2003	0	0	0	0
July 2012	0	0	0	0
August 2012	0	0	0	0
September 2012	0	0	0	0
October 2012	0	0	0	0
November 2012	0	0	0	0

Source: National Climatic Data Center, retrieved 3/1/2018

Historical Occurrence

According to National Climatic Data Center, the planning area had eight recorded drought events. These droughts occurred in August 1995, August 2001, August 2003, July 2012, August 2012, September 2012, October 2012, and November 2012. Fortunately, Chickasaw County experienced no property or crop damage due to these events. A brief summary of these droughts are as follows.

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 Chickasaw 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.[2]

August 2003 - Dry weather settled again over Iowa and Chickasaw 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, 1999, 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

[2]National Climatic Data Center, U.S. Department of Commerce, http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~ShowEvent~422598, Retrieved December 4, 2009.

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 3.11 displays drought events in Chickasaw County from 1995-2018 as recorded by the National Climatic Data Center.

Probability

From 1995-2018 there were four years, and eight events when a drought occurred spanning a total of eight months. Based on the historical occurrence, the probability of a drought in a given year is highly likely – with a percent greater than 33 percent chance of occurring (34.78%).

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 county residents 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 Chickasaw 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 Chickasaw 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.

Duration

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

Earthquake

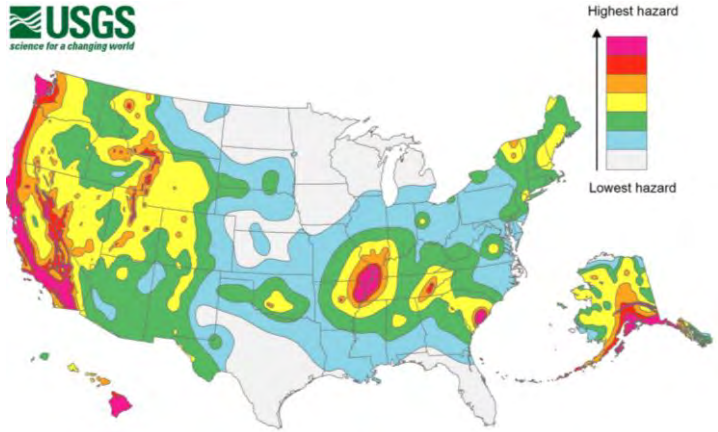
Definition and Description

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

FIGURE 3.1: SIMPLIFIED 2014 EARTHQUAKE HAZARD MAP



Source: earthquake.usgs.gov/hazards/

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 near the planning area starting north of the City of Waterloo, through the very southeast tip of Butler 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.

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 affects on the region. For example, in 2002 an earthquake with an epicenter in Alaska caused temporary “black water” to occur in area 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 Chickasaw County and its jurisdictions is unlikely, less than 10%. Figure 3.1 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 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.

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. The composite probability score of a large expansive soil event, affecting buildings and major infrastructure, was determined to be between Unlikely (up to 10 percent chance of occurring in a given year) and Occasional (10 to 20 percent chance of occurring in a given year. unlikely 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

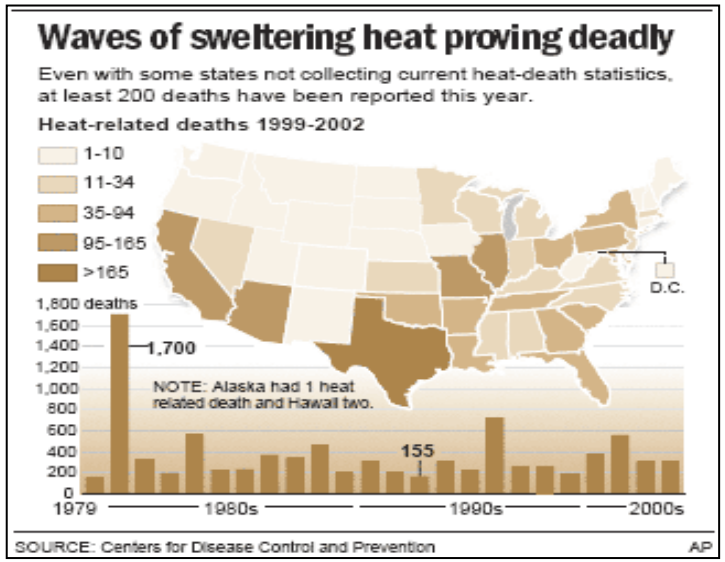


Figure 3.2: Heat Related Deaths, 1999-2002

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).

The National Climatic Data Center Storm Events Database indicates only one recorded Excessive Heat event in Chickasaw County since 1996; an extreme heat event was recorded beginning on July 17, 2011 and ending July 20, 2011. No injuries or deaths as a result, but there was an estimated $33,000 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.

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 effect some members of communities more than others (such as elderly persons or households without air conditioning), some jurisdictions considered extreme heat to be more probable despite few historical occurrences. However, based on NOAA criteria, the probability is unlikely.

Magnitude / Severity

All 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 Chickasaw County's population would fall into this category.

The amount of vulnerability can be greatly reduced by taking certain precautionary measures. Such measure include, 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 Chickasaw County from 1996 through 2017. These floods caused an estimated $1.892 million in property damage and $6.475 million 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.

Probability

The probability of a flash flood varies between communities. Even within those communities, some areas have much higher likelihood of experiencing flash flooding than other areas.

Overall, the average jurisdictional flash flooding probability was highly likely (over 33 percent chance of event happening each year.) See appendixes for details on the probability of flash flooding for each community.

TABLE 3.12: HISTORICAL OCCURRENCES OF FLASH FLOODING IN CHICKASAW COUNTY, 1996-2017

Location	Date	Time	Deaths or Injuries	Property Damage	Crop Damage
Alta Vista	06/18/1998	16:00	0	$12.00K	$20.00K
New Hampton	06/27/1998	21:33	0	$25.00K	$0.00K
Countywide	06/28/1998	01:30	0	$0.00K	$35.00K
Countywide	07/18/1999	22:55	0	$500.00K	$250.00K
Countywide	07/20/1999	18:02	0	$350.00K	$100.00K
Countywide	06/13/2000	21:00	0	$60.00K	$80.00K
Countywide	05/21/2004	19:33	0	$150.00K	$100.00K
South Portion	05/23/2004	01:45	0	$100.00K	$125.00K
Countywide	07/05/2004	20:45	0	$8.00K	$10.00K
Jerico	08/19/2007	18:26	0	$10.00K	$20.00K
Fredericksburg	04/25/2008	04:19	0	$50.00K	$0.00K
Lawler	06/17/2009	21:30	0	$20.00K	$30.00K
Saude	05/29/2013	15:25	0	$20.00K	$0.00K
Nashua	06/26/2013	00:18	0	$120.00K	$0.00K
Deerfield	06/19/2014	07:59	0	$5.00K	$0.00K
Lawler	07/23/2016	13:47	0	$0.00K	$0.00K
Little Turkey	08/24/2016	03:00	1	$10.00K	$0.00K
Lawler	09/09/2016	14:08	0	$35.00K	$0.00K
Nashua	09/22/2016	03:56	0	$48.00K	5.00K
Williamstown	07/21/2017	16:0010:50	0	$20.00K	$0.00K
Bassett	07/22/2017	00:51	0	$350.00K	5.700M
		Total	**1**	**$1.892M**	**$6.475M**

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. Chickasaw County has two primary rivers that flow through, including the Cedar River and the Wapsipinicon River. 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. See each communities respective appendix for specific information on previous and potential flash flooding impacts.

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 of the city and county. The new AlertIowa program can also provide notification of flash floods. Flash floods can result in a matter of tens of minutes. The warning time for a flash flood is considered to be minimal (less than 6 hours of warning).

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 and Wildland 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
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 Coordination Center Wildland Summary and Statistics Annual Report 2013, there were 433 wild land fires affecting 14,558 acres in Iowa in 2013.

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. There is no central database that records grass/wild land fires. However, grass and wildland fires do occur within the county and fire departments are called out on an annual basis.

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 Chickasaw 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.

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. Chickasaw County has over 240,000 acres in farmland, over 85% of the area of the county, with majority which is 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 Chickasaw 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.

Hazardous Materials / HAZMAT Incident

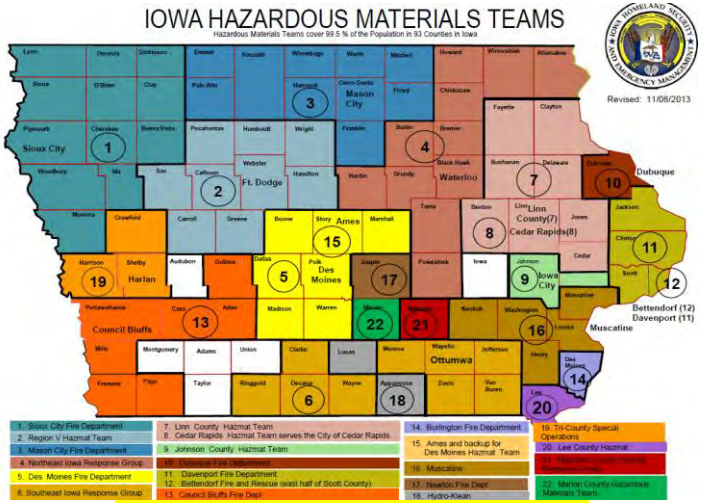


FIGURE 3.3: IOWA HAZARDOUS MATERIALS TEAMS
Courtesy of Iowa Homeland Security[3]

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 3.3 shows the Iowa Hazardous Materials Teams of Iowa.

Historical Occurrence

According to the Iowa Department of Natural Resources, there were forty-seven (47) hazardous materials spills in Chickasaw County from March 1, 2008 through March 1, 2018. Majority of these spills involved diesel fuel and the other numerous spill type involved hog manure. The Committee determined there was no known historical occurrence of transportation incidents involving HAZMAT or Radiological material.

Table 3.13: HAZARD SPILLS BY MODE
March 1, 2008 – March 1, 2018

Mode of Spill	Quantity
Handling and Storage	30
Transportation	6
Manure	3
Transformer	2
Railroad	2
Other	1
Total	**47**

Source: Iowa DNR Hazerdous Material Release Database

[3] *http://homelandsecurity.iowa.gov/documents/maps/MAP_HazMatTeams.pdf*

Probability

Chickasaw County averaged 4.7 hazardous spill incidents per year from March 1, 2008 through March 1, 2018.

Hazardous materials are transported are 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.

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. However, Chickasaw County does not have any TRI facilities.[4]

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. An average of all of the community's hazard assessment scores determined that the probability of this hazard taking place to between unlikely and occasional (0 – 20 percent chance of occurring in a given year. The committee's review compared to historical differences is due to the consideration that many of the recorded events are small, localized spills which are not probable to affect the public in a meaningful way.

Table 3.14 HAZARD SPILLS BY TYPE March 1, 2008 – March 1, 2018

Type of Spill	Quantity
Petroleum	9
Fertilizer/Pesticide	8
Inorganic Chemical	8
Manure	4
Acids/Bases	3
Other Chemicals	1
Chlorine	1
Not Listed	9
Total	**47**

Source: Iowa DNR Hazerdous Material Release Database

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

[4] *http://iaspub.epa.gov/triexplorer/tri_factsheet.factsheet?pDataSet=TRIQ1&pyear=2013&pstate=IA&pcounty=Bremer%20County*

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. Figure 3.3 (two pages back) shows the 20 Iowa Hazardous Materials Teams.

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, and 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 eleven “Emergency Reportable Diseases or Conditions” that are to be reported by telephone immediately should they be detected. These diseases include Botulism, Cholera, Diphtheria, Haemophilus influenza type b invasive disease, Measles, Meningococcal invasive disease, Plague, Polio, Rabies (human), 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 terrorism such as anthrax, mustard gas, sarin gas, ricin, tularemia, and smallpox.

Other diseases of recent concern include SARS, 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 past year, Ebola and the Zika Virus have both become concerning public health threats.

Historical Occurrences

The historical occurrence of the outbreak of communicable diseases in the planning area was difficult to determine. The Committee could note historical occurrences of Small Pox and Influenza on relatively large scales. More recently West Nile Virus has been known to occur within the county. Historically, Pseudorabies has been a concern in hog confinement operations in the state.

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, totally 498 cases since its first reporting in 1999. Confirmed cases have been found in neighboring counties, including: Black Hawk, Grundy, and Buchanan. 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.[5]

Probability

It is highly likely human disease as defined will affect Chickasaw 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. Numerous hospitals and clinics in Chickasaw County are available to provide care as well. Balancing the array of type of disease and impact, the probability has determined to be occasional.

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. Chickasaw 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

[5] http://www.cdc.gov/westnile/index.html

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 Chickasaw 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 averaged 36 deaths per year and ranked 31st out of the 50 states in the number of deaths per million between 2011 and 2015.

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.

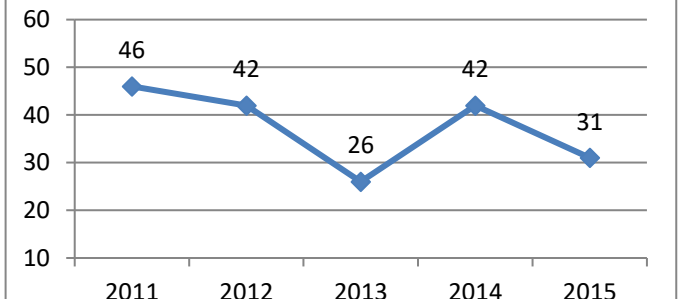
Historical Occurrences

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.

The county is not immune to structural and residential fires. Through not a central database to record previous events, jurisdictions can expect to face fire and energy outages each year.

Figure 3.4 shows the historic data of deaths caused by fires throughout the entire State of Iowa. The data is courtesy of the State Fire Marshall.

Figure 3.4: Count of Iowa Fire Fatalities By Year



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. The average probability score of all nine jurisdictions determined the likelihood of infrastructure failure 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 oversteepened 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

In a search of national databases,, there was no discovery of recorded landslides in Chickasaw County. It is possible that landslides have 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 Chickasaw County is unlikely. Figure 3.5 shows the general risk landslides pose throughout Iowa. All of Chickasaw County is within the "low" risk category. 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 map of the planning area is located in Attachment 1.

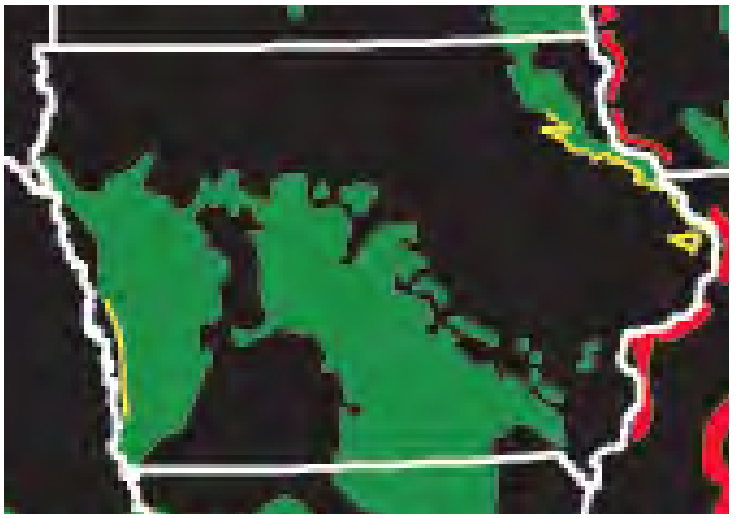


Figure 3.5: Landslide Potential

Red = Very High Potential; Yellow = High Potential; Green = Moderate Potential; Black = Low Potential

Courtesy of US Geological Survey, www.usgs.gov

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.

According to a 2005 publication by the Us Geological Survey[6] landslides:

- Cause damage in all 50 states
- Cost $3.5 billion per year, in 2005, in damage repair
- Reduce real-estate values and tourist revenue

[6] *https://pubs.usgs.gov/fs/2005/3156/*

- Lead to lost human, industrial, agricultural, and forestry production
- Cause damage to the natural environment.

In general, the areas of the county most susceptible to a landslide include the Appalachian Mountains, Rocky Mountains, and the west coast. The Midwest, with a relative flat terrain, experiences very landslides compared to these other areas.

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.

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"[7]

The United States Nuclear Regulatory Commission (NRC) identifies four types of emergency classifications for nuclear power plants. Table 3.15 provides a brief description of these types of emergencies.

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

TABLE 3.15: 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 epxted to exceed EPA PAG exposure levels offsite for more than the immediate site area.
Source: US Nuclear Regulatory Commission, "Emergency Classification"	

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 2017, the Duane Arnold Energy Center has had 7 Unusual Events, one Alert, no Site Area Emergencies and no General Emergencies.

Figure3.6 shows the location of the two nuclear power plants in eastern Iowa.

According to the state's 2013 Hazard Mitigation Plan, there are have be no occurrences of transportation radiological incidents in Iowa.

Transportation of radiological materials is licensed and regulated by the federal government. According to the state's 2013 Hazard Mitigation Plan, there have been no occurrences of transportation 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

Three nuclear facilities are located near the Iowa boarder. These 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.

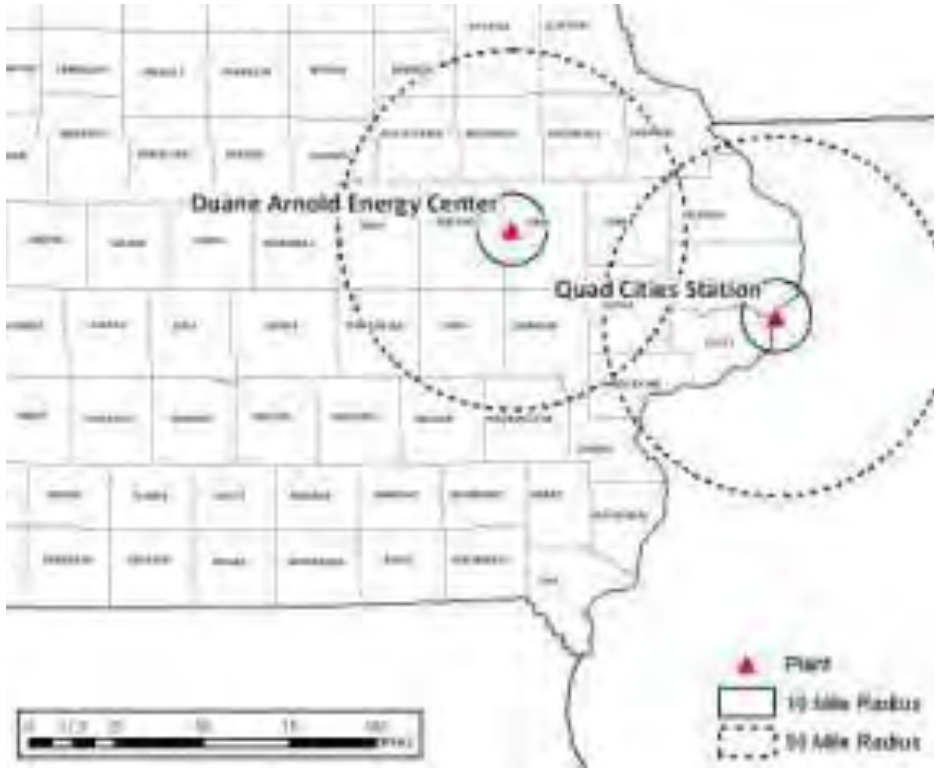


Figure 3.6: Location of Nuclear Power Plants in Eastern Iowa
Source: Iowa Hazard Mitigation Plan, 2013

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-mail radius from the plant, where radioactive materials could contaminate water supplies, food crops, and livestock"[8]

The 50-mile radius of the nuclear plant does not cover any of Chickasaw County.

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

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.[9]

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 Flooding

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 data from the National Climatic Data Center, there have been 11 reported flood events in Chickasaw County between 1996 and 2017. Table 3.16 displays the date, general location, and impact of these floods. Since 1996, floods have caused over $1.051 million in property and $1.101 million in crop damage

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

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.

Table 3.16: River Flooding Events in Chickasaw County, 1996-2017

Location	Date	Time	Death or Injuries	Property Damage ($)	Crop Damage ($)
Fredericksburg	06/24/1998	00:00	0	$20.00K	$0.00K
New Hampton	06/27/1998	20:15	0	$2.00K	$1.30K
Chickasaw County	07/19/1999	07:30	0	$350.00K	$100.00K
Horn FLD ARPT	04/25/2008	07:00	0	$50.00K	$0.00K
Horn FLD ARPT	06/07/2008	23:00	0	$600.00K	$1.000M
Deerfield	03/10/2010	16:00	1	$7.00K	$0.00K
Bassett	03/11/2010	23:00	0	$0.00K	$0.00K
New Hampton	06/23/2010	03:14	0	$0.00K	$0.00K
Deerfield	06/14/2016	19:05	0	$2.00K	$0.00K
Deerfield	08/23/2016	22:00	0	$20.00K	$0.00K
Bassett	08/23/2016	22:59	0	$0.00K	$0.00K
		Total	**1**	**$1.051M**	**$1.101M**

Source: National Climatic Data Center, retrieved 3/1/2018

Flood of 1999 – A Mesoscale Convective Complex developed over north central and northeast Iowa during the overnight and early morning hours of the 18th and 19th of July. The first flash flood warnings were issued during the wee hours after midnight. The most intense rainfall, estimated by WSR-88D radar at 6 to 10 inches, fell over a relatively small area of Cerro Gordo and southern Worth Counties. The hardest hit area was around Manly, where unofficial rainfall totals of at least 13 inches were received from within the town. There was extensive flooding of homes, roads, and businesses from small streams and creeks. A tragedy was barely averted in the town of Rock Falls, when a sudden rise in flood waters on the Shell Rock River swept a number of camping vehicles downstream, requiring rescues from atop the campers. In the town of Nora Springs, downstream from Rock Falls, there was a small earthen dam break on the Shell Rock River, which may have increased flows downstream. The dam was already being significantly overtopped at the time of failure, so it was difficult to determine the exact impact on the flows downstream. A flash flood watch was issued early on the 19th for much of western, central, and north central Iowa. Significant storms did develop overnight, but the heaviest rains fell in the western parts of the Des Moines HSA and fortunately there was only scattered light activity over northeast Iowa. Urban and small stream advisories were issued for Emmet and northern Palo Alto Counties, where radar estimated 2 to 4 inches of rainfall. The heaviest 24-hour gage report however was in Carroll, in the Middle Raccoon basin, with 2.96 inches. Another flash flood watch was issued early on the 20th for roughly the north half of Iowa. Factors cited in discussions about the potential for heavy rainfall included the presence of a very slow moving cold front, combined with 30 to 45 MPH low level winds feeding abundant moisture into the boundary. The forecasts for extreme rainfall were verified by tremendous rains which began late on the afternoon of the 20th. A flash flood warning was already issued by the early evening hours for southern Worth County, with radar estimated rainfall at 2 inches per hour. Storms continued to develop and train over the same areas during the evening hours, causing additional flash flood warnings in both Chickasaw and Butler Counties. Rainfall was heaviest in the cedar and Shell Rock River basin, as the band of intense rainfall sank slowly southward with the frontal boundary. Unofficial reports of 7 to 8 inches of rain were reported near Clarksville, located along the Cedar River in Butler County. River flood warnings were issued before midnight, late on the 20th, for the Cedar River from the Chickasaw County line southward into the Waterloo area. As additional rainfall reports were received early on Wednesday the 21st, the extent and degree of possible river flooding became evident. Radar estimated rainfall indicated a large area of greater than 6 inches of rainfall centered over Floyd County, with a center of 8 to 11 inches stretching from just south of Charles City westward to Rockford. The highest 24-hour gage report within the Cedar basin was at Charles City, with 6.65 inches. According to the Rainfall Frequency Atlas of the Midwest (Midwestern Climate Center - 1992), the 100-year, 24-hour rainfall in this part of northeast Iowa is around 6 inches, meaning

that 2 out of 3 nights the rain gage at Charles City had rains at or in excess of the 100-year frequency at 2 hours. Consider that this rain fell in much less time than 24 hours, and it was likely not at the most intense rainfall center! With all of this new rain falling within the same basins as the two nights previous, new flood warnings for yet higher crests were issued for the Winnebago, Shell Rock, and Cedar Rivers. Forecasts predicted several record flood levels along these rivers, with lead times to crest from 8 hours to several days. Near record flooding occurred along the Shell Rock River at Marble Rock with the 2nd highest crest on record, while record floods occurred further downstream at Shell Rock and on the Cedar River at Janesville. At Waterloo, rainfall over the West Fork Cedar River, Beaver Creek, and Black Hawk basin was much lower than in the Shell Rock and Cedar basins, reducing the inflows to the Cedar in Waterloo. Local officials in Cedar Falls, just upstream of Waterloo, stated that the crest exceeded the 1961 flood. The return frequency data for these river floods presents some interesting numbers. The most extreme flood in terms of return frequency was on the Cedar River at Janesville, where the discharge of 41,000 cubic feet per second (cfs) on July 22 made this about a 75-year flood (.015 exceedance probability). The stage at Janesville reached the highest stage on record. At Waterloo on the Cedar, the peak discharge of 65,700 cfs on July 23 was about a 20-year flood event (.05 exceedance probability). This stage was the 3rd highest on record. This highlights the importance of contributions from other tributaries to produce a major flood at Waterloo. On the Shell Rock River at Shell Rock, the peak discharge of 28.500 cfs on July 22 represented about a 25-year return frequency (.04 exceedance probability). Impacts from the flooding were extensive in terms of damaged infrastructure such as bridges and roads, flooded homes, and disruptions to normal life. There were no injuries or deaths in the Des Moines HSA, although several rescues and many evacuations were performed. Extensive sandbagging efforts saved important facilities in some towns, but others lost the battle. Some of the worst flooding took place in Waverly on the Cedar River, where about 1500 people were evacuated. A total of at least 600 homes in the town of Waverly had to be evacuated due to the high water. Extensive flooding also occurred in Rockford and Greene on the Shell Rock River. Part of the downtown area and several neighborhoods in Cedar Falls were saved from flooding only by the emergency completion of a levee which was already in the process of being built by the U.S. Army Corps of Engineers. In addition, the Presidential Disaster Declaration for the July 2-3 Flooding was extended to include the July 18-22 flooding.

Floods of 2008 – The record flooding in 2008 devastated many areas in Chickasaw County along the Cedar River and its tributaries. This event was estimated to be a 500-year flood in which the Cedar River crested at 25.33 feet (nearly 3 feet above the previous record) at the Charles City river gage on June 9, 2008, which is the nearest upriver gage. This flood effectively split Nashua into two separate communities as the bridge on Highway 346 crossing the Cedar River was closed until the flood waters receded. The city's water tower is on the western side of the river and when the flood destroyed one of the two water main crossings, the eastern side of the city was without potable water for several days (the other water main crossing malfunctioned). These water mains have since been repaired, with the destroyed water main having been replaced in a location that is less susceptible to flooding. Although several properties were flooded, no residents participated in a buyout program. Only one home was raised as a result of the flood.

Historically, other unmonitored streams in the county have had significant reports of flood events. These streams include Crane Creek, Etter Creek, Elk Run Creek, Beaver Creek, Two Mile Creek, Buck Creek, Plum Creek and Spring Creek.

Table 3.16 shows the recorded flooding events in Chickasaw County over a twenty-two-year span, from January 1, 1996 through March 1, 2018.

Probability

Considering the historical occurrence of flooding events and the number of streams and rivers located in planning area, the probability of future river flooding remains high. Flooding is an annual problem throughout the planning area.

As part of two watersheds (Upper Cedar River, and Upper Wapsipinicon), areas adjacent to the rivers and creeks, and its main tributaries are at significantly higher risk than those areas located away from these features.

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. See each jurisdiction's individual appendixes for additional details on previous flood events and probability of future flooding events.

Magnitude / Severity

While there are substantial areas of floodplain (see floodplain maps of unincorporated area as well as each city in Attachment 1) 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

Tables 3.17 & 3.18 displays the number of buildings in the 1.0% (100-year), 0.2% (500-year) floodplains for the combined incorporated areas and the unincorporated areas of county. The parcel information is current as of June 2018. The FEMA Digital FIRM data for Chickasaw County was completed on November 2017. The incorporated boundaries are current as of June 2018. Individual floodplain land, building, and dwelling values for each jurisdiction can be

Table 3.17: Floodplain Values of All Incorporated Cities in Chickasaw County

	# of Buildings	% of Buildings
1.0% Annual Chance Floodplain	313	4.98%
0.2% Annual Chance Floodplain	43	0.68%
Total Unincorporated Out of Floodplain	5,928	94.33%
Total Unincorporated	6,284	100.00%

Figures calculated using data from Chickasaw County GIS Department; Parcel data current as of June 2018

Table 3.18 Floodplain Buildings of Unincorporated Chickasaw County

	# of Buildings	% of Buildings
1.0% Annual Chance Floodplain	626	4.37%
0.2% Annual Chance Floodplain	2	>.01%
Total Unincorporated Out of Floodplain	13707	95.62%
Total Unincorporated	14335	100.00%

Figures calculated using data from Chickasaw County GIS Department; Parcel data current as of June 2018

found in their respective appendices.

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 3.19. 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 3.19: 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 2018 there were 88 winter storm events, including: Blizzard (13), Cold/Wind Chill (19), Heavy Snow (8), Ice Storm (3), Winter Weather (6), and Winter Storm (39). According to this data, there have been no fatalities or injuries resulting in from these hazard events. However, it is estimated that these 88 winter storm events have caused a minimal $110 thousand in property and zero dollars crop damage.

Table 3.20 displays the reported storm events in Chickasaw 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 1996 through 2018.

TABLE 3.20 WINTER STORM EVENTS IN CHICKASAW COUNTY, 1996-2018

Date	Type	Property Damage ($)	Crop Damage ($)	Date	Type	Property Damage ($)	Crop Damage ($)
1/18/1996	Blizzard	$0.00K	$0.00K	12/8/2008	Winter Storm	$0.00K	$0.00K
1/18/1996	Cold/Wind Chill	$0.00K	$0.00K	12/14/2008	Cold/Wind Chill	$0.00K	$0.00K
1/18/1996	Heavy Snow	$0.00K	$0.00K	12/18/2008	Winter Storm	$0.00K	$0.00K
1/26/1996	Blizzard	$0.00K	$0.00K	12/20/2008	Winter Storm	$0.00K	$0.00K
1/26/1996	Heavy Snow	$0.00K	$0.00K	12/21/2008	Cold/Wind Chill	$0.00K	$0.00K
1/28/1996	Blizzard	$0.00K	$0.00K	1/03/2009	Winter Weather	$0.00K	$0.00K
2/1/1996	Cold/Wind Chill	$0.00K	$0.00K	1/14/2009	Extreme Cold/Wind Chill	$0.00K	$0.00K
3/24/1996	Blizzard	$0.00K	$0.00K	12/8/2009	Blizzard	$0.00K	$0.00K
5/1/1996	Cold/Wind Chill	$0.00K	$0.00K	12/10/2009	Cold/Wind Chill	$0.00K	$0.00K
1/15/1997	Winter Storm	$0.00K	$0.00K	1/1/2010	Cold/Wind Chill	$0.00K	$0.00K
1/16/1997	Cold/Wind Chill	$0.00K	$0.00K	1/8/2010	Cold/Wind Chill	$0.00K	$0.00K
2/4/1997	Winter Storm	$0.00K	$0.00K	1/25/2010	Winter Weather	$0.00K	$0.00K
1/4/1998	Ice Storm	$0.00K	$0.00K	1/28/2010	Cold/Wind Chill	$0.00K	$0.00K
3/8/1998	Winter Storm	$0.00K	$0.00K	2/7/2010	Winter Storm	$0.00K	$0.00K
1/1/1999	Winter Storm	$0.00K	$0.00K	2/24/2010	Cold/Wind Chill	$0.00K	$0.00K
2/11/1999	Winter Storm	$0.00K	$0.00K	11/24/2010	Winter Weather	$0.00K	$0.00K
3/8/1999	Winter Storm	$0.00K	$0.00K	12/10/2010	Blizzard	$0.00K	$0.00K
1/19/2000	Winter Storm	$0.00K	$0.00K	12/20/2010	Winter Weather	$0.00K	$0.00K
12/10/2000	Winter Storm	$0.00K	$0.00K	12/23/2010	Winter Storm	$0.00K	$0.00K
12/18/2000	Winter Storm	$0.00K	$0.00K	2/01/2011	Winter Weather	$0.00K	$0.00K

12/28/2000	Winter Storm	$0.00K	$0.00K	2/20/2011	Winter Storm	$0.00K	$0.00K
2/7/2001	Ice Storm	$0.00K	$0.00K	12/20/2012	Blizzard	$0.00K	$0.00K
2/8/2001	Winter Storm	$0.00K	$0.00K	1/27/2013	Winter Storm	$0.00K	$0.00K
2/24/2001	Ice Storm	$0.00K	$0.00K	1/30/2013	Winter Storm	$0.00K	$0.00K
3/9/2002	Blizzard	$0.00K	$0.00K	2/21/2013	Winter Storm	$0.00K	$0.00K
3/4/2003	Winter Storm	$0.00K	$0.00K	3/4/2013	Heavy Snow	$0.00K	$0.00K
4/7/2003	Winter Storm	$0.00K	$0.00K	1/5/2014	Extreme Cold/Wind Chill	$0.00K	$0.00K
2/1/2004	Winter Storm	$0.00K	$0.00K	1/26/2014	Blizzard	$0.00K	$0.00K
2/5/2004	Winter Storm	$0.00K	$0.00K	1/27/2014	Extreme Cold/Wind Chill	$0.00K	$0.00K
1/4/2005	Winter Storm	$0.00K	$0.00K	2/20/2014	Blizzard	$0.00K	$0.00K
1/21/2005	Winter Storm	$0.00K	$0.00K	1/8/2015	Blizzard	$0.00K	$0.00K
1/22/2005	Blizzard	$0.00K	$0.00K	1/31/2015	Winter Storm	$0.00K	$0.00K
12/13/2005	Heavy Snow	$0.00K	$0.00K	2/1/2015	Winter Storm	$0.00K	$0.00K
2/15/2006	Winter Storm	$0.00K	$0.00K	11/20/2015	Heavy Snow	$0.00K	$0.00K
1/21/2007	Heavy Snow	$0.00K	$0.00K	12/28/2015	Winter Storm	$0.00K	$0.00K
2/2/2007	Extreme Cold/Wind Chill	$0.00K	$0.00K	1/17/2016	Extreme Cold/Wind Chill	$0.00K	$0.00K
2/23/2007	Winter Storm	$100.00K	$0.00K	2/2/2016	Winter Storm	$0.00K	$0.00K
2/24/2007	Blizzard	$0.00K	$0.00K	3/23/2016	Winter Storm	$10.00K	$0.00K
3/1/2007	Winter Storm	$0.00K	$0.00K	12/18/2016	Extreme Cold/Wind Chill	$0.00K	$0.00K
4/11/2007	Winter Storm	$0.00K	$0.00K	1/15/2017	Winter Weather	$0.00K	$0.00K
12/1/2007	Winter Storm	$0.00K	$0.00K	1/24/2017	Heavy Snow	$0.00K	$0.00K
1/29/2008	Extreme Cold/Wind Chill	$0.00K	$0.00K	2/23/2017	Winter Storm	$0.00K	$0.00K
1/29/2008	Winter Storm	$0.00K	$0.00K	3/12/2017	Heavy Snow	$0.00K	$0.00K
2/10/2008	Extreme Cold/Wind Chill	$0.00K	$0.00K		**Total**	**$110.00K**	**$0.00K**
2/17/2008	Winter Storm	$0.00K	$0.00K	*Source: National Climatic Data Center; Damage estimates include areas outside of Chickasaw County*			

Probability

From 1996 through 2018 there have been 88 recorded storm events in Chickasaw County. This includes 2 days with an event resulting in property damage and zero days with an event resulting in crop damage. The frequency and impact of severe winter storm events varies from year to year. Chickasaw County has had an event occur every year since the beginning of records in 1996. Based on historical occurrences it is highly likely a severe winter storm will affect Chickasaw County on an annual basis, likely multiple times in a year. As can be seen in Table 3.21, in the past 22 years Chickasaw County has averaged four winter storm events per year.

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.

TABLE 3.21: Annual Average of Winter Storm Events in Chickasaw County, 1996-2018

Storm Event	Total Events	Events Per Year
Blizzard	13	0.59
Cold/wind Chill	19	0.86
Heavy Snow	8	0.36
Ice Storm	3	0.14
Winter Weather	3	0.14
Winter Storm	39	1.77
Total	**88**	**4.0**

Source: National Climatic Data Center, retrieved on 3/1/2018

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 Chickasaw 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.

Figure 3.7: Locations of Sinkhole Depressions in Chickasaw County

Source:Iowa Department of Natural Resource's Natural Resources Geographic Information Systems Library & INRCOG

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.[10]

According to the Iowa Department of Natural Resource's Natural Resources Geographic Information Systems Library, there have been 2 recorded sinkholes in Chickasaw County, one in Utica and the other in Deerfield. Not all sinkholes are reported, or discovered, so this list is not comprehensive to all the sinkholes throughout the County. Their locations are displayed in Figure 3.7. See Map 2b, included in Attachment 1, for a historical map of Chickasaw County sinkholes.

Probability

Chickasaw County consists of several different soil types, a high prevalence of precipitation and current agricultural practices which focus on re-directing natural water flow. As is shown in Figure 3.7, Chickasaw County has experienced a small number of sinkholes historically, but surrounding counties have a much larger number of sinkholes on record.

Sinkhole probability varies by jurisdiction. Cumulatively, the committee determined the probability of a major sinkhole event to be between Unlikely and Occasional (0 to 20 percent chance of occurring in a given year)

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.

[10] *Iowa Department of Natural Resources, Geological Survey, http://www.igsb.uiowa.edu/service/hazards.htm*

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, as defined by the State of Iowa. However, in a nearby county, in 2002 an animal rights group, known as the Animal Liberation Front, claimed responsibility of the releasing of more than 1,200 domesticated minks from a fur farm in Butler County. The Butler County Sheriff's Department, Federal Bureau of Investigation, Iowa State Patrol, and the Iowa Department of Natural Resources were involved in the investigation. A similar animal release took place in Chickasaw County in 2000.

Outside of the event mentioned above, there have been no known or reported instances of any terrorist attacks having been perpetrated in the planning area.

Probability
No other events, which could be considered terrorism, are known of. Overall, the probability of terrorist event occurring in the planning area is unlikely (less than 10 percent probability in a given year). The type of terrorist attacks that have the highest probability are those involving small-arms fire at community events of public facilities, such as schools, city halls, and other-like organizations.

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). In the event of the mink release, it took dozens of volunteers to retrieve the remaining living minks over the following days.

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.

TABLE 3.21: 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

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 3.21 outlines the different sizes of hail and Table 3.22 describes the categories used to classify hailstorms.

TABLE 3.22: TORRO HAILSTORM INTENSITY SCALE

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

Source: The Tornado and Storm Research Organization

Historical Occurrence

Thunderstorms are common events in Chickasaw 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 3.23 depicts the historical occurrences of Thunderstorm Wind events, as recorded by the National Climatic Data Center, for the past 55 years, from 1962 – 2017. 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 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…"[11] NOAA reports, from 1962-2017, Chickasaw County experienced 86 Thunderstorm Wind events over 59 days. Based on this average, Chickasaw County should expect Thunderstorm Wind Events an average of just under twice per year.

TABLE 3.23: HISTORIC THUNDERSTORM WIND EVENTS IN CHICKASAW COUNTY. 1962-2017

Location	Date	Wind Speed (knots)	Property Damage	Crop Damage	Location	Date	Wind Speed (knots)	Property Damage	Crop Damage
Chickasaw County	5/22/1962	0	0.00K	0.00K	NASHUA	7/9/2000	55	20.00K	45.00K
Chickasaw County	7/1/1970	0	0.00K	0.00K	NEW HAMPTON	7/10/2000	52	50.00K	40.00K
Chickasaw County	7/13/1970	0	0.00K	0.00K	NEW HAMPTON	4/11/2001	52	1.00K	0.00K
Chickasaw County	6/19/1971	0	0.00K	0.00K	FREDRICKSBURG	9/7/2001	54	1.50K	0.00K
Chickasaw County	6/24/1971	54	0.00K	0.00K	NEW HAMPTON	7/4/2003	55	0.75K	1.30K
Chickasaw County	6/20/1974	0	0.00K	0.00K	FREDRICKSBURG	7/7/2003	52	0.00K	0.00K
Chickasaw County	4/14/1976	0	0.00K	0.00K	NEW HAMPTON	9/13/2005	52	2.00K	0.00K
Chickasaw County	5/29/1980	0	0.00K	0.00K	NEW HAMPTON	9/13/2005	56	3.00K	4.00K
Chickasaw County	6/27/1980	56	0.00K	0.00K	IONIA	7/1/2006	52	0.00K	0.00K
Chickasaw County	6/23/1981	0	0.00K	0.00K	NASHUA	8/15/2007	55	7.00K	0.00K
Chickasaw County	10/16/1984	52	0.00K	0.00K	NASHUA	8/15/2007	54	2.00K	0.00K
Chickasaw County	10/16/1984	0	0.00K	0.00K	NEW HAMPTON	8/21/2007	58	3.00K	0.00K
Chickasaw County	6/26/1985	0	0.00K	0.00K	JERICO	6/27/2008	50	0.00K	0.00K
Chickasaw County	7/27/1986	50	0.00K	0.00K	LAWLER	6/17/2009	55	15.00K	20.00K
Chickasaw County	5/8/1988	50	0.00K	0.00K	IONIA	8/8/2010	51	0.00K	0.00K
Chickasaw County	6/12/1989	50	0.00K	0.00K	BASSETT	9/6/2010	52	0.50K	0.00K
Chickasaw County	6/2/1990	50	0.00K	0.00K	NASHUA	7/25/2012	55	5.00K	0.00K
Chickasaw County	6/12/1990	50	0.00K	0.00K	NEW HAMPTON	5/19/2013	70	65.00K	0.00K
Chickasaw County	6/12/1990	50	0.00K	0.00K	FREDRICKSBURG	5/19/2013	65	50.00K	0.00K
Chickasaw County	8/9/1990	70	0.00K	0.00K	NASHUA	5/29/2013	52	0.00K	0.00K
Chickasaw County	5/29/1991	50	0.00K	0.00K	IONIA	5/29/2013	54	0.00K	0.00K
Fredericksburg	4/14/1994	50	5.00K	0.00K	NEW HAMPTON	5/29/2013	55	0.00K	0.00K
Fredericksburg	6/12/1994	69	50.00K	0.50K	FREDRICKSBURG	6/16/2014	50	0.01K	0.00K
New Hampton	7/7/1994	70	500.00K	5.00K	ALTA VISTA	6/18/2014	50	2.00K	0.00K
Fredericksburg	7/7/1994	50	50.00K	5.00K	NASHUA	6/29/2014	50	0.00K	0.00K
Alta Vista	7/19/1994	50	5.00K	0.05K	BOYD	6/29/2014	50	20.00K	1.50M

[11] *National Weather Service Instruction 10-1605* http://www.ncdc.noaa.gov/stormevents/pd01016005curr.pdf

Alta Vista	7/19/1994	50	50.00K	5.00K	BOYD	6/29/2014	50	8.00K	0.00K
New Hampton	7/4/1995	50	30.00K	2.00K	NEW HAMPTON	6/29/2014	50	7.00K	0.00K
New Hampton	7/4/1995	50	25.00K	1.00K	BOYD	6/29/2014	50	30.00K	0.00K
New Hampton	8/28/1995	52	10.00K	1.00K	NASHUA	6/22/2015	62	3.00K	0.00K
ALTA VISTA	5/18/1996	85	50.00K	0.00K	IONIA	6/14/2016	50	0.50K	0.00K
JERICO	5/18/1996	61	40.00K	0.00K	NEW HAMPTON	7/7/2016	50	0.00K	0.00K
NASHUA	5/18/1996	70	100.00K	5.00K	NASHUA	5/15/2017	50	2.00K	0.00K
JERICO	4/5/1997	55	10.00K	0.00K	NASHUA	5/15/2017	56	4.00K	0.00K
NEW HAMPTON	6/15/1997	53	3.50K	0.00K	ALTA VISTA	5/16/2017	55	2.00K	0.00K
ALTA VISTA	5/31/1998	57	35.00K	50.00K	NEW HAMPTON	5/17/2017	45	3.00K	0.00K
NASHUA	6/18/1998	100	500.00K	40.00K	BASSETT	5/17/2017	52	2.00K	0.00K
NASHUA	6/18/1998	96	150.00K	35.00K	LAWLER	5/17/2017	52	2.00K	0.00K
NORTH WASHINGTON	6/18/1998	95	60.00K	45.00K	ALTA VISTA	5/17/2017	52	0.00K	0.00K
ALTA VISTA	6/18/1998		8.90K	0.00K	NEW HAMPTON	7/19/2017	57	0.00K	0.00K
NASHUA	6/20/1998	52	0.00K	15.00K	ALTA VISTA	7/19/2017	61	3.00K	0.00K
NEW HAMPTON	6/20/1998	61	10.00K	0.00K	NEW HAMPTON	7/19/2017	52	5.00K	0.00K
ALTA VISTA	7/2/2000	52	0.00K	0.00K	**Total**			**2.013M**	**1.820M**
NASHUA	7/2/2000	55	1.00K	0.00K					
Source: National Climatic Data Center, retrieved 8/1/2018									

June of 1997 is the only recorded lightning strike in Chickasaw County. It struck a tree near New Hampton, which killed 45 cattle who were standing under the tree. The estimated property damage was $50,000

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[12]. Therefore Chickasaw County, which is approximately 506 square miles, should anticipate 5,769 lighting flashes annually.

Table 3.24 shows the recorded hailstorm events in Chickasaw County from 1962-2017. In the previous 55 years, 53 hail events have been recorded over the course of seven days. From 1962-2017 there were 54 days which in hailed in Chickasaw County. Of these days, 31 resulted in property damage and 25 caused crop damage. The largest hail size recorded in the previous 55 years was hail stones reported to be 2.75 inches in magnitude. This has occurred on one occasion in Boyd on 6/29/2014.

[12] http://www.lightningsafety.noaa.gov/stats/Table-Flashes_by_State_1997-2011.pdf

TABLE 3.24: HISTORIC HAILSTORMS IN CHICKASAW COUNTY, 1962-2017

City/Township	Date	Magnitude (inches)	Property Damage	Crop Damage	City/Township	Date	Magnitude (inches)	Property Damage	Crop Damage
Chickasaw County	5/5/1962	0.75	$0.00K	$0.00K	North Washington	6/19/2002	0.75	$0.00K	$0.00K
Chickasaw County	5/15/1968	1	$0.00K	$0.00K	Nashua	6/19/2002	0.75	$0.00K	$0.00K
Chickasaw County	7/12/1971	1.5	$0.00K	$0.00K	Nashua	6/19/2002	0.75	$0.00K	$0.00K
Chickasaw County	8/7/1977	1.75	$0.00K	$0.00K	New Hampton	6/19/2002	1	$0.80K	$4.00K
Chickasaw County	8/28/1979	0	$0.00K	$0.00K	New Hampton	6/19/2002	0.75	$0.00K	$0.00K
Chickasaw County	8/2/1980	1.5	$0.00K	$0.00K	New Hampton	6/19/2002	0.75	$0.00K	$2.00K
Chickasaw County	4/10/1981	1.25	$0.00K	$0.00K	New Hampton	6/21/2002	0.88	$0.00K	$0.00K
Chickasaw County	4/10/1981	1.75	$0.00K	$0.00K	Fredericksburg	5/8/2003	1	$0.00K	$0.00K
Chickasaw County	4/27/1984	1.75	$0.00K	$0.00K	New Hampton	7/7/2003	0.88	$0.00K	$0.00K
Chickasaw County	8/4/1989	0.75	$0.00K	$0.00K	New Hampton	7/20/2003	0.75	$0.00K	$0.75K
Chickasaw County	3/13/1990	0.75	$0.00K	$0.00K	Fredericksburg	7/20/2003	0.75	$0.00K	$0.80K
Chickasaw County	6/14/1991	1	$0.00K	$0.00K	Alta Vista	7/31/2003	1.75	$0.00K	$4.00K
Chickasaw County	6/14/1991	0.75	$0.00K	$0.00K	Alta Vista	7/31/2003	1	$0.00K	$2.00K
Chickasaw County	6/18/1991	2.5	$0.00K	$0.00K	Alta Vista	7/31/2003	1.5	$2.00K	$5.00K
Alta Vista	8/9/1993	1.75	$50.00K	$50.00K	Bassett	7/31/2003	0.75	$0.00K	$0.00K
New Hampton	8/9/1993	1.75	$0.50K	$50.00K	New Hampton	4/16/2004	0.75	$0.00K	$0.00K
Nashua	4/25/1994	1	$50.00K	$0.00K	DEERFIELD	4/17/2004	1.75	$1.00K	$0.00K
Alta Vista	7/19/1994	0.75	$5.00K	$5.00K	New Hampton	4/17/2004	2.5	$0.75K	$0.00K
Nashua	8/19/1994	1	$5.00K	$50.00K	IONIA	5/8/2004	1.75	$1.25K	$0.00K
Ionia	5/13/1995	0.75	$2.00K	$0.00K	IONIA	5/8/2004	1	$0.75K	$0.00K
Nashua	7/22/1995	2	$30.00K	$150.00K	NORTH WASHINGTON	5/8/2004	1.75	$1.25K	$0.00K
Ionia	5/18/1996	2.75	$75.00K	$0.00K	New Hampton	5/8/2004	1	$0.70K	$0.00K
North Washington	5/18/1996	1.75	$10.00K	$0.00K	New Hampton	5/8/2004	1	$0.50K	$0.00K
Saude	5/18/1996	2.75	$90.00K	$0.00K	New Hampton	5/8/2004	1.75	$5.00K	$0.00K
Lawler	5/18/1996	1.75	$25.00K	$0.00K	Nashua	5/21/2004	0.88	$0.00K	$0.00K
Alta Vista	3/29/1998	0.75	$0.00K	$0.00K	Bassett	9/19/2005	1	$4.00K	$10.00
New Hampton	5/28/1998	1	$0.00K	$30.00	Republic	6/21/2007	0.88	$0.00K	$0.00K
New Hampton	4/2/1999	0.75	$0.00K	$0.00K	Saude	7/16/2007	0.75	$0.00K	$0.00K
Fredericksburg	5/11/2000	1	$5.00K	$0.00K	Saude	7/16/2007	1	$5.00K	$8.00K

New Hampton	5/17/2000	1	$8.00K	$13.50	Saude	7/16/2007	0.75	$0.00K	$0.00K
Lawler	5/17/2000	1	$4.00K	$15.00	Nashua	5/25/2008	0.88	$0.00K	$0.00K
New Hampton	5/17/2000	1.75	$0.00K	$20.00	Chickasaw	8/4/2008	0.75	$0.00K	$0.00K
Chickasaw	6/15/2000	0.75	$0.00K	$0.00K	New Hampton	4/24/2009	0.88	$0.00K	$0.00K
Ionia	7/2/2000	0.88	$0.00K	$15.00	New Hampton	6/17/2009	0.75	$0.00K	$0.00K
New Hampton	7/2/2000	0.88	$0.00K	$12.50	Lawler	6/17/2009	1.75	$20.00K	$30.00K
New Hampton	7/2/2000	0.75	$0.00K	$10.00	Lawler	6/17/2009	1.75	$50.00K	$150.00K
New Hampton	6/17/2001	1.75	$2.00K	$7.50K	Ionia	6/25/2010	1	$0.00K	$0.00K
Ionia	4/18/2002	1.75	$0.00K	$0.00K	Lawler	3/22/2011	0.75	$0.00K	$0.00K
New Hampton	4/18/2002	0.88	$0.00K	$0.00K	Fredericksburg	7/18/2012	1.5	$0.00K	$0.00K
Ionia	4/18/2002	1	$0.00K	$0.00K	Nashua	6/29/2014	1.75	$0.00K	$3.10M
Ionia	4/18/2002	1	$0.00K	$0.00K	Boyd	6/29/2014	2.75	$0.00K	$0.00K
Ionia	4/18/2002	1.75	$0.00K	$0.00K	Boyd	6/29/2014	1.75	$30.00K	$0.00K
Ionia	4/18/2002	1.75	$0.00K	$0.00K	New Hampton Muni Arp	6/14/2016	1.75	$0.00K	$0.00K
New Hampton	4/18/2002	1.75	$0.00K	$0.00K	Ionia	5/15/2017	1	$0.00K	$0.00K
Lawler	4/18/2002	1	$0.00K	$0.00K	New Hampton	5/15/2017	2	$0.00K	$0.00K
New Hampton	4/18/2002	0.75	$0.00K	$0.00K	Little Turkey	5/15/2017	2	$0.00K	$0.00K
Lawler	4/18/2002	1.75	$0.00K	$0.00K	New Hampton	6/28/2017	0.75	$0.00K	$0.00K
Alta Vista	5/8/2002	0.75	$0.00K	$0.00K	Boyd	6/28/2017	0.75	$0.00K	$0.00K
Bassett	6/19/2002	1	$2.00K	$0.00K	**Total**			**$487.00K**	**$3.746M**
Source: National Climatic Data Center, Retrieved 3/1/2018									

Probability

The probability of a Thunderstorm/Lightning/Hail event 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 three thunderstorms per year that result in wind damage. Thunderstorms without measurable 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. Based on its size (506 square miles) Chickasaw County should anticipate approximately 5,769 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 2007-2017, the entire planning area can expect to average approximately just over two hail events per year. However, many of these hail events occurred on the same day as a result of the same storm. The 21 hail events in the past 10 years have occurred over the course of 12 days. From 1962-2017, 55 years, there were 97 hail occurrences, but on 53 days of hail falling in the county. Therefore, based on historic data, Chickasaw County should anticipate approximately two hail events occurring one day a year.

Magnitude / Impact

It is anticipated that a severe thunderstorm could impact 100% of the population (currently 24,276 persons) in the planning area. Those individuals most at risk would include:

1. People in automobiles (unable to determine),
2. People in mobile homes: (322 persons)
3. People in group quarters (183 persons),
4. Elderly persons 65 years or older (2,327) and young persons, less than 18 years old (2,880)

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.

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 half an 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

This hazard typically stays 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 scales 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 39

TABLE 3.25: 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.

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, 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 1953 there have been 26 recorded occurrences of tornado events in the planning area. The estimated total of property damage from these tornadoes is $4.906 million while crop damage totals to $94,550. The recorded tornado events for the entire planning area can be referenced for detail in Table 3.24. The first column in Table 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. 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 found in Attachment 1.

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 the county experienced 86 Thunderstorm wind events between 1962 and 2017. Winds resulted in estimated $2.013 million in property damage and $1.820 million in crop damage.

Table 3.23 in the Thunderstorm / Lighting / Hail hazard section includes a table of historical Thunderstorm Wind events from 1962 through 2017.

TABLE 3.24: HISTORICAL OCCURRENCES OF TORNADOES IN CHICKASAW COUNTY, 1953-2017

Touch Down Location	Date	Deaths/ Injuries	Property Damage ($)	Crop Damage ($)	Fujita Scale
Chickasaw County	5/20/1953	0	$0.00K	$0.00K	F3
Chickasaw County	7/17/1956	1	$250.00K	$0.00K	F2
Chickasaw County	5/25/1957	0	$25.00K	$0.00K	F0
Chickasaw County	10/12/1961	0	$25.00K	$0.00K	F1
Chickasaw County	10/12/1961	0	$25.00K	$0.00K	F1
Chickasaw County	4/11/1965	0	$250.00K	$0.00K	F1
Chickasaw County	5/15/1965	0	$2.50K	$0.00K	F1
Chickasaw County	5/15/1968	0	$0.03K	$0.00K	F5
Chickasaw County	7/12/1971	0	$2.50M	$0.00K	F4
Chickasaw County	8/28/1981	0	$0.00K	$0.00K	F0
Chickasaw County	6/29/1983	0	$25.00K	$0.00K	F1
Chickasaw County	10/16/1984	0	$250.00K	$0.00K	F1
Chickasaw County	5/24/1989	0	$25.00K	$0.00K	F1
Chickasaw County	6/18/1991	0	$2.50K	$0.00K	F1
New Hampton	8/9/1993	2	$500.00K	$50.00K	F2
New Hampton -	7/7/1994	0	$500.00K	$5.00K	F2
Fenton To	7/19/1994	0	$500.00K	$5.00K	F1
Alta Vista	7/19/1994	0	$0.05K	$0.05K	F0
New Hampton	7/19/1994	0	$0.50K	$0.50K	F0
New Hampton	7/5/1995	0	$100.00K	$4.00K	F1
Nashua	7/20/1999	0	$120.00K	$15.00K	F1
Fredericksburg	6/13/2000	0	$15.00K	$0.00K	F0
Ionia	5/8/2002	0	$0.00K	$0.00K	F0
Ionia	6/21/2002	0	$0.00K	$0.00K	F0
New Hampton	7/7/2003	0	$20.00K	$5.00K	F0
Fredericksburg	8/19/2009	0	$20.00K	$10.00K	EF0
Totals	**-**	**3**	**4.906M**	**94.55K**	**-**

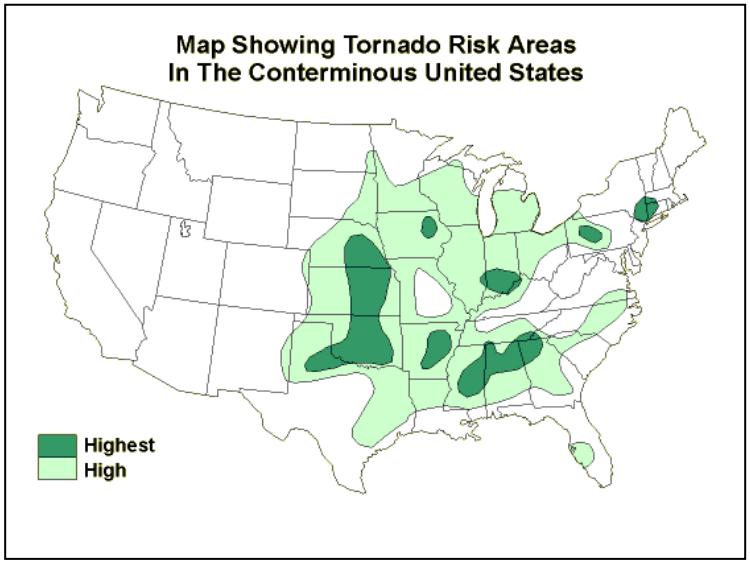
Source: Tornado Project and National Climatic Data Center, retrieved 3/1/2018

Probability

There have been 26 recorded tornados in the planning area since 1953. That averages, roughly, to a tornado every 2-3 years. Because tornadoes are sporadic, there cannot be a reliable long-term prediction made as to when or if they may occur. In the past 15 years, 2003-2018, Chickasaw County has experienced two tornadoes. The committee determined the probability of a Tornado/Windstorm event to be occasional (10 to

20 percent probability in a given year).

FIGURE 3.8: TORNADO RISK



If the historical average holds, it is highly likely the planning area will likely experience multiple tornados within the next five years. Also, given the historical paths of tornadoes (Attachment 1) in the planning area, it is likely that future events could impact the same areas.

The probability of a windstorm occurring in the planning area and having an impact on said area in the next year is 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.

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. Chickasaw County Emergency Management Agency routinely tests warning sirens.

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.

As Figure 3.8 shows, northeast Iowa is considered one of the highest risk locations for tornadoes. According the meteorologists with KGAN CBS2 in Cedar Rapids, Iowa northeast Iowa is, "…one of the most fertile breeding grounds in the nation for violent tornadoes. Since 1965 Iowa has experienced five of the country's 42 EF-5 tornadoes. In addition, since 1965, 33 of Iowa's 75 related deaths were within a 55-mile radius of Parkersburg, Iowa. Located in Butler County, which is south west of Chickasaw County, almost the entire county falls within this 55-mile radius around the City of Parkersburg.[13]

Using available data, a tornado scenario was developed for each city. These scenarios estimate the potential damage on an EF0 through EF tornado impacting each city. See each city's respective appendix for the estimated impact of tornadoes. Maps of the tornado scenarios are included for each jurisdiction in Attachment 1.

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

[13] http://www.cbs2iowa.com/news/features/top-stories/stories/NE-Iowa-Prone-to-Violent-Tornadoes-126215.shtml

Transportation Incident

Definition and Description

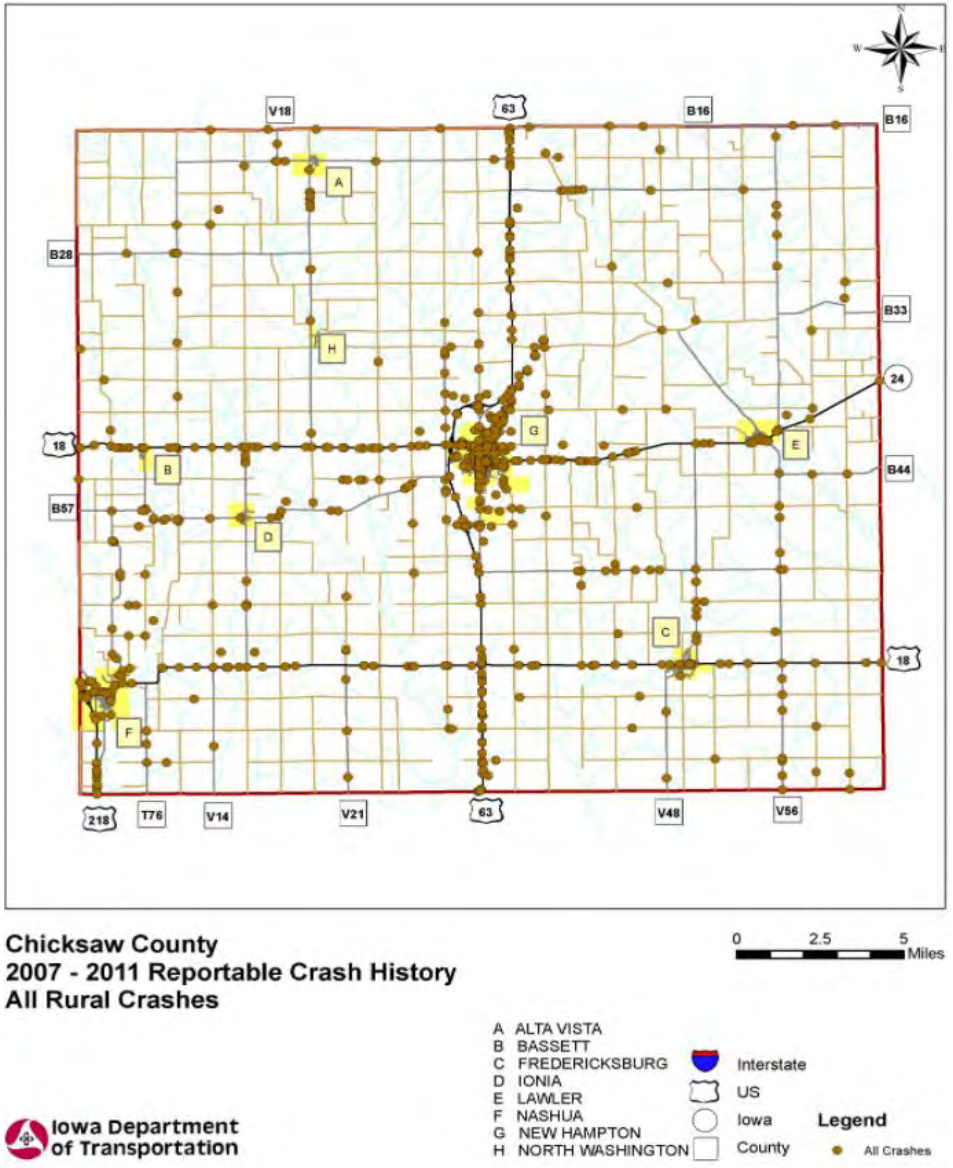
This hazard includes all modes of transportation - air, highway, railway, and waterway. Thus, transportation includes any incident involving a military, commercial, or private aircraft; single-multi-vehicle incident which requires responses exceeding normal day-to-day capabilities; derailment or a train 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.

Air

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.

The sole airport in the county is the New Hampton Municipal Airport (1Y5), located three miles northwest of New Hampton City Hall. The facility is classified as a local service airport offering a 2,900 foot long and 75 food wide paved asphalt runway and a 2,300 foot log 105 foot wide turf runway. In 2010 there were 5 aircraft based at the airport generating approximately 42 average aircraft operations per month based from 2016 data. The closest major airport is the Waterloo Regional Airport (ALO), approximately 30 miles from the southern

FIGURE 3.9: Map of Crash Locations



Courtesy of Iowa Department of Transportation
https://www.iowadot.gov/crashanalysis/data/county/chickasaw.aspx

border of Chickasaw County. 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.

Roads and Bridges

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.

Rail Transportation

Two railroads travel through the western portion of the county. The Cedar River Railroad Company enters the southern portion of the county, from Waverly, before traveling through Nashua and then north through Charles City after exiting the western part of the county. Figure 3.10 is a map of rail lines in Chickasaw County and the surrounding areas.

Dakota, Minnesota and Eastern Railroad Company owns and operates tracks that pass through the central portion of the county. This rail connects Prairie Du Chen to Charles City.

Waterways

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

FIGURE 3.10: RAIL ROUTES THROUGH CHICKASAW COUNTY

DME - Dakota, Minnesota and Eastern R.R. Company; CEDR – Cedar River R.R. Company
Courtesy of the Iowa Department of Transportation
http://www.iowadot.gov/iowarail/railroads/maps

in which a person, persons, or object falls through the ice on partially frozen bodies of water.

Historical Occurrence

Traffic accidents are fairly common occurrences in the county. According to the Iowa Department of Transportation[14], rural Chickasaw County experience 757 reported vehicular crashes from 2007 to 2011.

There was a significant derailment in Nashua in 2008 that caused three cars to spill hazardous materials.

TABLE 3.25: AUTOMOBILE CRASHES IN CHICKASAW COUNTY, 2007-2011

Year	Number of Crashes	Total Fatalities	Total Injuries
2007	151	1	41
2008	168	0	47
2009	162	2	85
2010	142	1	44
2011	134	3	48
5-year Total	**757**	**7**	**265**
Annual Average	**151.4**	**1.4**	**53**

Source: Iowa Department of Transportation, retrieved 3/1/2018

Probability

Based of historic crash data shown in Table 3.25 and Figure 3.9, the County should expect several crashes each year, likely more than 150. Probability of a railway or air transportation events remain relatively low.

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.

Jurisdictions (Nashua, Bassett, Ionia, New Hampton, and Lawler) in close proximity to local rail lines are more vulnerable to be harmed in the event of a train derailment. Furthermore, at locations where local roadways intersect with the railroad the potential for an accident is higher.

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 Waverly Municipal Airport 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. The same can be said for a rail disaster. 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.

[14] Iowa Department of Transportation, Iowa Crash Data for Chickasaw County, https://www.iowadot.gov/crashanalysis/data/county/chickasaw.aspx, Retrieved March 2018.

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. For instance, a multiple-car incident could impact the surrounding community for a few hours, whereas a derailment blocking numerous crossing could impact the immediate area for a few days.

SECTION 4 – MITIGATION STRATEGY

COUNTYWIDE HAZARD MITIGATION PLAN GOALS

Broad-based goals were developed to address a multitude of hazards and encompass a variety of mitigation activities. The hazard mitigation plan goals identified 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.

Mitigation actions can be grouped into six broad categories:

1. **Prevention.** Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space preservation, and storm water management regulations.
2. **Property Protection.** Actions that involve the modification of existing buildings or structures to protect them from a hazard, or removal from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
3. **Public Education and Awareness.** Actions to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.
4. **Natural Resource Protection.** Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
5. **Emergency Services.** Actions that protect people and property during and immediately after a disaster or hazard event. Services include warning systems, emergency response services, and protection of critical facilities.
6. **Structural Projects.** Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, levees, floodwalls, seawalls, retaining walls, and safe rooms.

Figure 11: Six Broad Categories for Mitigation Actions
Source: FEMA

CURRENT HAZARD MITIGATION ACTIVITIES

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.

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.

Prevention Mitigation Actions

Chickasaw 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. Effective September 28, 2012, the Iowa Department of Natural Resources and the Iowa Flood Center have recently mapped Chickasaw County's floodplain.

Table 4.1, provides a compilation of the current planning and regulatory documents currently in place for each jurisdiction in Chickasaw County.

TABLE 4.1: 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 Alta Vista, IA	Y	N	Y	N	N	N	Y	Y	Y
City of Fredericksburg, IA	Y	Y	N	Y	N	N	Y	Y	Y
City of Ionia, IA	Y	N	Y	RR	N	N	N	Y	Y
City of Lawler, IA	Y	Y	Y	RR	Y	Y	Y	N	Y
City of Nashua, IA	Y	Y	Y	RR	Y	Y	Y	N	Y
City of New Hampton, IA	Y	Y	N	Y	Y	Y	Y	Y	Y
City of North Washington, IA	Y	N	N	N	N	N	N	N	N
Chickasaw County, IA	Y	N	N	N	N	Y	N	N	N

Source: Local Communities
Notes: RR = Restricted Residential

Property Protection Mitigation Actions and Floodplain Management

It is important to note that there are several structures throughout the county that have experienced, and likely will again experience damaging water levels. According to information provided by the National Flood Insurance Program there are reported to be zero repetitive flood loss properties within rural Chickasaw County. These properties remain high on the county's list of priorities to have removed from the floodplain, but to accomplish would require willingness on the part of the property owners.

In May 1977 Chickasaw 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.

TABLE 4.2 NFIP STATISTICS IN CHICKASAW COUNTY

Community	Participates in NFIP?	CID #	# of NFIP Policies	NFIP Insurance in Force ($)
Alta Vista	Yes	190065	0	$0
Fredericksburg	Yes	190066	1	$1,665.88
Ionia	No	-	-	-
Lawler	Yes	190067	1	$2,006.16
Nashua	Yes	190068	13	$223,417.90
New Hampton	Yes	190069	7	$7,717.58
North Washington	Yes	190971	0	$0
Chickasaw County	Yes	190855	10	$79,648.38
Total	-	-	**32**	**$314,456.90**

Source: Federal Emergency Management Agency (FEMA)

TABLE 4.3: CHICKASAW COUNTY REPETITIVE LOSS PROPERTIES

Community	Total number of RL Buildings	RL Buildings Insured	Total number of RL Instances	RL Instances Insured	Total RL Losses($)	RL Losses Insured ($)
Alta Vista	0	0	0	0	0	0
Fredericksburg	0	0	0	0	0	0
Ionia	0	0	0	0	0	0
Lawler	0	0	0	0	0	0
Nashua	0	0	0	0	0	0
New Hampton	0	0	0	0	0	0
North Washington	0	0	0	0	0	0
Chickasaw County	0	0	0	0	0	0
TOTAL	**0**	**0**	**0**	**0**	**0**	**0**

Source: Iowa Department of Natural Resources; Data does not include properties that have been mitigate; RL = Repetitive Loss

Public Education and Awareness Mitigation Actions

Various public education and awareness activities occur within the planning area. A major communication device is 911 and AlertIowa. Other communications include radio and television addresses, newspaper, warning sirens, internet, and NOAA Radio Services. Facebook, county and city websites, and message board systems are also used to educate and inform the public.

Emergency Services Mitigation Actions

Chickasaw County Emergency Management

The entire County works with the Chickasaw County Emergency Management Coordinator, based out of the City of New Hampton, 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 Austen Seely and current contact information is as follows: Chickasaw County Emergency Management Agency, 260 E. Prospect Street, New Hampton, Iowa 50659, (641) 394-2406, email: ema@chickasawcoia.org.

Warning System and Communication

Chickasaw 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 Chickasaw 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.

Law Enforcement

The Chickasaw 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 Chickasaw County Sheriff's Office has service contracts to provide law enforcement patrols with a number of smaller communities in the County.

Fire Protection

There are eight independent fire departments (Alta Vista, Fredericksburg, Ionia, Lawler, Nashua, New Hampton, North Washington, and Protivin), as well as a township fire district (Chickasaw Township Fire District) in the county. Each department is responsible for fire protection services to a particular area within the county. The service area responsibilities can be viewed in *Map 12* of this document.

The Chickasaw Township Fire District is comprised of 23 volunteers and has one pumper truck (750 GPM), one tanker pumper (500 GPM), one grass truck, and one equipment truck.

By law, every township must provide fire protection to those citizens living within its borders. Every department within Chickasaw County has signed a mutual aid agreement with one another. This document is on file with Chickasaw County Emergency Management and can be viewed as a portion of the Chickasaw County Contingency Plan.

Ambulance

According to the Iowa Bureau of Medical Services, Chickasaw County has six ambulance services within its borders. Of the six services all six are Paramedic Provisional. Chickasaw Ambulance service also provides first response to rural areas and communities without their own private ambulance services. Ambulance service coverage areas can be viewed by referencing *Map 11* near the end of this document. These services can be activated by dialing the E-911 Emergency Response system.

Medical Facilities

Chickasaw County is presently a regional health care center. In addition to numerous private clinics and practicing physicians, Chickasaw County has four medical facilities, all of which are located in either New Hampton or Nashua. These facilities are listed below:

- Mercy Medical Center and Mercy Family Clinic (same location) - New Hampton
- Nashua Medical Center - Nashua
- Fredericksburg Family Clinic – Fredericksburg
- Waverly Health Center - Nashua

In addition to the medical health field, Chickasaw County has services available to deal with those who require mental health assistance. Chickasaw – Pathways Behavioral Services Inc., out of Waverly, provides psychiatric and counseling services to citizens who are in need of support.

HAZMAT

All Chickasaw County jurisdictions contract with the 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 County 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.

County Engineer and Secondary Roads Department
The County Engineer supervises the planning and maintenance of all county secondary roads including bridges and culverts through the Secondary Road Department. Offices can be found on the second floor of the County Courthouse.

Natural Resource Protection Mitigation Actions

There have been some natural resource protection mitigation actions undertaken within the planning area, see refer to each individual Appendices for additional details.

Structural Projects Mitigation Actions

One of the most prevalent forms of hazard mitigation is practiced by Chickasaw County in the form of road improvement. Chickasaw County maintains 833 miles of roadway. Ongoing and continuing efforts are being made toward hazard mitigation. These efforts first include an ongoing shouldering program. This program widens the shoulders of roads allowing for safer travel.

The county is constantly involved in road improvement. Specifically, bridge improvements work toward the goal of hazard mitigation. The Iowa Department of Transportation has specific standards that must be adhered to when accepting funding for road improvement. Therefore, usually when a bridge is improved the flow capacity of the bridge is also increased. This goes directly toward the alleviation of flooding caused by water backed up behind bridges and roadways.

A very costly mitigation and recovery effort engaged by the county is the removal of silt from road ditches. When flooding or heavy rainfall occurs there is a substantial amount of sedimentation that settles in the drainage ditches. This sedimentation results in the plugging of culverts and the reduced water capacity of the drainage ditches. Reduced water capacity in these ditches allow for the water too more easily top roadways causing treacherous driving conditions and damage to roadways.

Efforts to reduce the accumulation of silt and rubbish in culvert and bridge span areas are being made by encouraging the use of filter strips near these facilities. The idea of a filter strip is to develop a tall grass waterway that would essentially “filter” surface water flow during a heavy rainfall. This filtering process reduces the amount of such items as corn stalks from plugging culverts and helps to prevent massive quantities of topsoil being lost to erosion. This filter strip program is a cooperative effort between private landowners, Chickasaw County, and the NRCS.

Damage to roadways is a recovery effort that Chickasaw County has had to deal with numerous times as a result of past flood events. The county has demonstrated continual efforts to curb these types of events from causing damage. They have done this with numerous repair, placement, and replacement of bridges and culverts throughout the county.

See refer to each individual Appendices for additional details.

FUTURE HAZARD MITIGATION ACTIVITIES

While the existing mitigation activities discussed above detail the County'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 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 determined 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.

To prioritize the mitigation actions, the Committee discussed the STAPLEE prioritization criteria recommended by FEMA. STAPLEE is a tool used to assess the costs and benefits, and overall feasibility of mitigation actions. STAPLEE stands for the following: **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental. Based on this analysis, each activity was ranked as High (H), Medium (M) or Low (L).

The STAPLEE criteria were discussed during the meeting and the Committee was asked to complete a scoring worksheet for the actions they would provide for inclusion in the plan. This process of identification and analysis of mitigation options allowed the Committee to come to consensus and to prioritize recommended mitigation actions. Emphasis was placed on the importance of a benefit-cost analysis in determining project priority; however, this was not a quantitative analysis. The Disaster Mitigation Act regulations state that benefit-cost review is the primary method by which mitigation projects should be prioritized. Recognizing the federal regulatory requirement to prioritize by benefit-cost, and the need for any publicly funded project to be cost-effective, the Committee decided to pursue implementation according to when and where damage occurs, available funding, political will, jurisdictional priority, and priorities identified in the Iowa Hazard Mitigation Plan. Cost-effectiveness will be considered in additional detail when seeking FEMA mitigation grant funding for eligible projects identified in this plan.

Based on the order in which they would like to see the actions implemented, committee members assigned a priority ranking of high, medium, or low. This ranking does not necessarily correspond to the results of the STAPLEE scoring system as the STAPLEE system considers all elements to be weighted the same; whereas, at the local level, in many cases, one or more elements may be more important to the Committee and the city driving certain projects to be ranked higher than others.

To prioritize the mitigation actions, the HMPC discussed the STAPLEE prioritization criteria recommended by FEMA. STAPLEE is a tool used to assess the costs and benefits, and overall feasibility of mitigation actions. STAPLEE stands for the following:

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.

- **Social**: Will the action be acceptable to the community? Could it have an unfair effect on a particular segment of the population?
- **Technical**: Is the action technically feasible? Are there secondary impacts? Does it offer a long-term solution?
- **Administrative**: Are there adequate staffing, funding, and maintenance capabilities to implement the project?
- **Political**: Will there be adequate political and public support for the project?
- **Legal**: Does your jurisdiction have the legal authority to implement the action?
- **Economic**: Is the action cost-beneficial? Is there funding available? Will the action contribute to the local economy?
- **Environmental**: Will there be negative environmental consequences from the action? Does it comply with environmental regulations? Is it consistent with community environmental goals?

Committee members were asked to think about these questions while determining the priority for each action step. If the answer was "yes" to many of the above questions, then the action might take higher priority since it will have fewer complications, higher community support and the highest net beneficial impact on the community. INRCOG staff asked the committee to think about prioritization qualitatively, rather than quantitatively. Applying a score or number to each action may not provide an accurate gage since an action could score highly on many criteria, but in reality is a low priority since it's not socially acceptable to the community.

Emergency management activities are action steps devised by the jurisdiction (s) that do not apply to any single hazard or hazards, per se. Rather, these steps advance the all or a majority of the plan goals and enhance the general safety of the community before and after a disaster. The steps identified are at the recommendation of the County Emergency Management Office and offer a general support function in disaster preparedness and recovery. Therefore, "Emergency Management" is not a profiled hazard, such as those found in Table 17. But they are action steps the jurisdictions currently engage in and are considered relevant mitigation activities.

ACTION PLAN FOR COUNTY

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 County and its municipalities 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

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, identified the responsible party (ies) for each activity and finally related each activity to at least one of the five Hazard Mitigation Plan Goals listed above. Table 4.4 below is Chickasaw County's Implementation Strategy. Implementation Strategies / Action Plans for each municipality can be found in their respective appendix.

TABLE 4.4: CHICKASAW COUNTY'S IMPLEMENTATION STRATEGY (UNINCORPORATED AREA)						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard**	**Primary Agency Responsible for Implementation**	**Date for Completion**	**Estimated Cost (s)**	**Funding Source**
M	Continue to encourage the use of Iowa One Call – 811	ALL	Emergency Management, Law Enforcement, County Engineering, Environmental Health, Local Residents	On-Going	Minimal	
M	Educate the public on all hazard events – awareness, prevention, risks, recovery	ALL	Emergency Management, Fire Departments, Law Enforcement, Board of Health	On-Going	Minimal	
M	Identify alternative water sources	ALL	Emergency Management, Fire Departments, Law Enforcement, County Engineering	On-Going	Minimal	
H	Maintain a fully-equipped and well trained fire department and first responders	ALL	All County Departments	On-Going	Minimal-High	
M	Maintain NFIP Membership	Flash Flood, River Flood	Emergency Management, Board of Supervisors	On-Going	Minimal	
L	Continue Flood Mitigation through buyouts	Flash Flood, River Flood	Emergency Management, Board of Supervisors, Planning Commission	On-Going	Low-Moderate	
L	Update FEMA flood maps	Flash Flood, River Flood	Emergency Management, Board of Supervisors, Planning Commission	On-Going	Minimal	
M	Enforce Floodplain Ordinance	Flash Flood, River Flood	Planning Commission	On-Going	Minimal	
H	Elevate flood-prone structures	Flash Flood, River Flood	Emergency Management, Board of Supervisors	On-Going	Low-Moderate	
L	Utilize filter strips	Flash Flood, River Flood	Soil and Water District, Watershed Authority	On-Going	Minimal	
M	Creation of detention basins / wetland areas	Flash Flood, River Flood	County Conservation, Board of Supervisors, County Engineering, Soil and Water District, Watershed Authority	On-Going	Low-High	
M	Coordinate flood control efforts	Flash Flood, River Flood	Emergency Management, Law Enforcement, Fire Departments	On-Going	Minimal	
M	Invest in flood control infrastructure	Flash Flood, River Flood	Board of Supervisors, Emergency Management, County Engineering	On-Going	Minimal – High	
M	Increase distribution of NOAA Weather Radios	ALL	Emergency Management, County Law Enforcement	Short-Term	Minimal	
H	Backup and protect county data	ALL	All County Departments	On-Going	Minimal	
H	Coordinate, organize, plan, and train local jurisdictions on storm readiness	ALL	Emergency Management	On-Going	Minimal	
M	Continue utility improvements to reduce risk from hazards	ALL	Utility Providers, Board of Supervisors, Residents	On-Going	Minimal-Moderate	
H	Purchase and maintain backup generators at public	ALL	Emergency Management, Law	Shot-Term	Low	

	facilities		Enforcement, Board of Supervisors, Board of Health, Chickasaw County Public Health			
M	Continue volunteer recruitment and training for storm spotters	Thunderstorm and Lightning, Tornadoes	Emergency Management, Board of Supervisors, Law Enforcement, Fire Departments	On-Going	Minimal	
M	Maintain county roads and equipment	ALL	County Engineering	On-Going	Minimal – Low	
H	Bury utility lines	Severe Winter Storms, Hailstorms, Windstorms, Tornadoes, Thunderstorms and Lightning	Utility Providers, Residents, County Engineering, Board of Supervisors	On-Going	Minimal – Moderate	
M	Construct, maintain, and operate storm shelters	Severe Winter Storms, Extreme Heat	Emergency Management, Law Enforcement, Board of Supervisors	Short-Term	High	
L	Review and update applicable response and recovery plans	ALL	Emergency Management, Board of Supervisors, Law Enforcement, County Engineering	On-Going	Minimal	
H	Construct tornado shelters in at-risk locations	Tornadoes, Thunderstorms and Lightning	Emergency Management, Law Enforcement, Board of Supervisors, County Engineering, Conservation Board	Mid-Term	High	
M	Identify and develop tornado safe room alternatives (i.e., park restroom/shelter, etc.)	Tornadoes, Thunderstorms and Lightning	Emergency Management, Board of Supervisors, Law Enforcement, County Engineering	On-Going	High	
H	Review and analyze traffic data to better serve the public needs and safety	Transportation Incident, Hazardous Materials	County Engineering, State DOT	On-Going	Minimal-Low	
L	Install and maintain stop lights at railroad crossings	Transportation Incident, Hazardous Materials	County Engineering, Department of Transportation, Law Enforcment, Emergency Management, Railroad	Short-Term	Minimal	
M	Enhance accident response time	ALL	Emergency Management, Law Enforcement, Fire Departments, First Responders, Ambulance	On-Going	Minimal	
M	Develop and maintain list of cooling shelters	Extreme Heat	Emergency Management, Law Enforcement, Hospitals, Public Health, Board of Health	On-Going	Minimal	
M	Continue community assistance efforts for at-risk populations	ALL	Emergency Management, Law Enforcement, Hospitals, Public Health, Board of Health	On-Going	Minimal	
M	Maintain mutual aid agreements	ALL	Emergency Management, Board of Supervisors, Law Enforcement, Fire Departments, Board of Health	On-Going	Minimal	
H	Continue to maintain adequate training and	ALL	Emergency Management, Public	On-Going	Minimal-	

	preparedness for hazards and post-hazard		Health, Law Enforcement, Fire Departments, Board of Health		Low	
H	Regulate burn bans	Grass or Wildland Fire, Drought	Law Enforcement, Fire Departments	On-Going	Minimal	
M	Improve consistency in the communication system to enhance ability to prepare and response appropriately to a hazard	ALL	Emergency Management, Law Enforcement	On-Going	Minimal	
M	Increase the number of media outlets to communicate with residents (i.e., websites, social media, newspapers, flyers, etc.)	ALL	All county departments	On-Going	Minimal	
M	Continue to conduct incident command system training	ALL	Emergency Management, Law Enforcement, Fire Departments	On-Going	Minimal – Low	
M	Maintain and distribute public information officers contact list	ALL	Emergency Management	On-Going	Minimal	
H	Maintain and updated, as needed, the continuity of government plan	ALL	Emergency Management, Board of Supervisors	On-Going	Minimal	
M	Marketing, promoting, and encouragement of the use of buffer zones and filter strips along streams, lakes, and rivers	ALL	County Conservation, County Engineering, Watershed Authority, Soil and Conservation Board	On-Going	Minimal	
L	Identify and fill/cap of abandoned wells	Infrastructure Failure	Environmental Health, Board of Health	On-Going	Low	
L	Identify locations and development of wetlands/detention ponds	ALL	County Conservation, County Engineering	On-Going	Minimal – Low	
M	Use of GIS mapping for locating, responding, and preparation for hazards against critical facilities	ALL	Emergency Management, County Engineering	On-Going	Minimal - Low	
H	Development and enforcement of a storm water management program	Flash Flood, River Flood	Emergency Management, County Conservation	On-Going	Minimal	
L	Coordinate with area emergency management agencies, responders, industries, and the public	Radiological, Hazardous Materials	Emergency Management, Law Enforcement, Public Health, Hospitals, Fire Departments, Board of Health	On-Going	Minimal	
M	Regularly conduct response drills	ALL	Emergency Management, Law Enforcement	On-Going	Minimal	
M	Secure hazardous materials	Hazardous Materials	Emergency Management, Law Enforcement, Residents, Industries and Business Owners	On-Going	Minimal	
M	Continue training in HAZMAT reporting	Hazardous Materials	Emergency Management, Board of Health, Chickasaw County Public Health	On-Going	Minimal	
M	Increase drop site awareness (when, where, how to properly dispose of materials)	Hazardous Materials	Emergency Management, Board of Health, Chickasaw County Public Health	On-Going	Minimal	
H	Establish a fund to mitigate a HAZMAT release where there is no responsible party	Hazardous Materials	Emergency Management, Board of Supervisors, Chickasaw County Public	On-Going	Minimal-Low	

			Health			
H	Maintain compliance with the County's Emergency Response Plan	Hazardous Materials	Emergency Management, Law Enforcement, Fire Departments	On-Going	Minimal	
M	Coordinate efforts with the NE Iowa Hazardous Materials Response Team and Department of Natural Resources	Hazardous Materials	Emergency Management, County Conservation, Law Enforcement	On-Going	Minimal	
H	Continuously update County's firewall software	Terrorism	All county departments	On-Going	Minimal	
M	Maintain training for law enforcement entities and equipment capacity	ALL	Law Enforcement, Board of Supervisors	On-Going	Minimal-Low	
M	Coordinate with other Federal, State, and Local law enforcement entities	ALL	All county departments	On-Going	Minimal	
H	Maintain First Responders capacity and training	ALL	Emergency Management, Law Enforcement, Fire Departments, Hospitals	On-Going	Minimal	
M	Implement effective potential employee screening program to identify those individuals who may be considered a danger to the community and government	ALL	All county departments	On-Going	Minimal	
L	Encourage proper construction techniques on infrastructure development and improvement	Infrastructure Failure, Expansive Soils, Earthquakes	County Engineering, Planning Commission	On-Going	Minimal	
L	Determine which diseases are most likely to impact the county and develop strategies to prevent/reduce their occurrence	Animal/Crop/Plant Disease, Human Disease	Board of Health, Public Health, Hospitals, Emergency Management, Law Enforcement, Farmers, Fire Departments, Educational Institutions	On-Going	Minimal	
M	Monitor the health of plants and animals	Animal/Crop/Plant Disease	Farmers, Agricultural Industry, Emergency Management, Law Enforcement, Public Health, Board of Health	On-Going	Minimal	
H	Complete, maintain, and inform the public on the Foreign Animal Disease Plan	Animal/Crop/Plant Disease	Emergency Management, Public Health, County Conservation, Board of Health	On-Going	Minimal	
L	Regulate dumping by enforcing an environmentally friendly policy	Sinkholes	Law Enforcement, County Conservation, Environmental Health	On-Going	Minimal	
M	Discourage tree and shrubbery removal in vulnerable areas	Landslides	County Engineering, Emergency Management, County Conservation	On-Going	Minimal	
M	Devious contractor awareness	ALL	All county departments	On-Going	Minimal	
M	Water testing after flooding events	Flash Flood, River Flood	Environmental Health, Board of Health	On-Going	Minimal	

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 a five-year 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 Board of Supervisors may, by resolution, choose to accept any amendment to the plan. Once the Chickasaw County Board of Supervisors has adopted the amendment, the 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 the Chickasaw 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.

Phasing & Incorporation into Other Planning Mechanisms

Phasing is a process by which the completion of a project occurs over several budget cycles. It is recommended that this review 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.

Each jurisdiction will consider the findings from this document when updating other planning documents in the future. Examples of planning documents that would benefit from information provided in this plan include, but are not limited to: Comprehensive Land-Use Plans and Urban Renewal Plans. Existing and future Zoning and Subdivision Ordinances as well as Building Codes should consider the goals, guidelines, and actions presented in this Plan. 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).

Each of the jurisdictions with previous HMPs have incorporated their plans into their comprehensive land use plans. Although the wording differs in each plan, all the land use plans state the jurisdiction will protect the general health, safety and welfare of the community, adhere to the NFIP, avoid development in the floodplain, work with neighboring jurisdictions on planning issues of common interest. INRCOG develops transportation plans for the entire planning region and many jurisdictions include projects in the plan that will make the roadways safer and reduce accidents. The County Emergency Management Office works on disaster response and preparedness plans and regularly holds meetings with the jurisdictions.

Evaluation & Review Process

Ultimately, the Chickasaw County Emergency Management Coordinator and City Councils 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 Chickasaw 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, on jurisdictional websites, 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. Copies of the Plan and the Committee's review will be available at all government offices (city halls and courthouse). 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 Appendix M.

Appendix L details the progress each jurisdiction has made since the adoption of their previous plans. Since many activities fall under the normal duties of most city governments (e.g. funding and maintaining emergency services), not many activities were deleted.

Incorporation into Other Planning Mechanisms

Each county and city department will consider the findings from this document when updating other planning and operating documents in the future. Examples of planning documents that would benefit from information provided in this plan include, but are not limited to: Comprehensive Land-Use Plans and Urban Renewal Plans. Existing and future Zoning and Subdivision Ordinances as well as Building Codes should consider the goals, guidelines, and actions presented in this Plan.

Continued Public Participation

In order to ensure that the public remains involved in the future implementation of this Plan, it shall remain on hand at all participating city halls and the county courthouse. This Plan shall be made available to any party who requests to see it. If a jurisdiction intends to make or discuss amendments to the plan, a meeting with corresponding agenda shall be developed and posted; a newspaper notice shall be submitted and if necessary a legal notice will be published; and the Hazard Mitigation Committee members will be notified of the meeting via email, telephone, or regular mail. Also, the amendments shall also be made available prior to a City Council or Board of Supervisors action so that the public may be made aware. Consistent with the Iowa 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.

APPENDIX A: CITY OF ALTA VISTA

COMMUNITY PROFILE

Location

The City of Alta Vista is located in northern Chickasaw County in the northeast quadrant of Iowa at latitude 43.1986 N x 92.4171 W. Elevations in Alta Vista range from 1,140 feet to 1,200 feet above sea level. Two major highways serve the City, including County Roads T76 and V18.

Natural Environment

The terrain on which Alta Vista is built is generally the undulating topography that characterizes the agricultural areas of northeast Iowa. The highest point in the community lies at approximately 1,200 feet above sea level and is located on the eastern edge of town. From this peak, the elevation of the City drops as you move towards Elk Creek west of town. The lowest elevation in the community is located along Elk Creek at approximately 1,140 feet above sea level.

The surface water system in the City of Alta Vista is comprised predominantly of small local streams, which are abundant and evenly distributed in the planning area. Alta Vista is located between the Little Wapsipinicon River and the East Branch of the Wapsipinicon River, and falls into the Upper Wapsipinicon watershed. Elk Creek, which flows west of Alta Vista, is the primary drainage way for the community. Elk Creek eventually merges with the Little Wapsipinicon River southwest of the City. The Little Wapsipinicon then flows into the main branch of the Wapsipinicon River.

TABLE A1: CITY OF ALTA VISTA DEMOGRAPHICS

Government Framework	Mayor – City Council
General Population, 2010 Census	
Total Population	266
Total Males	128
Total Females	138
Median Age	38.8
At-Risk Population, <18 Yrs	77
At-Risk Population, >64 Yrs	55
One Race-White	265
Black or African American	0
American Indian and Alaskan Native	0
Asian)	0
Other Race	0
Two or More Races	1
Hispanic or Latino	0
Total Household Population	266
Total Population in Group Quarters	0
Persons in Group Quarters – Institutionalized	0
Persons in Group Quarters – Noninstitutionalized	0
Housing Characteristics, 2012-2016 ACS	
Total Housing Units	137
Total Owner-Occupied Housing Units	90
Total Renter-Occupied Housing Units	36
Total Vacant Housing Units	11
Total 1-Unit Detached and Attached Structures	118
Total 2, 3, and 4-Unit Structures	9
Total 5 to 19-Unit Structures	0
Total Mobile Homes	0
Year Majority of Housing Units were Built	1939 or earlier (60.3%)
Average Household Size	2.29
Average Family Size	3.02

Alta Vista's climate is not unlike those of most cities in the Midwest. Alta Vista has a climate of continental character. Because Alta Vista is far away from the moderating influence of a large body of water, a wide variation is experienced in both temperature and precipitation during the four distinct seasons. Temperatures in Alta Vista range from an average temperature of 15.1 degrees Fahrenheit in January to an average temperature of 72.3 degrees Fahrenheit in July.

Precipitation also varies substantially in a climate such as Alta Vista's. The two major types of precipitation to occur in Alta Vista are rain and snow. Average annual precipitation for the City is 35.8 inches. Summer precipitation results primarily from thunderstorm activity, although longer less intense rains are not uncommon in the area. Other forms of precipitation recorded in the area include snow, hail, ice pellets, sleet, dew, and vapor condensation due to low drifting cloud formations (fog).

Originally the land surrounding and including Alta Vista was comprised of a mix of prairie grass, with trees adjacent to established waterways such as Elk Creek. The original cover has been reduced to make room for additional cropland and construction of houses and businesses in suitable areas.

Tree cover can also be found throughout the community in residential areas and parks. These remaining trees contribute to the aesthetics of the community and are viewed as an asset.

According to the Chickasaw County Soil Survey issued in 1996 by the United State Department of Agriculture Soil Conservation Service, the soils in Alta Vista are primarily of the Ostrander Series in the east and the Saude Series in the west. Ostrander soils are "well drained moderately permeable soils on upland convex ridge tops and side slopes. Slopes range from 2 to 9 percent." Saude soils near Elk Creek are "well drained soils on stream terraces. Permeability is moderate in the upper soil and very rapid in the lower soil. Slopes range from 0 to 5 percent." In addition, due to their location in and near the Elk Creek floodplain, some of the soils in Alta Vista may be subject to minor flooding.

History

The City of Alta Vista, originally named Elk Creek, was established and incorporated in 1894. The City is split between Deerfield and Washington Townships. George Darrow Round Barn, located on County Road T76 is the only registered place on the National Register of Historic Places located within Alta Vista.

Demographics

Population

Alta Vista's demographic data is outlined in Tables A1 and A1.1. In the most recent 2016 U.S. Census ACS Survey, Alta Vista's population was estimated to have grown to 301, an increase of 13.15 percent increase since the 2010 U.S. Census (266). The previous U.S. Census, taken in 2000, recorded a population figure of 286 for Alta Vista.

TABLE A1.1: CITY OF ALTA VISTA DEMOGRAPHICS

Economics Characteristics, 2012-2016 ACS	
Population 16 years and over	229
Population In Labor Force (16 yrs and over)	150
Persons Employed	148
Persons Unemployed	2
Persons Employed in Management, Business, Science, and Arts Occupations	28
Persons Employed in Service Occupations	11
Persons Employed in Sales and Office Occupations	23
Persons Employed in Natural Resources, Construction, and Maintenance Occupations	21
Persons Employed in Production, Transportation, and Material Moving Occupations	65
Median Household Income	$40,909
Median Family Income	$48,438
Percent of Persons < 18 yrs. Below Poverty Level	2.6%
Percent of Persons 18-64 Yrs. Below Poverty Level	8.8%
Percent of Persons >65 Yrs. Below Poverty Level	11.4%
Social Characteristics, 2012-2016 ACS	
School Enrollment (3 yrs and over)	78
Nursery School, Preschool	2
Kindergarten and Elementary School (grades 1-8)	52
High School (grades 9-12)	5
College or Graduate School	9
Education Attainment: Population 25 Years and Over	174
Less than High School Graduate	8.0%
High School Graduate (includes equivalency)	58.6%
Some College, Associate's Degree	25.3%
Bachelor's Degree or Higher	8.0%

Community Services

The City of Alta Vista has a municipal water supply is taken from two locally located wells. The City maintains an underground storage facility with a capacity of approximately 50,000 gallons. The system has an estimated capacity to produce in excess of 62,000 gallons per day. The average daily use is estimated to be 24,000 gallons. The peak reported use is 36,000 gallons per day. The water is then pumped to service locations via municipal distribution lines. The water storage facility and pumps are located in the basement of City Hall.

The City of Alta Vista has just completed a complete construction/renovation of the municipal wastewater treatment facility prior to the last Plan. This improvement was necessary as a result of the deterioration of the previous system, which resulted in potential citation from the Iowa Department of Natural Resources. The City's facility includes a three-cell controlled discharge lagoon. This replaced the former system, which was comprised of a dated trickling filter system. The newer system was reviewed and approved by the Iowa DNR and the United Stated Department of Agriculture, who helped to fund a portion of the upgrade.

The primary providers of utilities in Alta Vista are listed in the table below.

TABLE A2: ALTA VISTA UTILITY PROVIDERS

Electric	Natural Gas	Telephone/Internet	Cable	Water	Sewer	Sanitation
Alliant Energy	None	Windstream	None	City of Alta Vista	City of Alta Vista	Jendro (Contract)

HAZARDS & RISK ASSESSMENT

Hazard Analysis

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 Alta Vista evaluated the risk associated with a specific hazard, defined by probability and frequency of occurrence, magnitude, severity, exposures, and consequences. Alta Vista'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

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, Alta Vista determined that even though the historical occurrences were low for certain hazards, the probability ranking for future occurrences should be higher.

Table A3 is the analysis scores for the City of Alta Vista. As shown in the table, the top four hazards for the city are: Flash Flooding, River Flooding, Tornado/Windstorm, and Thunderstorm/Lightning/Hail.

TABLE A3: CITY OF ALTA VISTA HAZARD RISK ASSESSMENT						
Hazard Rank	**Hazard**	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**Hazard Score**
1	Flash Flood	4	3	3	3	**3.45**
1	River Flooding	4	3	3	3	**3.45**
3	Tornado/Windstorm	3	3	4	1	**2.95**
3	Thunderstorm/Lightning/Hail	3	3	4	1	**2.95**
5	Severe Winter Storm	3	2	3	3	**2.7**
6	Animal/Plant/Crop Disease	3	2	1	4	**2.5**
7	Grass/Wild Fire	2	2	4	1	**2.2**
7	Drought	2	2	2	4	**2.2**
9	Extreme Heat	2	2	2	3	**2.1**
10	HAZMAT Incident	1	1	4	1	**1.45**
10	Earthquake	1	1	4	1	**1.45**
12	Infrastructure Failure	1	1	3	2	**1.4**
13	Human Disease	1	1	1	4	**1.3**
14	Transportation Incident	1	1	1	1	**1**
14	Expansive Soils	1	1	1	1	**1**
14	Radiological 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 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 Alta Vista.

TABLE A3: CRITICAL FACILITIES IN ALTA VISTA

Zion Lutheran Church	Schucky's
Alta Vista VFW	Alta Vista Municipal Center
St. Bernard's Catholic Church	City Hall/Fire Department
Library	

Source: Community

Identifying the location of critical facilities and designated shelters (see Table A3) in Alta Vista 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. Map *6B* illustrates the location of identified critical facilities throughout Alta Vista.

TABLE A4: CITY OF ALTA VISTA 100-YEAR FLOODPLAIN PROPERTIES

	# of Buildings	% of Buildings
1.0% Annual Chance Floodplain	51	15.94%
0.2% Annual Chance Floodplain	0	0.00%
Total Unincorporated Out of Floodplain	269	84.06%
Total Unincorporated	320	100.00%

Figures calculated using data from Chickasaw County GIS Department; Parcel data current as of June 2018

According to the available data sources, Alta Vista is projected to maintain its population over the next thirty years. This will mean that the current critical facilities will need to maintained or newer, additional critical facilities will need to be made to be able to support the community. However, the need for more critical facilities should be closely monitored these next 5-years and readdressed when this HMP is updated.

Flooding

A facility vulnerable to flooding is normally low, since these structures are not often 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.

According to the data provided by INRCOG, Chickasaw County, and FEMA, there is approximately 51 buildings are located within the 100-year floodplain. As shown on *Attachment 5A: Flood Scenario Map of the City,* this land is along an Elk Creek on the west side of the community. Flash flooding within the built areas of the community 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.

Tornadoes

As stated on the FEMA website[15], mobile homes are highly vulnerable to tornadoes. Even mobile homes that are tied down, offer little protection from tornadoes.

According to Census information and the Chickasaw County Treasurer's office, there are 2 mobile homes located in the City of Alta Vista. According to the community, 3 persons live in mobile homes within the city. General observation would suggest a recent increase in the number of manufactured homes in the area. This increased popularity has the potential to increase the potential risk of damage to people and property in the community. Currently, no FEMA certified tornado safe shelters are known to exist in the community.

The primary reason for the increased popularity of mobile and manufactured homes is affordability. Although HUD regulations and local building codes have increased the safety components of these types of houses significantly in recent history, this affordability has often been accompanied with a reduced level of safety. 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, 1999*).

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. Alta Vista currently does not have any nursing home or elderly home facilities located within its city limits.

[15] Federal Emergency Management Agency (FEMA), http://www.fema.gov/areyouready/tornadoes.shtm

Vulnerability – Social Assets (Populations)

The social vulnerability assessment identified how the hazards affect the population of Alta Vista 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 A5 presents an overview of the at-risk population in Alta Vista according to information retrieved from the 2010 U.S. Census and Iowa Data Center.

TABLE A5: CITY OF ALTA VISTA'S "AT-RISK" POPULATION

	2010
Total Community Population (2010)	266
Elderly (65 yrs and older)	55
Youth (under 18 yrs old)	77
Householder Living Alone	44
Population Living in Poverty	7.6%
Population in Mobile Homes	27
Group Quarters Population	0

Source: U.S. Census, 2010, Iowa Data Center, and 2016 ACS 5-Year Averages

According to Table A5, 20.7 percent of residents are 65 years and older. There are zero persons living in group quarters or nursing or skilled health facilities in the community. 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 28.9 percent of the city's total population under the age of 18.

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 community there are 2 in city limits, with 3 persons living in mobile homes.

Vulnerability – Estimating Potential Property Losses

Valuations are an important component of hazard mitigation planning insomuch 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 Alta Vista 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.

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.

National Flood Insurance Program/Repetitive Loss Properties

The city participates in the National Flood Insurance Program (NFIP) and has a flood ordinance in place. As Table A7 shows, there are currently zero NFIP policies in place within the city.

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. River flooding is the most common cause of repetitive loss in Chickasaw County. Table A7 illustrates the number of repetitive loss properties in the city. Currently (as of 12/31/2017) there is zero active repetitive loss building in the city.

TABLE A7: NFIP AND REPETITIVE LOSS DATA FOR ALTA VISTA

CID #	# of NFIP Policies	NFIP Insurance in Force ($)	Total # of RLB	RLB Insured	RLB Not Insured	Total RLB Losses ($)	RLB Losses Insured ($)
190065	0	$0	0	0	0	$0	$0

Source: Federal Emergency Management Agency (FEMA); Note: RLB = Repetitive Loss Building; NFIP data current as of 12/31/2017; Repetitive loss data current as of 12/31/2017

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.

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 identified are as follows:

1. Reduce the chance of and impact of flooding in the community.
2. Take measures to minimize the occurrence of injuries and loss of life due to hazards.
3. Take measures to minimize or eliminate damages that may occur as a result of hazards.
4. Increase the city's ability to respond to natural disasters and man-made hazards.
5. Return to the community to similar or improved pre-event conditions as quickly as possible following a disaster event.
6. Incorporate the City Plan into the proposed Multi-Jurisdictional Plan.
7. Continually re-assess and re-evaluate the plan and mitigation activities.

Current Mitigation Actions

Prevention Mitigation Actions

The only ordinance that the city has adopted in regards to zoning is a Wetlands Zoning Ordinance, which was adopted in 2003. According to the City of Alta Vista, there is a section covering building permits included in the City's codebook. However, no official building code has been adopted. Below are the current plans and ordinances according to the City.

TABLE A7: CURRENT PLANNING AND REGULATORY DOCUMENTS FOR ALTA VISTA

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	No	No	No	Yes	Yes	Yes

Source: Local Community

Property Protection Mitigation Actions

There has not historically been any major flood damage to the community. Therefore, very little has been done in the line of City initiated or sponsored property protection. As stated earlier, the City is a participating member of the National Flood Insurance Program. Therefore, residents of Alta Vista are eligible to receive flood insurance.

Public Education and Awareness Mitigation Actions

Alta Vista currently has in place E-911 Emergency Assistance. Other communications used by City personnel include pagers, radios, and cellular phones. Radio, television, cellular telephones, landline telephones, newspapers, warning sirens, and NOAA Radio Service are available to the public at large.

Emergency Services Mitigation Actions

The action to mitigate a natural disaster is communication first, following the chain of command: Mayor to Fire Chief, Ambulance, City Clerk, and Public Works. The EMS Departments of the City have written plans of action for natural disasters. The city has on outdoor warning siren. The siren is activated at the site of a tornado, or in case of an imminent threat of any kind. The fire department sounds a warning at the firth fire meeting each month. The fire chief sends a crew of firefighters out at the request of the sheriff if the National Weather Forecasts a chance of severe weather. The sheriff and fire chief communicate by radio ad does the team sent out to spot.

Chickasaw County Emergency Management

Alta Vista works with the Chickasaw County Emergency Management Coordinator, based out of the City of New Hampton, 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 Austen Seely and current contact information is as follows: Chickasaw County Emergency Management Agency, 260 E. Prospect Street, New Hampton, Iowa 50659, (641) 394-2406, email: ema@chickasawcoia.org.

Law Enforcement

Police protection is provided by the Chickasaw County Sheriffs' Department and the Iowa State Patrol.

Fire Protection

Fire protection is provided for Alta Vista with a force of 18 volunteer firefighters. All of the volunteers are HAZMAT operational. 12 of the volunteers have Firefighter I status. The fire station is located in the center of Alta Vista.

Equipment used by the Alta Vista Fire Department includes the following:

- 2004 Pumper (1,250 gpm pump)
- 1988 Pumper (1,500 gpm pump)
- 1991 Tanker (3,000 gallons)
- 1985 Brush Truck
- 10 Self-Contained Breathing Apparatus
- Thermal Imaging Camera

The Alta Vista Fire Department's primary coverage area includes Washington Township, Deerfield Township, and part of Jacksonville Township. The Alta Vista Fire Department maintains mutual aid agreements with all communities in Chickasaw County.

Equipment used by the Denver Fire Department includes the following: two tankers, three pumpers, eight total trucks, two "jaws of life", chains saws, air bags, tripod, and stabilizing jacks.

The City of Denver Fire Department has mutual aid agreements with every fire department in Bremer and Black Hawk Counties.

Ambulance & First Responders

Chickasaw Ambulance Service provides ambulance service to area hospitals. Chickasaw Ambulance Service is a private company that contracts service with local entities. The company is based out of New Hampton, approximately 14 miles southeast of Alta Vista.

Chickasaw County Rescue Squad also provides service in Alta Vista. There are 42 EMT certified individuals who volunteer to respond to emergency calls on a need basis in the county.

Medical Facilities

The nearest area hospital, Mercy Medical Center, is located in New Hampton. There are four other hospitals available in a 45-mile radius of the City of Alta Vista; the closest one is Mercy Medical Center in New Hampton.

HAZMAT

Alta Vista 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.

Public Works / Street Department

The City has one plow truck for snow and ice removal. A full-time city employee removes snow in the community. In an ideal winter storm scenario, the city roads would be adequately cleared within hours.

Warning Systems

The outdoor early warning system consists of one siren that is activated either by the County Emergency Management Office. According to the hazard mitigation planning committee, the existing siren does not adequately serve the entire community. The City is currently considering purchasing a new siren.

NOAA weather radio broadcasts are also available in the community. Currently the local fire department has a NOAA weather radio on hand. These radios provide up to the minute weather related alerts. Other locations that warnings and watches can be found are television, Internet, and radio

Chickasaw 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 Chickasaw 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

There are no current natural resource protection mitigation actions in place at this time.

Structural Projects Mitigation Actions

There are no current structural projects mitigation actions in place 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.

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. Based on this analysis, each activity was ranked as High (H), Medium (M) or Low (L). However, not all identified activities are applicable to all jurisdictions and is marked as such in Table A9.

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

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, identified the responsible party (ies) for each activity and finally related each activity to at least one of the five Hazard Mitigation Plan Goals listed above. Table A9 below is the City of Alta Vista's Implementation Strategy.

TABLE A9: CITY OF ALTA VISTA'S IMPLEMENTATION STRATEGY

Priority	Mitigation Action/Program/Project	Associated Hazard	Primary Agency Responsible for Implementation	Date for Completion	Estimated Cost	Funding Source
H	Educate the public on proper steps to protect their property and self during an event	ALL	County Emergency Management, Library, City Clerk, Red Cross, Schools,	On-Going	Minimal	
L	Place lightning arrestors on power lines	ALL	City Council, Private Property Owners, Local Electrical Utility	On-Going	Minimal-Low	
H	Purchase and install surge protector equipment on critical municipally-owned electronic equipment	ALL	City Council, Fire Chief	On-Going	Minimal	
H	Backup critical city data and stored off-site	ALL	City Clerk, City Council	On-Going	Minimal	
L	Bury overhead power lines	Severe Winter Storm, Hailstorm, Thunderstorm and Lightning, Tornado, Windstorm, Infrastructure Failure	City Council, City-Owned Utility	On-Going	Low-Moderate	
M	Maintain tree-trimming policies	Severe Winter Storms, Hailstorms, Thunderstorms and Lightning, Tornado, Windstorms	Public Works, City Council, Local Telephone and Electrical Utility Providers, Private Property Owners	On-Going	Minimal	
H	Acquire backup generation capabilities at critical facilities (i.e., lift station, city hall, fire department, telephone office, etc.	ALL	Public Works, City Council, Fire Department	On-Going	Low-Moderate	
H	Maintain a backup fuel supply	ALL	Public Works, City Council	On-Going	Minimal	
H	Regularly inspect propane connections	Infrastructure Failure	Public Works, Fire Department, Private Property Owners	On-Going	Minimal	
L	Divide community electrical circuits to	ALL	Public Works	On-Going	Minimal-Low	

	reduce the loss of power throughout the community					
H	Purchase and install early warning siren to be a replacement or an additional siren in the community	Thunderstorms and Lightning, Tornado, Windstorms	City Council, Public Works, County Emergency Management	Short-to-Mid-Term	Low	
H	Purchase NOAA Weather Radios for vulnerable population and critical locations in the community	ALL	City Council, County Emergency Management	On-Going	Minimal	
H	Recruit and train volunteer storm watchers/tornado spotters	Thunderstorms and Lightning, Tornado, Windstorms	Fire Department, County Emergency Management	On-Going	Minimal	
H	Identify locations and construct a public tornado shelter in vulnerable areas of town	Thunderstorms and Lightning, Tornado, Windstorms	City Council	Mid-Term	High	
H	Construct tornado safe rooms in homes, businesses, etc.	Thunderstorms and Lightning, Tornado, Windstorms	Private Property Owners, Developers	On-Going	Minimal-Moderate	
H	Work with local businesses and County EMA to ensure Tier II reports are being filed	Hazardous Materials	County Emergency Management, Fire Department, Iowa DNR	On-Going	Minimal	
H	Encourage citizens to keep hazardous materials secured	Hazardous Materials	City Council, Private Property Owners	On-Going	Minimal	
H	Establish and enforce designated routes for the transport of hazardous materials	Hazardous Materials, Transportation Incident	Sheriff's Department, City Council, Iowa DOT	On-Going	Minimal	
H	Maintain law enforcement contract to monitor large storage supplies of hazardous materials	Hazardous Materials	City Council, Sheriff's Department	On-Going	Minimal	
H	Maintain contract for HAZMAT response	Hazardous Materials	City Council, Fire Department	On-Going	Minimal	
H	Ensure first responders are aware of response plans for local facilities	Hazardous Materials	Fire Department, Sheriff's Department, County Emergency Management	On-Going	Minimal	
H	Maintain a well-trained and equipped Street Department	ALL	City Council, Public Works	On-Going	Minimal-Moderate	
H	Implement and enforce sidewalk clearance ordinance	Severe Winter Storms	City Council, Public Works, Private Property Owners	On-Going	Minimal	
M	Maintain tree-trimming policies	Severe Winter Storms, Windstorms, Hailstorms	Public Works, City Council, Local Telephone and Electrical Utilities,	On-Going	Minimal	

			Private Property Owners			
M	Designate and maintain heating shelters	Severe Winter Storms	City Council, County Emergency Management, Private facilities	On-Going	Minimal	
M	Acquire and distribute NOAA Weather Radios to vulnerable populations and critical facilities in the community	ALL	City Council, County Emergency Management	On-Going	Minimal	
L	Maintain list of potential translators to be called upon in case of an emergency	ALL	Fire Chief, City Clerk	On-Going	Minimal	
H	Implement and review annually an incident command standard operating procedure in local fire responder organizations	ALL	Fire Chief, County Emergency Management	On-Going	Minimal	
H	Maintain a well-trained and equipped fire department	ALL	City Council, Fire Department	On-Going	Minimal-High	
H	Encourage the use of smoke detectors, sprinkler systems and fire extinguishers	Infrastructure Failure, Thunderstorms and Lightning	City Council, Fire Department	On-Going	Minimal	
H	Identify needs of fire department and purse funding for: a replacement of old and worn-out bunker gear, fully outfit department with new SCBA's, and other items as they become needed	ALL	Fire Department	On-Going	Minimal-High	
M	Establish cooling shelters	Extreme Heat	County Emergency Management, American Red Cross, City Clerk	On-Going	Minimal	
H	Consider adopting building codes and developing a regular building inspections program	Infrastructure Failure	City Council	Mid-Term	Minimal	
H	Identify, purchase, and remove structures in flood hazard areas	Flash Flood, River Flood	City Council, Private Property Owners	On-Going	Low	
H	Enforce floodplain ordinance and remain member of National Flood Insurance Program	Flash Flood, River Flood	City Council, City Clerk	On-Going	Minimal	
H	Construct detention ponds and/or filter strips along upstream Elk Creek	Flash Flood, River Flood	City Council, Private Property Owners	On-Going	Minimal-Low	
H	Construct a dike along east bank of Elk Creek	Flash Flood, River Flood	City Council, Private Property Owners	Mid-to-Long Term	Low-Moderate	
H	Flood proof structures in flood hazard	Flash Flood, River Flood	City Council, Private Property	On-Going	Minimal-	

	areas		Owners		Moderate	
H	Maintain supply of sandbags	Flash Flood, River Flood	City Council, Public Works, Fire Department	On-Going	Minimal	
H	Continue to clean debris from stream	Flash Flood, River Flood	Public Works, Private Property Owners	On-Going	Minimal	
H	Acquire additional water pumps	Flash Flood, River Flood	Public Works, City Council	Short-to-Mid Term	Minimal	
H	Maintain a viable law enforcement department, capable of responding to all hazards	ALL	County Sheriff's Department, City Council	On-Going	Moderate	
H	Secure vulnerable critical sites throughout the community; including, but not limited to: locks on all critical facilities, fences at some critical facilities, security cameras, alarms, increase patrols, automatic locks.	Terrorism	City Council, Public Works, Sheriff's Department	On-Going	Minimal-Low	
H	Implement and enforce a storm water management program	Flash Flood, Human Disease, Animal/Crop/Plant Disease	Public Works, City Council	On-Going	Minimal	
H	Implement and encourage erosion control measures when construction disturbs a certain amount of ground soils	Human Disease, Animal/Crop/Plant Disease, Landslide, Sinkholes	City Council, Iowa DNR, Private Property Owners	On-Going	Minimal	
H	Continue to treat and monitor water supply	Human Disease, Animal/Crop/Plant Disease, Landslide, Sinkholes	Public Works	On-Going	Minimal	
H	Construct new wastewater treatment facility to meet current standards	Human Disease, Animal/Crop/Plant Disease, Landslide, Sinkholes, Infrastructure Failure	Public Works, City Council, USDA, IDED/HUD	Long-Term	High	
H	Ensure proper signage along transportation network to control flow of traffic	Transportation Incident	Public Works, County Engineering	On-Going	Minimal	
H	Implement and enforce burning bans when necessary	Drought, Extreme Heat	Fire Chief, City Council, County Emergency Management, State	On-Going	Minimal	

			Fire Marshall			
H	Restrict water usage, as necessary, to maintain water supply	ALL	Mayor, Fire Chief, State Fire Marshall	On-Going	Minimal	
H	Continue to cooperate with Health Department and local medical facilities to help insure effectiveness of prevention (vaccinations/immunizations), detection, and response mechanisms	Human Disease, Animal/Crop/Plant Disease	County Health Department, Mayor, City Council, Hospitals/Clinics	On-Going	Minimal	
H	Continue to spray for mosquitoes and other insects	Human Disease, Animal/Crop/Plant Disease	Contracted sprayer, City Council	On-Going	Minimal	
H	Maintain sanitary conditions at all public facilities	Human Disease	City Council, City Employees	On-Going	Minimal	
M	Identify and remove dangerous buildings throughout the community	Infrastructure Failure	City Council, Private Property Owners	On-Going	Low-Moderate	

APPENDIX B: CITY OF FREDERICKSBURG

COMMUNITY PROFILE

Location

Fredericksburg is located in the southeast portion County, in the northeastern quadrant of Iowa, at latitude 42.9653 N x longitude 92.1996 W and elevations ranging from 1,060 to 1,100.

Geography

The terrain on which Fredericksburg is built is generally the undulating topography that characterizes the agricultural areas of northeast Iowa. The highest point in the community lies at approximately 1,100 feet above sea level and is located at the east end of High Street. From this peak, the elevation of the City drops as you move west towards the East Branch of the Wapsipinicon River.

The surface water system in the City of Fredericksburg is dominated by the East Branch of the Wapsipinicon River, which flows along the western edge of the community. Also, Plum Creek flows from east to west along the northern edge of the community into the East Branch of the Wapsipinicon River. The Wapsipinicon River system is the largest river system in Chickasaw County. Fredericksburg falls into the Upper Wapsipinicon River watershed.

TABLE B1: CITY OF FREDERICKSBURG DEMOGRAPHICS

Government Framework	Mayor – City Council
General Population, 2010 Census	
Total Population	931
Median Age	44.5
At-Risk Population, <18 Years	201
At-Risk Population, >64 Years	208
Total Males	467
Total Females	464
One Race-White	895
Black of African American	2
American Indian and Alaskan Native	2
Asian	1
Two or More Races	10
Housing Characteristics, 2012-2016 ACS	
Total Housing Units	584
Total Owner-Occupied Housing Units	364
Total Renter-Occupied Housing Units	164
Total Vacant Housing Units	56
Total 1-Unit Detached and Attached Structures	475
Total 2, 3, and 4-Unit Structures	13
Total 5 to 19-Unit Structures	42
Total Mobile Homes	0
Year Majority of Housing Units were Built	1939 or earlier (37.9%)
Average Household Size	2.18
Average Family Size	2.77

Fredericksburg's climate is not unlike those of most cities in the Midwest. Fredericksburg has a climate of continental character. Because Fredericksburg is far away from the moderating influence of a large body of water, a wide variation is experienced in both temperature and precipitation during the four distinct seasons. Temperatures in Fredericksburg range from an average winter temperature of 19.4 degrees Fahrenheit to an average summer temperature of 70.2 degrees Fahrenheit.

Precipitation also varies substantially in a climate such as Fredericksburg's. The two major types of precipitation to occur in Fredericksburg are rain and snow. Average annual rainfall is 32.9 inches, while average snowfall is approximately 35.5 inches. Summer precipitation results primarily from thunderstorm activity,

although longer less intense rains are not uncommon in the area. Other forms of precipitation recorded in the area include snow, hail, ice pellets, sleet, dew, and vapor condensation due to low drifting cloud formations (fog).

Originally the land surrounding and including Fredericksburg was comprised of mixed prairie grasses and some deciduous forest. The forest was adjacent to established waterways. The original cover has been reduced to make room for additional cropland and construction of houses and businesses in suitable areas.

Tree cover can also be found throughout the community in residential areas, parks, and cemeteries. These remaining trees contribute to the aesthetics of the community and are viewed as an asset.

According to the Chickasaw County Soil Survey issued in 1996 by the United State Department of Agriculture Soil Conservation Service, the soil in Fredericksburg is primarily of the Saude Series. The Saude Series "consists of well drained soils on stream terraces. These soils formed in 24 to 32 inches of loamy alluvial deposits and the underlying sandy and gravelly glacial outwash. Permeability is moderate in the upper part and very rapid in the lower part. The native vegetation is mixed prairie grasses. Slopes range from 0 to 5 percent."

History

During the fall of 1853, John Patten built a log shanty near the bank of Plum Creek, the first building of any sort to be erected on the site of Fredericksburg. This shanty was located near the junction of Plum Creek and the East Wapsipinicon River. "Wapsipinicon" comes from an Indian word meaning "white potato." Little was known of John Patten and his family, where they came from or where they went. They lived in the shanty but a short time until spring when they moved away.

On September 21, 1854, Frederick Padden and his family moved into the little empty shack on the bank of the creek. Frederick Padden, pioneer, first permanent settler in Fredericksburg, first hotel keeper, first mill builder and owner, first roadmaster and first postmaster – he gave his name to the town and township. Frederick Padden was born in the state of New York in 1823. He was married at Springfield Corners, Pennsylvania, in 1854 to Julia Ann Robinson. He came west with his family consisting of his wife, his daughter, Anna, and his three sons, Frederick Jerome, Robert, and Melville M.

They remained in this shanty while he was building a house that later came to be known as the Fountain House. In November of 1854, the family moved into this building while it was still incomplete. This house was located on the lot west of where the United Methodist Church (111 South Hamilton) now stands.

More settlers came in the fall and the next spring. Lewis Padden, a brother of Frederick, Christopher C. Stone, J.K. Kroninger, Jesse F. Appleberry, Thomas P. Vokes, George Hillson, Daniel Bloxham, James Potter, Godfrey Vail, and others came with their families to this new settlement and to the country nearby. At this time there were no churches in the settlement, but the people of various denominations met in private homes where they sang hymns and prayed. The first sermon was preached on May 9, 1855 in the front room of Frederick Padden's hotel, the Fountain House by a Free Will Baptist Minister, Rev. S. M. Prentice.

In October of 1856, the town of Fredericksburg was platted by Frederick Padden and Daniel Bloxham. Fredericksburg is located in both Fredericksburg and Dresden Townships – in part of Sections 7 and 18 in Fredericksburg Township and in part of Sections 12 and 13 in Dresden Township.

As originally planned the business section of the town was to have been along Plum Street, directly south of the creek. For some reason, the plans were changed and Main Street and Washington Avenue became the center of the business section of town. Main Street was laid out 100 feet wide and is now 100 feet from building to building and 80 feet from curb to curb. In 1856, the first Post Office was established with Frederick Padden as postmaster and F.W. Barrow as deputy. This was a money order office in 1882.

In 1903, Fredericksburg put in waterworks at a cost of $4,000 with Main Street piped, and since that time has developed excellent water and sewer systems. U.S. Highway 18 runs through Main Street. Paving of this highway through town was begun in the fall of 1933 and completed in 1934. A few years later Main Street was paved from curb to curb and through the years the other streets in town have been surfaced, with curb and gutter installed.

Demographics

Population

Fredericksburg's demographic data is outlined in Tables B1 and B1.1. In the recent 2010 U.S. Census, Fredericksburg's population declined to 931, a decrease of 5.4 percent over ten years. The previous U.S. Census, taken in 2000, recorded a population figure of 984 for Fredericksburg. Much of the data included in the tables are from the 2010 U.S. Census and the 2012-2016 ACS.

TABLE B1.1: CITY OF FREDERICKSBURG DEMOGRAPHICS

Economics Characteristics, 2012-2016 ACS	
Population 16 years and over	864
Population In Labor Force (16 yrs and over)	530
Persons Employed	508
Persons Unemployed	22
Persons Employed in Management, Business, Science, and Arts Occupations	116
Persons Employed in Service Occupations	78
Persons Employed in Sales and Office Occupations	109
Persons Employed in Natural Resources, Construction, and Maintenance Occupations	74
Persons Employed in Production, Transportation, and Material Moving Occupations	131
Median Household Income	$37,083
Median Family Income	$53,523
Percent of Persons < 18 yrs. Below Poverty Level	7.8%
Percent of Persons 18-64 Yrs. Below Poverty Level	11.4%
Percent of Persons >65 Yrs. Below Poverty Level	10.7%
Social Characteristics, 2012-2016 ACS	
School Enrollment (3 yrs and over)	267
Nursery School, Preschool	13
Kindergarten and Elementary School (grades 1-8)	128
High School (grades 9-12)	98
College or Graduate School	28
Education Attainment: Population 25 Years and Over	719
Less than High School Graduate	7.1%
High School Graduate (includes equivalency)	49.2%
Some College, Associate's Degree	27.2%
Bachelor's Degree or Higher	16.4%

Community Services

According to available data, there are 400 housing units that are connected to the municipal water service, while the remaining 13 used privately drilled wells. The City's water is supplied by local wells, with an elevated storage capacity of 250,000 gallons. The capacity of the water plant is 230,000 gallons. Average consumption is 85,000 gallons per day (gpd), while the peak consumption is 110,000 gpd. The capacity of the municipal water system currently exceeds peak demands. Therefore, the system has the capacity to accommodate additional residential development.

The City of Fredericksburg is served by a primary sewage treatment plant. The average load is 180,000 gpd, with a peak load of 260,000 gpd. The design capacity of the facility is 337,000 gpd.

Again, according to the Census Bureau, of the 413 houses in Fredericksburg, 404 received waste water collection and treatment from City services. The remaining housing units use either a septic tank or cesspool.

The current waste water treatment facility consists of waste management treatment ponds located west of the city limits. The waste water is transported to the ponds with the assistance of five waste water lift stations strategically located throughout the City. The locations of these waste water stations are shown on the Critical Sites Map, *see Map 5.*

The primary providers of utilities in Fredericksburg are listed in the table below.

TABLE B2: FREDERICKSBURG UTILITY PROVIDERS

Electric	Natural Gas	Telephone/Internet	Cable	Water	Sewer	Sanitation
City of Fredericksburg (Bought from Butler County REC)	Black Hills	Windstream	Mediacom	City of Fredericksburg	City of Fredericksburg	City of Fredericksburg/ Jendro Sanitation

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 Fredericksburg evaluated the risk associated with a specific hazard, defined by probability and frequency of occurrence, magnitude, severity, exposures, and consequences. Fredericksburg'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

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, Fredericksburg determined that even though the historical occurrences were low for certain hazards, the probability ranking for future occurrences should be higher.

Table B3 is the analysis scores for the City of Fredericksburg. As shown in the table, the top four hazards for the city are: animal/plant/crop disease, flash flooding, river flooding, and thunderstorm/lighting/hail.

TABLE B3: CITY OF FREDERICKSBURG'S HAZARD RISK ASSESSMENT						
Hazard Rank	**Hazard**	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**Hazard Score**
1	Animal/Plant/Crop Disease	4	2	4	4	**3.4**
2	Flash Flood	3	3	4	4	**3.25**
3	River Flooding	3	3	3	4	**3.1**
4	Thunderstorm/Lightning/Hail	3	2	4	3	**2.85**
5	Tornado/Windstorm	2	3	4	4	**2.8**
5	Infrastructure Failure	2	3	4	4	**2.8**
7	HAZMAT Incident	1	4	4	4	**2.65**
8	Drought	3	2	1	4	**2.5**
9	Severe Winter Storm	3	2	1	3	**2.4**
10	Dam / Levee Failure	1	3	4	4	**2.35**
11	Transportation Incident	2	2	4	1	**2.2**
12	Terrorism	1	2	4	3	**1.95**
13	Extreme Heat	2	2	1	2	**1.85**
13	Grass/Wild Fire	1	2	4	2	**1.85**
15	Earthquake	1	2	4	1	**1.75**
16	Landslide	1	1	4	3	**1.65**
17	Expansive Soils	1	2	1	4	**1.6**
18	Human Disease	1	1	1	4	**1.3**
19	Sinkholes	1	1	1	1	**1**
19	Radiological 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 thunderstorms and lightning, and tornadoes, this hazard was added to the assessment. The following discussion only considers the assets in the community of Fredericksburg.

TABLE B4: CRITICAL FACILITIES IN FREDERICKSBURG

Middle School	Elementary School
Community Center/City Hall	Hillcrest Baptist Church
St. Paul's Lutheran Church	Upham Memorial Library
United Methodist Church	Whispering Willow Assisted Living
Fredericksburg Family Health Clinic	Fire Station
Kerry Ingredients	AVEKA Manufacturing
Farmers Win Co-op	

Source: Community

Identifying the location of critical facilities and designated shelters (see Table B4) in Fredericksburg 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 B4: CITY OF FREDERICKSBURG 100-YEAR FLOODPLAIN PROPERTIES

	# of Buildings	% of Buildings
1.0% Annual Chance Floodplain	23	2.71%
0.2% Annual Chance Floodplain	0	0.00%
Total Unincorporated Out of Floodplain	825	97.29%
Total Unincorporated	848	100.00%

Figures calculated using data from Chickasaw County GIS Department; Parcel data current as of June 2018

According available data, Fredericksburg 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.

Flooding

A facility vulnerable to flooding is normally low, since these structures are not often constructed within the 100-year floodplain. According to the information provided, bridges and roadways was 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.

Approximately 23 structures are located within the 100-year floodplain. Table B4 provides a breakdown for those acres. As shown on *Attachment 5C: Flood Scenario Map of City,* the eastern portion of the community is along the Wapsipinicon River and Plum Creek. As shown on *Attachment 5C: Flood Scenario Map of the City,* this land is along the Wapsipinicon River and Plum Creek. Much of the community is located outside the floodplain. However, flash flooding within the built areas of the community 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.

Tornadoes

As stated on the FEMA website[16], mobile homes are highly vulnerable to tornadoes. Even mobile homes that are tied down, offer little protection from tornadoes.

According to Census, there are no mobile homes located in Fredericksburg. General observation would suggest a recent increase in the number of manufactured homes in the region. This increased popularity has the potential to increase the potential risk of damage to people and property in the community. Currently, no FEMA certified tornado safe shelters are known to exist in the community.

TABLE B5: CITY OF FREDERICKSBURG "AT-RISK" POPULATION

	2010
Total Community Population (2010)	931
Elderly (65 yrs and older)	208
Youth (under 18 yrs old)	201
Householder Living Alone	148
Population Living in Poverty	11.8%
Population in Mobile Homes	0
Group Quarters Population	0

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

The primary reason for the increased popularity of mobile and manufactured homes is affordability. Although HUD regulations and local building codes have increased the safety components of these types of houses significantly in recent history, this affordability has often been accompanied with a reduced level of safety. 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, 1999*).

Vulnerability – Social Assets (Populations)

The social vulnerability assessment also identified how the hazards affect the population of Fredericksburg 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.

The elderly are often listed as an "at risk" population. Iowa currently ranks second in the nation in the percentage of person over the age of 85. The Iowa Department of Elder Affairs, the area agencies on aging, and Iowa State University recently studied the elderly in Iowa. According to their findings, most elderly Iowans own their own homes and few live in group living facilities such as nursing homes, assisted living, or independent living facilities. The study found that over 50 percent of the elderly lived alone. According to 2010 Census data, Fredericksburg has an aging population (208 persons) and the age group of those 80 and over is increasing more rapidly than any other age group. There are 148 persons living alone in the community.

[16] Federal Emergency Management Agency (FEMA), http://www.fema.gov/areyouready/tornadoes.shtm

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 212 people under the age of 18.

In addition, persons living in mobile homes, also known as manufactured housing may also be at risk from tornadoes or high winds. At the time of the 2000 Census, there were 2 manufactured housing units in Fredericksburg. Using the average persons per household of 2.18, there are approximately 5 persons living in manufactured housing units in Fredericksburg.

Finally, persons living in some multi-family housing units may also be at risk, due to the lack of a proper tornado shelter. In 2000, there were 52 multi-family housing units in apartment buildings housing, thus, according to this available data, that is approximately 123 persons living in multi-family housing units.

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. Table B6 lists assets that would be affected in the event affected the unincorporated area of the county. This data was used in the Vulnerability discussion in each of the Hazard Profiles in Section 3.

This information was made available from the Chickasaw County Assessors and Auditors offices and City Clerk. It should be noted however that these dollar amounts do not include gas and electric utility valuations.

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.

National Flood Insurance Program/Repetitive Loss Properties

The city participates in the National Flood Insurance Program (NFIP) and has a flood ordinance in place. As Table B7 shows, there are currently two NFIP policies valued at $455,000 in insurance located within the city.

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. According to FEMA's data, Fredericksburg participates in the National Flood Insurance Program. However, Fredericksburg does not have any repetitive loss

properties.

TABLE B7: NFIP AND REPETITIVE LOSS DATA FOR FREDERICKSBURG

CID #	# of NFIP Policies	NFIP Insurance in Force ($)	Total # of RLB	RLB Insured	# of Active RLB	Total RLB Losses ($)	RLB Losses Insured ($)
190066	2	$455,000	0	0	0	$0	$0

Source: Federal Emergency Management Agency (FEMA); Note: RLB = Repetitive Loss Building; NFIP data current as of 9/30/2016; Repetitive loss data current as of 11/30/2014

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.

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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 identified are as follows:

1. Reduce the chance of and impact of flooding in the community.
2. Take measures to minimize the occurrence of injuries and loss of life due to hazards.
3. Take measures to minimize or eliminate damages that may occur as a result of hazards.
4. Increase the city's ability to respond to natural disasters and man-made hazards.
5. Return to the community to similar or improved pre-event conditions as quickly as possible following a disaster event.
6. Incorporate the City Plan into the proposed Multi-Jurisdictional Plan.
7. Continually re-assess and re-evaluate the plan and mitigation activities.

Current Mitigation Actions

Prevention Mitigation Actions

The City of Fredericksburg has several planning and regulatory ordinances to assist with prevention mitigation. Table B7 summarizes these documents.

TABLE B7: FREDERICKSBURG'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	No	Yes	No	Yes	Yes	Yes

Source: Community

Property Protection Mitigation Actions

The City of Fredericksburg has been a participating member of the National Flood Insurance Program (NFIP) since September 29, 1986. Fredericksburg was originally granted entry into NFIP in 1975 through the emergency program, as amended by the Flood Disaster Protection Act of 1973. The first flood insurance was made available to the general public in October 17, 1975.

Public Education & Awareness Mitigation Actions

The City has a public awareness plan for natural gas. Citizens receive a detailed letter regarding what to do in case of a gas emergency. The City also informs citizens of Iowa One Call.

Natural Resource Protection Mitigation Actions

Fredericksburg currently has no natural resource protection mitigation activities.

Emergency Services Mitigation Actions

Chickasaw County Emergency Management

Fredericksburg works with the Chickasaw County Emergency Management Coordinator, based out of the City of New Hampton, 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 Austen Seely and current contact information is as follows: Chickasaw County Emergency Management Agency, 260 E. Prospect Street, New Hampton, Iowa 50659, (641) 394-2406, email: ema@chickasawcoia.org.

Warning Systems & Communication

The outdoor early warning system consists of one siren that is activated by the County Emergency Management Office. This siren does not have battery backup, and is therefore vulnerable to failure during a power outage. In addition to this warning system, major industry and schools take advantage of weather notifications from the County Sheriff's Department, NOAA Weather Radios, and local media sources.

NOAA Weather Radio broadcasts are also available in the community. NOAA Radio's provide up to the minute weather related alerts. Other locations that warnings and watches can be found are television, Internet, and radio.

Chickasaw 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 Chickasaw 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.

Fire Department

Fire protection is provided for Fredericksburg with a force of 24 volunteer firemen, and the department considers itself fully staffed at this number. Each of the volunteers is HAZMAT certified, with four at Firefighter I status. The fire station is located in the central part of Fredericksburg.

Equipment used by the Fredericksburg Fire Department include the following:

- 1991 Pumper Truck
- 1999 Rescue Truck
- 2012 Gator ATV
- 1995 Tanker Truck
- 2018 Freightliner Tanker w/ pump
- 1999 Pickup
- 2012 Freightliner Pumper

The Fredericksburg Fire Department maintains 28E agreements with the following communities: Sumner, Frederika, Waucoma, Alta Vista, Bassett, Ionia, Lawler, Nashua, New Hampton, and North Washington.

Law Enforcement Department

Police protection is provided by the Chickasaw County Sheriff's Department and the Iowa State Patrol.

HAZMAT

Fredericksburg 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.

Public Works / Streets Department

The Public Works Department is located at 151 West Main Street in Fredericksburg.

Ambulance and First Responders

Chickasaw Ambulance Service provides ambulance service to area hospitals. Chickasaw Ambulance Service is a private company that contracts service with local entities. The company is based out of New Hampton, approximately 9 miles northwest of Fredericksburg.

Chickasaw County Rescue Squad also provides service in Fredericksburg. There are 42 EMT certified individuals who volunteer to respond to emergency calls on a need basis in the county.

Medical Facilities

Fredericksburg is served primarily by one hospital, Mercy Medical Center, located in New Hampton. There are four other hospitals available in a 35-mile radius of the City of Fredericksburg. Furthermore, there is a medical clinic and assisted living facility located within the city limits.

Structural Projects Mitigation Actions

None

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.

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. Based on this analysis, each activity was ranked as High (H), Medium (M)or Low (L). However, not all identified activities are applicable to all jurisdictions and is marked as such in Table B9.

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

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, identified the responsible party (ies) for each activity and finally related each activity to at least one of the five Hazard Mitigation Plan Goals listed above. Table B9 below is the City of Fredericksburg's Implementation Strategy.

TABLE B9: CITY OF FREDERICKSBURG'S IMPLEMENTATION STRATEGY

Priority	Mitigation Action/Program/Project	Associated Hazard	Primary Agency Responsible for Implementation	Status	Estimated Cost (s)	Funding Source
High	Continue to follow monitoring requirements set forth by the Iowa DNR	Human Disease, Animal/Crop/Plant Disease	Public Works	In Process	Minimal	
Med	Consider development of a storm water management program	Human Disease, Animal/Crop/Plant Disease, Sinkholes, Landslides, Flash Flood	Public Works, City Council	Not Started	Minimal	
Med	Educate the public on preparedness, avoidance, and recovery from hazards to reduce the loss of life and property	ALL	City Council, Public Works, Fire Department, County Emergency Management, Red Cross, Law Enforcement	On-Going	Minimal	
Low	Encourage the use of buffer and filter strips	Flash Flood, Human Disease, Animal/Crop/Plant Disease, Landslides, Sinkholes	DNR, Department of Agriculture, Landowners, County Conservation	Not Started	Minimal-Low	
Med	Continue participation in the National Flood Insurance Program	Flash Flood, River Flood	City Council	On-Going	Minimal	

Med	Maintain, enforce, and update Zoning and Floodplain Ordinances as needed	Flash Flood, River Flood	City Council, Floodplain Manager	On-Going	Minimal	
Med	Continue with improvements to the storm sewer system	Flash Flood, River Flood	City Council, Public Works	On-Going	Minimal-High	
Med	Develop and maintain a plan for sandbagging in the community	Flash Flood, River Flood	City Council, Public Works, Fire Department	On-Going	Minimal	
High	Continue to provide necessary training for Fire Department personnel, law enforcement personnel, and ambulance crews for all hazard response	ALL	Fire Department, Law Enforcement, Ambulance Service, City Council	On-Going	Minimal	
High	Maintain existing equipment and purchase needed firefighting equipment	ALL	Fire Department, City Council	In Process	Minimal-High	
High	Maintain existing 28E agreements with surrounding communities for mutual aid assistance	ALL	City Council, County Fire Association, County Sheriff, Ambulance Service, Fire Department	On-Going	Minimal	
Med	Continue to make necessary updates to and enforce the city guidelines for burning	Grass and Wildland Fire, Infrastructure Failure	Fire Department, City Council, Law Enforcement	On-Going	Minimal	
Low	Create an annual fire inspection program for commercial and industrial properties	Infrastructure Failure	Fire Department, City Council	On-Going	Minimal	
Low	Encourage local utility to install surge protectors on major electric lines	Infrastructure Failure	City Utility Provider	On-Going	Minimal-Low	
Med	Continue working with the Northeast Iowa Response Group	Hazardous Materials	City Council, Fire Department, Ambulance Service, Law Enforcement, Northeast Iowa Response Group	On-Going	Minimal	
High	Ensure hazardous materials are reported (Tier II reports) in accordance with applicable laws	Hazardous Materials	City Council	On-Going	Minimal	
Med	Continue to enforce tree inspection and trimming program	Windstorms, Hailstorms, Tornado, Severe Winter Storms, Animal/Crop/Plant Disease, Thunderstorms and Lightning, Infrastructure Failure	Local Utility Provider, Public Works, Private Landowners	On-Going	Minimal	
Med	Work with local utility to develop a program for burying existing power lines	Windstorms, Hailstorms, Tornado, Severe Winter Storms, Thunderstorms and Lightning, Infrastructure Failure	Local Utility Provider, City Council	On-Going	Low-High	
High	Purchase new generators for emergency power in needs of need at the main lift station and well	ALL	City Council	Completed	Low-Moderate	
High	Backup electronic data at City Hall and	ALL	City Departments, Emergency	On-Going	Minimal	

	emergency response locations and store off-site		Response entities			
Med	Continue to enforce snow ordinance	Severe Winter Storms	City Council, Public Works, Law Enforcement	On-Going	Minimal	
High	Establish heating sites for at-risk populations	Severe Winter Storms	Red Cross, City Council, County Emergency Management	On-Going	Minimal	
High	Regularly review and amend fire, medical, and hazardous response standard operating procedures	ALL	Fire Department, Law Enforcement, Ambulance Service	On-Going	Minimal	
Low	Install GPS in all emergency vehicles to speed response routes and monitoring location of said vehicles	ALL	Fire Department, Law Enforcement, E911 Board, City Council	Not Started	Low-Moderate	
Low	Maintain a list of available translators in the community	ALL	City Council, Local Residents	Not Started	Minimal	
Med	Evaluate current terrorism mitigation efforts	Terrorism	City Council, Public Works, Fire Department, Law Enforcement, Ambulance Service, County Emergency Management	On-Going	Minimal	
Med	Increase security measures taken to protest and secure critical facilities in community	Terrorism	City Council, Public Works	Not Started	Minimal-Low	
Med	Encourage the installation of back-flow valves in structures to prevent contamination of water supply	Human Disease	City Council, Public Works, County Emergency Management	On-Going	Minimal-Low	
High	Continue community cooperation with Iowa One Call	Infrastructure Failure	City Council, Local Residents, Iowa One Call, Contractors	On-Going	Minimal	
High	Encourage immunizations and vaccinations	Human Disease	Public Health Department	On-Going	Minimal	
Med	Educate and train city personnel on all hazards that could impact the community	ALL	City Council, County Emergency Management	On-Going	Minimal	
Med	Develop a NOAA Weather Radio awareness program	ALL	County Emergency Management	Not Started	Minimal	
Low	Maintain access to Geiger counters for first responders	Radiological Incident	County Emergency Management	Not Started	Minimal	
Med	Update and install improved signage along roadways, as it become necessary	Transportation Incident	City Council, Iowa DOT, Public Works, Chickasaw County Engineering Department	On-Going	Minimal	
Med	Develop a tornado safe room awareness program	Tornado, Windstorms	County Emergency Management	On-Going	Minimal	
High	Maintain weather spotter training	Tornado, Windstorms	Fire Department, County Emergency Management	On-Going	Minimal	
Med	Develop and maintain a plan for rationing water use within the community	Drought	City Council	On-Going	Minimal	

High	Establish local cooling sites for at-risk populations	Extreme Heat	City Council, County Emergency Management	On-Going	Minimal	
Med	Encourage citizens to plant shade trees near dwellings	Extreme Heat	City Council, Private Property Owners	Not Started	Minimal	
Med	Update Emergency Response Plan as needed	ALL	City Council, Fire Department, Law Enforcement, Ambulance Service, County Emergency Management	Not Started	Minimal	
High	Develop and update as needed, a continuity of operations plan	ALL	Fire Department, Law Enforcement, Ambulance Service, Public Works, City Council	On-Going	Minimal	
High	Develop a list of structures to be used as gathering sites in the event of an emergency situation	ALL	City Council, Law Enforcement, County Emergency Management	On-Going	Minimal	
High	Continue to follow monitoring requirements set forth by the Iowa DNR	Human Disease, Animal/Crop/Plant Disease	Public Works	In Process	Minimal	

APPENDIX C: CITY OF IONIA

COMMUNITY PROFILE

Location

Ionia is located in southwest Chickasaw County, in the northeastern quadrant of Iowa, at latitude 43.0341 N x longitude 92.4560 W and elevations averaging 1,148 feet.

Natural Environment

Because Ionia is far away from the moderating influence of a large body of water, a wide variation is experienced in both temperature and precipitation during the four distinct seasons. Temperatures in the community range from an average winter temperature of 19.4 degrees Fahrenheit to an average summer temperature of 70.2 degrees Fahrenheit.

Precipitation also varies substantially in a climate such as Ionia. The two major types of precipitation to occur in the community are rain and snow. Average annual rainfall is 32.9 inches, while average snowfall is approximately 35.5 inches. Summer precipitation results primarily from thunderstorm activity, although longer less intense rains are not uncommon in the area. Other forms of precipitation recorded in the area include snow, hail, ice pellets, sleet, dew, and vapor condensation due to low drifting cloud formations (fog).

Originally the land surrounding and including Ionia was comprised of mixed prairie grasses and some deciduous forest. The forest was adjacent to established waterways. The original cover has been reduced to make room for additional cropland and construction of houses and businesses in suitable areas.

TABLE C1: CITY OF IONIA DEMOGRAPHICS

Government Framework	Mayor – City Council
General Population, 2010 Census	
Total Population	291
Median Age	36.8
At-Risk Population, <18 Years	88
At-Risk Population, >64 Years	45
Total Males	147
Total Females	144
One Race-White	290
Black of African American	0
American Indian and Alaskan Native	0
Asian	0
Two or More Races	0
Housing Characteristics, 2012-2016 ACS	
Total Housing Units	158
Total Owner-Occupied Housing Units	122
Total Renter-Occupied Housing Units	24
Total Vacant Housing Units	12
Total 1-Unit Detached and Attached Structures	129
Total 2, 3, and 4-Unit Structures	7
Total 5 to 19-Unit Structures	8
Total Mobile Homes	2
Year Majority of Housing Units were Built	1939 or earlier (37.3%)
Average Household Size	2.45
Average Family Size	3.09

Tree cover can also be found throughout the community in residential areas, parks, and cemeteries. These remaining trees contribute to the aesthetics of the community and are viewed as an asset.

According to the Chickasaw County Soil Survey issued in 1996 by the United State Department of Agriculture Soil Conservation Service, the soil in Ionia is primarily of the Saude Series. The Saude Series "consists of well drained soils on stream terraces. These soils formed in 24 to 32 inches of loamy alluvial

deposits and the underlying sandy and gravelly glacial outwash. Permeability is moderate in the upper part and very rapid in the lower part. The native vegetation is mixed prairie grasses. Slopes range from 0 to 5 percent."

Ionia has no bodies of water in or near its city limits.

Demographics

Population

Ionia's demographic data is outlined in Tables C1 and C1.1. In the recent 2010 U.S. Census, Ionia's population grew to 291, an increase of 5.05 percent over ten years. The previous U.S. Census, taken in 2000, recorded a population figure of 277 for Ionia. Much of the data included in the tables are from the 2010 U.S. Census and the 2012-2016 ACS.

TABLE C1.1: CITY OF IONIA DEMOGRAPHICS	
Economics Characteristics, 2012-2016 ACS	
Population 16 years and over	247
Population In Labor Force (16 yrs and over)	183
Persons Employed	178
Persons Unemployed	5
Persons Employed in Management, Business, Science, and Arts Occupations	41
Persons Employed in Service Occupations	30
Persons Employed in Sales and Office Occupations	29
Persons Employed in Natural Resources, Construction, and Maintenance Occupations	44
Persons Employed in Production, Transportation, and Material Moving Occupations	34
Median Household Income	$48,750
Median Family Income	$49,375
Percent of Persons < 18 yrs. Below Poverty Level	0.0%
Percent of Persons 18-64 Yrs. Below Poverty Level	8.7%
Percent of Persons >65 Yrs. Below Poverty Level	14.6%
Social Characteristics, 2012-2016 ACS	
School Enrollment (3 yrs and over)	89
Nursery School, Preschool	7
Kindergarten and Elementary School (grades 1-8)	42
High School (grades 9-12)	19
College or Graduate School	18
Education Attainment: Population 25 Years and Over	216
Less than High School Graduate	12
High School Graduate (includes equivalency)	126
Some College, Associate's Degree	58
Bachelor's Degree or Higher	20

Community Services

The community of Ionia relies on their municipally-owned public water system. The system is supplied by two wells. The first well is 280 feet deep and was built in 1983. It is equipped with a submersible pump to produce approximately 100 GPM. The second well is 20 feet deep and was constructed in 1950. This well also has a submersible pump that produces water at a rate of approximately 300 GPM. The pressure and storage of the water from this well is provided by a 3,000-gallon pressure tank located in the second well house. The city doesn't have an elevated storage tower. Instead there is a 75,000-gallon storage tank.

Table C2 shows the primary utility providers for the city.

TABLE C2: IONIA UTILITY PROVIDERS

Electric	Natural Gas	Telephone/Internet	Cable	Water	Sewer	Sanitation
Alliant Energy	Black Hills	Windstream	None	City	City	Jendro Sanitation

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 Ionia evaluated the risk associated with a specific hazard, defined by probability and frequency of occurrence, magnitude, severity, exposures, and consequences. Ionia'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

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, Ionia determined that even though the historical occurrences were low for certain hazards, the probability ranking for future occurrences should be higher.

Table C3 is the analysis scores for the City of Ionia. As shown in the table, the top four hazards for the city are: transportation incident, thunderstorm/lightning/hail, grass/wild fire, and severe winter storm.

TABLE C3: CITY OF IONIA HAZARD RISK ASSESSMENT						
Hazard Rank	**Hazard**	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**Hazard Score**
1	Transportation Incident	1	4	4	4	**2.65**
2	Thunderstorm/Lightning/Hail	2	2	4	2	**2.3**
2	Grass/Wild Fire	2	2	4	2	**2.3**
4	Severe Winter Storm	2	2	2	3	**2.1**
5	HAZMAT Incident	1	2	4	4	**2.05**
6	Tornado/Windstorm	1	1	4	4	**1.75**
7	Flash Flood	1	1	4	3	**1.65**
8	Drought	1	1	1	4	**1.3**
9	Animal/Plant/Crop Disease	1	1	1	1	**1**
9	River Flooding	1	1	1	1	**1**
9	Infrastructure Failure	1	1	1	1	**1**
9	Dam / Levee Failure	1	1	1	1	**1**
9	Terrorism	1	1	1	1	**1**
9	Extreme Heat	1	1	1	1	**1**
9	Earthquake	1	1	1	1	**1**
9	Landslide	1	1	1	1	**1**
9	Expansive Soils	1	1	1	1	**1**
9	Human Disease	1	1	1	1	**1**
9	Sinkholes	1	1	1	1	**1**
9	Radiological 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. The following discussion only considers the assets in the community only.

TABLE C3: CRITICAL FACILITIES IN IONIA	
Water Supply	Pump Stations
Sewer System	Fire Department/ Community Building

Source: Community

Identifying the location of critical facilities and designated shelters (see TableC3) in Ionia 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 6D* illustrates the location of identified critical facilities throughout the city.

According to available data, Ionia is projected to see an increase in population over the next thirty years. This population increase most likely 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.

TABLE C4: CITY OF IONIA 100-YEAR FLOODPLAIN PROPERTIES		
	# of Buildings	**% of Buildings**
1.0% Annual Chance Floodplain	0	0.00%
0.2% Annual Chance Floodplain	0	0.00%
Total Unincorporated Out of Floodplain	269	100.00%
Total Unincorporated	269	100.00%

Figures calculated using data from Chickasaw County GIS Department; Parcel data current as of June 2018

Flooding

The City of Ionia is not impacted by flooding. For reference, a facility vulnerable to flooding is normally low, since these structures are not often 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.

According to the data provided by INRCOG and Chickasaw County, there are no structures located within the 100-year floodplain. See *Attachment 5D: Flood Scenario Map of the City* and Table C4.

Tornadoes

As stated on the FEMA website[17], mobile homes are highly vulnerable to tornadoes. Even mobile homes that are tied down, offer little protection from tornadoes.

According to Census information, there are 2 mobile homes located in Ionia, but according to physical counts, there are no mobile homes or multiple family housing in Ionia. General observation would suggest a recent increase in the number of manufactured homes in the region. This increased popularity has the potential to increase the potential risk of damage to people and property in the community. Currently, no FEMA certified tornado safe shelters are known to exist in the community.

The primary reason for the increased popularity of mobile and manufactured homes is affordability. Although HUD regulations and local building codes have increased the safety components of these types of houses significantly in recent history, this affordability has often been accompanied with a reduced level of safety. 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, 1999*).

Vulnerability – Social Assets (Populations)

The social vulnerability assessment identified how the hazards affect the population of Ionia 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 C5 presents an overview of the at-risk population in Ionia according to information retrieved from the 2010 U.S. Census and Iowa Data Center. According to Table C5, 15.4% of Ionia residents are 65 years and older. There are no persons in the community living in group quarters.

TABLE C5: CITY OF IONIA "AT-RISK" POPULATION

	2010
Total City Population (2010)	291
Elderly (65 yrs and older)	45
Youth (under 18 yrs old)	88
Householder Living Alone	39
Population Living in Poverty	6.3%
Population in Mobile Homes	5
Group Quarters Population	0

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

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 30.2% of the city's total population under the age of 18.

[17] Federal Emergency Management Agency (FEMA), http://www.fema.gov/areyouready/tornadoes.shtm

In addition, persons living in mobile homes, also known as manufactured housing may also be at risk from tornadoes or high winds brought on by thunderstorms. At the time of the 2010 Census, there were 2 mobile homes in the city. Using the 2010 Census sampling data, there are 5 people residing in mobile homes in Ionia.

Flooding

The City of Ionia is not impacted by flooding.

Vulnerability – Estimating Potential Property Losses

Valuations are an important component of hazard mitigation planning insomuch 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 Ionia are available from the County Assessors and Auditors offices.

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.

National Flood Insurance Program/Repetitive Loss Properties

The city does not participate in the National Flood Insurance Program (NFIP) and has no flood ordinance in place. As Table C7 shows, there are zero NFIP policies in place within the city.

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 is zero repetitive loss property in the city.

River flooding is the most common cause of repetitive loss in Chickasaw County.
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.

MITIGATION STRATEGY

Hazard Mitigation Plan Goals

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 identified are as follows:

1. Reduce the chance of and impact of flooding in the community.
2. Take measures to minimize the occurrence of injuries and loss of life due to hazards.
3. Take measures to minimize or eliminate damages that may occur as a result of hazards.
4. Increase the city's ability to respond to natural disasters and man-made hazards.
5. Return to the community to similar or improved pre-event conditions as quickly as possible following a disaster event.
6. Incorporate the City Plan into the proposed Multi-Jurisdictional Plan.
7. Continually re-assess and re-evaluate the plan and mitigation activities.

Current Mitigation Actions

Prevention Mitigation Actions

The community of Ionia has a building code and no floodplain ordinance.

Table C7 summarizes Ionia's preventive mitigation actions.

TABLE C7: CURRENT PLANNING AND REGULATORY DOCUMENTS FOR IONIA

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	RR	No	No	No	Yes	Yes

Source: City, Note: RR=Restricted Residential

Property Protection Mitigation Actions

The community uses storm drains to eliminate and/or reduce the amount of water runoff and flash flooding.

Public Education and Awareness Mitigation Actions

City employees, including Mayor and Council members are educated regularly so the public can be properly informed of disaster events. The Fire Department participates in tornado spotting classes and has programs for children to learn about tornadoes and fires.

Emergency Services Mitigation Actions

Chickasaw County Emergency Management

Fredericksburg works with the Chickasaw County Emergency Management Coordinator, based out of the City of New Hampton, 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 Austen Seely and current contact information is as follows: Chickasaw County Emergency Management Agency, 260 E. Prospect Street, New Hampton, Iowa 50659, (641) 394-2406, email: ema@chickasawcoia.org.

Warning System and Communication

Chickasaw 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 Chickasaw 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.

Law Enforcement

Chickasaw County Sheriff and the Iowa State Patrol provide police protection to the City of Ionia.

Fire Protection

Fire protection is provided by the Chickasaw Township Dire District with a force of 23 volunteer firemen. The District has the following equipment:

- 2000 pumper truck (1,500 GPM)
- 2006 tanker pumper (500 GPM)
- 2011 grass truck and a ATV for grass fires and wooded areas
- 2000 equipment truck

Ambulance
The community is serviced by the Chickasaw Ambulance in New Hampton.

Medical Facilities
The community is serviced by the Mercy Medical Center in New Hampton.

HAZMAT
Ionia 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 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.

Public Works / Street Department
The Public Works and Street Department is done by one City employee who does repairs to streets and facilities.

Natural Resource Protection Mitigation Actions
Ionia does not have nor done any natural resource protection mitigation actions.

Structural Projects Mitigation Actions
Ionia does not have nor done any structural projects.

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.

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. Based on this analysis, each activity was ranked as High (H), Medium (M)or Low (L). However, not all identified activities are applicable to all jurisdictions and is marked as such in Table C10.

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

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, identified the responsible party (ies) for each activity and finally related each activity to at least one of the five Hazard Mitigation Plan Goals listed above. Table C9 below is the City of Ionia's Implementation Strategy.

TABLE C9: CITY OF IONIA'S IMPLEMENTATION STRATEGY						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard**	**Primary Agency Responsible for Implementation**	**Date for Completion**	**Estimated Cost (s)**	**Funding Source**
	Have sandbags on hand and train firemen	Flash Flood	City Council, Fire Department	Completed	Minimal	
	Keep people trained in weather spotting	Tornadoes	Fire Department, County Emergency Management	On-Going	Minimal	
	First responders trained to handle all hazards	ALL	Fire Department, Ambulance Service, County Emergency Management, City Council	On-Going	Minimal	
	Fire Department training	ALL	Fire Department, City Council	On-Going	Minimal	
	Continue to work with County and their programs	Animal/Crop/Plant Disease	City Council, County Departments	On-Going	Minimal	
	Continue to work with the County Sheriff's office	Terrorism	City Council, County Sheriff	On-Going	Minimal	
	Continue to improve (repair as needed) City Hall and Sewer System	Infrastructure Failure	City Council	Completed (for now)	Minimal-High	
	Continue enforcing building codes	ALL	City Council	On-Going	Minimal	
	Continue to clean out storm drains	ALL	City Council	On-Going	Minimal-Low	
	Educate public on hazards	ALL	City Council & Fire Department	On-Going	Minimal	
	Maintain all mutual aid agreements	ALL	City Council & Fire Department	On-Going	Minimal	
	Update Emergency Response Plan	ALL	City Council & Fire Department	In-progress	Minimal	

APPENDIX D: CITY OF LAWLER

COMMUNITY PROFILE

Location

Lawler is located in east-central Chickasaw County, in the northeastern quadrant of Iowa, at latitude 43.0696 N x longitude 92.1558 W. The majority of Lawler lies at an elevation of between 1,070 and 1,140 feet.

History

The City of Lawler was founded in 1871 after the establishment of a depot on the Chicago, Milwaukee, and St. Paul Railroad. In the early years of the community, Lawler was the country's largest shipper of timothy, a native grass. Early growth led to the development of a hotel, pharmacy, grocery, hardware store, dry goods store, general merchandisers, agricultural implement dealer, wagon maker, blacksmith, shoemaker, newspaper, and a carpentry shop. Shortly thereafter a post office was established and elections were held for the first mayor and council. The City of Lawler was no stranger to disaster. The community suffered major fires in 1877, 1879, and 1881. Each time the people of Lawler rebuilt their town.

TABLE D1: CITY OF LAWLER DEMOGRAPHICS

Government Framework	Mayor – City Council
General Population, 2010 Census	
Total Population	439
Median Age	44.3
At-Risk Population, <18 Yrs	90
At-Risk Population, >64 Yrs	96
Total Males	215
Total Females	224
One Race-White	407
Black of African American	1
American Indian and Alaskan Native	0
Asian	0
Two or More Races	1
Housing Characteristics, 2012-2016 ACS	
Total Housing Units	191
Total Owner-Occupied Housing Units	142
Total Renter-Occupied Housing Units	30
Total Vacant Housing Units	19
Total 1-Unit Detached and Attached Structures	145
Total 2, 3, and 4-Unit Structures	15
Total 5 to 19-Unit Structures	10
Total Mobile Homes	2
Year Majority of Housing Units were Built	1939 or earlier (39.4%)
Average Household Size	2.2
Average Family Size	2.77

Natural Environment

The terrain on which Lawler is built is generally the undulating topography that characterizes the agricultural areas of northeast Iowa. The highest point in the community lies at approximately 1,140 feet above sea level and is located west of Mc Hugh Street between Grove Street and Spring Street. From this peak, the elevation of the City drops towards Crane Creek northeast of the community. The lowest elevation in the community is located in along Crane Creek at approximately 1,070 feet above sea level.

The surface water system in the City of Lawler is comprised predominantly of small local streams. The Little Turkey River is located northeast of Lawler. Lawler falls into the Turkey watershed. Crane Creek, which flows northeast of Lawler, is the primary drainage way for the community. Crane Creek eventually merges with the Little Turkey River southeast of Lawler.

Lawler's climate is not unlike those of most cities in the Midwest. Lawler has a climate of continental character. Because Lawler is far away from the moderating influence of a large body of water, a wide variation is experienced in both temperature and precipitation during the four distinct seasons. Temperatures in Lawler range from an average temperature of 14.7 degrees Fahrenheit in January to an average summer temperature of 72.2 degrees Fahrenheit in July.

Precipitation also varies substantially in a climate such as Lawler's. The two major types of precipitation to occur in Lawler are rain and snow. Average annual precipitation for Lawler is 35.3 inches. Summer precipitation results primarily from thunderstorm activity, although longer less intense rains are not uncommon in the area. Other forms of precipitation recorded in the area include snow, hail, ice pellets, sleet, dew, and vapor condensation due to low drifting cloud formations (fog).

Originally the land surrounding and including Lawler was comprised of tall grass prairie and deciduous forest. The forest was adjacent to established waterways such as Crane Creek. The original cover has been reduced to make room for additional cropland and construction of houses and businesses in suitable areas.

Tree cover can also be found throughout the community in residential areas, parks, and cemeteries. These remaining trees contribute to the aesthetics of the community and are viewed as an asset.

TABLE D1.1: CITY OF LAWLER DEMOGRAPHICS

Economics Characteristics, 2012-2016 ACS	
Population 16 years and over	271
Population In Labor Force (16 yrs and over)	181
Persons Employed	176
Persons Unemployed	5
Persons Employed in Management, Business, Science, and Arts Occupations	51
Persons Employed in Service Occupations	15
Persons Employed in Sales and Office Occupations	51
Persons Employed in Natural Resources, Construction, and Maintenance Occupations	28
Persons Employed in Production, Transportation, and Material Moving Occupations	31
Median Household Income	$48,750
Median Family Income	$61,250
Percent of Persons < 18 yrs. Below Poverty Level	13.2%
Percent of Persons 18-64 Yrs. Below Poverty Level	12.0%
Percent of Persons >65 Yrs. Below Poverty Level	6.3%
Social Characteristics, 2012-2016 ACS	
School Enrollment (3 yrs and over)	37
Nursery School, Preschool	8
Kindergarten and Elementary School (grades 1-8)	11
High School (grades 9-12)	1
College or Graduate School	11
Education Attainment: Population 25 Years and Over	245
Less than High School Graduate	25
High School Graduate (includes equivalency)	100
Some College, Associate's Degree	82
Bachelor's Degree or Higher	38

Demographics

Population

Lawler's demographic data is outlined in Tables D1 and D1.1. In the recent 2010 U.S. Census, Lawler's population declined to 439 a decrease of 5.7% percent over ten years. The previous U.S. Census, taken in 2000, recorded a population figure of 461 for Lawler. Much of the data included in the tables are from the 2010 U.S. Census and the 2012-2016 ACS.

Community Services

The City of Lawler has a municipal water system with a 50,000 gallon storage capacity. The community's water is taken from two local wells, and supplies water to approximately 250 local hookups. The system has an average use of approximately 42,000 gallons per day with a peak demand of 48,000 gallons. It provides water for fire protection within the City of Lawler as well protection in rural areas.

The City of Lawler's wastewater is treated through a lagoon system. These treatment lagoons are located northeast of the City, on the opposite side of Crane Creek. Treated water is then drained into Crane Creek, a process that is allowed only by permit. According to the City, the existing system can handle a population of approximately 700 persons. The 2010 Census showed that Lawler had a population of 439 persons.

Table D2 shows the primary utility providers for the city.

TABLE D2: LAWLER UTILITY PROVIDERS

Electric	Natural Gas	Telephone/Internet	Cable	Water	Sewer	Sanitation
City of Lawler	Black Hills	Iowa Telecom	None	City of Lawler	City of Lawler	Jendro (Contract)

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 Lawler evaluated the risk associated with a specific hazard, defined by probability and frequency of occurrence, magnitude, severity, exposures, and consequences. Lawler'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

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, Lawler determined that even though the historical occurrences were low for certain hazards, the probability ranking for future occurrences should be higher.

Table D3 is the analysis scores for the City of Lawler. As shown in the table, the top four hazards for the city are: Transportation Incident, Thunder/Lightning/Hail, Tornado/Windstorm, and Flash Flood.

TABLE D3: CITY OF LAWLER HAZARD RISK ASSESSMENT						
Hazard Rank	**Hazard**	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**Hazard Score**
1	Transportation Incident	3	3	4	1	**2.95**
2	Thunderstorm/Lightning/Hail	3	3	1	3	**2.7**
2	Tornado/Windstorm	3	3	1	3	**2.7**
4	Flash Flood	3	2	3	2	**2.6**
5	Severe Winter Storm	2	2	2	3	**2.1**
6	HAZMAT Incident	2	2	2	2	**2**
7	Animal/Plant/Crop Disease	1	1	1	4	**1.3**
8	Dam / Levee Failure	1	1	1	3	**1.2**
9	Drought	1	1	1	1	**1**
9	Earthquake	1	1	1	1	**1**
9	Expansive Soils	1	1	1	1	**1**
9	Extreme Heat	1	1	1	1	**1**
9	Grass/Wild Fire	1	1	1	1	**1**
9	Human Disease	1	1	1	1	**1**
9	Infrastructure Failure	1	1	1	1	**1**
9	Landslide	1	1	1	1	**1**
9	Radiological Incident	1	1	1	1	**1**
9	River Flooding	1	1	1	1	**1**
9	Sinkholes	1	1	1	1	**1**
9	Terrorism	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.

TABLE D3: CRITICAL FACILITIES IN LAWLER	
Bank of Iowa	Hugeback Funeral Home
American Heartland Inc.	Lawler Library
Kohlmeyer, Inc	Sandean Inc.
Mt. Carmel Church	Mt. Carmel CCD Building
Lawler Municipal Hall	Hole in the Wall
Brite Spot	Fire Star Coop
Cash Inc.	Lawler Fire Station
Source: Community	

Identifying the location of critical facilities and designated shelters (City Hall is the only designated shelter) in Lawler is important in order to assess their vulnerability to hazards. These critical facilities are important to the operation of a community, 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 6E* illustrates the location of identified critical facilities throughout Lawler.

According to available data, Lawler 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.

Flooding

A facility vulnerable to flooding is normally low, since these structures are not often constructed within the 100-year floodplain. According to the information provided, bridges and roadways was 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.

According to the data provided by INRCOG and Chickasaw County (see Table D4), there are 20 buildings located within the 100-year floodplain. See *Attachment 5E: Flood Scenario Map of the City.*

TABLE D4: CITY OF LAWLER 100-YEAR FLOODPLAIN PROPERTIES		
	# of Buildings	**% of Buildings**
1.0% Annual Chance Floodplain	20	4.18%
0.2% Annual Chance Floodplain	0	0.00%
Total Unincorporated Out of Floodplain	458	95.82%
Total Unincorporated	478	100.00%
Figures calculated using data from Chickasaw County GIS Department; Parcel data current as of June 2018		

Tornadoes

As stated on the FEMA website[18], mobile homes are highly vulnerable to tornadoes. Even mobile homes that are tied down, offer little protection from tornadoes.

According to Census information, there are 8 mobile homes (also referred to as manufactured homes) located in the Lawler. According to 2010 US Census, the average household size in the city was 2.20 persons. Using this information, it is estimated that 18 persons live in mobile homes. General observation would suggest a recent increase in the number of manufactured homes in the area. This increased popularity has the potential to increase the potential risk of damage to people and property in the community. Currently, no FEMA certified tornado safe shelters are known to exist in the community.

The primary reason for the increased popularity of mobile and manufactured homes is affordability. Although HUD regulations and local building codes have increased the safety components of these types of houses significantly in recent history, this affordability has often been accompanied with a reduced level of safety. 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, 1999*).

Vulnerability – Social Assets (Populations)

The social vulnerability assessment identified how the hazards affect the population of Lawler 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.

According to Table D5, 21.8% of residents are 65 years and older. There are no persons living in group quarters.

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 20.5% of the city's total population under the age of 18.

In addition, persons living in mobile homes, also known as manufactured housing may also be at risk from tornadoes or high winds. It is estimated that there are 8 mobile homes in the city. Based on the

TABLE D5: CITY OF PLAINFIELD "AT-RISK" POPULATION

	2010
Total City Population (2010)	439
Elderly (65 yrs and older)	96
Youth (under 18 yrs old)	90
Householder Living Alone	67
Population Living in Poverty	9.6%
Population in Mobile Homes	18
Group Quarters Population	0

Source: U.S. Census, 2010, 2012-2016 ACS and Iowa Data Center

[18] Federal Emergency Management Agency (FEMA), http://www.fema.gov/areyouready/tornadoes.shtm

average household size (2.20) it is estimated that there are approximately 18 persons living in mobile homes.

Flooding

Portions of Chickasaw County are highly vulnerable to floods, especially along the Crane Creek in Lawler. Flooding puts the entire population at some level of risk, whether through the flooding of their homes, businesses, or places of employment, or the road, sewer, and water infrastructure that serve them daily. High floodwaters can devastate homeowners with property damage, property loss, and extensive, time-consuming cleanup. Secondary effects caused by flooding can add to the property damage. Power loss can leave citizens without heat or air conditioning for extended periods of time. The transportation infrastructure of the community can be impacted by flooding events, which can endanger citizens attempting to travel or evacuate the area, as well as leave those remaining without goods and services.

As shown on the city's Flood Plain Map (Map 3I) only the far eastern edge of the city is within a floodplain.

During high rain and flood events, the city takes on water via runoff, which drains to the Crane Creek. This is particularly problematic when the water table is high due to flooding. When this occurs, water cannot properly drain.

Vulnerability – Estimating Potential Property Losses

Valuations are an important component of hazard mitigation planning insomuch 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 Lawler are available from the County Assessors and Auditors offices. City of Lawler's property valuations are in Table D6.

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.

National Flood Insurance Program/Repetitive Loss Properties

The city of Lawler participates in the National Flood Insurance Program (NFIP) and has a flood ordinance in place. As Table D7 shows, there are currently six NFIP policies in place within the city.

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 is zero repetitive loss property in the city. River flooding is the most common cause of repetitive loss in Chickasaw County. Table D7 illustrates the number of repetitive loss properties for the city.

TABLE D7: NFIP AND REPETITIVE LOSS DATA FOR LAWLER

CID #	# of NFIP Policies	NFIP Insurance in Force ($)	Total # of RLB	RLB Insured	# of Active RLB	Total RLB Losses ($)	RLB Losses Insured ($)
190067	6	$951,500	0	0	0	$0	$0

Source: Federal Emergency Management Agency (FEMA); Note: RLB = Repetitive Loss Building; NFIP data current as of 9/30/2016; Repetitive loss data current as of 11/30/2014

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.

River flooding is the most common cause of repetitive loss in Chickasaw County. The City of Lawler participates in the NFIP has zero repetitive loss property.

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 identified are as follows:

1. Reduce the chance of and impact of flooding in the community.
2. Take measures to minimize the occurrence of injuries and loss of life due to hazards.
3. Take measures to minimize or eliminate damages that may occur as a result of hazards.
4. Increase the city's ability to respond to natural disasters and man-made hazards.
5. Return to the community to similar or improved pre-event conditions as quickly as possible following a disaster event.
6. Incorporate the City Plan into the proposed Multi-Jurisdictional Plan.
7. Continually re-assess and re-evaluate the plan and mitigation activities.

Current Mitigation Actions

Prevention Mitigation Actions

Table D8 summarizes Lawler's preventive mitigation actions.

TABLE D8: CURRENT PLANNING AND REGULATORY DOCUMENTS FOR LAWLER

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, (Restricted Residence)	Yes	Yes	Yes	No	Yes

Source: Local Communities, Note: RR=Restricted Residential

Property Protection Mitigation Actions

The City of Lawler has encountered a number of flooding events, which have resulted in property damage and the loss of a bridge during one flooding event. The City established a levee on the eastern edge of town designed to keep the Crane Creek within its banks and protect the local park on that side of the community. To date, sandbagging has also been successful in preventing major flooding from Crane Creek.

Public Education and Awareness Mitigation Actions

Lawler currently has in place E911 Emergency Assistance. Other communications used by city personnel include pagers, radios, and cellular telephones. Radio, television, cellular telephones, landline telephones, newspapers, warning sirens, and NOAA Radio Service are available to the public at large.

Emergency Services Mitigation Actions

Chickasaw County Emergency Management

Lawler works with the Chickasaw County Emergency Management Coordinator, based out of the City of New Hampton, 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 Austen Seely and current contact information is as follows: Chickasaw County Emergency Management Agency, 260 E. Prospect Street, New Hampton, Iowa 50659, (641) 394-2406, email: ema@chickasawcoia.org.

Warning Systems & Communication

The outdoor early warning system consists of one siren that is activated either by the Sheriff's Department or the Emergency Management Office. The existing siren was installed in 2011 and has a battery backup.

NOAA Weather Radio broadcasts are also available in the community. NOAA Radio's provide up to the minute weather related alerts. Other locations that warnings and watches can be found are television, Internet, and radio.

Chickasaw 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 Chickasaw 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.

Fire Department

Fire protection is provided for Lawler with a force of 12 volunteer firemen, and the department considers itself fully staffed at this number. Each of the volunteers is HAZMAT certified, all 12 with Firefighter I status. The fire station is located in the central part of Lawler.

Equipment used by the Lawler Fire Department include the following:

- 1975 Ambulance
- 1982 Chevy Truck/Grass Buggy
- 1985 Chevy Blazer
- 1995 Ford/Central States Pumper
- 2007 Fouts Tanker with Pump
- 2016 Peirce Tanker with Pump
- 2001 Ford F350 Grass Buggy

Law Enforcement

In the past, the City of Lawler has had its own Police Department. However, police protection in Lawler is currently provided by the Chickasaw County Sheriff's Department and the Iowa State Patrol.

Ambulance

Chickasaw Ambulance Service provides ambulance service to area hospitals. Chickasaw Ambulance Service is a private company that contracts service with local entities. The company is based out of Fredericksburg, approximately 8 miles west of Lawler.

Chickasaw County Rescue Squad also provides service in Lawler. There are 42 EMT certified individuals who volunteer to respond to emergency calls on a need basis in the county.

Medical Facilities

The nearest medical center, Mercy Medical Center, is located in New Hampton, approximately 8 miles west. There are four other hospitals available in a 35-mile radius of the City of Lawler.

HAZMAT

Lawler 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.

Natural Resource Protection Mitigation Actions

Lawler does not have nor done any natural resource protection mitigation actions.

Structural Projects Mitigation Actions

Lawler 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.

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. Based on this analysis, each activity was ranked as High (H), Medium (M)or Low (L). However, not all identified activities are applicable to all jurisdictions and is marked as such in Table D9.

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

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, identified the responsible party (ies) for each activity and finally related each activity to at least one of the five Hazard Mitigation Plan Goals listed above. Table D9 below is the City of Lawler's Implementation Strategy.

TABLE D9: CITY OF LAWLER'S IMPLEMENTATION STRATEGY

Priority	Mitigation Action/Program/Project	Associated Hazard	Primary Agency Responsible for Implementation	Date for Completion	Estimated Cost (s)	Funding Source
Medium	Continue to follow monitoring requirements set forth by the Iowa DNR	Human Disease	Public Works	On-Going	Minimal	
Medium	Consider the development of a storm water management program	Flash Flood, River Flood	Public Works, City Council	On-Going	Minimal	
Low	Continue to participation in the National Flood Insurance Program	Flash Flood, River Flood	City Council	On-Going	Minimal	
Low	Widen and clear the southwest drainage channel of Crane Creek and widen Brush Street culvert	Flash Flood, River Flood	City County, Iowa Homeland Security and Emergency Management, FEMA	Completed	Moderate	
Medium/High	Construct a berm and clear growth and debris in northwest drainage channel of Crane Creek	Flash Flood, River Food	City County, Iowa Homeland Security and Emergency Management, FEMA	Long-Term	Moderate – High	
Low	Maintain, enforce, and update Zoning and Floodplain Ordinances as needed	Flash Flood, River Flood	City Council, Floodplain Manager	On-Going	Minimal	
Low	Continue to enforce and update, as needed, the 2012 Building Code	ALL	City Council	On-Going	Minimal	
Low	Ensure proper training and	Flash Flood, River Flood	City Council, Floodplain	On-Going	Minimal	

	certification of Floodplain Manager		Manager			
Low	Flood proof structures in the floodplain	Flash Flood, River Flood	City Council, Homeowners, Floodplain Manager, FEMA	On-Going	Low – Moderate	
Medium	Continue to provide necessary training to Fire Department and other emergency response personnel	ALL	Fire Department, Ambulance Service, County Emergency Management	On-Going	Minimal	
Medium	Maintain existing and purchase new firefighting equipment as needed	ALL	Fire Department, City Council	On-Going	Minimal-Moderate	
Medium	Maintain existing mutual aid agreements with surrounding communities for mutual aid emergency assistance	ALL	City Council, County Fire Association, Ambulance Service, Law Enforcement, Northeast Iowa HAZMAT Response Group, Fire Department	On-Going	Minimal	
Medium	Enforce city guidelines for burning	Grass and Wildland Fire	Fire Department, Law Enforcement	On-Going	Minimal	
Medium	Create an annual fire inspection program for commercial and industrial properties	Infrastructure Failure	City Council, Fire Department	Long-Term	Minimal	
Medium	Work with local utility provider to install surge protectors on major electric lines	Infrastructure Failure, Thunderstorms and Lightning	Local Utility Provider	On-Going	Low	
Low	Purchase additional generators to provide emergency power in times of need	ALL	City Council	Completed	Low-Moderate	
Medium	Provide education to the public on how to prevent/prepare, respond, and recover from hazard events	ALL	City Council, Fire Department, Law Enforcement, County Emergency Management, Red Cross, Public Health, Environmental Health	On-Going	Minimal	
Low	Continue the tree inspection and trimming program	Windstorms, Thunderstorms and Lightning, Tornado, Infrastructure Failure, Animal/Crop/Plant Disease, Hailstorms, Severe Winter Storms	City Council, Local Utility Provider	On-Going	Minimal	

Medium	Work with local utility provider to develop a program to bury existing utility lines	Windstorms, Thunderstorms and Lightning, Tornado, Infrastructure Failure, Hailstorms, Severe Winter Storms	City Council, Local Utility Provider	Long-Term	Moderate-High	
Medium	Maintain existing redundant grid within the city	Infrastructure Failure	City Council	On-Going	Minimal	
Low	Maintain a list of individuals in the community who require oxygen systems	Infrastructure Failure	Fire Department, Ambulance Service	On-Going	Minimal	
Low	Enforce snow ordinance	Severe Winter Storms	City Council, Public Works	On-Going	Minimal	
Medium	Maintain a heating facility for individuals at city hall	Severe Winter Storms	City Council	On-Going	Minimal	
Low	Regularly review and amend fire, medical, and hazardous material response standard operating procedures	ALL	Fire Department, Ambulance, County Emergency Management	On-Going	Minimal	
Low	Install GPS in all emergency vehicles to speed response times and monitor vehicle location during an emergency	ALL	Fire Department, City Council	Long-Term	Low	
Low	Evaluate current terrorism mitigation efforts	Terrorism	City Council, Public Works, Fire Department, Ambulance Service, County Emergency Management	On-Going	Minimal	
Low	Increase security measures taken to protect and secure city facilities and utilities	Terrorism	City Council, Public Works	Updated Recently	Minimal-Moderate	
Medium	Improve public awareness of existing evacuation plans	ALL	City Council	On-Going	Minimal	
Medium	Develop a NOAA Weather Radio awareness program	ALL	County Emergency Management	On-Going	Minimal	
High	Complete installation of improved warning equipment at railroad crossings	Transportation Incident	Local Railroad	On-Going/In progress	Moderate – High	
Low	Complete installation of street lighting at poorly lit intersections	Transportation Incident	City Council, Public Works	Short-Term	Low-Moderate	

Medium	Develop a tornado safe room awareness program	Tornado, Thunderstorms and Lightning, Windstorms	County Emergency Management	On-Going	Minimal	
Low	Continue weather spotter training	Tornado, Thunderstorms and Lightning, Windstorms	Fire Department, County Emergency Management	On-Going	Minimal	
Low	Develop a plan for rationing water use within the community	Drought	City Council	On-Going	Minimal	
Low	Maintain a cooling facility at city hall for at-risk population	Extreme Heat	City Council	On-Going	Minimal	
Low	Update emergency response plan as needed	ALL	City Council, County Emergency Management, Fire Department, Ambulance Service, Law Enforcement	On-Going	Minimal	
Low	Consider the use of incident command process	ALL	City Council, Fire Department, Ambulance Service, Law Enforcement	On-Going/Continued Training	Minimal	
Low	Develop a continuity of operations plan and recovery ordinance	ALL	City Council, Fire Department, Ambulance Service, Law Enforcement, Public Works	Long-Term	Minimal	

APPENDIX E: CITY OF NASHUA

COMMUNITY PROFILE

Geography

Nashua is located in southwest Chickasaw County, in the northeastern quadrant of Iowa, at latitude 42.9522 N x longitude 92.5386 W. Elevations in Nashua range from between 935 to 1,090 feet above sea level. Nashua is located just south of Cedar Lake and east of U.S. Highway 218.

History

The early history of Nashua began with the establishment of the first business on the west bank of the Cedar River and the building of a log cabin by John Hall in 1854. A few other families moved in and by 1856, Andrew Sample owned the land on which the town was platted and Enoch Woodbridge became part owner.

Woodbridge and Sample were instrumental in laying out the town. The town was first called Bridgeport, and then changed to Woodbridge. In 1857, the name was changed to Nashua because of the discovery that there was another town in Iowa already named Woodbridge. Two prominent families, Edward P. and Charles Greeley had come from Nashua, New Hampshire and were instrumental in naming this town after their original home. The streets of Woodbridge, Sample and Greeley in Nashua are named after these prominent founders.

TABLE E1: CITY OF NASHUA DEMOGRAPHICS

Government Framework	Mayor – City Council
General Population, 2010 Census	
Total Population	1,663
Median Age	38.4
At-Risk Population, <18 Years	433
At-Risk Population, >64 Years	332
Total Males	817
Total Females	846
One Race-White	1,640
Black of African American	6
American Indian and Alaskan Native	0
Asian	9
Two or More Races	8
Housing Characteristics, 2012-2016 ACS	
Total Housing Units	766
Total Owner-Occupied Housing Units	536
Total Renter-Occupied Housing Units	143
Total Vacant Housing Units	87
Total 1-Unit Detached and Attached Structures	602
Total 2, 3, and 4-Unit Structures	13
Total 5 to 19-Unit Structures	50
Total Mobile Homes	13
Year Majority of Housing Units were Built	1939 or earlier (44.0%)
Average Household Size	2.34
Average Family Size	2.95

In 1857, a hotel was built by J.D. Hall, called The Montgomery House. By 1858 the early businesses were a grocery store by Smiley Sample, general merchandise stores by E.P. Greeley, Veter & Ripe, Trott & Green, George T. Butterfield, Enoch Woodbridge, Elihu Hall, George Fountain and James A. Webster. The first grist mill was erected by Andrew Sample. A steam saw mill was built in 1858 by Charles Greeley and Edward P. Greeley; it operated only a few years.
The first newspaper was published May 22, 1867 and reported that at that time Nashua had good water power from a dam across the river, excellent stands of timber, a brick yard, and a woolen factory was being organized. In 1867, mail came from the north daily and tri-weekly from West Union.

In 1867, the population of Nashua was 600 with 160 students in school. In 1869, the first school building was erected with bricks from the local brickyard and in 1885 the first class graduated from the Nashua High School.

It was largely through the influence of the Greeley's that the railroad came to Nashua. In 1868, the Cedar Valley and Minnesota Branch of the Illinois Central Railroad built a line through Nashua, giving the town an important place on the railroad map and is still in use today. In 1868, a depot was also built for the railroad. A wooden bridge was constructed across the river.

The city was incorporated in 1869 with the first mayor being, T. S. Bradford. In 1875, the first bank was established. By 1898, a creamery, pickle factory and two cemeteries had been added to the town's resources. A brick power house was built in 1912. In 1902, the Nashua Public Library was founded by the citizens of Nashua. In 1905, a new building was erected for $6000.00 from a grant received from Andrew Carnegie. It is a stately brick building built up on a hill with two stories and a basement. It is decorated inside with beautiful wood. It was dedicated on January 10, 1906. In 1914, Librarian Fanny V. Eastman reported there were 3,253 volumes in the library. In 1986, a new addition was added on at ground level and the original library closed, but can still be toured.

The early churches were the Congregational, organized in 1866 and the building erected in 1870. Methodist Episcopal incorporated and built in 1869 and St Michael's Catholic incorporated and built in 1873. The historic Little Brown Church in the Vale is located two miles outside of town and was organized on November 4, 1855 and built and dedicated by December 29, 1864.

TABLE E2: CITY OF NASHUA DEMOGRAPHICS	
Economics Characteristics, 2012-2016 ACS	
Population 16 years and over	1,270
Population In Labor Force (16 yrs and over)	843
Persons Employed	779
Persons Unemployed	64
Persons Employed in Management, Business, Science, and Arts Occupations	188
Persons Employed in Service Occupations	157
Persons Employed in Sales and Office Occupations	168
Persons Employed in Natural Resources, Construction, and Maintenance Occupations	73
Persons Employed in Production, Transportation, and Material Moving Occupations	193
Median Household Income	$46,402
Median Family Income	$58,750
Percent of Persons < 18 yrs. Below Poverty Level	1.3%
Percent of Persons 18-64 Yrs. Below Poverty Level	7.6%
Percent of Persons >65 Yrs. Below Poverty Level	13.7%
Social Characteristics, 2012-2016 ACS	
School Enrollment (3 yrs and over)	365
Nursery School, Preschool	33
Kindergarten and Elementary School (grades 1-8)	198
High School (grades 9-12)	71
College or Graduate School	51
Education Attainment: Population 25 Years and Over	1,062
Less than High School Graduate	89
High School Graduate (includes equivalency)	459
Some College, Associate's Degree	370
Bachelor's Degree or Higher	144

Demographics

Population

Nashua's demographic data is outlined in Tables E1 and E2. In the recent 2010 U.S. Census, Nashua's population grew to 1663, an increase of 2.8% percent over ten years. The previous U.S. Census, taken in 2000, recorded a population figure of 1,618 for Nashua. Much of the data included in the tables are from the 2010 U.S. Census and the 2012-2016 ACS.

Community Services

The City of Nashua draws its water from local wells. These wells produce approximately 1,625 gallons of water per minute. The City has elevated water supply with a total capacity of 300,000 gallons. Typical daily usage is approximately 140,000 gallons per day, and just over 50 million gallons are used annually in the City. Peak consumption is approximately 0.25 million gallons per day (mgd). The rated capacity of the water plant is 1.296 mgd.

The City sewage treatment system serves approximately 96 percent of the community. The average load (demand) of the system is 120,000 gallons per day. Peak load is approximately 300,000 gallons per day. The design capacity of the system is 720,000 gallons per day. Inflow and infiltration account for the increase from average to peak flows in the system.

Table E3 shows the primary utility providers for the City of Nashua.

TABLE E3: NASHUA UTILITY PROVIDERS

Electric	Natural Gas	Telephone/Internet	Cable	Water	Sewer	Sanitation
MidAmerican Energy	MidAmerican Energy	Qwest	Butler-Bremer Communications	City of Nashua	PeopleService, Inc. (Contracted)	Jendro (Contracted)

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 Nashua evaluated the risk associated with a specific hazard, defined by probability and frequency of occurrence, magnitude, severity, exposures, and consequences. Nashua'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

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, Nashua determined that even though the historical occurrences were low for certain hazards, the probability ranking for future occurrences should be higher.

Table E4 is the analysis scores for the City of Nashua. As shown in the table, the top four hazards for the city are: Tornado/Windstorm, Dam/Levee Failure, Thunderstorm/Lightning/Hail, and River Flooding.

TABLE E4: CITY OF NASHUA HAZARD RISK ASSESSMENT						
Hazard Rank	**Hazard**	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**Hazard Score**
1	Tornado/Windstorm	3	4	4	4	**3.55**
2	Dam / Levee Failure	3	4	3	4	**3.4**
2	Thunderstorm/Lightning/Hail	4	2	4	4	**3.4**
4	River Flooding	3	4	3	3	**3.3**
5	Flash Flood	3	3	4	3	**3.15**
6	Terrorism	1	4	4	4	**2.65**
7	Animal/Plant/Crop Disease	3	1	4	3	**2.55**
7	Severe Winter Storm	3	2	2	3	**2.55**
9	Infrastructure Failure	2	2	4	4	**2.5**
10	HAZMAT Incident	2	2	4	1	**2.2**
11	Extreme Heat	3	1	1	3	**2.1**
12	Human Disease	1	3	1	4	**1.9**
12	Transportation Incident	2	1	4	1	**1.9**
14	Drought	2	1	1	4	**1.75**
14	Earthquake	1	1	4	4	**1.75**
14	Expansive Soils	1	1	4	4	**1.75**
14	Grass/Wild Fire	1	1	4	4	**1.75**
14	Landslide	1	1	4	4	**1.75**
14	Radiological Incident	1	1	4	4	**1.75**
14	Sinkholes	1	1	4	4	**1.75**

Vulnerability – Identifying Critical Facility Assets

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 this hazard was added to the assessment. The following discussion only considers the assets in the community of Nashua.

TABLE E5: CRITICAL FACILITIES IN NASHUA	
Welcome Center (Tornado Shelter)	Lift Station
Fire Station	Wastewater Treatment Plant
Police Department/City Hall	Wells
City Shed	
Source: Community	

According to available data, Nashua is projected to see an increase in population over the next thirty years. This population increase most likely 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.

Critical Facilities

Identifying the location of critical facilities and designated shelters (see TableE5) in Nashua 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: CITY OF NASHUA 100-YEAR FLOODPLAIN PROPERTIES		
	# of Buildings	**% of Buildings**
1.0% Annual Chance Floodplain	115	8.33%
0.2% Annual Chance Floodplain	43	3.12%
Total Unincorporated Out of Floodplain	1222	88.55%
Total Unincorporated	1380	100.00%
Figures calculated using data from Chickasaw County GIS Department; Parcel data current as of June 2018		

Flooding

A facility vulnerable to flooding is normally low, since these structures are not often 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 E4 lists the number of parcels and values for the planning area within the 1% annual chance flood zone (See *Map 4g: Flood Scenario*). Based upon data provided by INRCOG and Chickasaw County, there are an estimated 115 buildings located within the 1% annual chance floodplain.

Any information beyond what is provided, including displacement costs, infrastructure loss estimates, contents value and damages, and flood depths are not available at this time. A 1% annual chance flood may not necessarily impact 115 structures in Nashua. Sandbagging efforts may "save" some structures. Some

structures could be elevated, which aerial map analysis does not reveal. Many dwellings might just have basement flooding, so only a percentage of the value would be impacted. Further analysis is needed to determine more specific impacts of a 1% annual chance flood on the city, while the current analysis only provides a general estimate of a flood's impacts.

Flooding has the potential to put the entire population of the planning area at some level of risk, whether through the flooding of their homes, businesses, or places of employment, or the road, sewer, and water infrastructure that serve them daily. High floodwaters can devastate homeowners with property damage, property loss, and extensive, time-consuming cleanup. Secondary effects caused by flooding can add to the property damage. Power loss can leave citizens without heat or air conditioning for extended periods of time. The transportation infrastructure of the community can be impacted by flooding events, which can endanger citizens attempting to travel or evacuate the area, as well as leave those remaining without goods and services.

Areas at risk for flash flooding include low-lying areas, scattered throughout community, particularly near the Cedar River that have 1% annual chance flood zones.

Tornadoes

As stated on the FEMA website[19], mobile homes are highly vulnerable to tornadoes. Even mobile homes that are tied down, offer little protection from tornadoes.

According to Census, there are 13 mobile homes located in Nashua according to the latest Census information. Using the average household size of 2.34, it would suggest that there are 31 persons living in mobile homes in Nashua. General observation would suggest a recent increase in the number of manufactured homes in the region. This increased popularity has the potential to increase the potential risk of damage to people and property in the community. Currently, no FEMA certified tornado safe shelters are known to exist in the community.

The primary reason for the increased popularity of mobile and manufactured homes is affordability. Although HUD regulations and local building codes have increased the safety components of these types of houses significantly in recent history, this affordability has often been accompanied with a reduced level of safety. 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, 1999*).

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[19] Federal Emergency Management Agency (FEMA), http://www.fema.gov/areyouready/tornadoes.shtm

Vulnerability – Identifying Social Asset Populations

The social vulnerability assessment identified how the hazards affect the population of Nashua 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 E5 presents an overview of the at-risk population in Nashua according to information retrieved from the 2000 U.S. Census and Iowa Data Center.

TABLE E5: CITY OF NASHUA "AT-RISK" POPULATION

Total City Population (2010)	1,663
Elderly (65 yrs and older)	332
Youth (under 18 yrs old)	433
Householder Living Alone	224
Population Living in Poverty	14.1%
Population in Mobile Homes	31
Group Quarters Population	0

Source: 2010 US Census, 2012-2016 ACS

According to Table E5, 19.9 percent of Nashua residents are 65 years and older.

Children 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, 26 percent of the city's population was 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. Table B6 lists assets that would be affected in the event affected the unincorporated area of the county. This data was used in the Vulnerability discussion in each of the Hazard Profiles in Section 3.

This information was made available from the Chickasaw County Assessors and Auditors offices and City Clerk. It should be noted however that these dollar amounts do not include gas and electric utility valuations. These results should be considered preliminary, as a full accounting of assets has not been completed.

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.

National Flood Insurance Program/Repetitive Loss Properties

The city participates in the National Flood Insurance Program (NFIP). As Table E7 indicates, there are currently 14 NFIP policies in place within the city.

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 Nashua to date.

River flooding is the most common cause of repetitive loss in Chickasaw County. According to Table E7, Nashua participates in the NFIP, has 14 active policies in force. Nashua has no repetitive loss properties.

TABLE E7: NFIP AND REPETITIVE LOSS DATA FOR NASHUA

CID #	# of NFIP Policies	NFIP Insurance in Force	Total # of RLB	RLB Insured	# of Active RLB	Total RLB Losses	RLB Losses Insured
190068	14	$1,492,800	0	0	0	$0	$0

Source: Federal Emergency Management Agency (FEMA); Note: RLB = Repetitive Loss Building

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.

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 identified are as follows:

1. Reduce the chance of and impact of flooding in the community.
2. Take measures to minimize the occurrence of injuries and loss of life due to hazards.
3. Take measures to minimize or eliminate damages that may occur as a result of hazards.
4. Increase the city's ability to respond to natural disasters and man-made hazards.
5. Return to the community to similar or improved pre-event conditions as quickly as possible following a disaster event.
6. Incorporate the City Plan into the proposed Multi-Jurisdictional Plan.
7. Continually re-assess and re-evaluate the plan and mitigation activities.

Current Mitigation Actions

Prevention Mitigation Actions

The City of Nashua has several planning and regulatory ordinances to assist with prevention mitigation. Table E8 summarizes these documents.

TABLE E8: CURRENT PLANNING AND REGULATORY DOCUMENTS FOR NASHUA

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, (Restricted Residence)	Yes	Yes	Yes	No	Yes

Source: Community

Property Protection Mitigation Actions

As a result of the 1999 flood, the City conducted a housing buy-out program to remove existing housing from the floodplain. Additionally, building permits are now required before construction or re-construction of any housing unit in the floodplain. New homes must be built above the 1% annual chance flood zone. Existing homes must be rehabilitated to provide adequate floodproofing where possible. The City participated in the 1999 Flood Recovery Program by using

money made available through FEMA and the Iowa Department of Economic Development (IDED). Information on the number of properties acquired through this program are not available. Although the city experienced record flooding in 2008, no property owners expressed interest in participating in a buyout program.

Due to the location of Nashua on the banks of the Cedar River the probability of flooding remains a possibility. However, the probability of flooding is reduced by the dam that created Cedar Lake, on the north edge of the city. An earthen levee was constructed to keep water from backing up into a housing district in the northernmost section of the community. The dam on the Cedar River is considered a critical piece of infrastructure in the community. The Army Corps of Engineers and the Iowa Department of Natural Resources annually inspect the dam and levees in the community. They check these locations to ensure continued structural stability. The city is also constructing a floodwall to protect the wastewater treatment facility, which lies near the Cedar River. The facility has been flooded several times and has caused untreated wastewater to spill into the Cedar River.

Public Education and Awareness Mitigation Actions

The City of Nashua makes their best effort to publish relevant information in the local newspaper and post flyers and pamphlets at City Hall to notify residents. The city also posts information on their website. Radio, television, cellular telephones, landline telephones, newspapers, and National Oceanic and Atmospheric Association (NOAA) Radio Service are available to the public at large.

Emergency Services Mitigation Actions

Chickasaw County Emergency Management

Nashua works with the Chickasaw County Emergency Management Coordinator, based out of the City of New Hampton, 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 Austen Seely and current contact information is as follows: Chickasaw County Emergency Management Agency, 260 E. Prospect Street, New Hampton, Iowa 50659, (641) 394-2406, email: ema@chickasawcoia.org.

Warning Systems & Communications

Radio, television, cellular telephones, landline telephones, newspapers, and National Oceanic and Atmospheric Association (NOAA) Radio Service are available to the public at large.

Chickasaw 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 Chickasaw 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.

Law Enforcement

Police protection is provided by the Nashua Police Department, Chickasaw County Sheriff's Department, and the Iowa State Patrol. There is a total of four individuals serving the Nashua Police Department.

Fire Protection

Fire protection is provided for Nashua with a force of 25 volunteer firemen. The Fire Department recently constructed a new fire station, located along Highway 346 on the east side of the Cedar River. This new station provides needed space for fire equipment maintained by the Nashua Fire Department.

Major equipment used by the Nashua Fire Department includes the following:

- 1993 GMC Pumper
- 1977 Ford Pumper
- 1975 Ford Tanker
- 1965 Ford Tanker
- 1984 Chevy 1-ton Rescue Truck
- 1984 Chevy 1-ton, 4x4 Grass/Rescue Truck
- 17 ft. Rescue Boat w/ 40 hp outboard
- Jaws of Life (vehicle extraction device)

The Nashua Fire Department maintains mutual aid agreements with the following communities: All of Floyd County (although mostly with Charles City), Ionia, New Hampton, Fredericksburg, Lawler, North Washington, Alta Vista, Plainfield, Greene, and Clarksville.

The fire department is active in doing its part to educate the public. For example, members from the department participate in an annual Fire Safety Week presentation at the local elementary school. Furthermore, they provide information at Farm Safety Day.

The department communicates via two-way radios (mobile, hand-held, and base station), cellular telephones, hardwire telephones, and use pagers for dispatch purposes.

Typical services performed and/or provided by the department include the following: response to structure fires, grass/wild land fires, extrication, water/ice rescue, confined space rescue, severe weather storm watchers, hazardous materials initial response and detection, flood response, damage control and coordination, EMS assistance, fire education (as mentioned above), smoke and carbon monoxide response.

Expenses that are incurred annually by the department include: annual flow test of air packs, annual air quality test of air fill station, annual pump inspection, CPR re-certification costs, truck maintenance, and updating personal protective and firefighting equipment to meet NFPA standards.

Ambulance
The Chickasaw Ambulance provides volunteer EMT services to Nashua and has a unit in the city.

Medical Facilities
There is a small doctor's office in Nashua, but there are no facilities that provide emergency medical services. The hospital (Floyd County Memorial Hospital) nearest to Nashua is located in Charles City, approximately 10 miles northwest of Nashua.

There are two other hospitals available in a 20-mile radius of the City of Nashua. These include Waverly Municipal Hospital in Waverly and Mercy Medical Center in New Hampton.

HAZMAT
Nashua 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.

Public Works / Street Department
The City currently employs two full time staff in their Public Works Department. Some of the equipment they have available includes snowplows, a road grader, end loader and pickup trucks. The Department is responsible for snow removal, minor road maintenance, grass mowing and miscellaneous projects throughout the city.

<u>Natural Resource Protection Mitigation Actions</u>
None at this time.

<u>Structural Projects Mitigation Actions</u>

The city completed a Welcome Center that is equipped with a FEMA-certified tornado safe room. The school district is also considering the possibility of constructing a tornado safe room. Other projects that were completed include a new water main servicing the east side of town, a new water well, and flood wall will be completed for the wastewater treatment plan with a couple years

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.

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. Based on this analysis, each activity was ranked as High (H), Medium (M)or Low (L). However, not all identified activities are applicable to all jurisdictions and is marked as such in Table E10.

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

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, identified the responsible party (ies) for each activity and finally related each activity to at least one of the five Hazard Mitigation Plan Goals listed above. Table E10 is the City of Nashua's Implementation Strategy.

TABLE E10: CITY OF NASHUA'S IMPLEMENTATION STRATEGY

Priority	Mitigation Action/Program/Project	Associated Hazard	Primary Agency Responsible for Implementation	Date for Completion	Estimated Cost (s)	Funding Source
Low	Educate the Public	All	City Council, Chickasaw County EMA	On-Going	Minimal	
Low	Evaluate and make improvements to outdoor warning siren network.	Tornado, Windstorms, Hailstorms	City Council, Chickasaw County EMA	On-Going	Minimal to Low	
Low	Encourage residents to purchase NOAA weather radios.	Tornado, Windstorms, Hailstorms	City Council, Chickasaw County EMA	On-Going	Minimal	
Low	Recruit and train volunteer firefighters in storm watching/tornado spotting.	Tornado, Windstorms, Hailstorms	City Council, Fire Department	On-Going	Minimal	
Low	Encourage the construction tornado safe rooms in homes, businesses, and schools.	Tornado, Windstorms, Hailstorms	City Council, Chickasaw County EMA	On-Going	Minimal	
Minimal	Purchase and install surge protector equipment on critical municipally owned electronic equipment.	Thunderstorm and Lightning	City Council	On-Going	Minimal	
High	Backup critical city data and store offsite.	Thunderstorm and Lightning, Energy Disruption	City Council	On-Going	Minimal to Low	
High	Encourage the utility provider to bury overhead utility lines.	Thunderstorm and Lightning, Communications Failure, Severe Winter Storm	City Council	On-Going	Minimal	

Minimal	Encourage and ensure the utility provider maintains tree-trimming policies.	Thunderstorm and Lightning, Severe Winter Storm	City Council	On-Going	Minimal	
Low	Work with local businesses and County EMA to ensure Tier II reports are being filed.	Hazardous Materials	City Council, City Staff, Chickasaw County EMA	On-Going	Minimal	
High	Maintain law enforcement monitoring of large storage supplies of hazardous materials (i.e. Anhydrous Ammonia)	Hazardous Materials	City Council, Police Department	On-Going	Low	
High	Maintain contract for service with Northeast Iowa Response Group for HAZMAT response.	Hazardous Materials	City Council	On-Going	Minimal	
Low	Maintain contract for service with Northeast Iowa Response Group for HAZMAT response.	Hazardous Materials	City Council	On-Going	Minimal	
High	Ensure first responders are aware of any response plans for local facilities.	Hazardous Materials	City Council, First Responders	On-Going	Minimal	
High	Maintain employee training efforts to help ensure compliance with all OSHA regulations.	Hazardous Materials	City Council, City Staff	On-Going	Minimal	
High	Maintain first responder training to properly handle HAZMAT incidents.	Hazardous Materials	City Council, First Responders	On-Going	Minimal to Low	
High	Enforce designated truck carrier routes for the transport of Hazardous Materials.	Hazardous Materials	City Council, Police Department	On-Going	Minimal	
Low	Purchase and maintain generators for critical facilities throughout the community.	Energy Disruption	City Council	On-Going	Low	
Low	Maintain backup fuel supplies.	Energy Disruption	City Council	On-Going	Minimal to Low	
Low	Encourage energy conservation.	Energy Disruption	City Council	On-Going	Minimal	
High	Enforce floodplain ordinance and remain member of the National Flood Insurance Program.	River Flood, Flash Flood	City Council	On-Going	Minimal	
Low	Require back flow valves on the sanitary sewer connections in all new construction.	River Flood, Flash Flood	City Council	On-Going	Minimal	
High	Explore potential steps to reduce illegal inflow and infiltration into the sanitary	River Flood, Flash Flood	City Council, City Engineer	On-Going	Low to Moderate	

	sewer.					
Low	Continue to remove structures from identified flood hazard areas, as needed.	River Flood	City Council	On-Going	Moderate	
Minimal	Floodproof structures in or near the flood hazard areas.	River Flood	City Council, Residents	On-Going	Moderate to High	
Low	Consider certification training for the flood manager.	River Flood, Flash Flood	City Council	On-Going	Minimal	
Low	Consider the purchase of sandbagging machine to expedite the filling of sandbags during a flood event.	River Flood, Flash Flood	City Council	On-Going	Minimal	
Minimal	Continue to have local supply of sandbags on hand for future flood events.	River Flood, Flash Flood	City Council	On-Going	Minimal	
High	Elevate lift station south of Highway 346 and east of Cedar River.	River Flood	City Council	On-Going	Moderate	
High	Flood proof the wastewater treatment plant with a floodwall, per the provisions of the recent HMGP award from FEMA.	River Flood	City Council	2-3 years	High	
High	Study the effect of a total dam breach/failure on downriver properties within the city.	River Flood, Dam Failure	City Council	Jun-11	Low to Moderate	
High	Explore areas within the city where “green storm water management” practices would be appropriate and beneficial.	Flash Flood	City Council	On-Going	Low	
Low	Maintain list of potential translators to be called upon in case of an emergency.	Communications Failure	City Council, City Staff	On-Going	Minimal	
Low	Upgrade radio equipment as needed or required by law.	Communications Failure	City Council	On-Going	Low	
Low	Maintain list of emergency contacts.	Communications Failure	City Council, City Staff	On-Going	Minimal	
Minimal	Maintain a well-trained and equipped public works department.	Severe Winter Storm	City Council	On-Going	Low to Moderate	
Low	Enforce sidewalk clearance ordinance.	Severe Winter Storm	City Council, Public Works	On-Going	Minimal	
Minimal	Designate heating shelter(s)	Severe Winter Storm	City Council	On-Going	Minimal	
Minimal	Continue improving cooling shelters plan to be used during extreme heat events.	Extreme Heat	City Council	On-Going	Minimal	
Minimal	Conduct citizen welfare checks for vulnerable populations.	Extreme Heat	City Council	On-Going	Minimal	
High	Maintain a viable law enforcement agency,	Transportation Incident,	City Council	On-Going	Low to	

	capable of properly responding to this type of an event.	Terrorism, Public Disorder			Moderate	
High	Ensure that proper signage is in place to facilitate a controlled flow of traffic.	Transportation Incident	City Council, Police Department	On-Going	Minimal	
High	Continue to inspect bridges for safety and maintenance issues.	Transportation Incident	City Council, City Staff	On-Going	Low	
High	Maintain training, equipment and facilities for the Fire Department and Ambulance Service.	ALL	City Council	On-Going	Low to Moderate	
High	Gather a militia should the U.S. Military not be able to respond	Enemy Attack	City Council	On-Going	Minimal	
High	Secure vulnerable critical sites throughout the community.	Terrorism	City Council, Police Department	On-Going	Minimal to Low	
High	Maintain and update anti-virus software, as needed	Terrorism	City Council, City Staff	On-Going	Minimal	
High	Keep open flow of information and cooperate with the FBI and other government agencies.	Terrorism	City Council, City Staff	On-Going	Minimal	
High	Implement Storm Water Management program.	Watershed or Groundwater Contamination	City Council	On-Going	Minimal to Low	
High	Implement Wellhead Protection Program.	Watershed or Groundwater Contamination	City Council	On-Going	Minimal to Low	
High	Implement and encourage erosion control measures.	Watershed or Groundwater Contamination	City Council	On-Going	Minimal to Low	
Minimal	Continue and encourage use of monitoring wells.	Watershed or Groundwater Contamination	City Council	On-Going	Minimal	
Low	Continue to treat and monitor water supply.	Watershed or Groundwater Contamination	City Council, Public Works	On-Going	Low	
Low	Identify and map areas of past contamination.	Watershed or Groundwater Contamination	City Council	On-Going	Minimal	
High	Encourage residents to have and maintain	Infrastructure Failure	City Council, Fire Department	On-Going	Minimal	

	Smoke Detectors/Sprinkler Systems/Fire Extinguishers					
High	Improve water distribution system.	Infrastructure Failure	City Council	On-Going	Low to Moderate	
Low	Implement burning bans when severe drought occurs.	Drought, Grass or Wildland Fire	City Council, Chickasaw County EMA	On-Going	Minimal	
Low	Restrict water usage as necessary in times of severe drought in order to maintain water supply.	Drought	City Council, Public Works	On-Going	Minimal	
Low	Encourage residents to use the yard waste facility instead of burning.	Drought, Grass or Wildland Fire	City Council	On-Going	Minimal	
High	Continue inspection of dam structure	Dam Failure	City Council, City Engineer	On-Going	Minimal to Low	
High	Continue to test the various dam components on an annual basis.	Dam Failure	City Council, City Engineer	On-Going	Minimal to Low	
Minimal	Encourage the Fire Department to attend pipeline incident response training.	Infrastructure Failure	City Council, Fire Department	On-Going	Minimal	
Low	Place tile in back of curbs on any new street construction.	Expansive Soils	City Council, City Engineer	On-Going	Minimal to Low	
Low	Continue to cooperate with Health Department and local medical facilities to help insure effectiveness of prevention, detection, and response mechanisms.	Human Disease, Animal/Crop/Plant Disease	City Council, City Staff	On-Going	Minimal	
Low	Encourage vaccinations	Human Disease, Animal/Crop/Plant Disease	City Council	On-Going	Minimal	
High	Spray for mosquitoes, other insects. Also, use granular inserts into standing water for same purpose.	Human Disease, Animal/Crop/Plant Disease	City Council	On-Going	Minimal	
Minimal	Consider enforcing the local building codes.	Infrastructure Failure	City Council, City Staff	On-Going	Minimal	
Minimal	Maintain regular building inspections.	Infrastructure Failure	City Council, City Staff	On-Going	Minimal	
Low	Identify and remove dangerous buildings throughout the community.	Infrastructure Failure	City Council	On-Going	Low to Moderate	
Low	Continue to seek housing rehabilitation grants for eligible and willing homeowners	Infrastructure Failure	City Council	On-Going	Minimal	
Low	Maintain teasers and training on the use of	Public Disorder	City Council, Police Department	On-Going	Minimal	

	such devices.					
Low	Encourage erosion control measures.	Landslides	City Council, City Engineer	On-Going	Minimal	
Low	Continue to monitor and repair sinkholes, should they develop.	Sinkholes	City Council, Public Works	On-Going	Minimal	
Minimal	Inspect any water or utility lines that might be near a sinkhole.	Sinkholes	City Council, Public Works	On-Going	Minimal	
High	Secure the area around a sinkhole with a barrier.	Sinkholes	City Council, Public Works	On-Going	Minimal	
High	Continue to inspect and maintain levee	Levee Failure	City Council, City Engineer	On-Going	Minimal	

APPENDIX F – CITY OF NEW HAMPTON

COMMUNITY PROFILE

Location

New Hampton is located in the middle of Chickasaw County in the northeastern quadrant of Iowa. Elevations in New Hampton range from 1,100 to 1,170 feet above sea level. Located at 43.0593 N, 92.3179 W.

Geography

The terrain on which New Hampton is built is generally the undulating topography that characterizes the agricultural areas of northeast Iowa. The highest point in the community lies at approximately 1,170 feet above sea level and is located in the northernmost area of town. From this peak, the elevation of the City drops as you follow Spring Creek to the south. The lowest elevation in the community is located in southern New Hampton at approximately 1,100 feet above sea level.

The surface water system in the City of New Hampton is comprised predominantly of small local streams, which are abundant and evenly distributed in the planning area. The Wapsipinicon River is the largest river in Chickasaw County. New Hampton falls into the Wapsipinicon River watershed. Spring Creeks, which flows through New Hampton, is the primary drainage way for the community. Spring Creek eventually merges with the Little Wapsipinicon River approximately 4.5 miles south west of the New Hampton city limits. The Little Wapsipinicon then flows into the main branch of the Wapsipinicon River about one-half mile downstream.

TABLE F1: CITY OF NEW HAMPTON DEMOGRAPHICS

Government Framework	Mayor – City Council
General Population, 2010 Census	
Total Population	3,571
Median Age	44.8
At-Risk Population, <18 Years	819
At-Risk Population, >64 Years	822
Total Males	1,691
Total Females	1,322
One Race-White	3,429
Black of African American	11
American Indian and Alaskan Native	5
Asian	19
Two or More Races	16
Housing Characteristics, 2012-2016 ACS	
Total Housing Units	1,665
Total Owner-Occupied Housing Units	1,034
Total Renter-Occupied Housing Units	538
Total Vacant Housing Units	93
Total 1-Unit Detached and Attached Structures	1,216
Total 2, 3, and 4-Unit Structures	33
Total 5 to 19-Unit Structures	255
Total Mobile Homes	69
Year Majority of Housing Units were Built	1939 or earlier (36.8%)
Average Household Size	2.20
Average Family Size	2.82

New Hampton's climate is not unlike those of most cities in the Midwest. New Hampton has a climate of continental character. Because New Hampton is far away from the moderating influence of a large body of water, a wide variation is experienced in both temperature and precipitation during the four distinct seasons. Temperatures in New Hampton range from an average winter temperature of 19.4 degrees Fahrenheit to an average summer temperature of 70.2 degrees Fahrenheit.

Precipitation also varies substantially in a climate such as New Hampton's. The two major types of precipitation to occur in New Hampton are rain and snow. Average annual rainfall is 32.9 inches, while average snowfall is approximately 35.5 inches. Summer precipitation results primarily from thunderstorm activity,

although longer less intense rains are not uncommon in the area. Other forms of precipitation recorded in the area include snow, hail, ice pellets, sleet, dew, and vapor condensation due to low drifting cloud formations (fog).

Originally the land surrounding and including New Hampton was comprised of tall grass prairie and deciduous forest. The forest was adjacent to established waterways such as Spring Creek. The original cover has been reduced to make room for additional cropland and construction of houses and businesses in suitable areas.

Tree cover can also be found throughout the community in residential areas, parks, and cemeteries. These remaining trees contribute to the aesthetics of the community and are viewed as an asset.

According to the Chickasaw County Soil Survey issued in 1996 by the United State Department of Agriculture Soil Conservation Service, the soil in New Hampton is primarily of the Readlyn and Tripoli type, "somewhat poorly drained, moderately permeable soils on broad upland divides, slightly convex ridges and side slopes, and in coves at the dead of drainage ways. These soils formed in loamy erosional sediments and the underlying firm loamy glacial till. Slopes range from 0 to 5 percent." In addition, due to their location in and near the Spring Creek floodplain, some of the soils in New Hampton may be subject to minor flooding.

History

New Hampton was named by Osgood Gowan, an early settler and the town's first postmaster. He named the town in honor of his former home in New Hampton, New Hampshire. In 1857, the county seat of Chickasaw County was moved from Bradford to New Hampton, a more central location in the county. Following this, there were several attempts to remove the county seat from New Hampton. The list of unsuccessful bidders included Fredericksburg, Bradford, and Forest City.

In 1865 the first courthouse in New Hampton was completed. This original courthouse was completely destroyed in a fire on March 26, 1880, with total losses estimated at $2,000. Due to continued fighting over the location of the county seat, the new courthouse in New Hampton was not completed until 1881. The courthouse as it exists today was completed in 1929.

A pivotal point in New Hampton's history occurred in 1868. It was in this year that attorney J. H. Powers, one of the town's founders, was able to use his influence to change the proposed route of the railroad line that now runs through New Hampton. Originally, the railroad was intended to run several miles north of town. However, the relocation resulted in the rapid growth of New Hampton, which was incorporated in 1873.

Demographics

Population

New Hampton's demographic data is outlined in Tables F1 and F2 In the recent 2010 U.S. Census, New Hampton's population declined to 3,571, a decrease of 3.4% percent over ten years. The previous U.S. Census, taken in 2000, recorded a population figure of 3,692 for New Hampton. Much of the data included in the tables are from the 2010 U.S. Census and the 2012-2016 ACS.

TABLE F2: CITY OF NEW HAMPTON DEMOGRAPHICS

Economics Characteristics, 2012-2016 ACS	
Population 16 years and over	2,754
Population In Labor Force (16 yrs and over)	1,631
Persons Employed	1,568
Persons Unemployed	63
Persons Employed in Management, Business, Science, and Arts Occupations	451
Persons Employed in Service Occupations	285
Persons Employed in Sales and Office Occupations	302
Persons Employed in Natural Resources, Construction, and Maintenance Occupations	156
Persons Employed in Production, Transportation, and Material Moving Occupations	374
Median Household Income	$39,455
Median Family Income	$57,917
Percent of Persons < 18 yrs. Below Poverty Level	10.5%
Percent of Persons 18-64 Yrs. Below Poverty Level	11.2%
Percent of Persons >65 Yrs. Below Poverty Level	7.0%
Social Characteristics, 2012-2016 ACS	
School Enrollment (3 yrs and over)	886
Nursery School, Preschool	91
Kindergarten and Elementary School (grades 1-8)	495
High School (grades 9-12)	159
College or Graduate School	141
Education Attainment: Population 25 Years and Over	2,425
Less than High School Graduate	296
High School Graduate (includes equivalency)	1,042
Some College, Associate's Degree	641
Bachelor's Degree or Higher	446

Community Services

The City of New Hampton has a municipal water supply that services approximately 1,632 water meters. The community's water is taken from two locally located wells. These wells produce approximately 1,625 gallons of water per minute. In addition to structures that use the municipal water supply, there are several housing units that obtain their water from individually drilled wells. The City has two elevated water towers with a total capacity of 800,000 gallons. Typical daily usage is approximately 512,000 gallons per day, and just less than 200 million gallons are used annually in the City. The water is treated with chlorine at each well location.

An expansion to New Hampton's Wastewater Treatment Facility expanded the capacity of the system by approximately 50 percent, which improved the efficiency of the treatment process. Improvements were made to better serve the needs of citizens and potential industrial growth. The Wastewater Treatment Facility consists of waste management treatment ponds located south of the city limits. Wastewater is transported to the ponds with the assistance of four wastewater lift stations. One lift station is located at the north end of town, near Sparboe Foods Corporation at the intersection of North Linn Avenue and West Milwaukee Street. The other two lift stations are located in the south portion of New Hampton. One is located to the south of Cleveland Street and the other just west of the treatment plant near Croell Redi-Mix.

Table F3 shows the primary utility providers for the City of New Hampton.

TABLE F3: NEW HAMPTON UTILITY PROVIDERS

Electric	Natural Gas	Telephone/Internet	Cable	Water	Sewer	Sanitation
New Hampton Municipal Light Plant	Black Hills Energy	Windstream	Mediacom	City of New Hampton	City of New Hampton	Jendro (Contract)

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 New Hampton evaluated the risk associated with a specific hazard, defined by probability and frequency of occurrence, magnitude, severity, exposures, and consequences. New Hampton'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

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, New Hampton determined that even though the historical occurrences were low for certain hazards, the probability ranking for future occurrences should be higher.

Table F4 is the analysis scores for the City of New Hampton. As shown in the table, the top four hazards for the city are: Tornado/Windstorm, Thunderstorm/Lightning/Hail, Severe Winter Storm, and Animal/Plant/Crop Disease.

TABLE F4: CITY OF NEW HAMPTON HAZARD RISK ASSESSMENT						
Hazard Rank	**Hazard**	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**Hazard Score**
1	Tornado/Windstorm	4	4	4	2	**3.8**
2	Thunderstorm/Lightning/Hail	4	2	4	2	**3.2**
3	Severe Winter Storm	4	2	1	3	**2.85**
4	Animal/Plant/Crop Disease	4	1	1	4	**2.65**
5	Human Disease	3	2	1	4	**2.5**
6	Flash Flood	3	1	3	2	**2.3**
6	HAZMAT Incident	2	2	4	2	**2.3**
8	Dam / Levee Failure	2	1	3	1	**1.75**
8	Infrastructure Failure	1	1	4	4	**1.75**
10	Extreme Heat	2	1	1	3	**1.65**
11	Sinkholes	1	1	4	1	**1.45**
11	Transportation Incident	1	1	4	1	**1.45**
13	Drought	1	1	1	4	**1.3**
13	Expansive Soils	1	1	1	4	**1.3**
15	Grass/Wild Fire	1	1	1	1	**1**
15	Landslide	1	1	1	1	**1**
15	Radiological Incident	1	1	1	1	**1**
15	River Flooding	1	1	1	1	**1**
15	Terrorism	1	1	1	1	**1**

Vulnerability – Identifying

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 this hazard was added to the assessment. The following discussion only considers the assets in the community of New Hampton.

According to available data, New Hampton 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.

TABLE F5: CRITICAL FACILITIES IN NEW HAMPTON	
Fire Station	City Hall
Wastewater Treatment Plant	Lift Stations
Water Towers	Mercy Hospital
Police Station	Hew Hampton Care Center
New Hampton Nursing and Rehabilitation Center	New Hampton Schools

Source: Community

Critical Facilities

Identifying the location of critical facilities and designated shelters (see Table F5) in New Hampton 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. *Attachment 6G* illustrates the location of identified critical facilities in New Hampton.

TABLE F6: CITY OF NEW HAMPTON 100-YEAR FLOODPLAIN PROPERTIES		
	# of Buildings	**% of Buildings**
1.0% Annual Chance Floodplain	104	3.80%
0.2% Annual Chance Floodplain	0	0.00%
Total Unincorporated Out of Floodplain	2634	96.20%
Total Unincorporated	2738	100.00%

Figures calculated using data from Chickasaw County GIS Department; Parcel data current as of June 2018

Nursing homes or skilled living centers are also highly vulnerable to tornadoes/windstorms. 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. According to 2010 Census, there were 156 persons living in group quarters within the city. There are multiple facilities throughout New Hampton which provide group housing for a variety of reasons.

Homes In Hazardous Areas

The City of New Hampton is potentially affected by flooding from the Spring Creek. The waterway has a 1% annual chance of flooding and there remain several structures located within that floodplain. In 2002, the City attempted to buyout three flood-prone commercial properties within the city limits, but the application was denied.

In the City of New Hampton there are 104 buildings located in the 1% annual floodplain. Refer to the *Map 4h: Flood Scenario* for a view of the structures located in the 1% annual chance flood zone.

Those who are directly vulnerable to future flooding in the city include all those residing in low-lying areas of the city. At greater risk are those with businesses or houses within the 1% and 0.2% annual chance floodplains as indicated on the Flood Insurance Rate Maps (FIRM) created by the Federal Emergency Management Agency (FEMA). Populations living in a flood hazard area are also at risk of sustaining personal injury or property damage.

As stated on the FEMA website[20], mobile homes are highly vulnerable to tornadoes. Even mobile homes that are tied down, offer little protection from tornadoes.

According to Census information, there are 69 mobile homes in New Hampton. Based on the city's average household size of 2.20 persons, it estimated that approximately 152 persons live in mobile homes. General observation would suggest a recent increase in the number of manufactured homes in the area. This increased popularity has the potential to increase the potential risk of damage to people and property in the community. Currently, no FEMA certified tornado safe shelters are known to exist in the community.

The primary reason for the increased popularity of mobile and manufactured homes is affordability. Although HUD regulations and local building codes have increased the safety components of these types of houses significantly in recent history, this affordability has often been accompanied with a reduced level of safety. 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, 1999*).

Vulnerability – Identifying Social Asset Populations

The social vulnerability assessment also identified how the hazards affect the population of New Hampton and it is assumed that the identified populations are more likely to require assistance during times of disaster and are therefore, generally speaking, more at-risk than the remaining population. The at-risk population must be identified and targeted in successful mitigation efforts. Table F5 identifies the population of various segments of the population that may consider "at-risk" in the event of a hazard.

According to Table F7, 23.0 percent of the city's residents are 65 years and older. There are 156 persons living in group quarters.

TABLE F7: CITY OF NEW HAMPTON "AT-RISK" POPULATION

	2010
Total City Population (2010)	3,571
Elderly (65 yrs and older)	822
Youth (under 18 yrs old)	819
Householder Living Alone	536
Population Living in Poverty	16.5%
Population in Mobile Homes	152
Group Quarters Population	156

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

[20] Federal Emergency Management Agency (FEMA), http://www.fema.gov/areyouready/tornadoes.shtm

Children 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, 22.9 percent were under the age of 18.

Portions of Chickasaw County are highly vulnerable to floods, especially along the Little Wapsipinicon River in New Hampton. Flooding puts the entire population at some level of risk, whether through the flooding of their homes, businesses, or places of employment, or the road, sewer, and water infrastructure that serve them daily. High floodwaters can devastate homeowners with property damage, property loss, and extensive, time-consuming cleanup. Secondary effects caused by flooding can add to the property damage. Power loss can leave citizens without heat or air conditioning for extended periods of time. The transportation infrastructure of the community can be impacted by flooding events, which can endanger citizens attempting to travel or evacuate the area, as well as leave those remaining without goods and services.

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. Table F8 lists assets that would be affected in the event affected the unincorporated area of the county. This data was used in the Vulnerability discussion in each of the Hazard Profiles in Section 3.

This information was made available from the Chickasaw County Assessors and Auditors offices and City Clerk. It should be noted however that these dollar amounts do not include gas and electric utility valuations. These results should be considered preliminary, as a full accounting of assets has not been completed.

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

The city participates in the National Flood Insurance Program (NFIP) and has a flood ordinance in place. As Table F9 shows, there are currently 13 NFIP policies valued at $1,971,600 in insurance located within the city.

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.

According to FEMA's data, New Hampton participates in the National Flood Insurance Program. However, New Hampton does not have any repetitive loss properties.

River flooding is the most common cause of repetitive loss in Chickasaw County. Table F9 illustrates the number of repetitive loss properties for New Hampton.

TABLE F9: REPETITIVE LOSS PROPERTIES FOR NEW HAMPTON

CID #	# of NFIP Policies	NFIP Insurance in Force ($)	Total Paid Losses	Total Payments Made ($)	# of Repetitive Loss Properties	Repetitive Loss Payment ($)	Target Rep. Loss Buildings
190069	13	$ 1,971,600	0	$ 0	0	$ 0	0

Source: Federal Emergency Management Agency (FEMA);

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 identified are as follows:

1. Reduce the chance of and impact of flooding in the community.
2. Take measures to minimize the occurrence of injuries and loss of life due to hazards.
3. Take measures to minimize or eliminate damages that may occur as a result of hazards.
4. Increase the city's ability to respond to natural disasters and man-made hazards.
5. Return to the community to similar or improved pre-event conditions as quickly as possible following a disaster event.
6. Incorporate the City Plan into the proposed Multi-Jurisdictional Plan.
7. Continually re-assess and re-evaluate the plan and mitigation activities.

Current Mitigation Actions

New Hampton's current mitigation actions are listed below for the following categories: prevention, property protection, public education and awareness,

Prevention Mitigation Actions

The City of New Hampton has several planning and regulatory ordinances to assist with prevention mitigation. Table F8 summarizes these documents.

TABLE F8: CURRENT PLANNING AND REGULATORY DOCUMENTS FOR NEW HAMPTON

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: City of New Hampton

Property Protection Mitigation Actions

There has not historically been any major flood damage to the community. Therefore, very little has been done in the line of City initiated or sponsored

property protection. There was, however, a study entitled "Spring Creek Flood Plain Study; New Hampton, Iowa" prepared in October 2000 for New Hampton.

The study, prepared by Earth Tech of Waterloo, analyzes the Spring Creek watershed to determine estimated discharge amounts for various rainfall events. The plain identifies the likely extent of 10, 25, 50, and 100-year flood frequencies. Furthermore, the plan provides recommendations to the community on how to reduce flooding problems.

There are several structures in the community that are recognized as having received property damage from high water on several occasions. According to the City, there are believed to be at least eight structures believed to be in or near the flood hazard area. While the specific addresses cannot be shared in this document, the City keeps a record of the properties at City Hall in the event relocation and/or elevation dollars can be secured for a potential future mitigation project.

In fact, after receiving the results of this study, the City attempted to pursue FEMA mitigation funding to purchase and remove structures from three properties considered to be at risk of future flood events. However, the application was not funded. All the same, this action shows recognition of risk and a sincere effort by the community to help reduce that risk.

One project that was constructed was a retention pond along Spring Creek, just north of the railroad tracks.

On September 1, 1987 the City of New Hampton became an active member 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.

The Floodplain Ordinance is a portion of New Hampton's Zoning Ordinance. The Zoning Administrator is charged with enforcement of the floodplain ordinance in addition to his/her other duties. In accordance with NFIP guidelines, the ordinance does not allow for new construction within the floodplain. In addition, if a floodplain permit is issued for development in a special flood hazard area the ordinance requires those structures to "be designed or anchored to prevent the flotation, collapse or lateral movement of the structures or portions of structures due to flooding…"

Improvements to the sanitary sewer system and the conversion of what was polishing pond to a catch basin will help to minimize the adverse effects of flooding during future high-water events.

Public Education & Awareness Mitigation Actions

New Hampton currently has in place E911 Emergency Assistance. Other communications used by city personnel include pagers, radios, and cellular telephones. Radio, television, cellular telephones, landline telephones, newspapers, warning sirens, and NOAA Radio Service are available to the public at large. The City has developed a website in order to keep its citizens, and other interested parties, aware of local and government affairs. The website address is www.ci.new-hampton.ia.us/.

Natural Resource Protection Mitigation Actions

New Hampton currently has no natural resource protection mitigation activities.

Emergency Services Mitigation Actions

Chickasaw County Emergency Management

New Hampton works with the Chickasaw County Emergency Management Coordinator, based out of the City of New Hampton, 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 Austen Seely and current contact information is as follows: Chickasaw County Emergency Management Agency, 260 E. Prospect Street, New Hampton, Iowa 50659, (641) 394-2406, email: ema@chickasawcoia.org.

Warning Systems & Communication

The outdoor early warning system consists of four sirens that are activated either by the Sheriff's Department or the Emergency Management Office. In addition to this warning system, some facilities in the City of New Hampton maintain and use the Plectron Warning System. Facilities currently using this system include the Tri/Mark Corporation, the New Hampton Health Center, the high school, and the elementary school.

NOAA Weather Radio broadcasts are also available in the community. NOAA Radio's provide up to the minute weather related alerts. Other locations that warnings and watches can be found are television, Internet, and radio.

Chickasaw 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 Chickasaw 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.

Fire Protection

Fire protection is provided for New Hampton with a force of 29 volunteer firemen. Ideally the Fire Department would be fully staffed with 30 volunteers. The fire station is located in the central part of New Hampton.

Equipment used by the New Hampton Fire Department includes the following:

- 3 Pumper Trucks (1,000 gallon/minute, one 1,500 gallon/minute)

- 2 Tanker (2,000 gallon w/ pump, 2,000 gallon w/o pump)
- 2 Grass Rig (210 gallon w/ pump, 80 gallon pump)

The New Hampton Fire Department maintains mutual aid agreements with the following communities: Alta Vista, Charles City, Protivin, Ionia, Lawler, Nashua, Fredericksburg, and North Washington.

Law Enforcement

Police protection is provided by the New Hampton Police Department, Chickasaw County Sheriff's Department, and the Iowa State Patrol. Currently, there are a total of six full time officers serving the New Hampton Police Department. Mike Anderson is the current Police Chief for the department.

The Police Department maintains three marked patrol cars and one unmarked patrol car. They maintain mutual aid agreements with surrounding law enforcement agencies, primarily the nearby Sheriff's Department.

Ambulance

Chickasaw Ambulance Service provides ambulance service to area hospitals. Chickasaw Ambulance Service is a private company that contracts service with local entities. The company is based out of New Hampton. There are two ambulance service units in the community.

Chickasaw County Rescue Squad also provides service in New Hampton. There are 42 EMT certified individuals who volunteer to respond to emergency calls on a need basis in the county. Twelve of those individuals reside in New Hampton.

Medical Facilities

New Hampton is served by one local hospital: Mercy Medical Center on Maple Avenue. There are four other hospitals available in a 35-mile radius of the City of New Hampton. In addition to the local hospital, there is also a Mercy Family Clinic in New Hampton.

HAZMAT

New Hampton 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 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.

Public Works / Street Department
3 Staff members work in the street department. They are primarily responsible for snow removal, patching and cleaning streets, assist with all street construction, assist with jetting of sewer lines. They assist the Clerk's office with nuisance investigations, zoning issues and multiple other items.

Structural Projects Mitigation Actions
None.

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.

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. Based on this analysis, each activity was ranked as High (H), Medium (M)or Low (L). However, not all identified activities are applicable to all jurisdictions and is marked as such in Table F10.

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

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, identified the responsible party (ies) for each activity and finally related each activity to at least one of the five Hazard Mitigation Plan Goals listed above. Table F10 below is the City of New Hampton's Implementation Strategy.

TABLE F10: CITY OF NEW HAMPTON'S IMPLEMENTATION STRATEGY

Priority	Mitigation Action/Program/Project	Associated Hazard	Primary Agency Responsible for Implementation	Status of Project	Estimated Cost (s)	Funding Source
Low	Educate the public on proper steps to prevent/reduce/protect/recover from hazard events	ALL	County Emergency Management, Red Cross, City Council, City Staff, Schools, Fire Department, Law Enforcement, Public Health, Environmental Health	On-Going	Minimal	
Low	Install backup generators at identified critical facilities: local wells, hospital, schools, police station, fire station, etc.	ALL	City Clerk, Public Works, Municipal Light Plant, Hospitals, Schools	On-Going	Low	
Low	Encourage the planting of trees for shade	Extreme Heat	Private Property Owners, Park Board, Municipal Light Plant, City Council	On-Going	Minimal	
High	Maintain community swimming pool and water slide	Extreme Heat	Leisure Services, City Council	On-Going	Minimal – Moderate	
Low	Establish cooling shelters for at-risk populations	Extreme Heat	Red Cross, City Clerk, County Emergency Management	On-Going	Minimal	
High	Purchase and install additional early warning sirens	Tornadoes, Thunderstorms and Lightning, Windstorms	City Council, Public Works, Fire Department, County Emergency Management, Local Developers	Mid-Term	Low	
Low	Construct public tornado shelters in vulnerable areas of town: New Hampton Elementary, Middle, and High Schools, near mobile home court, hospital, nursing home, industrial park, and St. Joe's Catholic School	Tornadoes, Thunderstorms and Lightning, Windstorms	City Council, Schools, Hospital, Developers, Park Board, Planning and Zoning Commission, Industries	Mid-Long-Term	High	
Moderate	Encourage the construction of tornado safe rooms	Tornadoes, Thunderstorms and Lightning, Windstorms	City Council,, Hospital, Developers, Planning and Zoning Commission, Industries	On-Going	Low - Moderate	
Moderate	Recruit and train volunteer storm	Tornadoes,	Fire Department, Police	On-Going	Minimal	

	watchers/tornado spotters	Thunderstorms and Lightning, Windstorms	Department, County Emergency Management, Interested Citizens			
High	Maintain a well-trained and equipped street department	ALL	City Council, Public Works	On-Going	Minimal-Moderate	
Low	Designate heating shelters	Severe Winter Storms	City Council, County Emergency Management, Private facilities	On-Going	Minimal	
High	Enforce existing ordinances	ALL	City Council, County Emergency Management, Fire Department, Police Department	On-Going	Minimal	
High	Maintain a viable law enforcement department, capable of properly responding to all types of hazard events	ALL	City Council, Police Department	On-Going	Moderate – High	
Moderate	Secure vulnerable critical sites throughout the community with: locks, fences, security cameras, alarms, increase patrols, automatic locks, etc.	Terrorism	City Council, Public Works, Police Department	On-Going	Minimal – Low	
High	Maintain a well-trained and equipped fire department, capable of properly responding to all types of hazard events. Identified need for new equipment truck, larger fire station, aerial rig, GPS for vehicles, and thermal imaging cameras.	ALL	City Council, Fire Department	On-Going	Moderate-High	
High	Analyze and improve water distribution system	Infrastructure Failure, Grass and Wildland Fire, Human Disease,	City Council, Public Works	On-Going	Moderate-High	
Moderate	Consider expanding fire code to entire community	Infrastructure Failure	Fire Department, City Council	Mid-Term	Minimal	
High	Work with local businesses/industries and County EMA to ensure Tier II reports are being filed	Hazardous Materials	County Emergency Management, Fire Department, Iowa DNR, Local Business/Industry Owners	On-Going	Minimal	
High	Maintain contract for HAZMAT response	Hazardous Materials	City Council, Fire Department, Northwest Iowa Response Group	On-Going	Minimal	
High	Ensure first responders are aware of any response plans for local facilities	Hazardous Materials	Fire Department, Police Department	On-Going	Minimal	
High	Continue to treat and monitor drinking water supply and wastewater	Human Disease, Animal/Crop/Plant Disease	Public Works	On-Going	Minimal	

High	Ensure proper signage is in place to facilitate a controlled flow of traffic	Transportation Incident	Public Works, Iowa DOT, County Engineering	On-Going	Minimal	
High	Maintain list of potential translators to be called upon in case of an emergency	ALL	Police Chief, Fire Chief, City Clerk, Hospital	On-Going	Minimal	
High	Implement burning bans when necessary	Drought, Windstorms, Grass and Wildland Fire	Fire Chief, City Council, County Emergency Management, State Fire Marshall	On-Going	Minimal	
High	Restrict water usage when necessary	Drought	Mayor, Fire Chief, State Fire Marshall	On-Going	Minimal	
High	Implement the usage of surge protectors	Infrastructure Failure	Municipal Light Plant, City Council, Citizens	On-Going	Minimal	
High	Purchase and install squirrel guards around transformers	Infrastructure Failure	City Council, Public Works, Municipal Light Plant	Short-Term	Minimal	
High	Enforce the use of Iowa One Call	Infrastructure Failure	State of Iowa, Local Utility Providers, Citizens, Public Works	On-Going	Minimal	
High	Acquisition and removal of flood prone structures	Flash Flood, River Flood	City Council, Private Property Owners, FEMA, Iowa Homeland Security and Emergency Management	On-Going	Moderate-High	
High	Continue to make improvements to storm water system	Flash Flood, River Flood	City Council, Public Works	On-Going	Minimal-High	
Low	Elevation of structures in the floodplain	Flash Flood, River Flood	City Council, FEMA, Private Property Owners	On-Going	Low-Moderate	
High	Continue participation in the National Flood Insurance Program	Flash Flood, River Flood	Mayor, City Council, Planning and Zoning Commission, City Clerk	On-Going	Minimal	
Low	Purchase portable water pumps	Flash Flood, River Flood	City Council, Public Works, Fire Department	Short-Term	Minimal -Low	
High	Require back flow valves in all new construction	Flash Flood, River Flood	City Council, Developers, Private Property Owners	On-Going	Minimal	

APPENDIX G: CITY OF NORTH WASHINGTON

COMMUNITY PROFILE

Location

The City of North Washington is located in the western portion of Chickasaw County in the north eastern quadrant of Iowa. Located at 43.1180 N 92.4168 W with elevations averaging 1,142 feet above sea level.

Natural Environment

The small town has the Little Wapsipinicon River flowing along the northeast corner of the city limits.

North Washington has a climate of continental character. Because North Washington is far away from the moderating influence of a large body of water, a wide variation is experienced in both temperature and precipitation during the four distinct seasons. Temperatures in the community range from an average winter temperature of 19.4 degrees Fahrenheit to an average summer temperature of 70.2 degrees Fahrenheit.

The two major types of precipitation to occur in the community are rain and snow. Average annual rainfall is 32.9 inches, while average snowfall is approximately 35.5 inches. Summer precipitation results primarily from thunderstorm activity, although longer less intense rains are not uncommon in the area. Other forms of precipitation recorded in the area include snow, hail, ice pellets, sleet, dew, and vapor condensation due to low drifting cloud formations (fog).

TABLE G1: CITY OF NORTH WASHINGTON DEMOGRAPHICS	
Government Framework	Mayor – City Council
General Population, 2010 Census	
Total Population	117
Median Age	38.2
At-Risk Population, <18 Years	35
At-Risk Population, >64 Years	9
Total Males	61
Total Females	56
One Race-White	114
Black of African American	2
American Indian and Alaskan Native	0
Asian	0
Two or More Races	0
Housing Characteristics, 2012-2016 ACS	
Total Housing Units	57
Total Owner-Occupied Housing Units	45
Total Renter-Occupied Housing Units	12
Total Vacant Housing Units	0
Total 1-Unit Detached and Attached Structures	55
Total 2, 3, and 4-Unit Structures	0
Total 5 to 19-Unit Structures	0
Total Mobile Homes	2
Year Majority of Housing Units were Built	1939 or earlier (42.1%)
Average Household Size	2.72
Average Family Size	3.19

Originally the land surrounding and including the community was comprised of mixed prairie grasses and some deciduous forest. The forest was adjacent to established waterways. The original cover has been reduced to make room for additional cropland and construction of houses and businesses in suitable areas.

Tree cover can also be found throughout the community in residential areas, parks, and cemeteries. These remaining trees contribute to the aesthetics of the community and are viewed as an asset.

According to the Chickasaw County Soil Survey issued in 1996 by the United States Department of Agriculture Soil Conservation Service, the soil in North Washington is primarily of the Saude Series. The Saude Series "consists of well drained soils on stream terraces. These soils formed in 24 to 32 inches of loamy alluvial deposits and the underlying sandy and gravelly glacial outwash. Permeability is moderate in the upper part and very rapid in the lower part. The native vegetation is mixed prairie grasses. Slopes range from 0 to 5 percent."

Demographics

Population

North Washington's demographic data is outlined in Tables G1 and G2. In the recent 2010 U.S. Census, North Washington's population slightly decreased to 117, a decrease of 0.85 percent over ten years. The previous U.S. Census, taken in 2000, recorded a population figure of 118 for North Washington. Much of the data included in the tables are from the 2010 U.S. Census and the 2012-2016 ACS.

TABLE G2: CITY OF NORTH WASHINGTON DEMOGRAPHICS	
Economics Characteristics, 2012-2016 ACS	
Population 16 years and over	120
Population In Labor Force (16 yrs and over)	98
Persons Employed	98
Persons Unemployed	0
Persons Employed in Management, Business, Science, and Arts Occupations	21
Persons Employed in Service Occupations	17
Persons Employed in Sales and Office Occupations	16
Persons Employed in Natural Resources, Construction, and Maintenance Occupations	18
Persons Employed in Production, Transportation, and Material Moving Occupations	26
Median Household Income	$70,625
Median Family Income	$83,750
Percent of Persons < 18 yrs. Below Poverty Level	2.2%
Percent of Persons 18-64 Yrs. Below Poverty Level	7.7%
Percent of Persons >65 Yrs. Below Poverty Level	0.0%
Social Characteristics, 2012-2016 ACS	
School Enrollment (3 yrs and over)	51
Nursery School, Preschool	3
Kindergarten and Elementary School (grades 1-8)	66
High School (grades 9-12)	20
College or Graduate School	5
Education Attainment: Population 25 Years and Over	100
Less than High School Graduate	0
High School Graduate (includes equivalency)	67
Some College, Associate's Degree	22
Bachelor's Degree or Higher	11

Community Services

Table G3 shows the primary utility providers for the City of North Washington.

TABLE G3: NORTH WASHINGTON UTILITY PROVIDERS						
Electric	**Natural Gas**	**Telephone/Internet**	**Cable**	**Water**	**Sewer**	**Sanitation**
Alliant Energy	None	Windstream	None	Well (private)	Septic	Jendro (contract)

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 North Washington evaluated the risk associated with a specific hazard, defined by probability and frequency of occurrence, magnitude, severity, exposures, and consequences. North Washington'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

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, North Washington determined that even though the historical occurrences were low for certain hazards, the probability ranking for future occurrences should be higher.

Table G4 is the analysis scores for the City of North Washington. As shown in the table, the top four hazards for the city are: Severe Winter Storm, Thunderstorm/Lightning/Hail, Grass/Wild Fire, and Tornado/Windstorm.

TABLE G4: CITY OF NORTH WASHINGTON HAZARD RISK ASSESSMENT						
Hazard Rank	**Hazard**	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**Hazard Score**
1	Severe Winter Storm	4	4	3	2	**3.65**
2	Thunderstorm/Lightning/Hail	4	4	3	1	**3.55**
3	Grass/Wild Fire	4	3	3	1	**3.25**
4	Tornado/Windstorm	3	4	2	3	**3.15**
5	Animal/Plant/Crop Disease	4	2	2	3	**3**
6	HAZMAT Incident	2	3	4	1	**2.5**
7	Transportation Incident	3	2	1	1	**2.2**
7	River Flooding	1	4	1	4	**2.2**
9	Earthquake	1	3	4	1	**2.05**
10	Drought	3	1	1	1	**1.9**
11	Flash Flood	2	2	1	1	**1.75**
11	Extreme Heat	2	2	1	1	**1.75**
13	Infrastructure Failure	2	1	1	1	**1.45**
14	Human Disease	1	2	1	1	**1.3**
14	Expansive Soils	1	2	1	1	**1.3**
16	Terrorism	1	1	1	1	**1**
16	Radiological Incident	1	1	1	1	**1**

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). The following discussion only considers the assets in the community of North Washington.

TABLE G5: CRITICAL FACILITIES IN NORTH WASHINGTON	
Fire Department	

Source: Community

Critical Facilities

Identifying the location of critical facilities and designated shelters (see TableG5) in North Washington 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.

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. North Washington does not have any nursing homes or group homes located in the community.

According to Section 2, North Washington is projected to remain steady in population over the next thirty years. This population plateau most likely results in a no 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

The City of North Washington is minimally affected by flooding from the Little Wapsipinicon River. *Map 4i: Flood Scenario* shows the flood hazard areas for North Washington and the potential impact a flooding event would have on the community. As shown on the map, there are currently zero building that are impacted by a 1% annual chance flood.

As stated on the FEMA website[21], mobile homes are highly vulnerable to tornadoes. Even mobile homes that are tied down, offer little protection from tornadoes.

TABLE G6: CITY OF NORTH WASHINGTON 100-YEAR FLOODPLAIN PROPERTIES		
	# of Buildings	**% of Buildings**
1.0% Annual Chance Floodplain	0	0.00%
0.2% Annual Chance Floodplain	0	0.00%
Total Unincorporated Out of Floodplain	158	100.00%
Total Unincorporated	158	100.00%

Figures calculated using data from Chickasaw County GIS Department; Parcel data current as of June 2018

[21] Federal Emergency Management Agency (FEMA), http://www.fema.gov/areyouready/tornadoes.shtm

According to American Community Survey 5-year average, there 2 mobile homes located in the city. Based on the city's average household size of 2.72 persons, it can be estimated that approximately 6 persons live in mobile home. General observation would suggest a recent increase in the number of manufactured homes in the area. This increased popularity has the potential to increase the potential risk of damage to people and property in the community. Currently, no FEMA certified tornado safe shelters are known to exist in the community.

The primary reason for the increased popularity of mobile and manufactured homes is affordability. Although HUD regulations and local building codes have increased the safety components of these types of houses significantly in recent history, this affordability has often been accompanied with a reduced level of safety. 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, 1999*).

Finally, persons living in some multi-family housing units may also be at risk, due to the lack of a proper emergency shelter. Fortunately, according to 2016 ACS data, there are not any multifamily units in the city.

Vulnerability – Social Assets (Populations)

The social vulnerability assessment identified how the hazards affect the population of North Washington 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 G7 presents an overview of the at-risk population in North Washington according to information retrieved from the 2010 U.S. Census and Iowa Data Center.

TABLE G7: CITY OF NORTH WASHINGTON "AT-RISK" POPULATION

Total City Population (2010)	117
Elderly (65 yrs and older)	9
Youth (under 18 yrs old)	35
Householder Living Alone	10
Population in Mobile Homes	6
Group Quarters Population	0

Source: 2010 U.S. Census, 2010-2014 ACS 5-year Averages

According totable G7, 7.7 percent of residents are 65 years or older. There are zero persons living in group quarters, indicating the remaining elderly populations live throughout the community.

Children 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. According to ACS, 29.9 percent of the community's population is under the age of 18.

Vulnerability – Estimating Potential Property Losses

Valuations are an important component of hazard mitigation planning insomuch 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 North Washington are available from the County Assessors and Auditors offices. City of North Washington's property valuations are in Table G8. 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.

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.

National Flood Insurance Program/Repetitive Loss Properties

The city participates in the National Flood Insurance Program (NFIP). As Table G9 shows, there are currently zero NFIP policies in place within the city.

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 is one repetitive loss property in North Washington. Table G9 shows relevant NFIP and Repetitive Loss statistics for the city.

TABLE G9: NFIP AND REPETITIVE LOSS DATA FOR NORTH WASHINGTON

CID #	# of NFIP Policies	NFIP Insurance in Force ($)	Total # of RLB	RLB Insured	# of Active RLB	Total RLB Losses ($)	RLB Losses Insured ($)
190971	0	$0	0	0	0	$0	$0

Source: Federal Emergency Management Agency (FEMA); Note: RLB = Repetitive Loss Building

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.

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 identified are as follows:

1. Reduce the chance of and impact of flooding in the community.
2. Take measures to minimize the occurrence of injuries and loss of life due to hazards.
3. Take measures to minimize or eliminate damages that may occur as a result of hazards.
4. Increase the city's ability to respond to natural disasters and man-made hazards.
5. Return to the community to similar or improved pre-event conditions as quickly as possible following a disaster event.
6. Incorporate the City Plan into the proposed Multi-Jurisdictional Plan.
7. Continually re-assess and re-evaluate the plan and mitigation activities.

Current Mitigation Actions

Prevention Mitigation Actions

The community of North Washington has no ordinances or regulations. Table G10 summarizes these documents.

TABLE G10: CURRENT PLANNING AND REGULATORY DOCUMENTS FOR NORTH WASHINGTON

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	No

Source: Local Communities

Property Protection Mitigation Actions

There are no current property protection activities in the community.

Public Education and Awareness Mitigation Actions

The community of North Washington relies on Chickasaw County for public education and hazard awareness.

Emergency Services Mitigation Actions

Chickasaw County Emergency Management

Fredericksburg works with the Chickasaw County Emergency Management Coordinator, based out of the City of New Hampton, 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 Austen Seely and current contact information is as follows: Chickasaw County Emergency Management Agency, 260 E. Prospect Street, New Hampton, Iowa 50659, (641) 394-2406, email: ema@chickasawcoia.org.

Warning Systems & Communication

Two warning sirens.

In the event of a tornado the City of North Washington has two early warning sirens to warn the public of an oncoming storm. NOAA Weather Radio broadcasts are also available in the community. NOAA Radio's provide up-to-the-minute weather-related alerts. The community also participates in Chickasaw County's Code Red emergency notification system. The outdoor early warning system consists of four sirens that are activated either by the Sheriff's Department or the Emergency Management Office. Other locations that warnings and watches can be found are television, Internet, and radio.

Chickasaw 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 Chickasaw 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.

Law Enforcement

Chickasaw County Sheriff's Department provides police service to the community of North Washington.

Fire Protection

The City of North Washington has a volunteer Fire Department with a force of 16 volunteer firemen. The department's coverage area is 25 square miles. The fire department has in place 28E agreements with surrounding communities to provide and receive assistance as needed on a mutual aid basis. The department's equipment includes:

- 1979 pumper truck (750 gallons per minute)
- 1984 tanker/pumper (1,000 capability with 250 gallons per minute)

- 2015 grass truck

Ambulance
Chickasaw Ambulance serves North Washington if service is needed.

Medical Facilities
The closest hospital is Mercy Medical Center in New Hampton; along with a Mercy Family Clinic.

HAZMAT
North Washington 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.

Streets and Public Works Department
Work is completed by City Officials

Natural Resource Protection Mitigation Actions
North Washington has not done any natural resource protection mitigation actions.

Structural Projects Mitigation Actions
None.

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.

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. Based on this analysis, each activity was ranked as High (H), Medium (M) or Low (L). However, not all identified activities are applicable to all jurisdictions and is marked as such in Table G10.

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

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, identified the responsible party (ies) for each activity and finally related each activity to at least one of the five Hazard Mitigation Plan Goals listed above. Table G11 below is the City of North Washington's Implementation Strategy.

TABLE G11: CITY OF NORTH WASHINGTON'S IMPLEMENTATION STRATEGY						
Priority	**Mitigation Action/Program/Project**	**Associated Hazard**	**Primary Agency Responsible for Implementation**	**Date for Completion**	**Estimated Cost (s)**	**Funding Source**
Medium	Educate the public on hazards	ALL	City Council, County Emergency Management	On-Going	Minimal	
High	Training and equipping the Fire Department	ALL	City Council, Fire Department	On-Going	Minimal-High	
High	Continue to send firefighters and council members to weather spotting classes	Tornado	City Council, Fire Department	On-Going	Minimal	
Medium	Continue to use the County Sheriff Office for law enforcement	ALL	City Council, County Sheriff	On-Going	Minimal	
High	Continue to maintain tornado sirens	Tornado	City Council, Fire Department, County Emergency Management	On-Going	Minimal	
Medium	Maintain all mutual aid agreements	ALL	City Council	On-Going	Minimal	

APPENDIX H: NASHUA-PLAINFIELD COMMUNITY SCHOOL DISTRICT

DISTRICT PROFILE

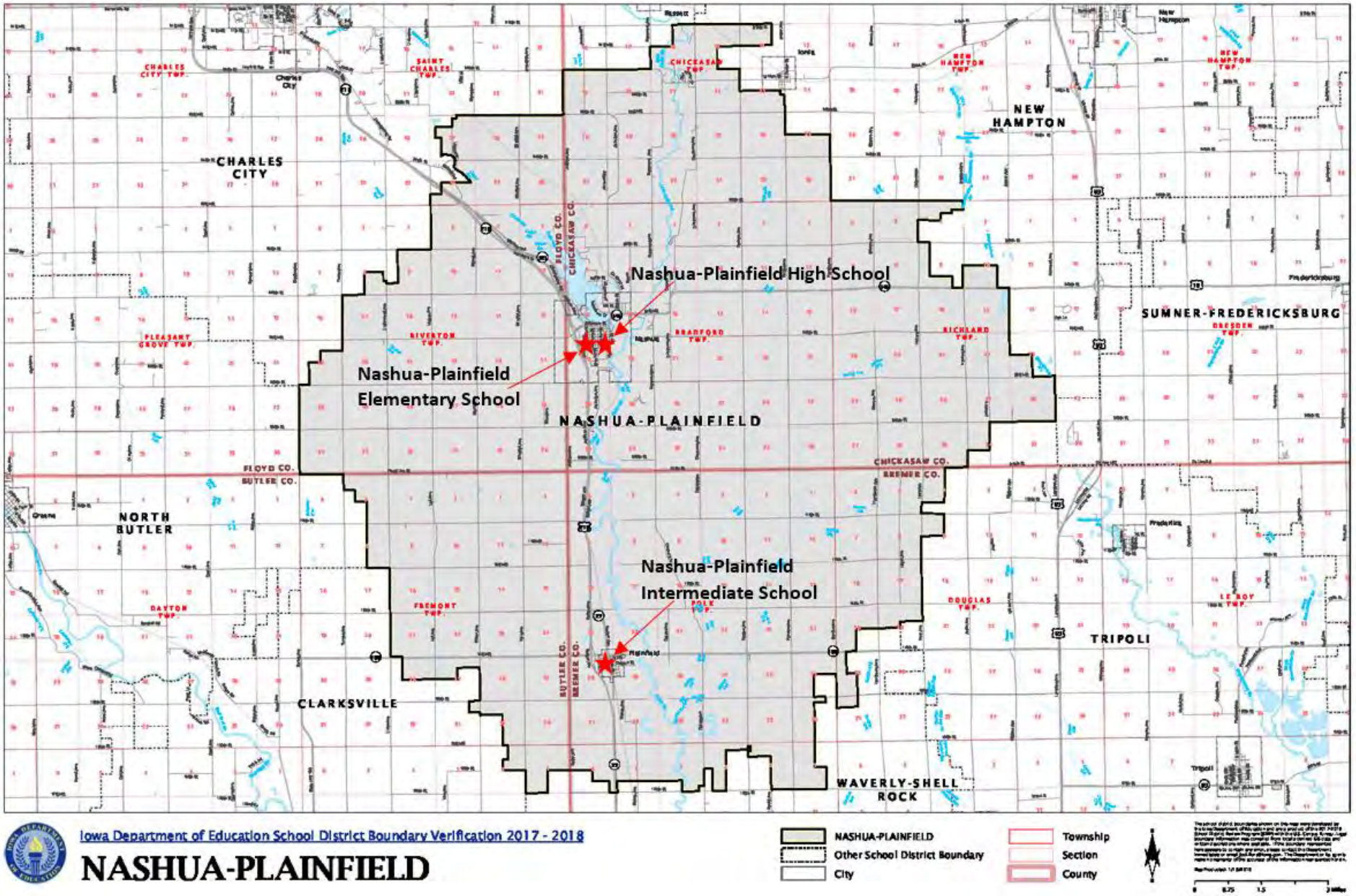
The Nashua-Plainfield Community School District, based in the Cities of Nashua and Plainfield, provides Pre-kindergarten through 12th grade education to nearly 615 students. The District serves the Cities of Nashua and Plainfield, as well as surrounding unincorporated areas. Figure H1 is a map of the school district's area as of the 2017-18 school year.

The school's high school campus is located in the western quadrant of the city at 612 Greeley Street in Nashua. In addition to the high school building, there is also one elementary school located at 621 Panama Street in Nashua and one middle school located 417 Main Street in Plainfield.

TABLE H1: HISTORIC CERTIFIED ENROLLMENT

School Year	Certified Enrollment
2013-2014	646.4
2014-2015	624.4
2015-2016	630.1
2016-2017	623.3
2017-2018	612.8

Figure H1: Map of Nashua-Plainfield Community School District



Community Services

Table H2 shows the primary utility providers for the City of Nashua.

TABLE H2: NASHUA-PLAINFIELD COMMUNITY SCHOOLS UTILITY PROVIDERS						
Electric	**Natural Gas**	**Telephone/Internet**	**Cable**	**Water**	**Sewer**	**Sanitation**
MidAmerican Energy	MidAmerican Energy	Qwest	Butler-Bremer Communications	City of Nashua	PeopleService, Inc. (Contracted)	Jendro (Contracted)

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 H3 displays the school district's hazard scores. The top three hazards for the Nashua-Plainfield Community Schools are Tornado/Windstorm, Dam/Levee Failure, and Thunderstorm/Lightning/Hail.

TABLE H3: CITY OF NASHUA-PLAINFIELD HAZARD RISK ASSESSMENT						
Hazard Rank	**Hazard**	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**Hazard Score**
1	Tornado/Windstorm	3	4	4	4	**3.55**
2	Dam / Levee Failure	3	4	3	4	**3.4**
2	Thunderstorm/Lightning/Hail	4	2	4	4	**3.4**
4	River Flooding	3	4	3	3	**3.3**
5	Flash Flood	3	3	4	3	**3.15**
6	Terrorism	1	4	4	4	**2.65**
7	Animal/Plant/Crop Disease	3	1	4	3	**2.55**
7	Severe Winter Storm	3	2	2	3	**2.55**
9	Infrastructure Failure	2	2	4	4	**2.5**
10	HAZMAT Incident	2	2	4	1	**2.2**
11	Extreme Heat	3	1	1	3	**2.1**
12	Human Disease	1	3	1	4	**1.9**
12	Transportation Incident	2	1	4	1	**1.9**
14	Drought	2	1	1	4	**1.75**
14	Earthquake	1	1	4	4	**1.75**
14	Expansive Soils	1	1	4	4	**1.75**
14	Grass/Wild Fire	1	1	4	4	**1.75**
14	Landslide	1	1	4	4	**1.75**
14	Radiological Incident	1	1	4	4	**1.75**
14	Sinkholes	1	1	4	4	**1.75**

MITIGATION STRATEGY

Hazard Mitigation Plan Goals

The district established the following 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 Chickasaw County Multi-Jurisdictional Hazard Mitigation Plan, which was adopted in 2014.
- 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.

Chickasaw County Emergency Management

Nashua works with the Chickasaw County Emergency Management Coordinator, based out of the City of New Hampton, 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 Austen Seely and current contact information is as follows: Chickasaw County Emergency Management Agency, 260 E. Prospect Street, New Hampton, Iowa 50659, (641) 394-2406, email: ema@chickasawcoia.org.

Warning Systems & Communications

Radio, television, cellular telephones, landline telephones, newspapers, and National Oceanic and Atmospheric Association (NOAA) Radio Service are available to the public at large.

Chickasaw 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 Chickasaw 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.

Law Enforcement

Police protection is provided by the Nashua Police Department, Chickasaw County Sheriff's Department, and the Iowa State Patrol. There is a total of four individuals serving the Nashua Police Department.

Fire Protection

Fire protection is provided for Nashua with a force of 25 volunteer firemen. The Fire Department recently constructed a new fire station, located along Highway 346 on the east side of the Cedar River. This new station provides needed space for fire equipment maintained by the Nashua Fire Department.

Major equipment used by the Nashua Fire Department includes the following:

- 1993 GMC Pumper
- 1977 Ford Pumper
- 1975 Ford Tanker
- 1965 Ford Tanker
- 1984 Chevy 1-ton Rescue Truck
- 1984 Chevy 1-ton, 4x4 Grass/Rescue Truck
- 17 ft. Rescue Boat w/ 40 hp outboard
- Jaws of Life (vehicle extraction device)

The Nashua Fire Department maintains mutual aid agreements with the following communities: All of Floyd County (although mostly with Charles City), Ionia, New Hampton, Fredericksburg, Lawler, North Washington, Alta Vista, Plainfield, Greene, and Clarksville.

The fire department is active in doing its part to educate the public. For example, members from the department participate in an annual Fire Safety Week presentation at the local elementary school. Furthermore, they provide information at Farm Safety Day.

The department communicates via two-way radios (mobile, hand-held, and base station), cellular telephones, hardwire telephones, and use pagers for dispatch purposes.

Typical services performed and/or provided by the department include the following: response to structure fires, grass/wild land fires, extrication, water/ice rescue, confined space rescue, severe weather storm watchers, hazardous materials initial response and detection, flood response, damage control and coordination, EMS assistance, fire education (as mentioned above), smoke and carbon monoxide response.

Expenses that are incurred annually by the department include: annual flow test of air packs, annual air quality test of air fill station, annual pump inspection, CPR re-certification costs, truck maintenance, and updating personal protective and firefighting equipment to meet NFPA standards.

Ambulance

The Chickasaw Ambulance provides volunteer EMT services to Nashua and has a unit in the city.

Medical Facilities

There is a small doctor's office in Nashua, but there are no facilities that provide emergency medical services. The hospital (Floyd County Memorial Hospital) nearest to Nashua is located in Charles City, approximately 10 miles northwest of Nashua.

There are two other hospitals available in a 20-mile radius of the City of Nashua. These include Waverly Municipal Hospital in Waverly and Mercy Medical Center in New Hampton.

HAZMAT

Nashua 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.

Public Works / Street Department

The City currently employs two full time staff in their Public Works Department. Some of the equipment they have available includes snowplows, a road grader, end loader and pickup trucks. The Department is responsible for snow removal, minor road maintenance, grass mowing and miscellaneous projects throughout the city.

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.

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. Based on this analysis, each activity was ranked as High (H), Medium (M)or Low (L). However, not all identified activities are applicable to all jurisdictions and is marked as such in Table H4.

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

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, identified the responsible party (ies) for each activity and finally related each activity to at least one of the five Hazard Mitigation Plan Goals listed above. Table H4 below is the Nashua-Plainfield Community School District's Implementation Strategy.

TABLE H4: NASHUA-PLAINFIELD 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 Nashua-Plainfield 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/Wild Fire, 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	Infrastructure 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

APPENDIX I: NEW HAMPTON COMMUNITY SCHOOL DISTRICT

DISTRICT PROFILE

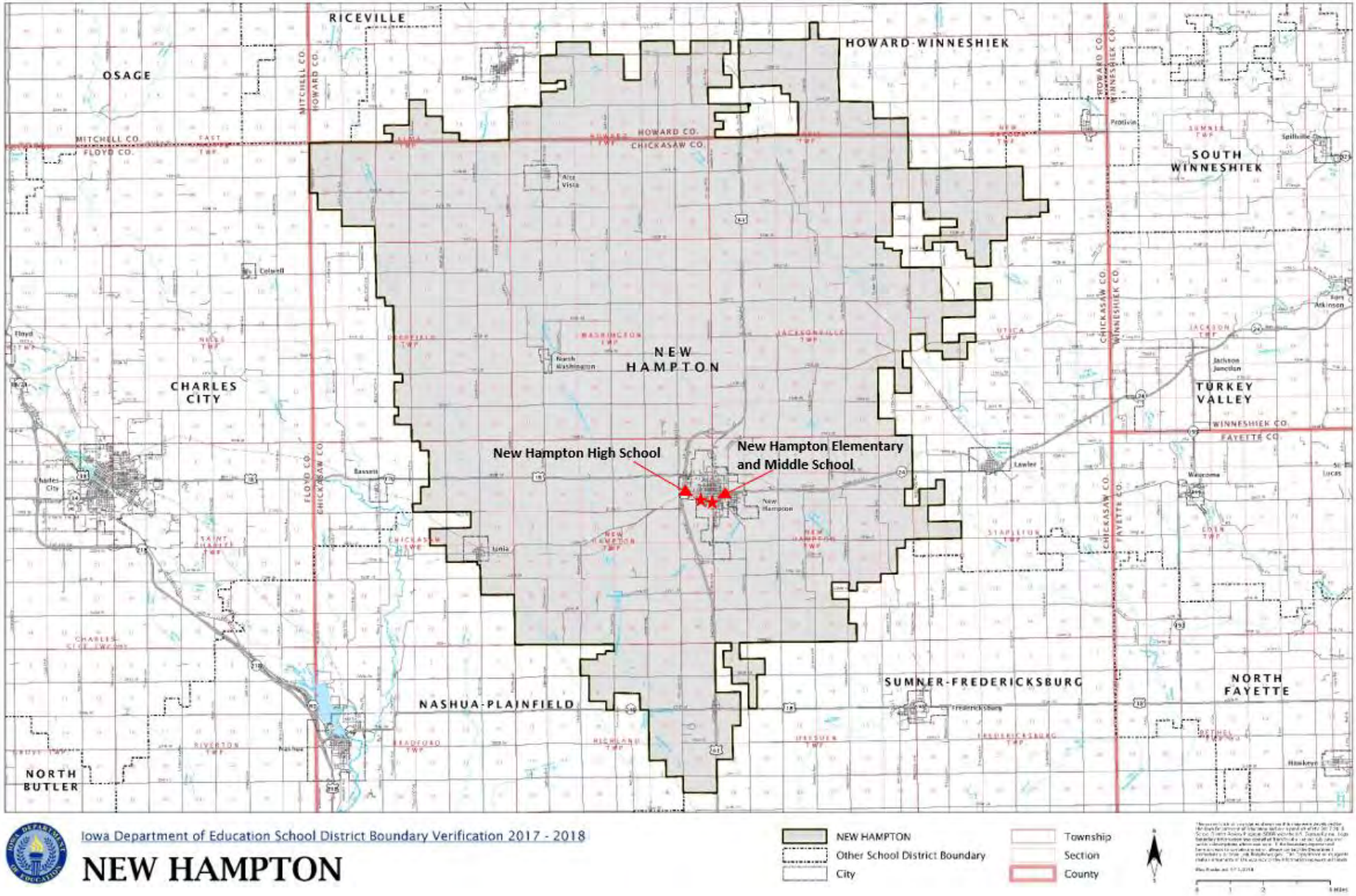
The New Hampton Community School District, based in the City of New Hampton, provides Pre-kindergarten through 12th grade education to nearly 1,220 students. The District serves the City of New Hampton as well as surrounding unincorporated areas. Figure H1 is a map of the school district's area as of the 2017-18 school year.

The school's high school campus is located in the western quadrant of the city at 710 West Main Street. In addition to the high school building, there is also one elementary school and one middle school located at 206 West Main Street.

TABLE I1: HISTORIC CERTIFIED ENROLLMENT

School Year	Certified Enrollment
2013-2014	982.1
2014-2015	970.3
2015-2016	981.9
2016-2017	962.8
2017-2018	959.6

Figure I1: Map of New Hampton Community School District



Community Services

Table I2 shows the primary utility providers for the City of New Hampton.

TABLE I2: NEW HAMPTON COMMUNITY SCHOOLS UTILITY PROVIDERS						
Electric	**Natural Gas**	**Telephone/Internet**	**Cable**	**Water**	**Sewer**	**Sanitation**
New Hampton Municipal Utilities	Black Hills Energy	Windstream	Mediacom	City of New Hampton	City of New Hampton	Jendro Sanitation

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 I3 displays the school district's hazard scores. The top three hazards for the New Hampton Community Schools are Thunderstorm/Lightning/Hail, Severe Winter Storm, and Tornado/Windstorm.

TABLE I3: NEW HAMPTON COMMUNITY SCHOOL DISTRICT HAZARD RISK ASSESSMENT						
Hazard Rank	**Hazard**	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**Hazard Score**
1	Thunderstorm/Lightning/Hail	4	2	2	1	**2.8**
2	Severe Winter Storm	4	1	2	2	**2.6**
3	Tornado/Windstorm	1	3	4	1	**2.05**
4	HAZMAT Incident	1	2	4	3	**1.95**
5	Human Disease	2	1	2	3	**1.8**
6	Flash Flood	2	1	3	1	**1.75**
6	Transportation Incident	1	2	4	1	**1.75**
6	Earthquake	1	2	4	1	**1.75**
7	Dam / Levee Failure	1	1	4	3	**1.65**
8	Infrastructure Failure	1	1	4	2	**1.55**
9	Radiological Incident	1	1	4	1	**1.45**
9	Terrorism	1	1	4	1	**1.45**
9	Animal/Plant/Crop Disease	1	1	2	4	**1.45**
10	Extreme Heat	1	2	1	2	**1.4**
11	River Flooding	1	1	1	4	**1.3**
11	Sinkholes	1	1	3	4	**1.3**
11	Grass/Wild Land Fire	1	1	3	1	**1.3**
11	Drought	1	1	1	4	**1.3**
12	Landslide	1	1	1	1	**1**
12	Expansive Soils	1	1	1	1	**1**

MITIGATION STRATEGY

Hazard Mitigation Plan Goals

The district established the following 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 is currently reviewing and updating it's Crisis Plan and procedures to make sure they are still meeting the needs of the district.
- 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.
- Fire and tornado drills are conducted as required by State guidelines.
- Staff development is being expanded to include more safety procedures.

Chickasaw County Emergency Management

New Hampton works with the Chickasaw County Emergency Management Coordinator, based out of the City of New Hampton, 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 Austen Seely and current contact information is as follows: Chickasaw County Emergency Management Agency, 260 E. Prospect Street, New Hampton, Iowa 50659, (641) 394-2406, email: ema@chickasawcoia.org.

Warning Systems & Communication

The outdoor early warning system consists of four sirens that are activated either by the Sheriff's Department or the Emergency Management Office. In addition to this warning system, some facilities in the City of New Hampton maintain and use the Plectron Warning System. Facilities currently using this system include the Tri/Mark Corporation, the New Hampton Health Center, the high school, and the elementary school.

NOAA Weather Radio broadcasts are also available in the community. NOAA Radio's provide up to the minute weather related alerts. Other locations that warnings and watches can be found are television, Internet, and radio.

Chickasaw 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 Chickasaw 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.

Fire Protection

Fire protection is provided for New Hampton with a force of 29 volunteer firemen. Ideally the Fire Department would be fully staffed with 30 volunteers. The fire station is located in the central part of New Hampton.

Equipment used by the New Hampton Fire Department includes the following:

- 3 Pumper Trucks (1,000 gallon/minute, one 1,500 gallon/minute)
- 2 Tanker (2,000 gallon w/ pump, 2,000 gallon w/o pump)
- 2 Grass Rig (210 gallon w/ pump, 80 gallon pump)

The New Hampton Fire Department maintains mutual aid agreements with the following communities: Alta Vista, Charles City, Protivin, Ionia, Lawler, Nashua, Fredericksburg, and North Washington.

Law Enforcement

Police protection is provided by the New Hampton Police Department, Chickasaw County Sheriff's Department, and the Iowa State Patrol. Currently, there are a total of seven full time officers serving the New Hampton Police Department. Mike Anderson is the current Police Chief for the department.

The Police Department maintains two marked patrol cars and one unmarked patrol car. They maintain mutual aid agreements with surrounding law enforcement agencies, primarily the nearby Sheriff's Department.

Ambulance

Chickasaw Ambulance Service provides ambulance service to area hospitals. Chickasaw Ambulance Service is a private company that contracts service with local entities. The company is based out of New Hampton. There are two ambulance service units in the community.

Chickasaw County Rescue Squad also provides service in New Hampton. There are 42 EMT certified individuals who volunteer to respond to emergency calls on a need basis in the county. Twelve of those individuals reside in New Hampton.

Medical Facilities

New Hampton is served by one local hospital: Mercy Medical Center on Maple Avenue. There are four other hospitals available in a 35-mile radius of the City of New Hampton. In addition to the local hospital, there is also a Mercy Family Clinic in New Hampton.

HAZMAT

New Hampton 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.

P*ublic Works / Street Department*

The Street Superintendent is Donald Mai, Jr. who can be contacted at New Hampton City Hall.

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.

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. Based on this analysis, each activity was ranked as High (H), Medium (M)or Low (L). However, not all identified activities are applicable to all jurisdictions and is marked as such in Table B9.

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

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, identified the responsible party (ies) for each activity and finally related each activity to at least one of the five Hazard Mitigation Plan Goals listed above. Table H4 below is the New Hampton Community School District's Implementation Strategy.

TABLE H4: NEW HAMPTON 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 New Hampton 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	Chickasaw County

2: Geography Maps

a	Topography
b	Sinkholes

3: Flood Plain and Flood Scenario Maps

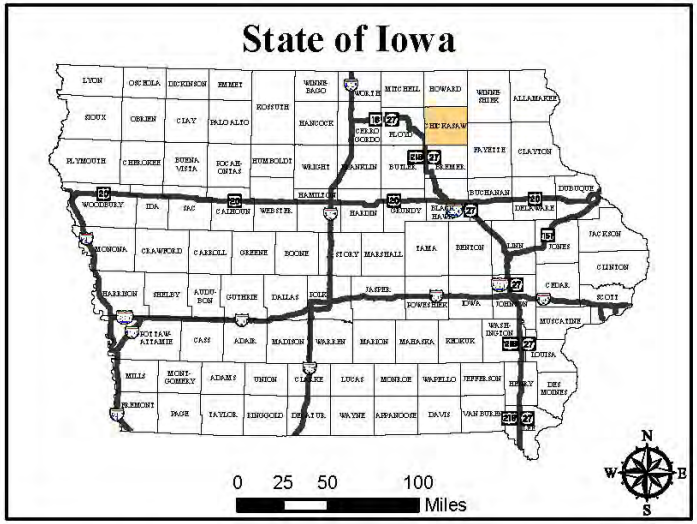
a/b	Chickasaw County
c/d	Alta Vista
e/f	Fredericksburg
g/h	Ionia
i/j	Lawler
k/l	Nashua
m/n	New Hampton
o/p	North Washington

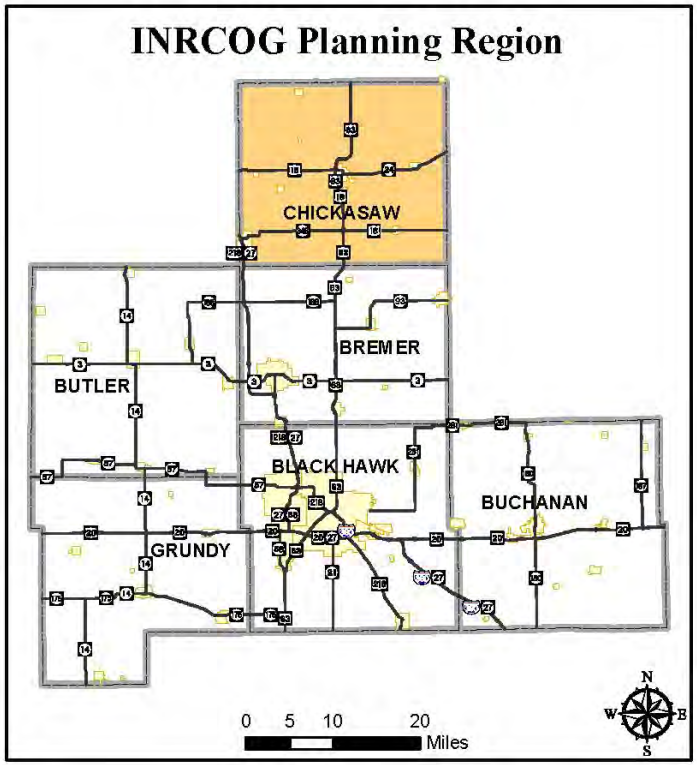
4: Historic Tornado and Scenario Maps

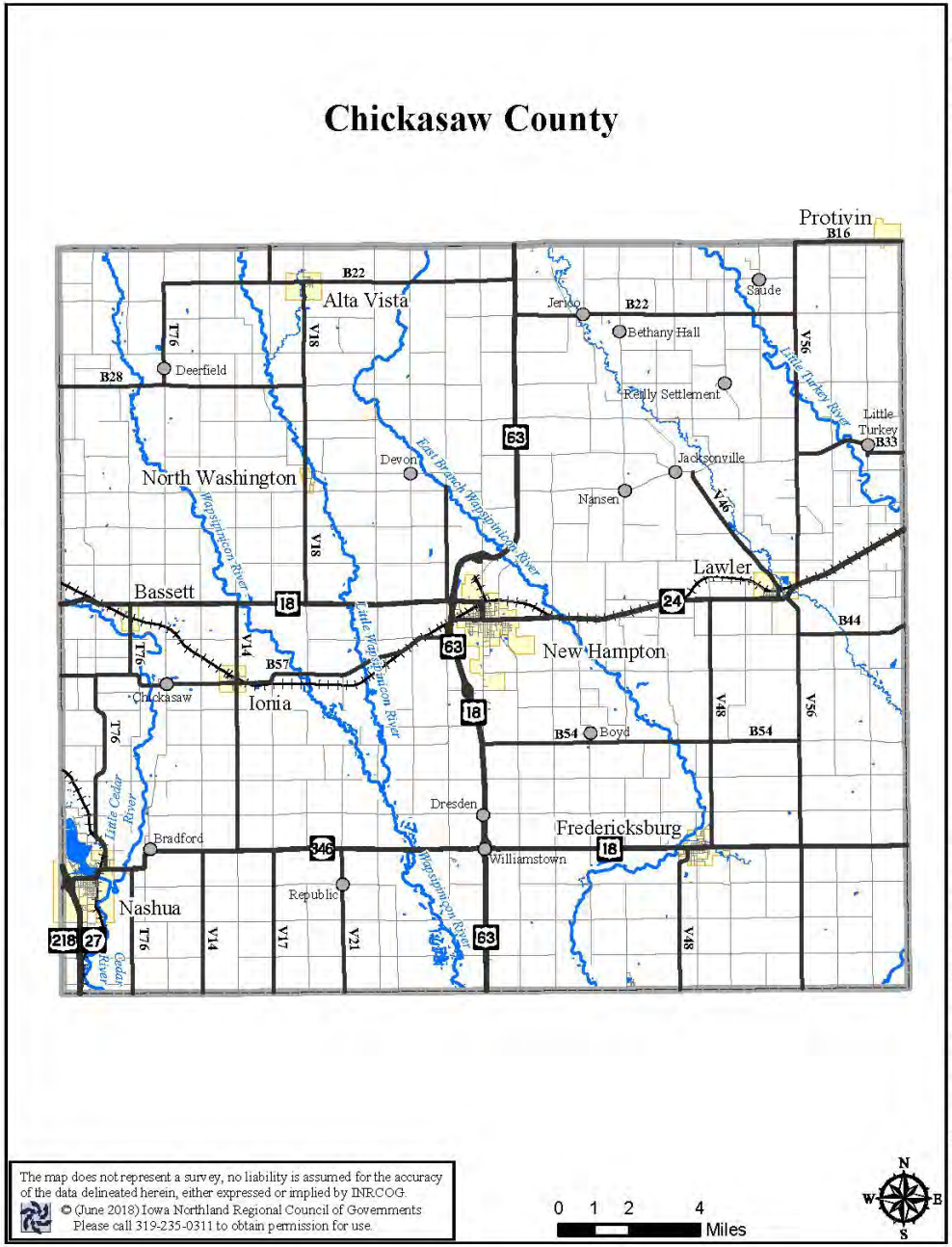
a	Chickasaw County - Historic
b/c	Alta Vista
d/e	Fredericksburg
f/g	Ionia
h/i	Lawler
j/k	Nashua
l/m	New Hampton
n/o	North Washington

5: Critical Site Maps

a	Chickasaw County
b	Alta Vista
c	Fredericksburg
d	Ionia
e	Lawler
f	Nashua
g	New Hampton
h	North Washington
i	Nashua-Plainfield Community School District
j	New Hampton Community School District



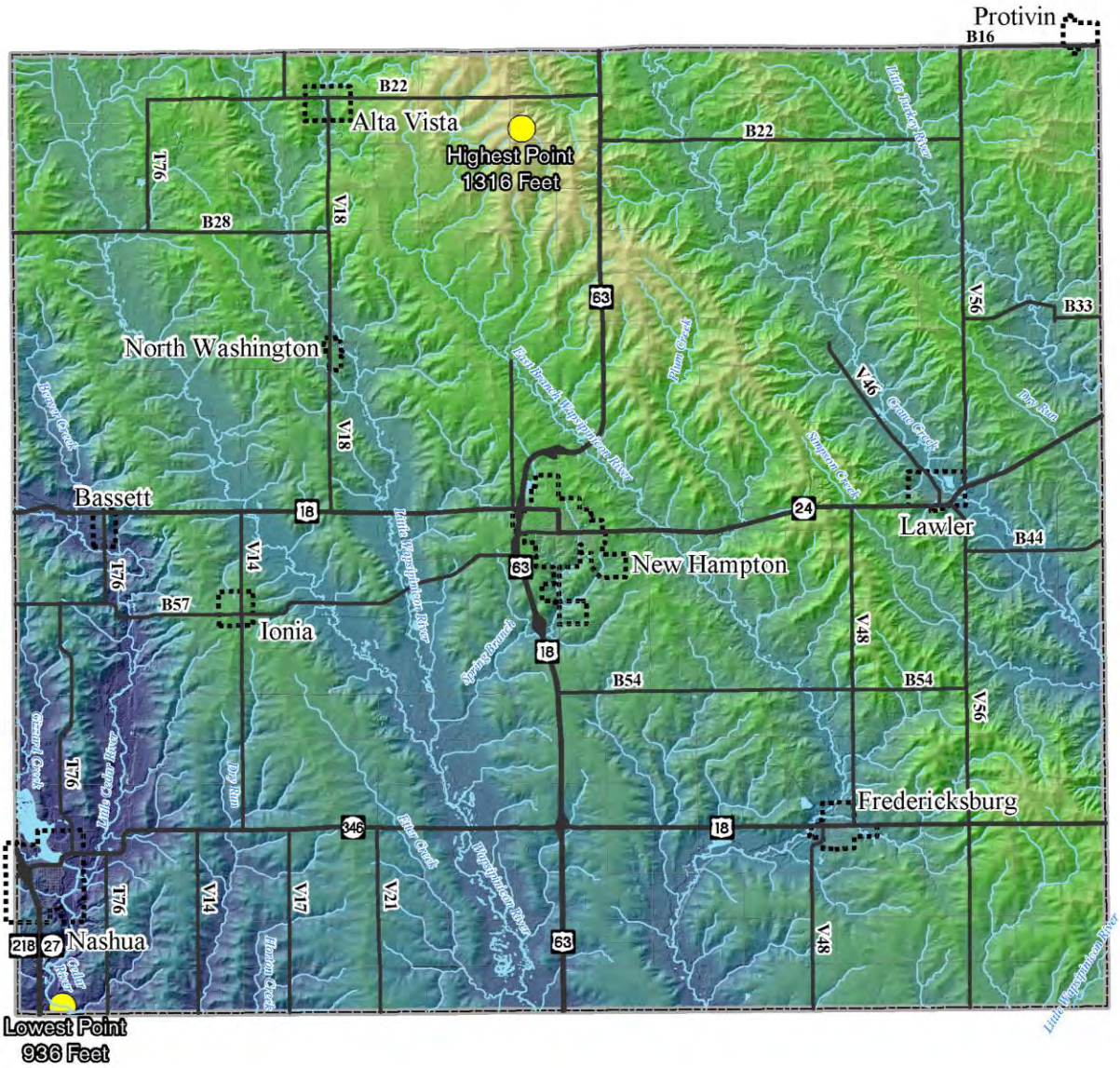




Map 1: Location of the County

Chickasaw County Hazardous Mitigation Plan

Topographic Map



Elevation Data Source: Iowa Department of Natural Resources.

N
W E
S

0 1 2 4 Miles

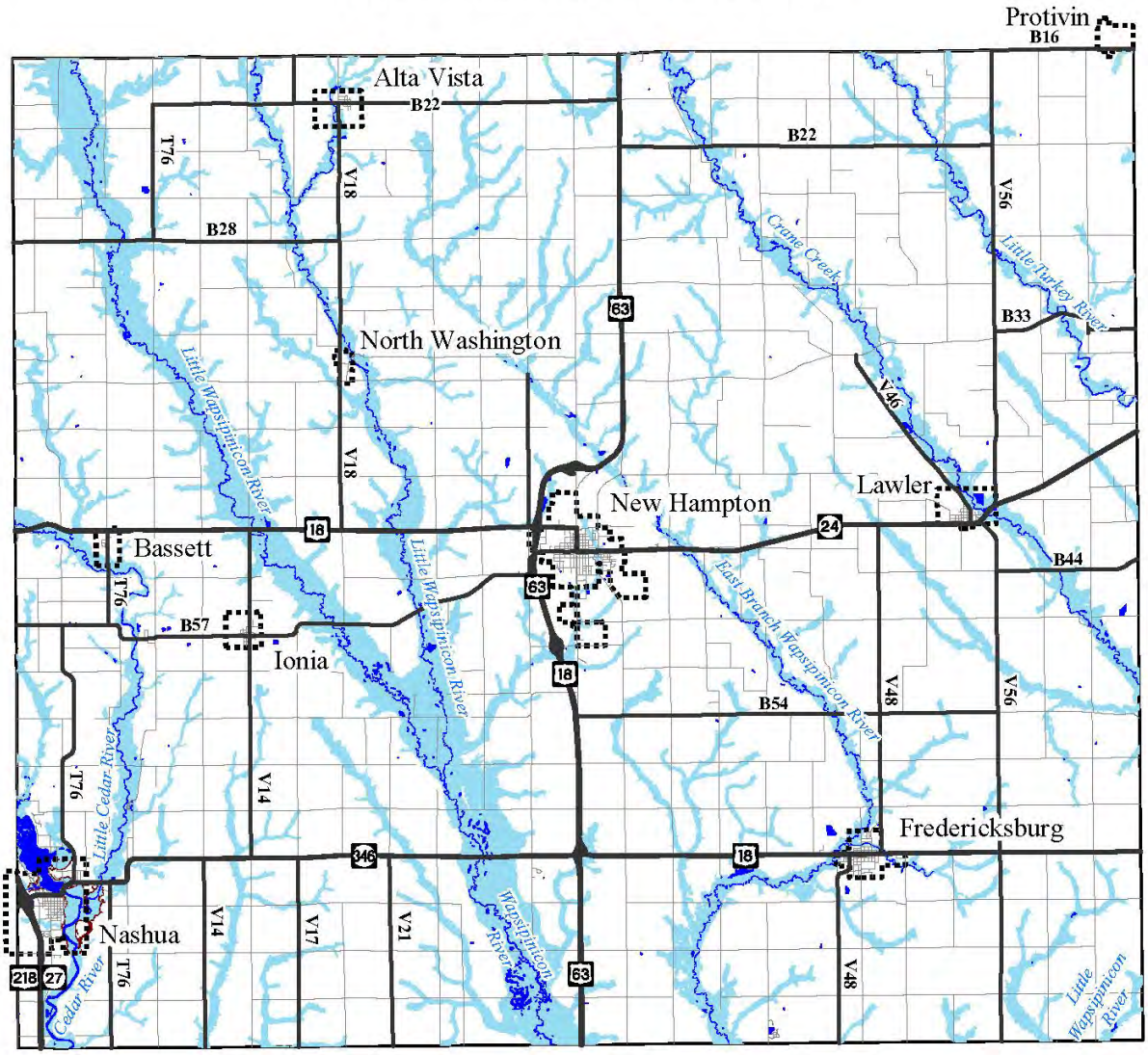
LEGEND

Elevation

High : 1316 Ft.

Low : 936 Ft.

Flood Prone Areas of the County



DISCLAIMER

This flood overlay shows the current floodplain designations in Chickasaw County, Iowa. The digital flood layer was obtained from the Federal Emergency Management Agency (FEMA). This digital data is FEMA's current Digital Flood Insurance Rate map for the County. The effective date is 9/28/2012.

For actual determination if a location is within the floodplain please contact your local floodplain administrator.

LEGEND

Water

Flood Zone

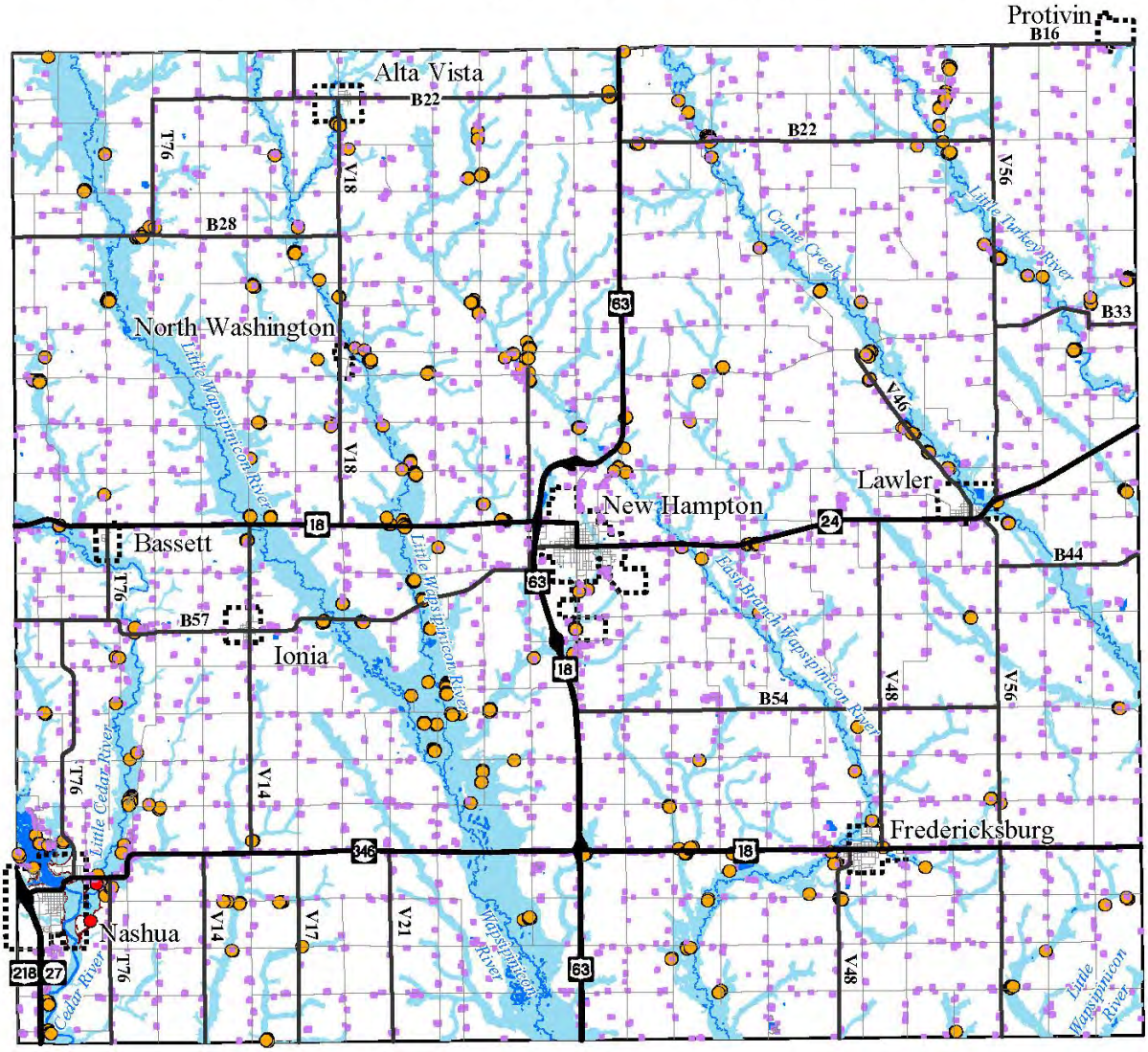
1.0% Annual Chance Of Flooding

0.2% Annual Chance Of Flooding In the Nashua Area Only

N W E S

0 1 2 4 Miles

Flood Prone Buildings in the Unincorporated Areas



DISCLAIMER

This flood overlay shows the current floodplain designations in Chickasaw County, Iowa. The digital flood layer was obtained from the Federal Emergency Management Agency (FEMA). This digital data is FEMA's current Digital Flood Insurance Rate map for the County. The effective date is 9/28/2012.

For actual determination if a location is within the floodplain please contact your local floodplain administrator.

626 - Unincorporated Buildings in the 1.0% Annual Floodplain

2 - Unincorporated Buildings in the 0.2% Annual Floodplain

13707 - Unincorporated Buildings not in the Floodplain

0 1 2 4 Miles

LEGEND

City Limits

Water

Flood Zone

1.0% Annual Chance of Flooding

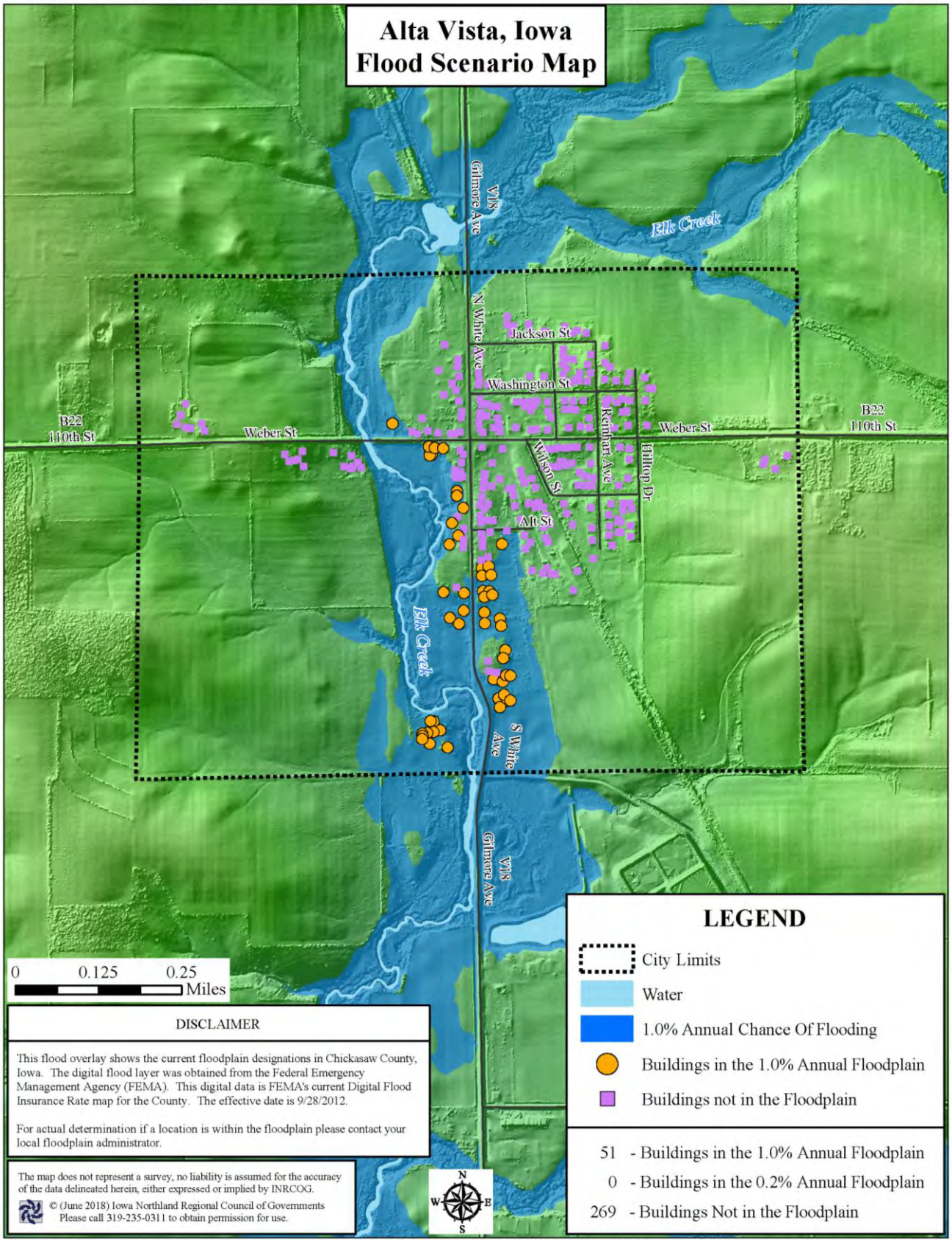
0.2% Annual Chance of Flooding In the Nashua Area Only

Buildings in the 1.0% Annual Floodplain

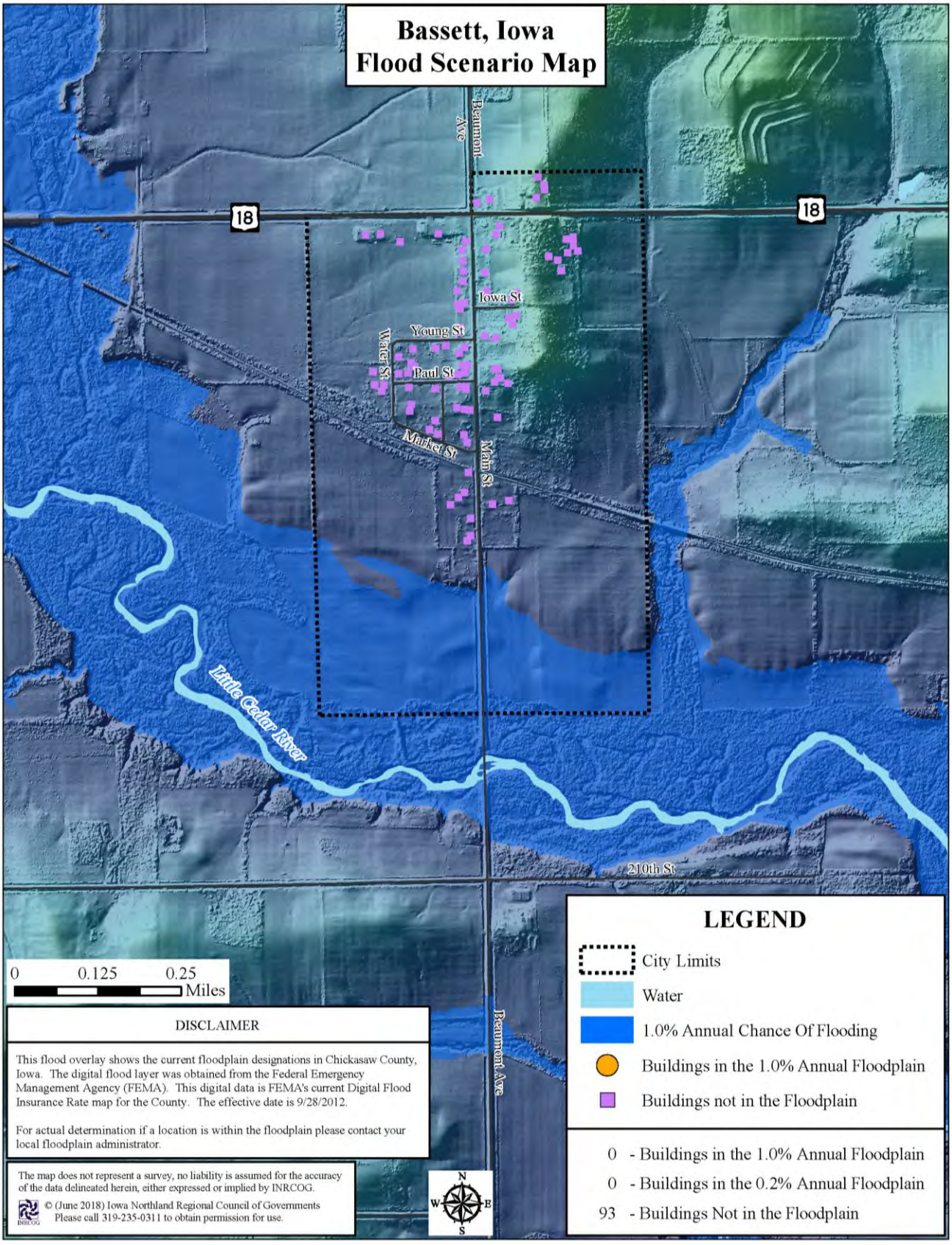
Buildings in the 0.2% Annual Floodplain

Buildings not in the Floodplain

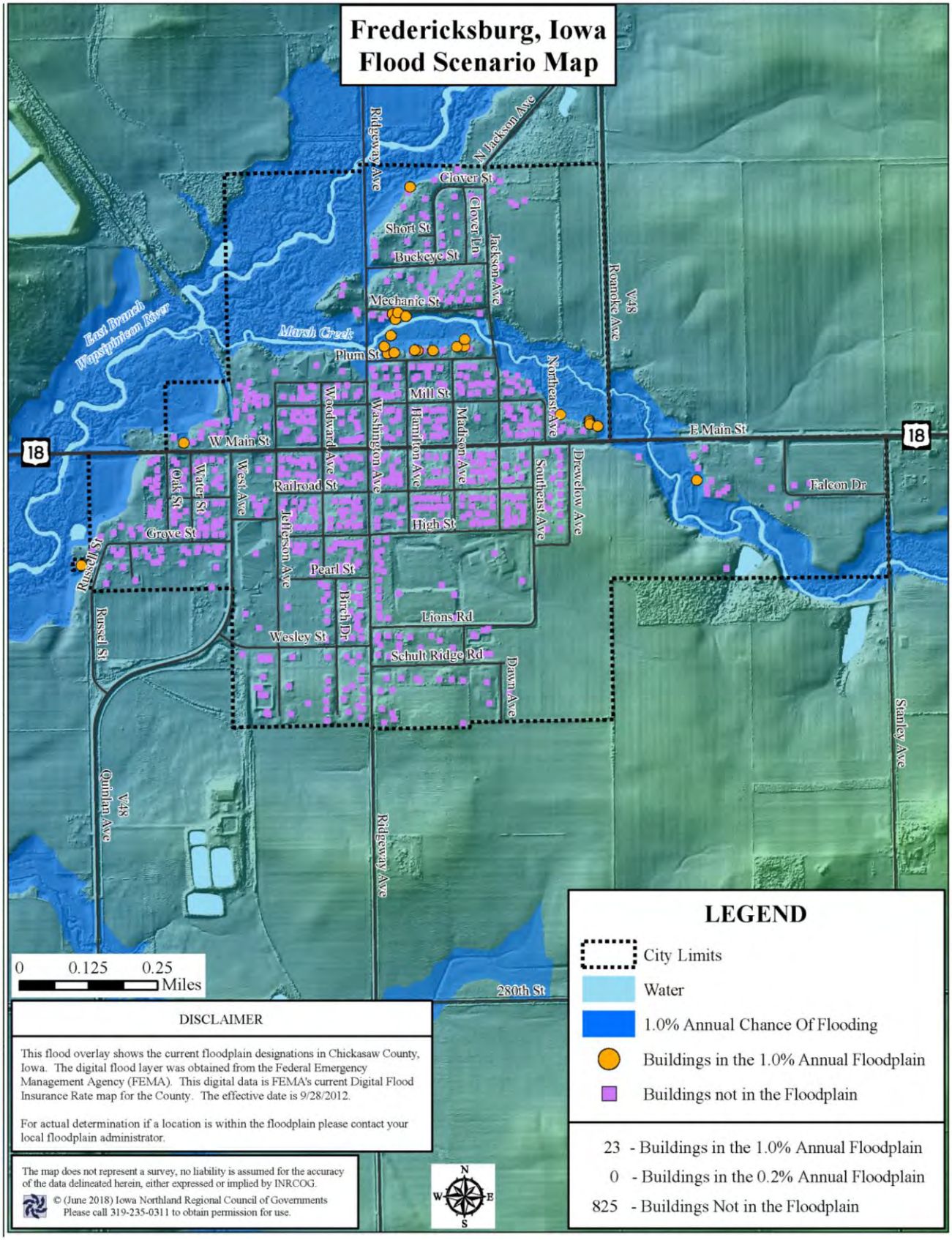
Map 4b: Flood Scenario Map of the City



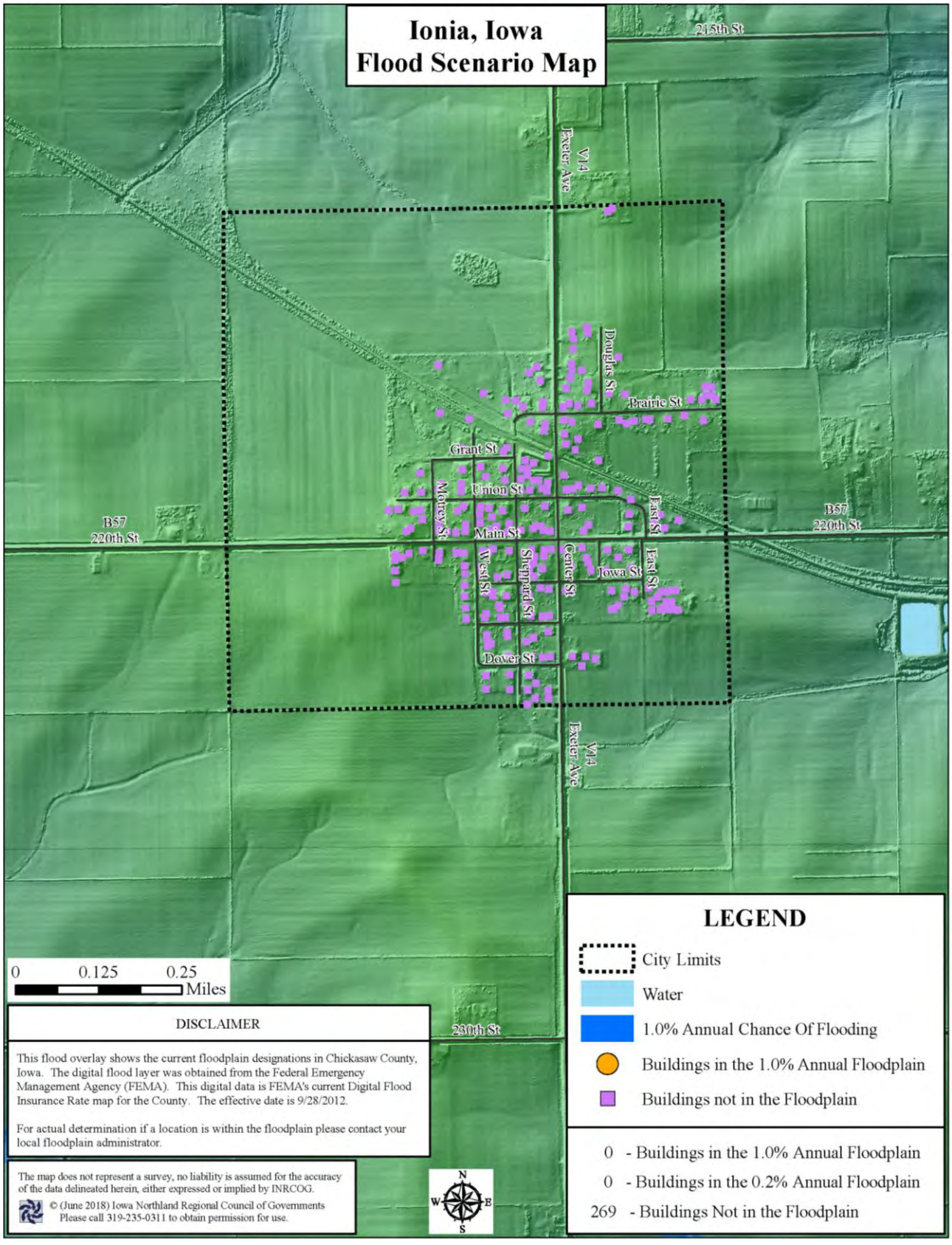
Map 4c: Flood Scenario Map of the City



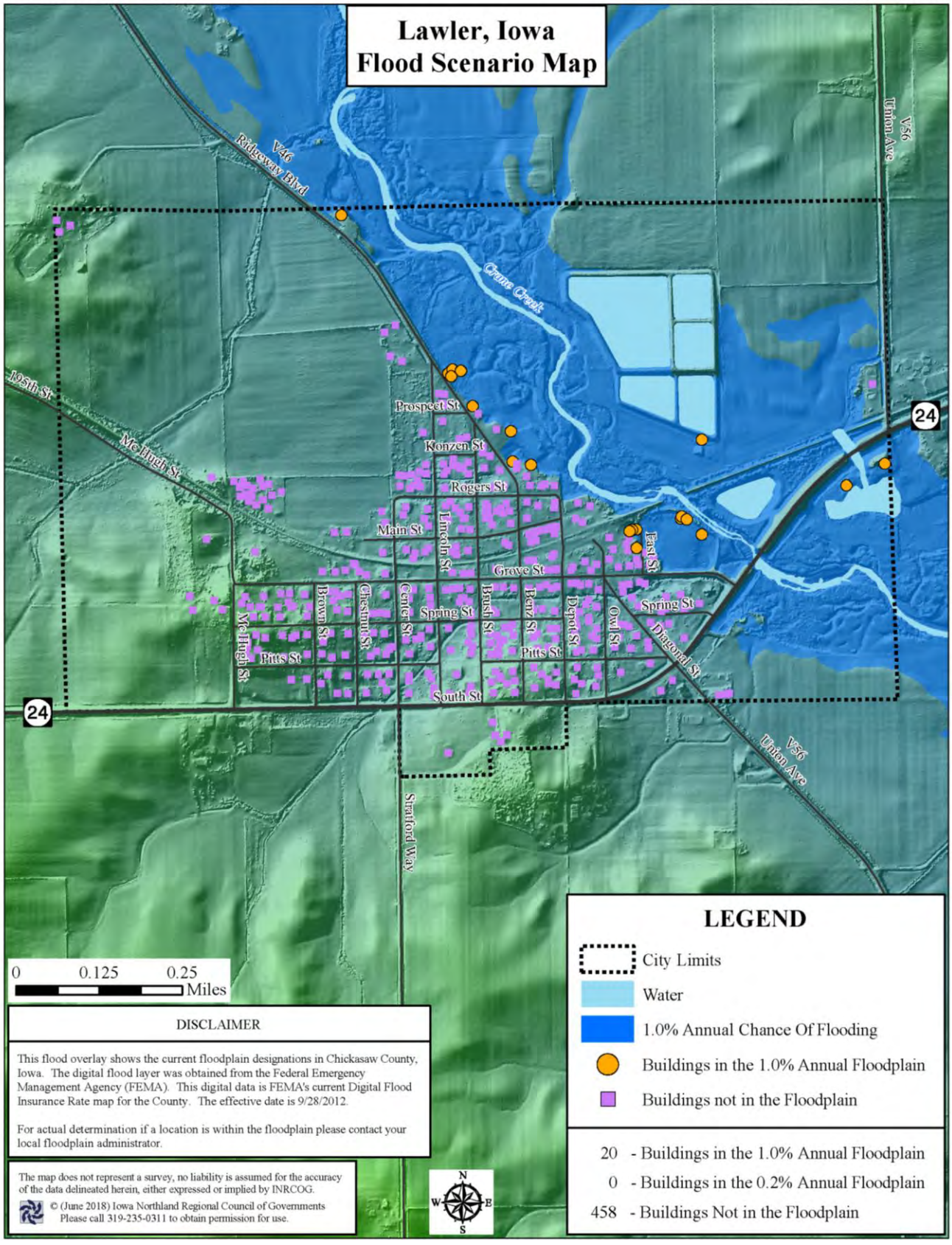
Map 4d: Flood Scenario Map of the City



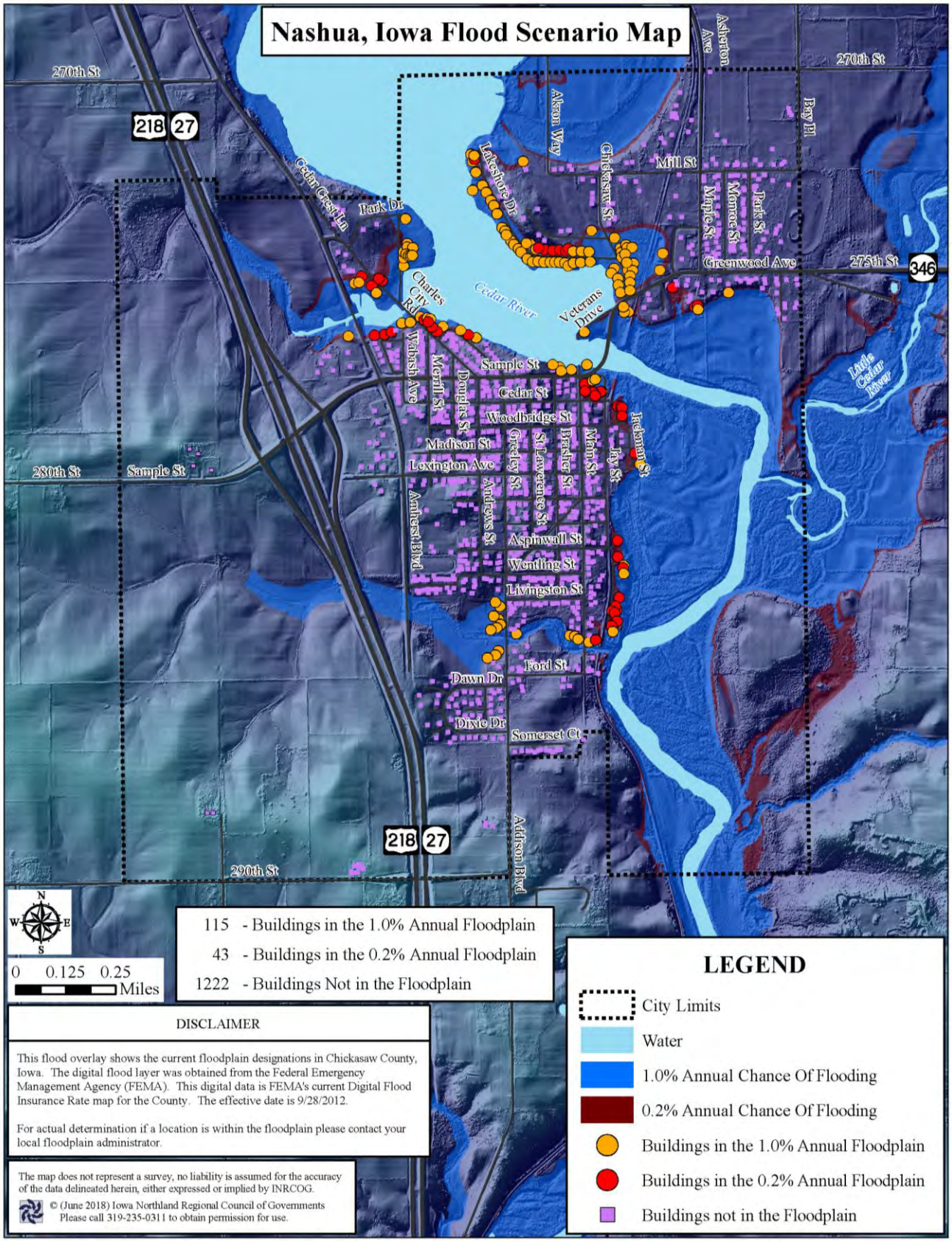
Map 4e: Flood Scenario Map of the City



Map 4f: Flood Scenario Map of the City

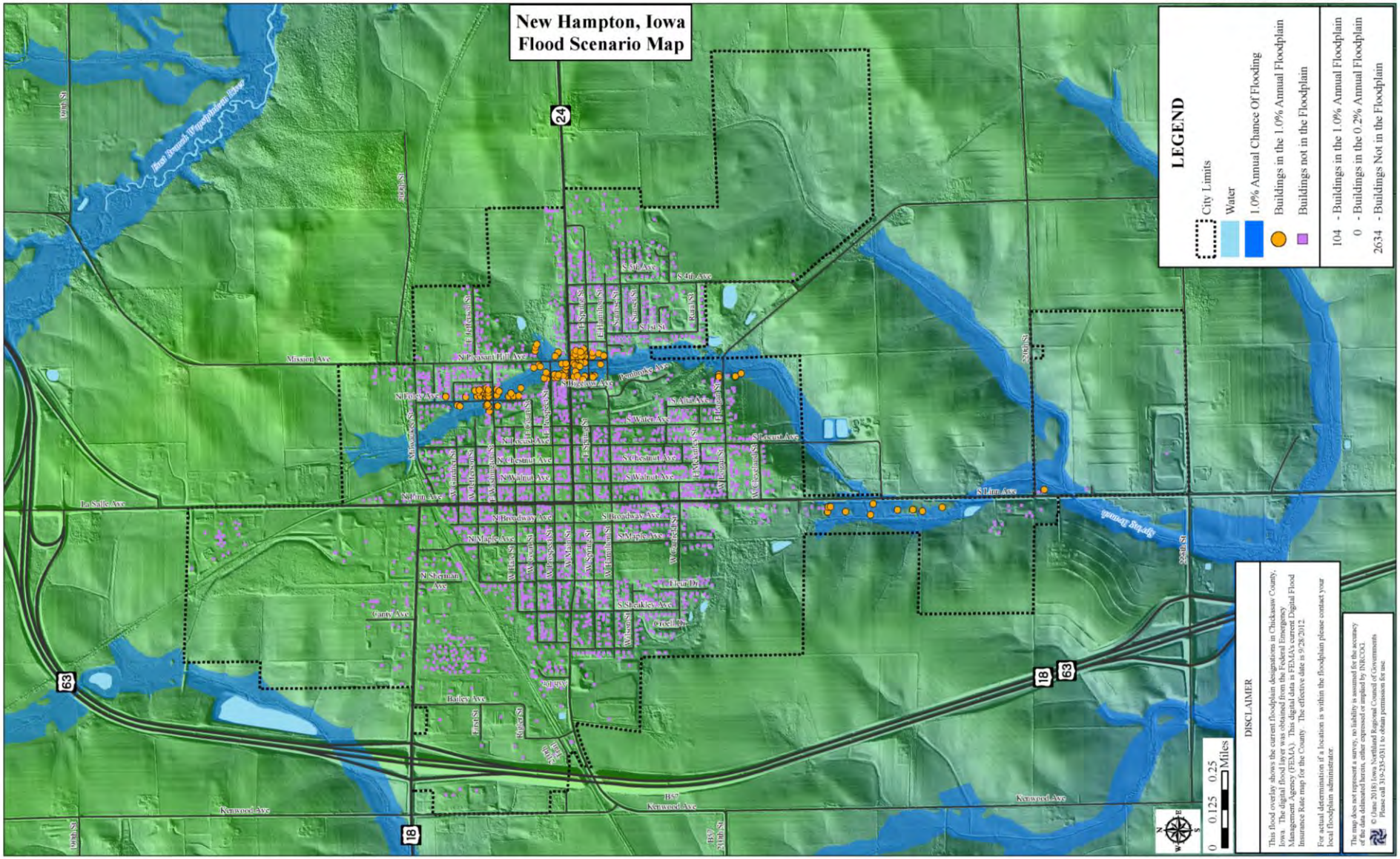


Map 4g: Flood Scenario Map of the City

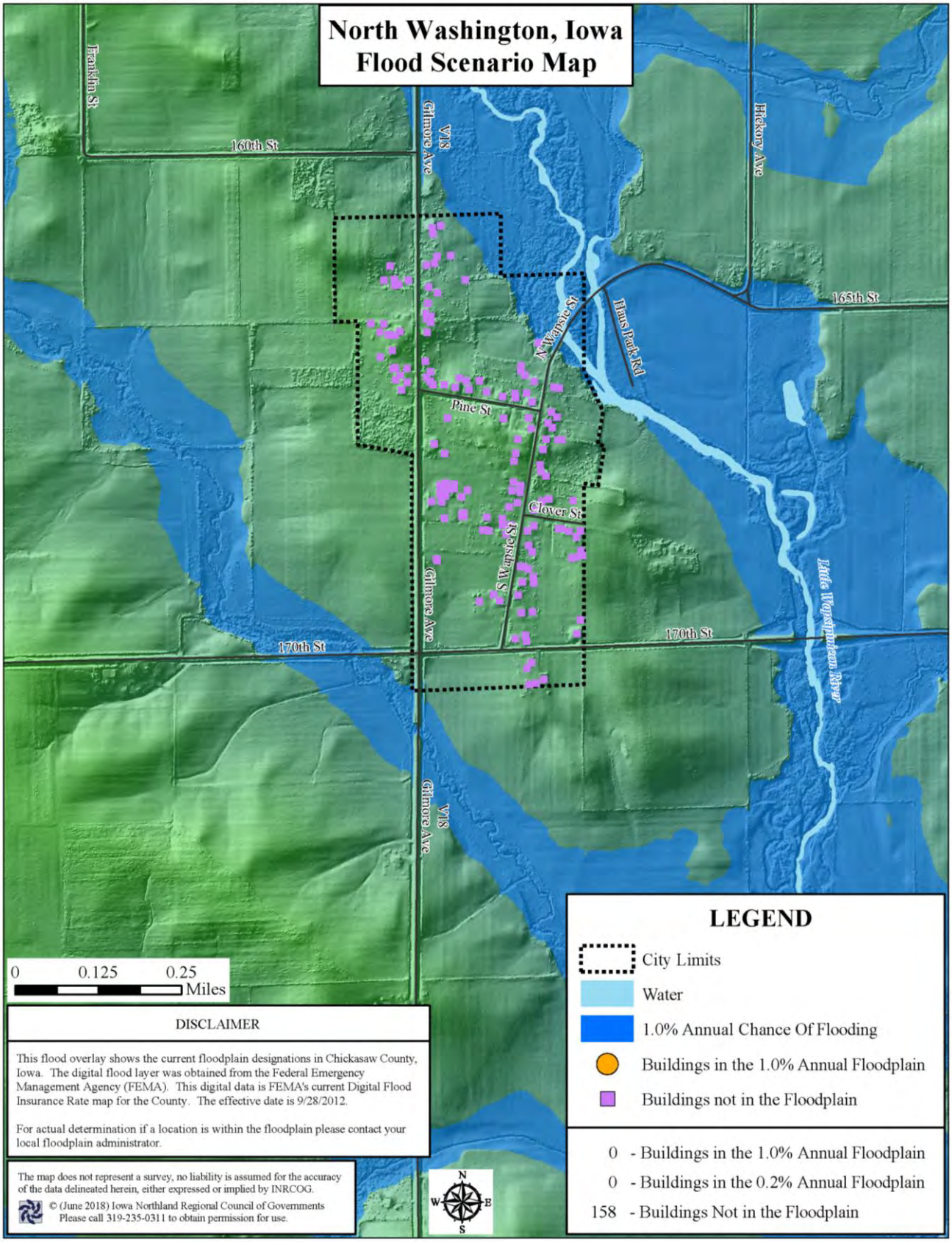


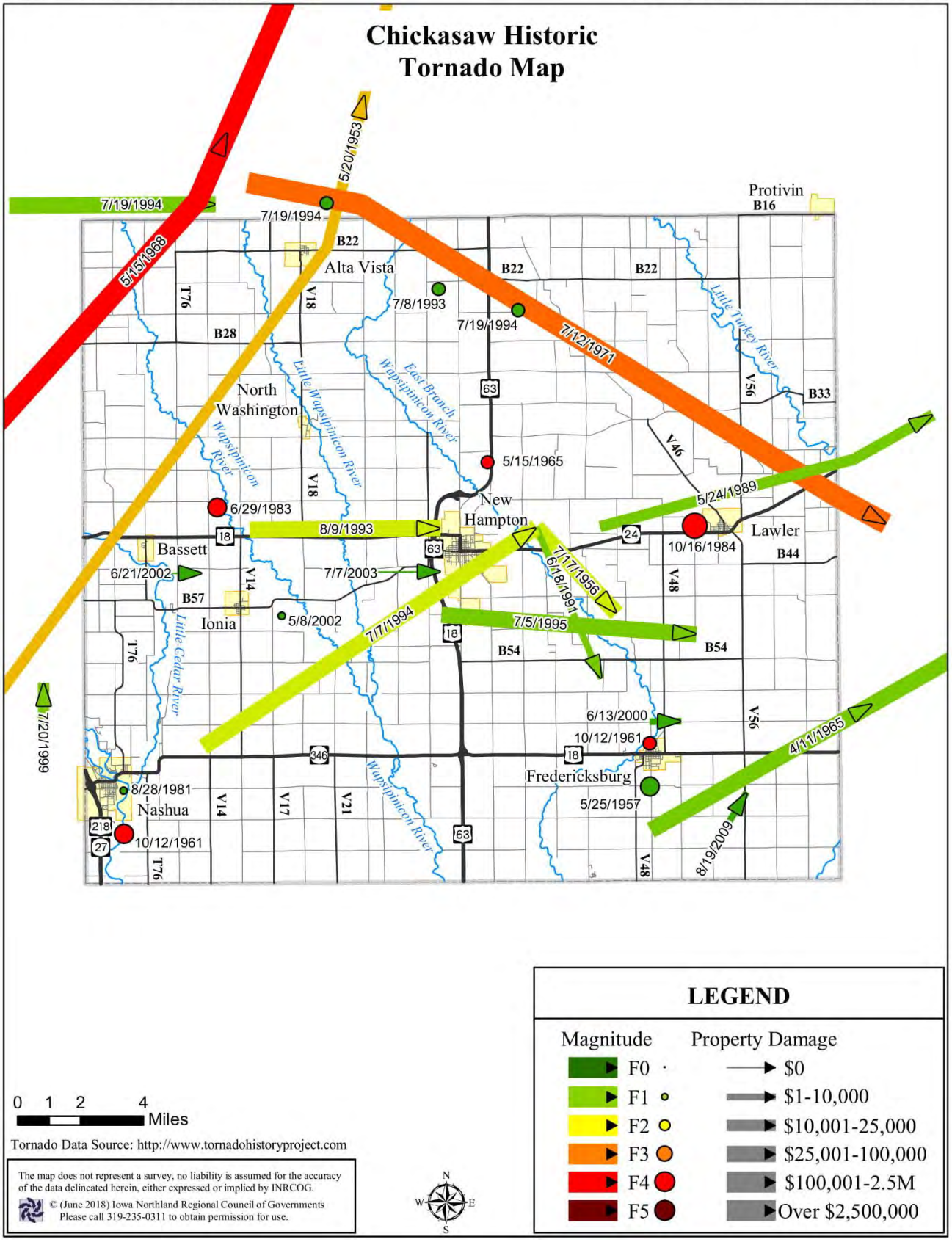
Map 4h: Flood Scenario Map of the City

Chickasaw County Hazardous Mitigation Plan



Map 4i: Flood Scenario Map of the City




Chickasaw Historic
Tornado Map
5/20/1953
7/19/1994
7/19/1994
5/15/1968
Protivin
B16
B22
Alta Vista
B22
B22
7/8/1993
7/19/1994
7/12/1971
T76
V18
B28
Little Turkey River
V56
B33
North
Washington
Little Wapsipinicon River
East Branch
Wapsipinicon River
Wapsipinicon
River
63
5/15/1965
V46
5/24/1989
6/29/1983
V18
New
Hampton
8/9/1993
18
63
24
Lawler
10/16/1984
B44
Bassett
6/21/2002
7/7/2003
V14
B57
6/18/1991
7/17/1956
V48
Ionia
5/8/2002
7/7/1994
7/5/1995
18
B54
B54
T76
Little Cedar River
7/20/1999
6/13/2000
10/12/1961
V56
4/11/1965
346
18
Fredericksburg
Wapsipinicon River
8/28/1981
Nashua
5/25/1957
V14
V17
V21
218
27
63
10/12/1961
T76
V48
8/19/2009
LEGEND
Magnitude
Property Damage
F0
$0
F1
$1-10,000
F2
$10,001-25,000
F3
$25,001-100,000
F4
$100,001-2.5M
F5
Over $2,500,000
0 1 2 4
Miles
Tornado Data Source: http://www.tornadohistoryproject.com
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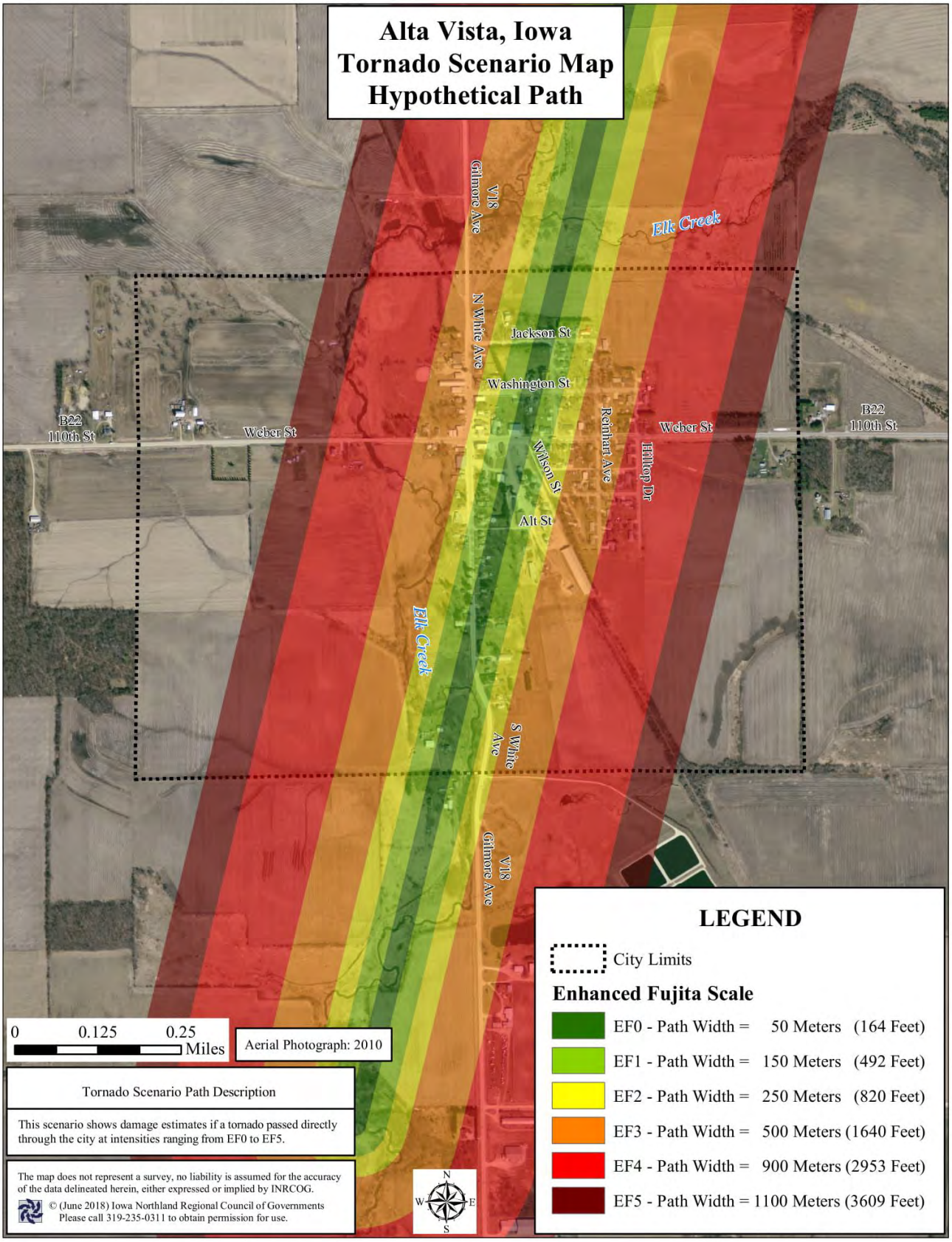
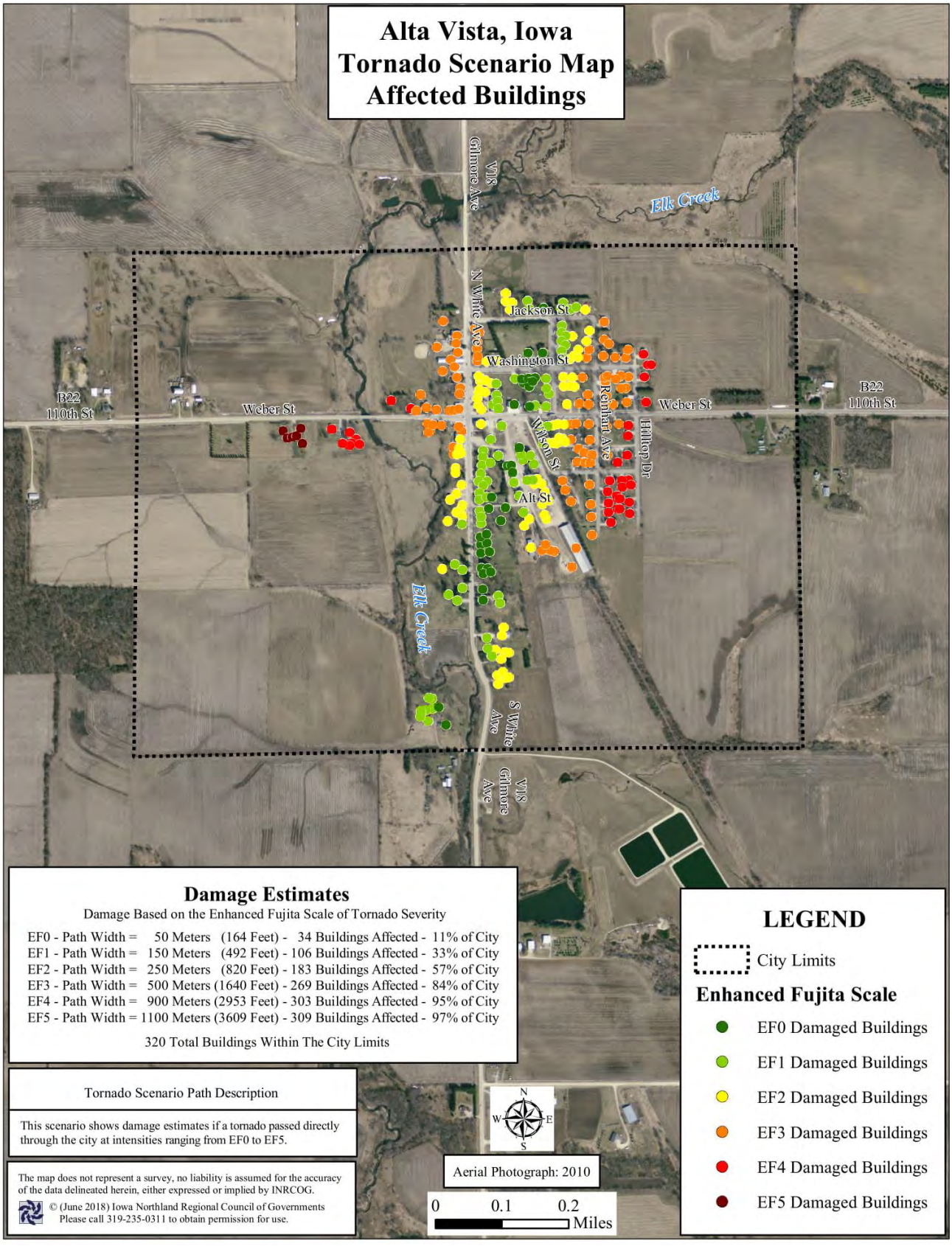
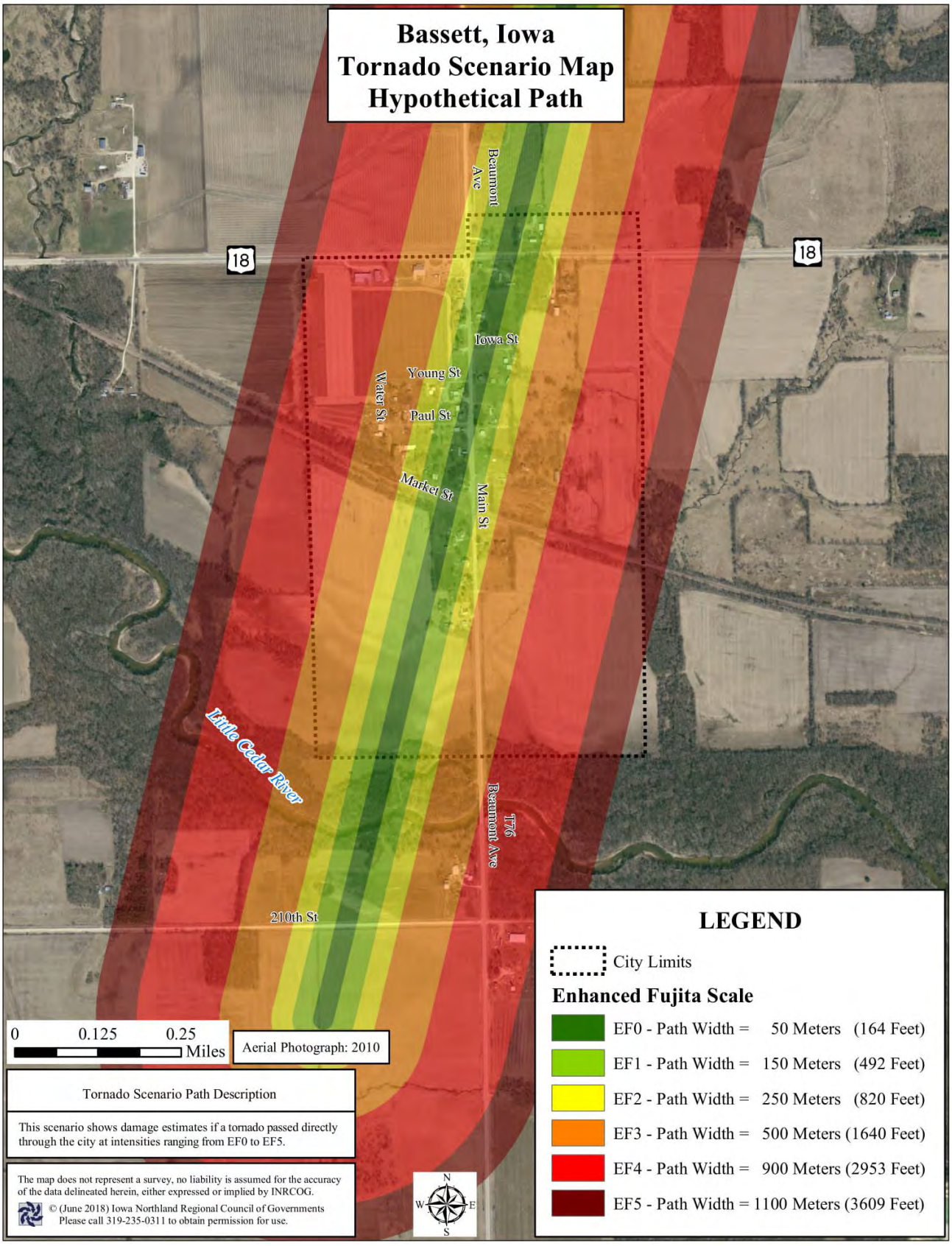
Map 5b: Tornado Scenario Map of the City

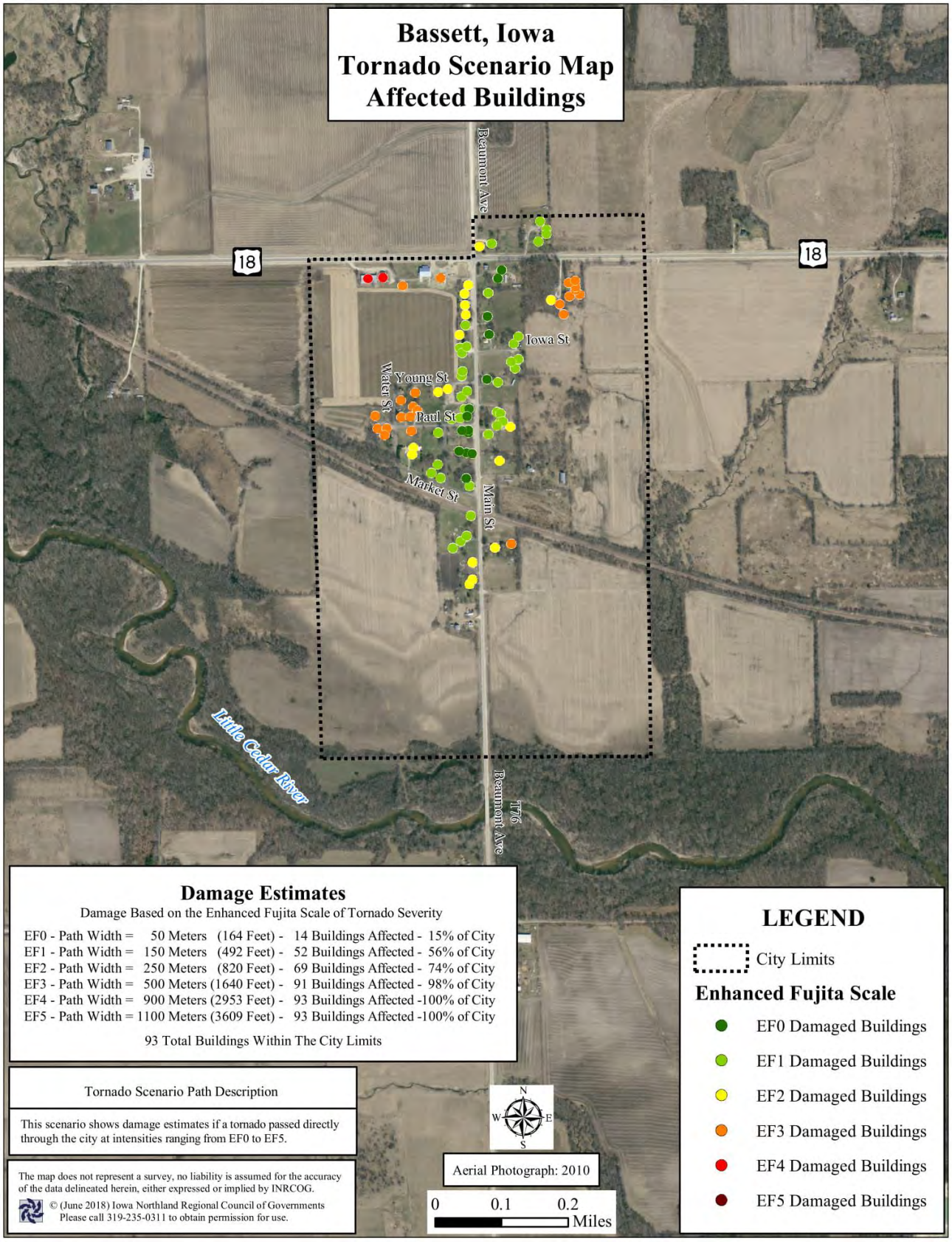


Map 5c: Tornado Scenario Map of the City



Map 5d: Tornado Scenario Map of the City




Bassett, Iowa
Tornado Scenario Map
Affected Buildings
Beaumont Ave
18
18
Iowa St
Young St
Water St
Paul St
Market St
Main St
Little Cedar River
Beaumont Ave
T76
Damage Estimates
Damage Based on the Enhanced Fujita Scale of Tornado Severity
EF0 - Path Width = 50 Meters (164 Feet) - 14 Buildings Affected - 15% of City
EF1 - Path Width = 150 Meters (492 Feet) - 52 Buildings Affected - 56% of City
EF2 - Path Width = 250 Meters (820 Feet) - 69 Buildings Affected - 74% of City
EF3 - Path Width = 500 Meters (1640 Feet) - 91 Buildings Affected - 98% of City
EF4 - Path Width = 900 Meters (2953 Feet) - 93 Buildings Affected -100% of City
EF5 - Path Width = 1100 Meters (3609 Feet) - 93 Buildings Affected -100% of City
93 Total Buildings Within The City Limits
LEGEND
City Limits
Enhanced Fujita Scale
EF0 Damaged Buildings
EF1 Damaged Buildings
EF2 Damaged Buildings
EF3 Damaged Buildings
EF4 Damaged Buildings
EF5 Damaged Buildings
Tornado Scenario Path Description
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.
N
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S
Aerial Photograph: 2010
0 0.1 0.2
Miles
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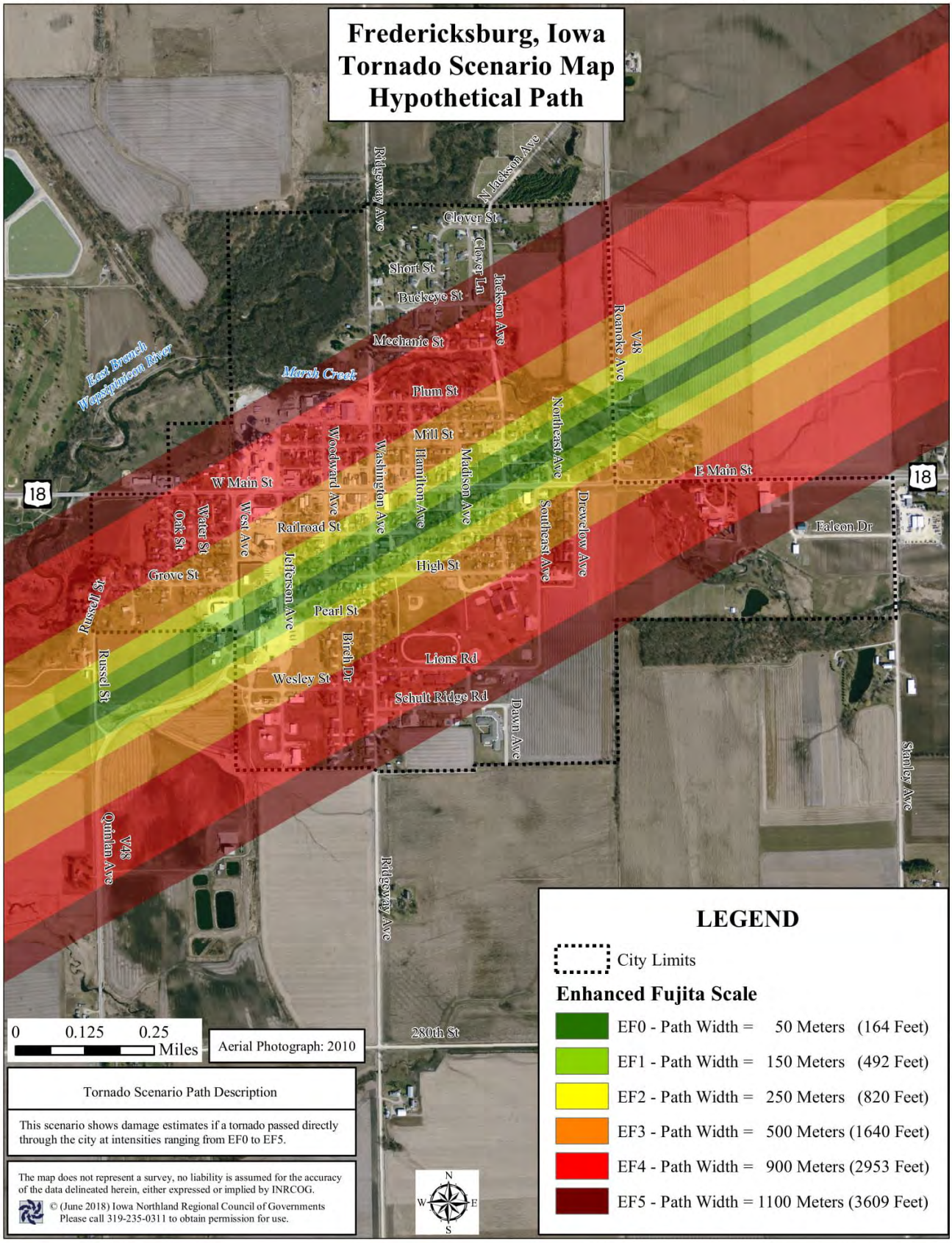
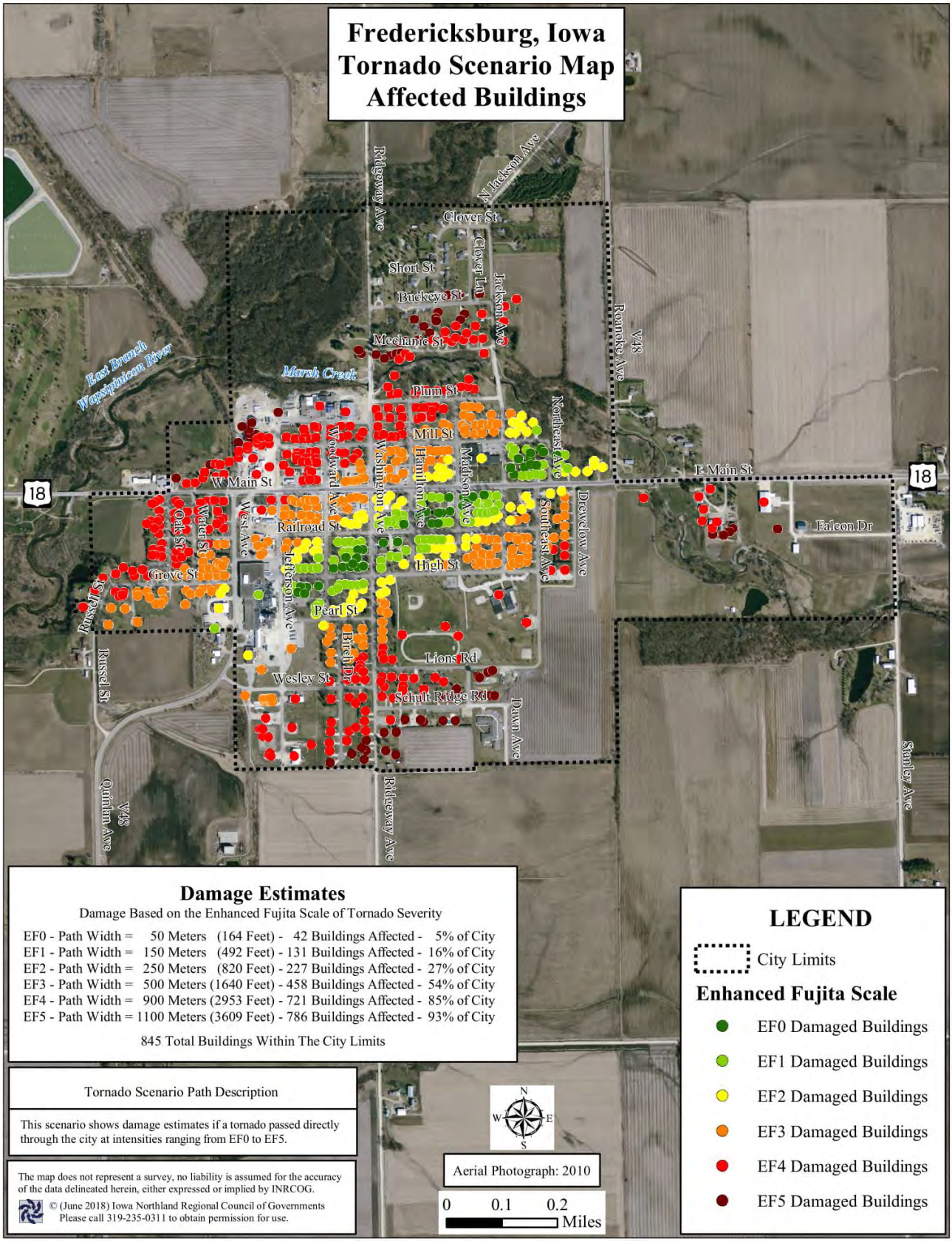
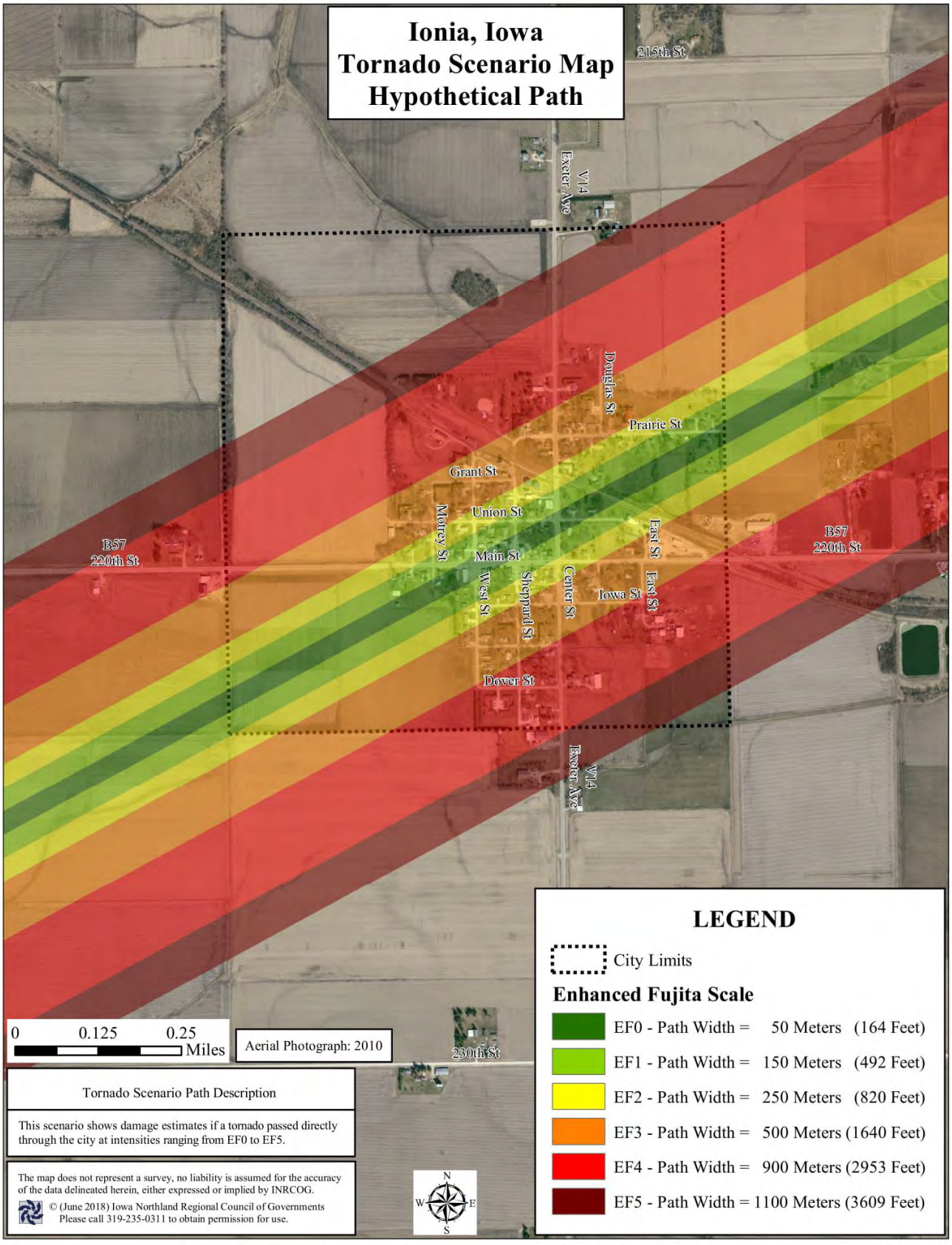
Map 5f: Tornado Scenario Map of the City



Map 5g: Tornado Scenario Map of the City




Ionia, Iowa
Tornado Scenario Map
Hypothetical Path
215th St
Exeter Ave
V14
Douglas St
Prairie St
Grant St
Union St
Morey St
Main St
West St
Sheppard St
Center St
East St
Iowa St
B57
220th St
Dover St
230th St
0
0.125
0.25
Miles
Aerial Photograph: 2010
Tornado Scenario Path Description
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.
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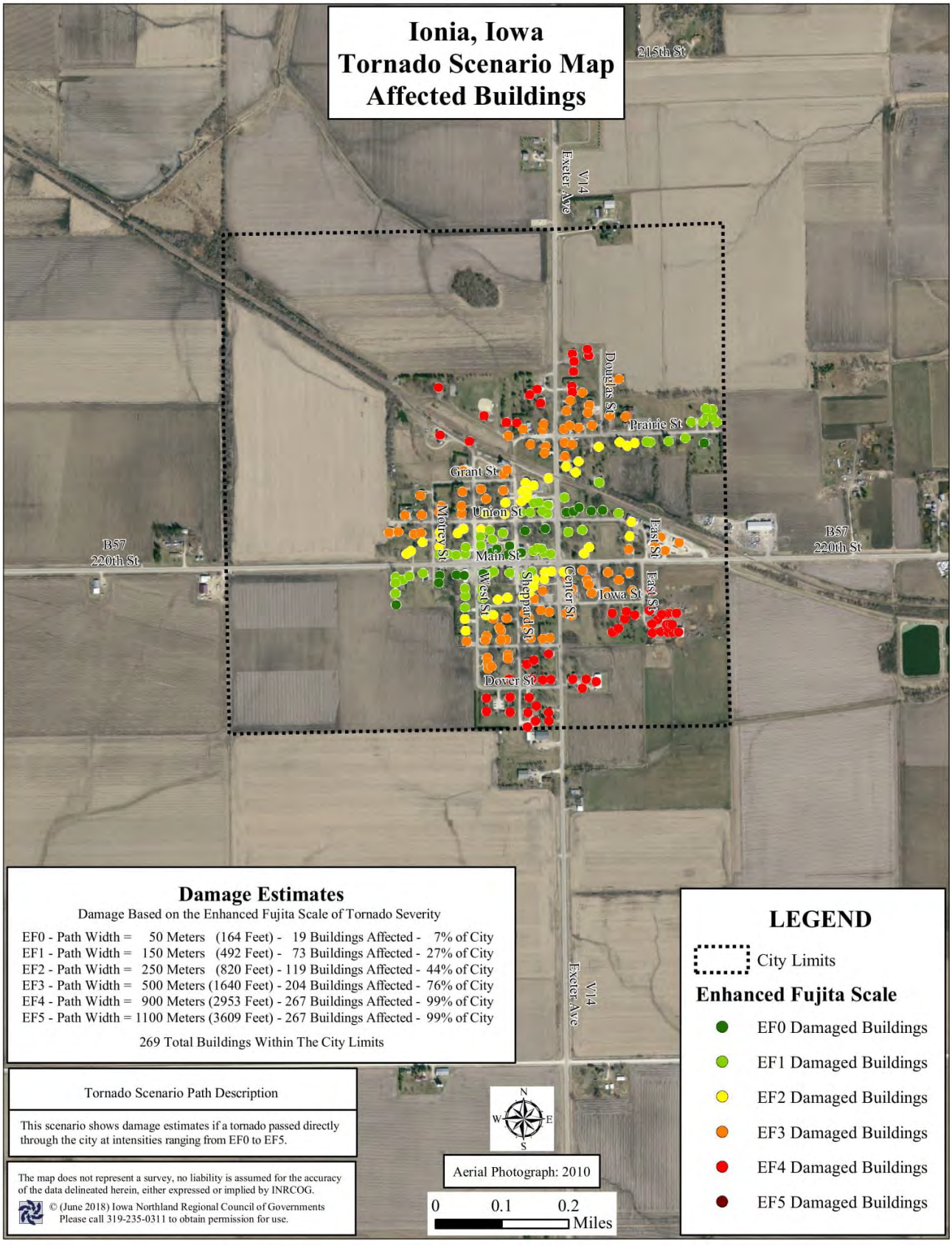
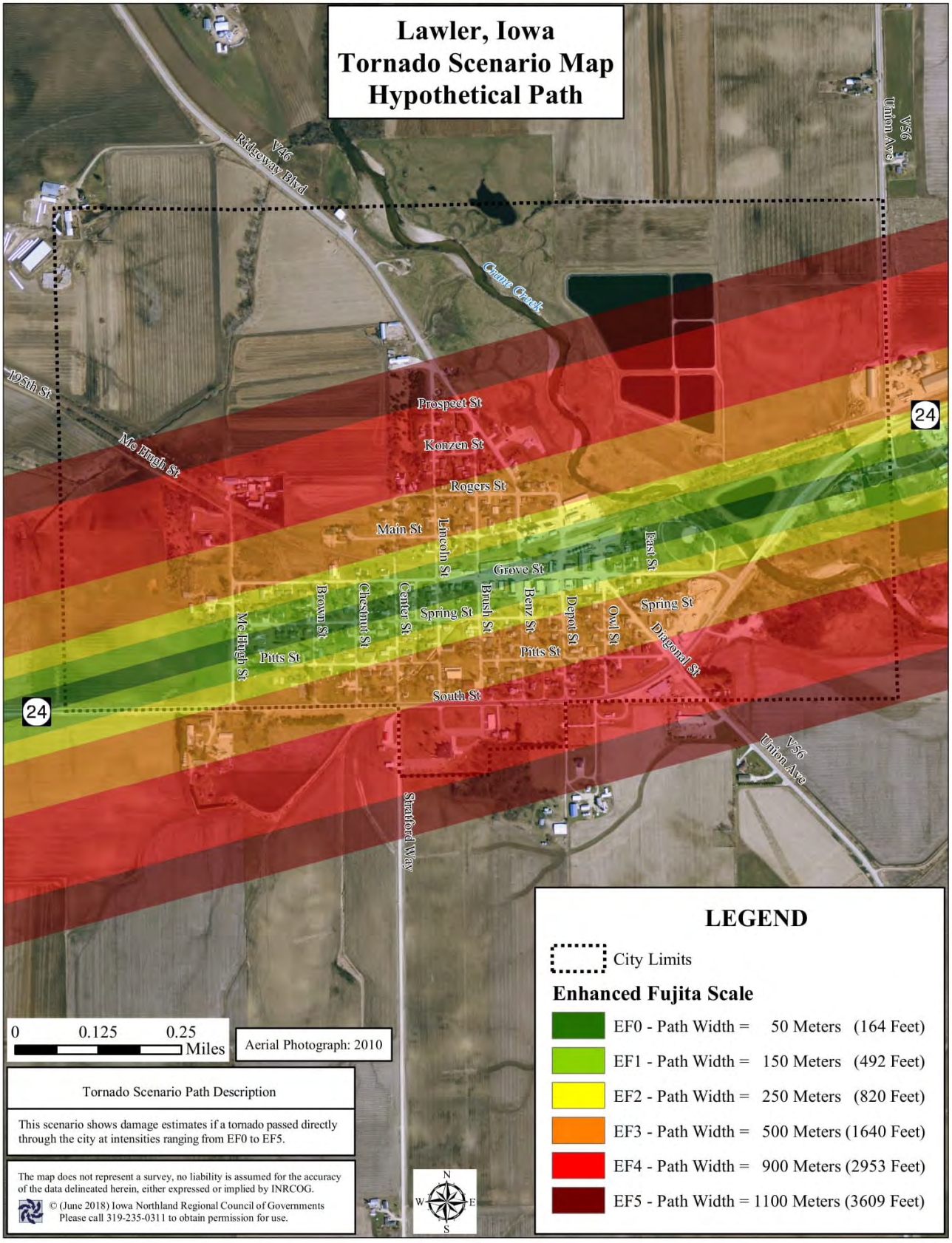
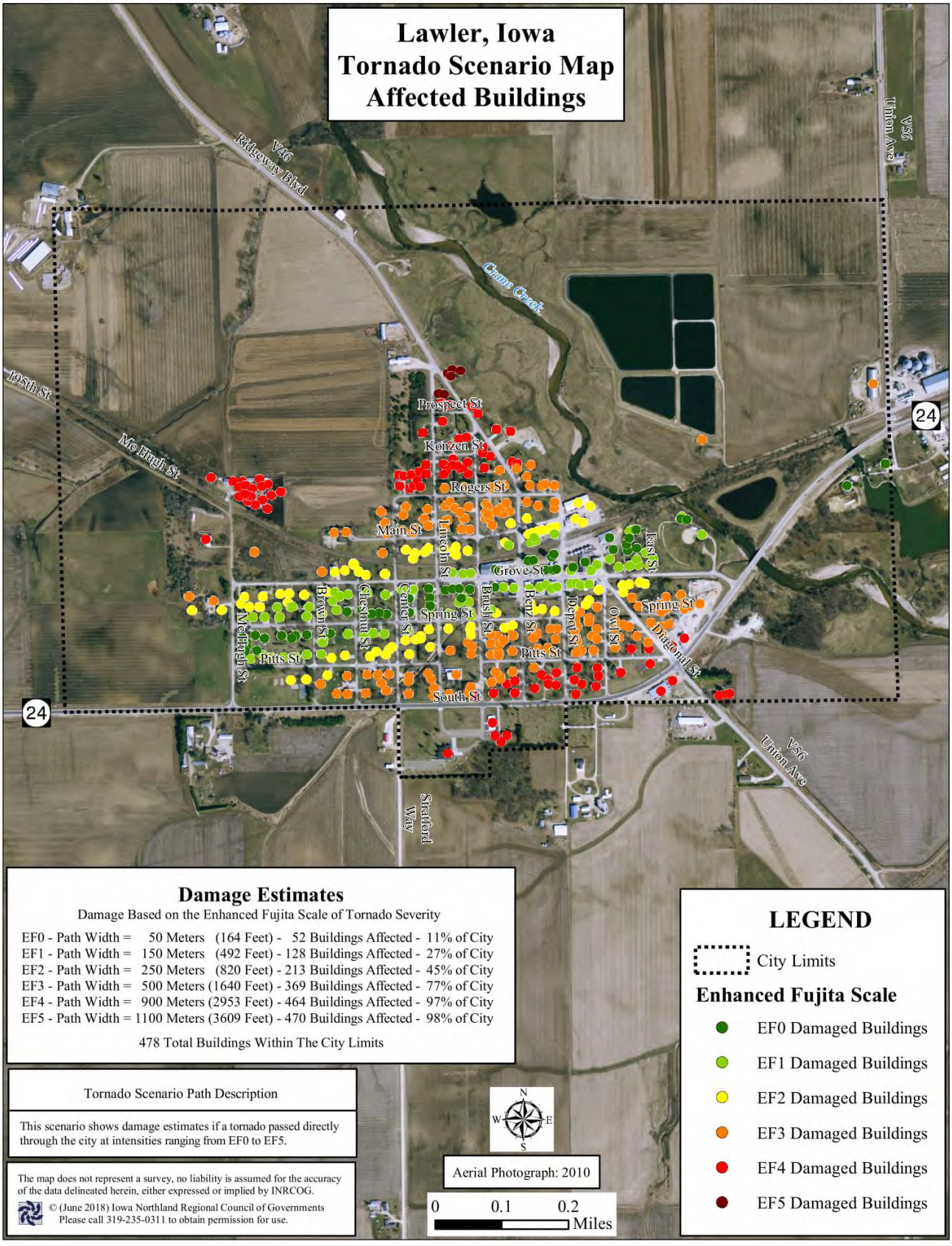
N
W
E
S
LEGEND
City Limits
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet)
EF1 - Path Width = 150 Meters (492 Feet)
EF2 - Path Width = 250 Meters (820 Feet)
EF3 - Path Width = 500 Meters (1640 Feet)
EF4 - Path Width = 900 Meters (2953 Feet)
EF5 - Path Width = 1100 Meters (3609 Feet)

Map 5i: Tornado Scenario Map of the City



Map 5j: Tornado Scenario Map of the City




Lawler, Iowa
Tornado Scenario Map
Affected Buildings
V46
Ridgeway Blvd
V56
Union Ave
Crane Creek
195th St
Mc Hugh St
24
Prospect St
Konzen St
Rogers St
Main St
Lincoln St
Grove St
East St
Brown St
Chestnut St
Center St
Spring St
Brush St
Benz St
Depot St
Owl St
Spring St
Diagonal St
Mc Hugh St
Pitts St
Pitts St
South St
Stratford Way
Damage Estimates
Damage Based on the Enhanced Fujita Scale of Tornado Severity
EF0 - Path Width = 50 Meters (164 Feet) - 52 Buildings Affected - 11% of City
EF1 - Path Width = 150 Meters (492 Feet) - 128 Buildings Affected - 27% of City
EF2 - Path Width = 250 Meters (820 Feet) - 213 Buildings Affected - 45% of City
EF3 - Path Width = 500 Meters (1640 Feet) - 369 Buildings Affected - 77% of City
EF4 - Path Width = 900 Meters (2953 Feet) - 464 Buildings Affected - 97% of City
EF5 - Path Width = 1100 Meters (3609 Feet) - 470 Buildings Affected - 98% of City
478 Total Buildings Within The City Limits
LEGEND
City Limits
Enhanced Fujita Scale
EF0 Damaged Buildings
EF1 Damaged Buildings
EF2 Damaged Buildings
EF3 Damaged Buildings
EF4 Damaged Buildings
EF5 Damaged Buildings
Tornado Scenario Path Description
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.
N
W
E
S
Aerial Photograph: 2010
0 0.1 0.2
Miles
The map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
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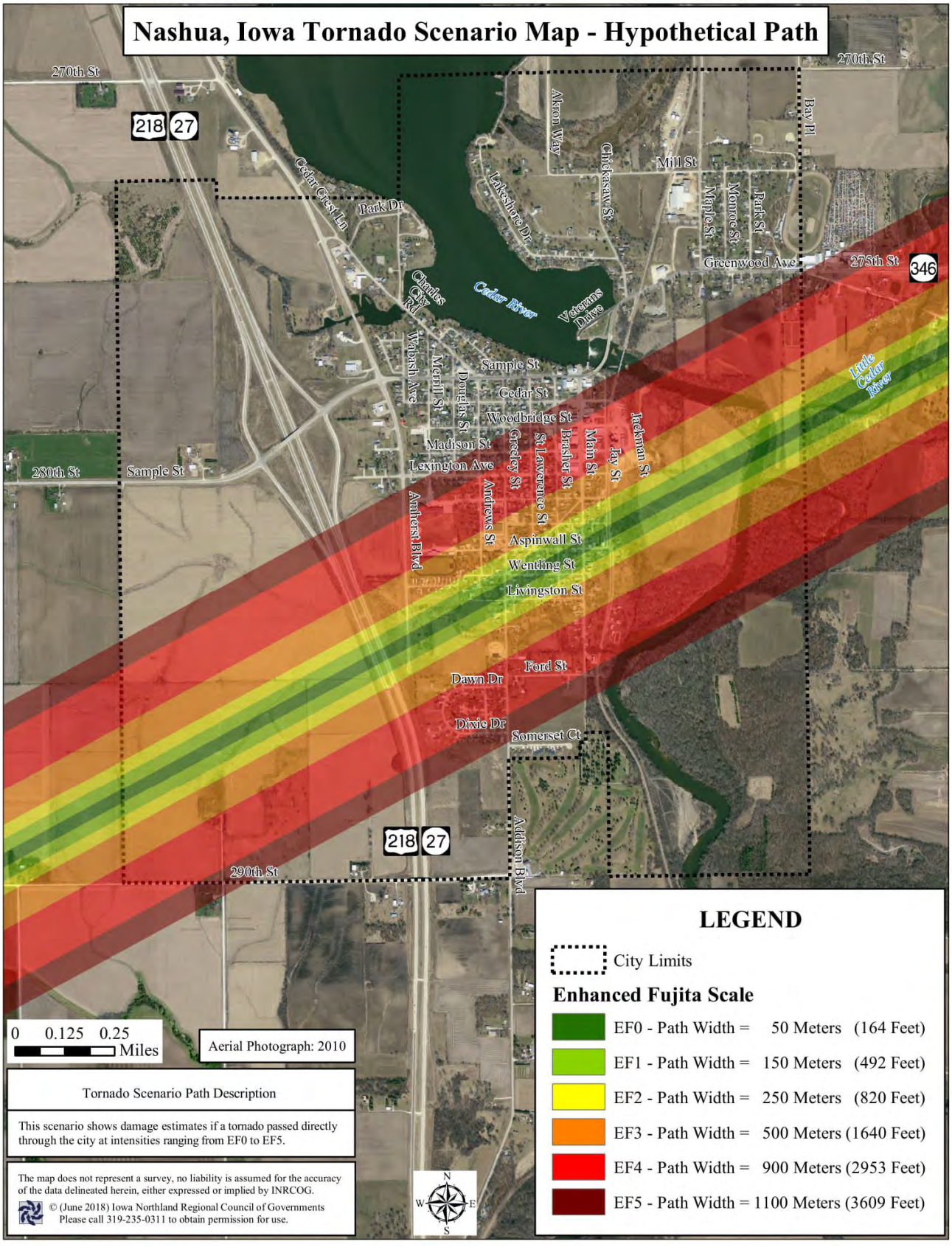
Nashua, Iowa Tornado Scenario Map - Hypothetical Path
270th St
218
27
Cedar Crest Ln
Park Dr
Lakeshore Dr
Akron Way
Chickasaw St
Mill St
Bay Pl
Maple St
Monroe St
Park St
Greenwood Ave
275th St
346
Charles City Rd
Cedar River
Veterans Drive
Wabash Ave
Merrill St
Douglas St
Sample St
Cedar St
Woodbridge St
Madison St
Lexington Ave
Greeley St
St Lawerence St
Brasher St
Main St
Jay St
Jackman St
Little Cedar River
280th St
Sample St
Amherst Blvd
Andrews St
Aspinwall St
Wentling St
Livingston St
Ford St
Dawn Dr
Dixie Dr
Somerset Ct
Addison Blvd
290th St
0 0.125 0.25 Miles
Aerial Photograph: 2010
Tornado Scenario Path Description
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.
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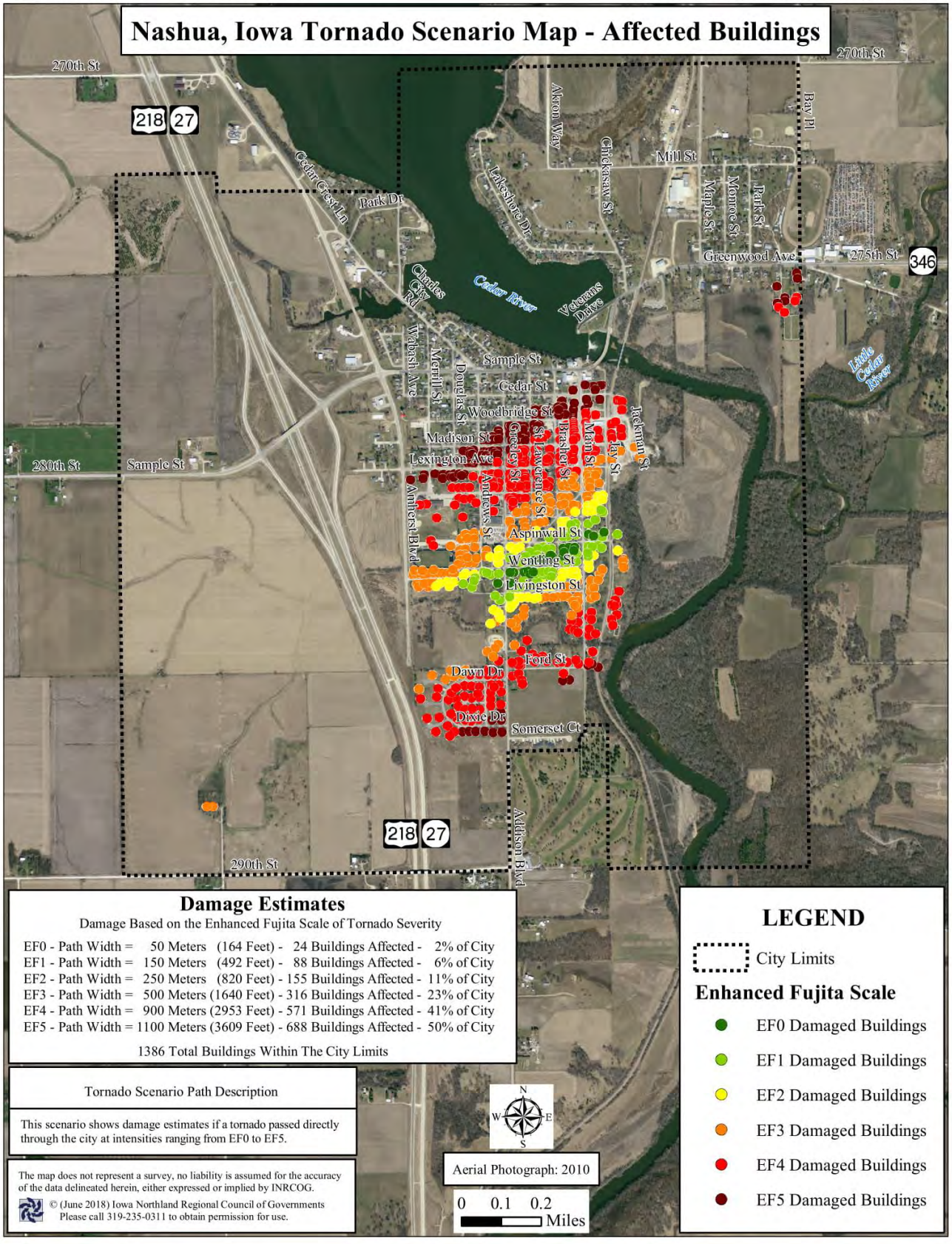
N
W
E
S
LEGEND
City Limits
Enhanced Fujita Scale
EF0 - Path Width = 50 Meters (164 Feet)
EF1 - Path Width = 150 Meters (492 Feet)
EF2 - Path Width = 250 Meters (820 Feet)
EF3 - Path Width = 500 Meters (1640 Feet)
EF4 - Path Width = 900 Meters (2953 Feet)
EF5 - Path Width = 1100 Meters (3609 Feet)

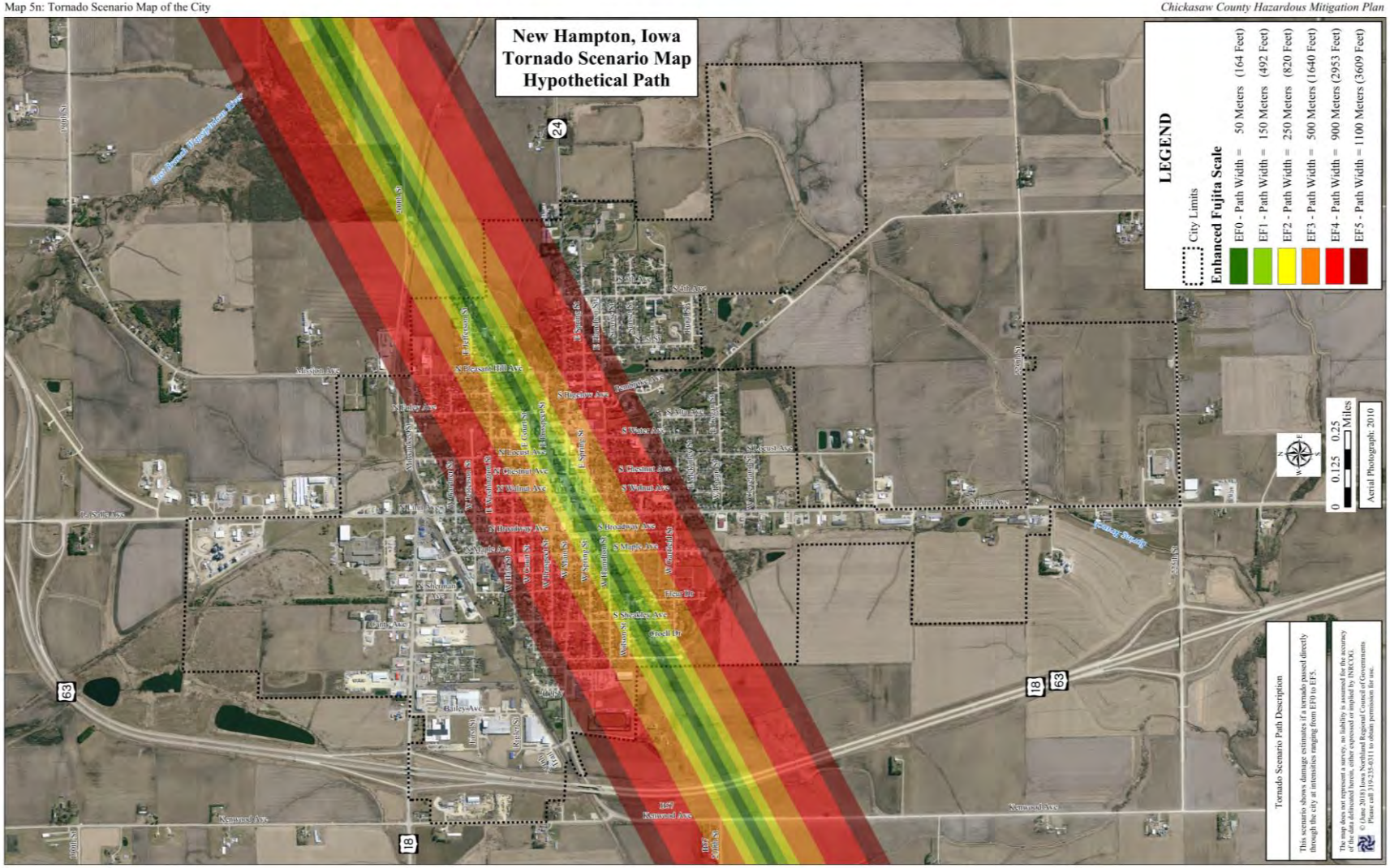
Map 5m: Tornado Scenario Map of the City

Chickasaw County Hazardous Mitigation Plan



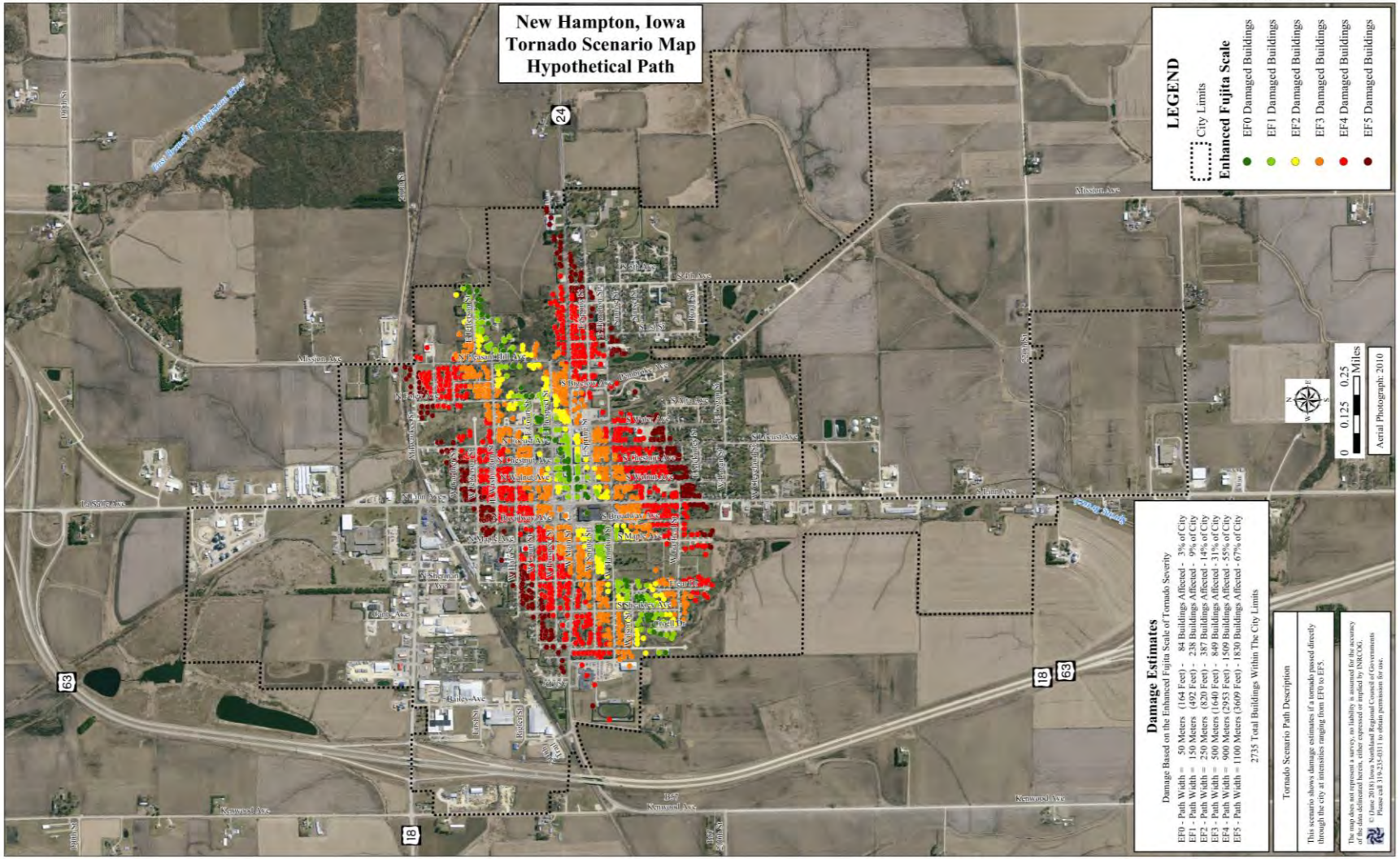
Map 5n: Tornado Scenario Map of the City

Chickasaw County Hazardous Mitigation Plan

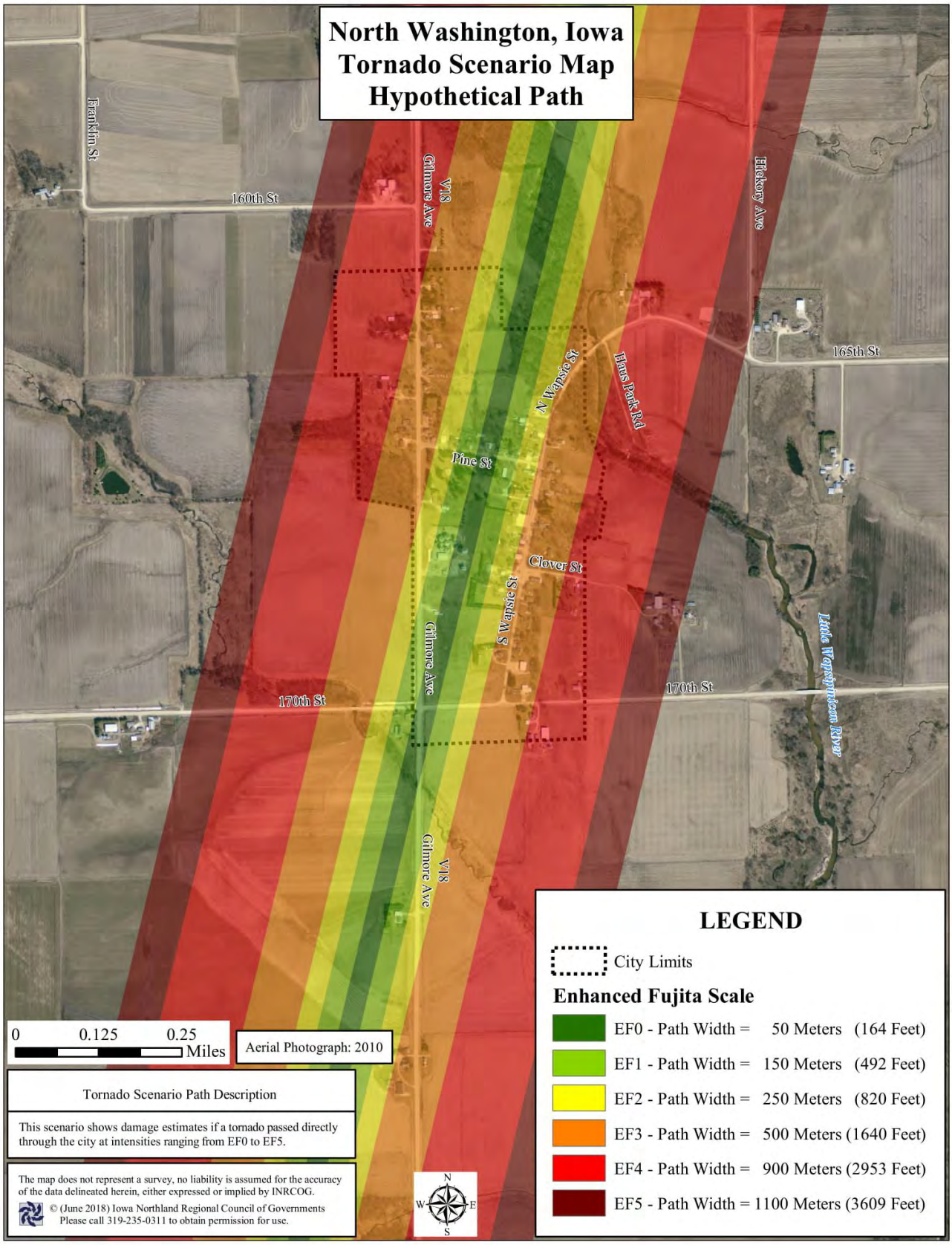


Map 5o: Tornado Scenario Map of the City

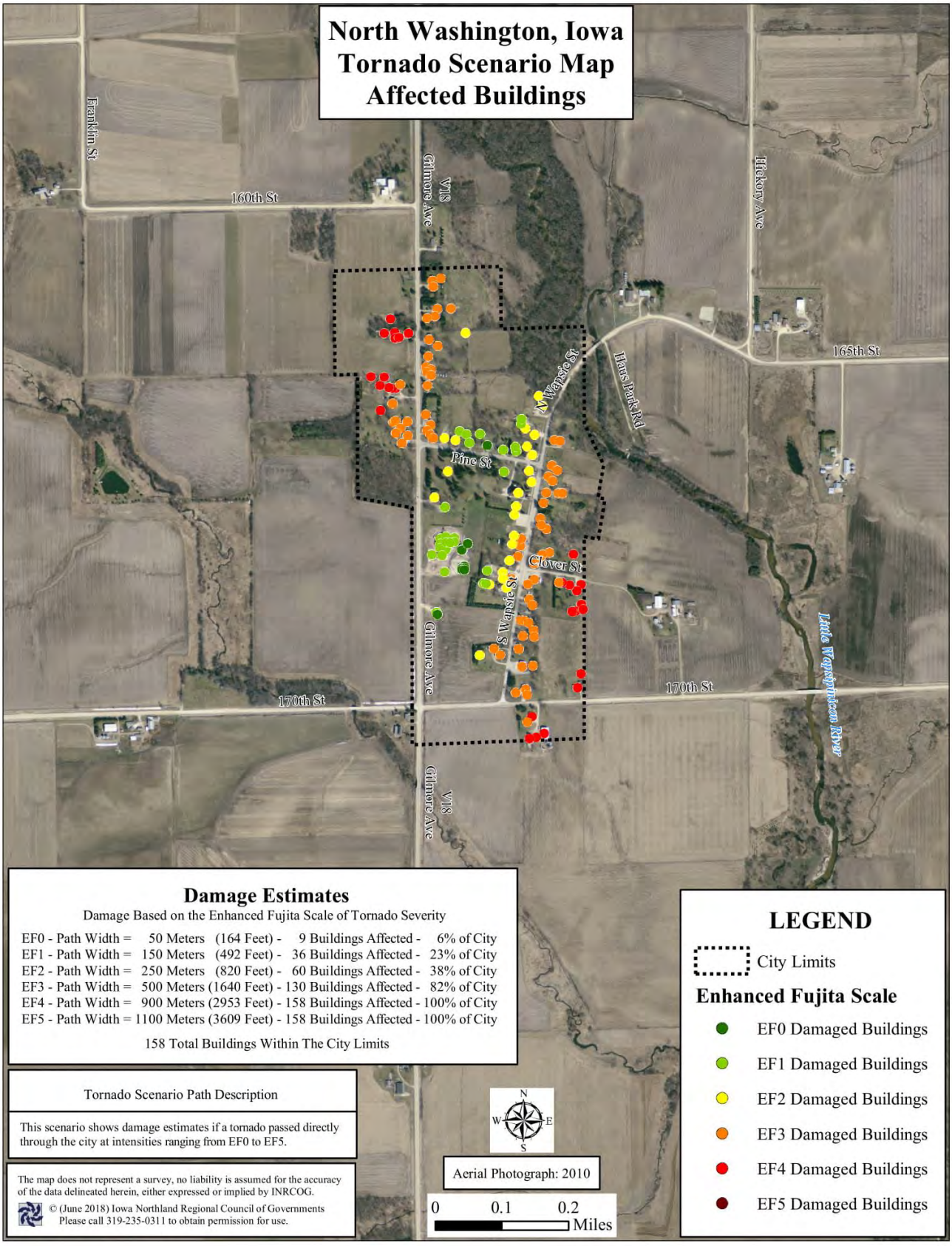
Chickasaw County Hazardous Mitigation Plan

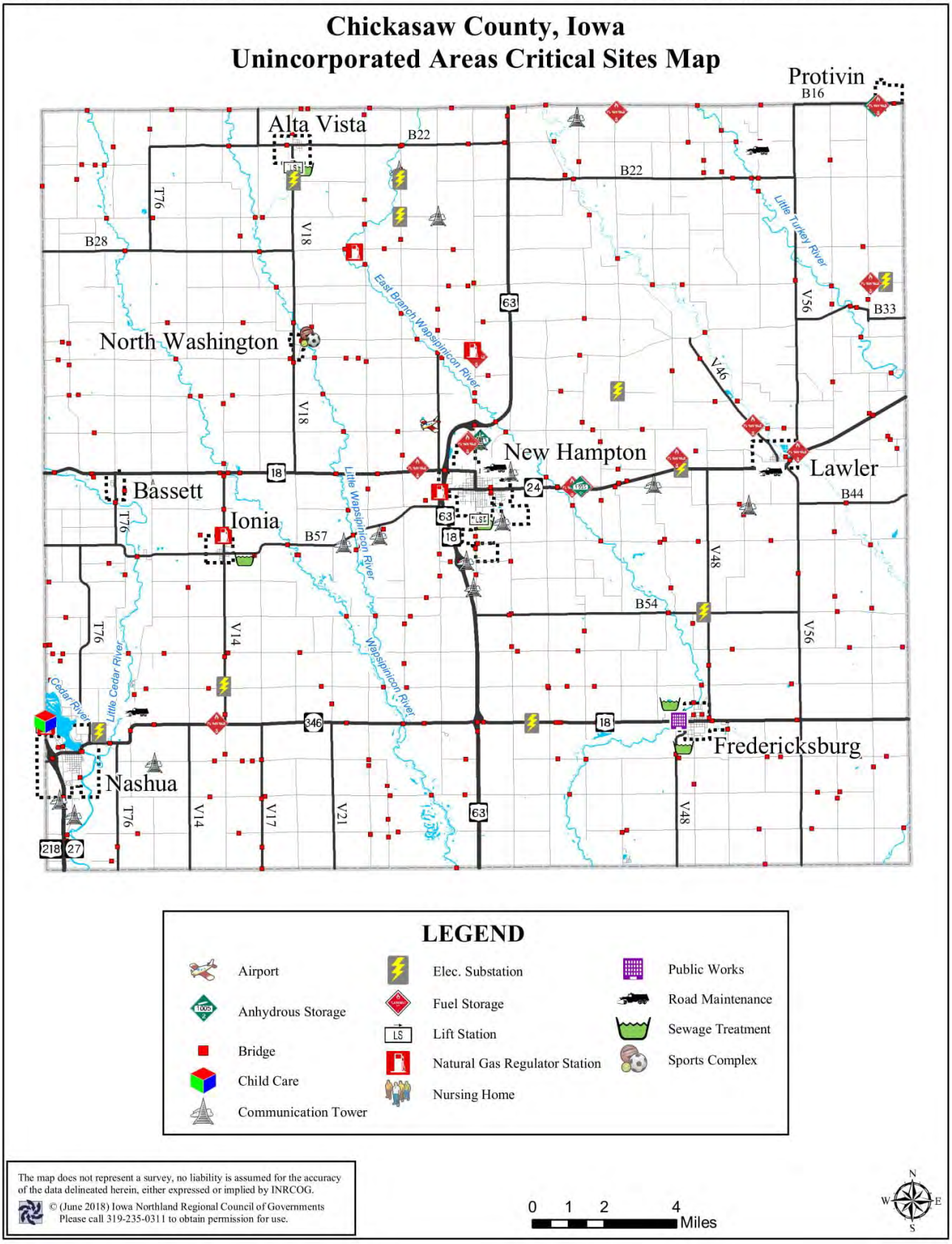


Map 5p: Tornado Scenario Map of the City



Map 5q: Tornado Scenario Map of the City




Chickasaw County, Iowa
Unincorporated Areas Critical Sites Map
Protivin
B16
Alta Vista
B22
T76
B28
V18
East Branch Wapsipinicon River
Little Turkey River
V56
B33
63
North Washington
V46
New Hampton
Lawler
18
Bassett
24
B44
Ionia
B57
Little Wapsipinicon River
V48
B54
V14
Little Cedar River
Cedar River
Wapsipinicon River
346
Fredericksburg
Nashua
V17
V21
218
27
LEGEND
Airport
Anhydrous Storage
Bridge
Child Care
Communication Tower
Elec. Substation
Fuel Storage
Lift Station
Natural Gas Regulator Station
Nursing Home
Public Works
Road Maintenance
Sewage Treatment
Sports Complex
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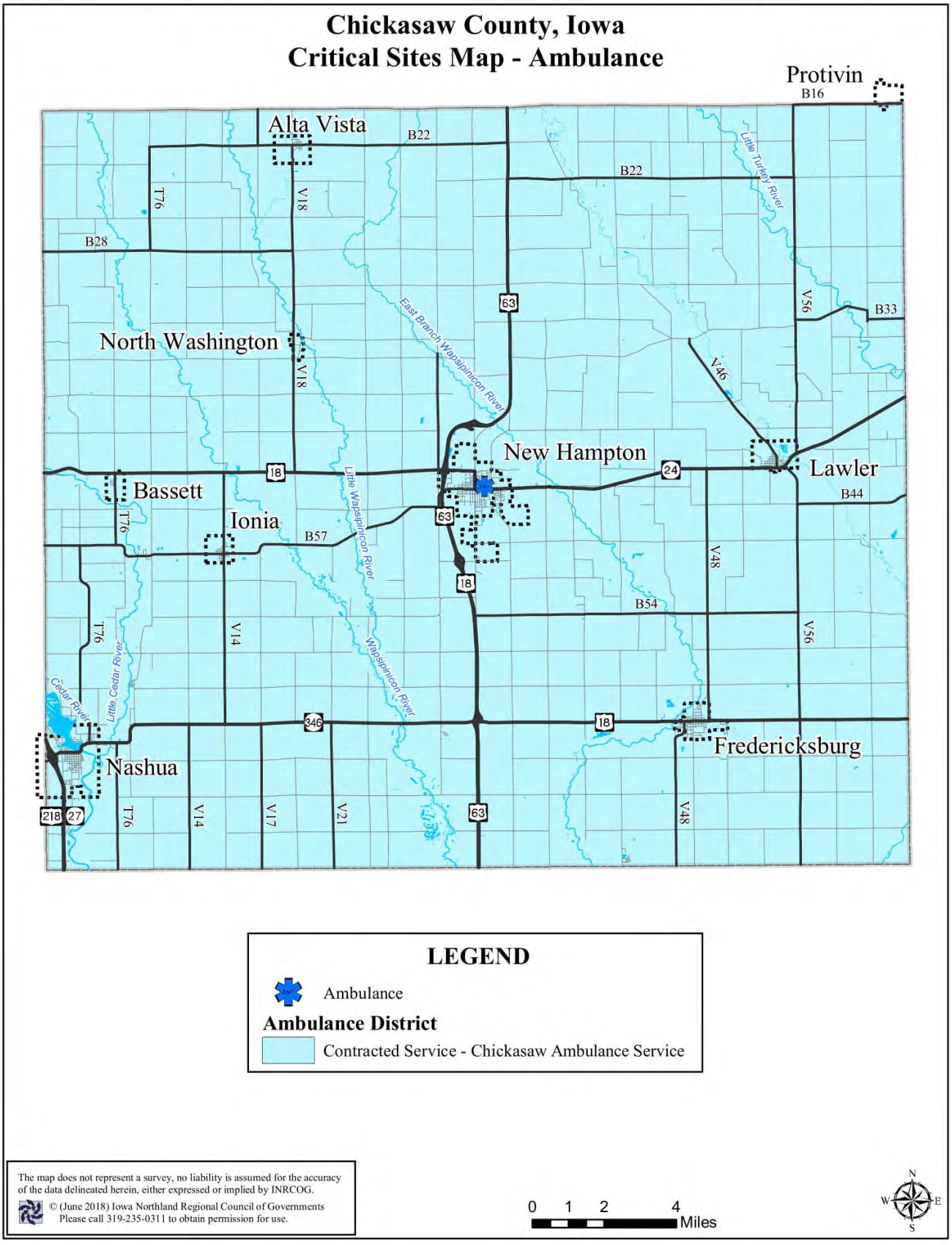
0 1 2 4
Miles
N
W
E
S


Chickasaw County, Iowa
Critical Sites Map - Ambulance
Protivin
B16
Alta Vista
B22
T76
V18
B28
North Washington
East Branch Wapsipinicon River
63
Little Turkey River
V56
B33
V46
New Hampton
18
24
Lawler
B44
Bassett
Ionia
B57
Little Wapsipinicon River
V48
B54
Wapsipinicon River
V14
T76
Cedar River
Little Cedar River
346
Nashua
Fredericksburg
218
27
V17
V21
LEGEND
Ambulance
Ambulance District
Contracted Service - Chickasaw Ambulance Service
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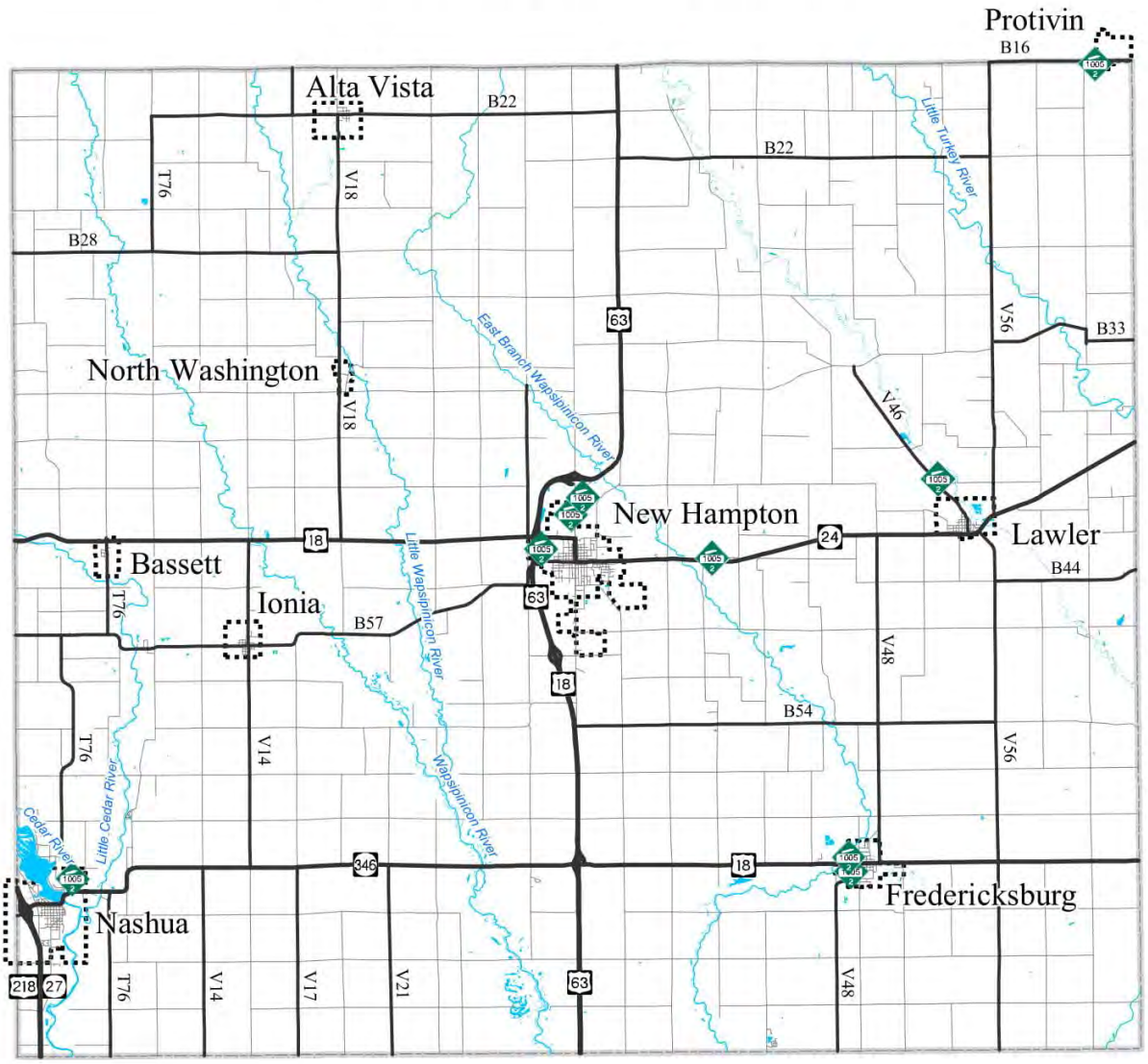
0 1 2 4
Miles
N
W
E
S

Chickasaw County, Iowa
Critical Sites Map - Anhydrous Storage

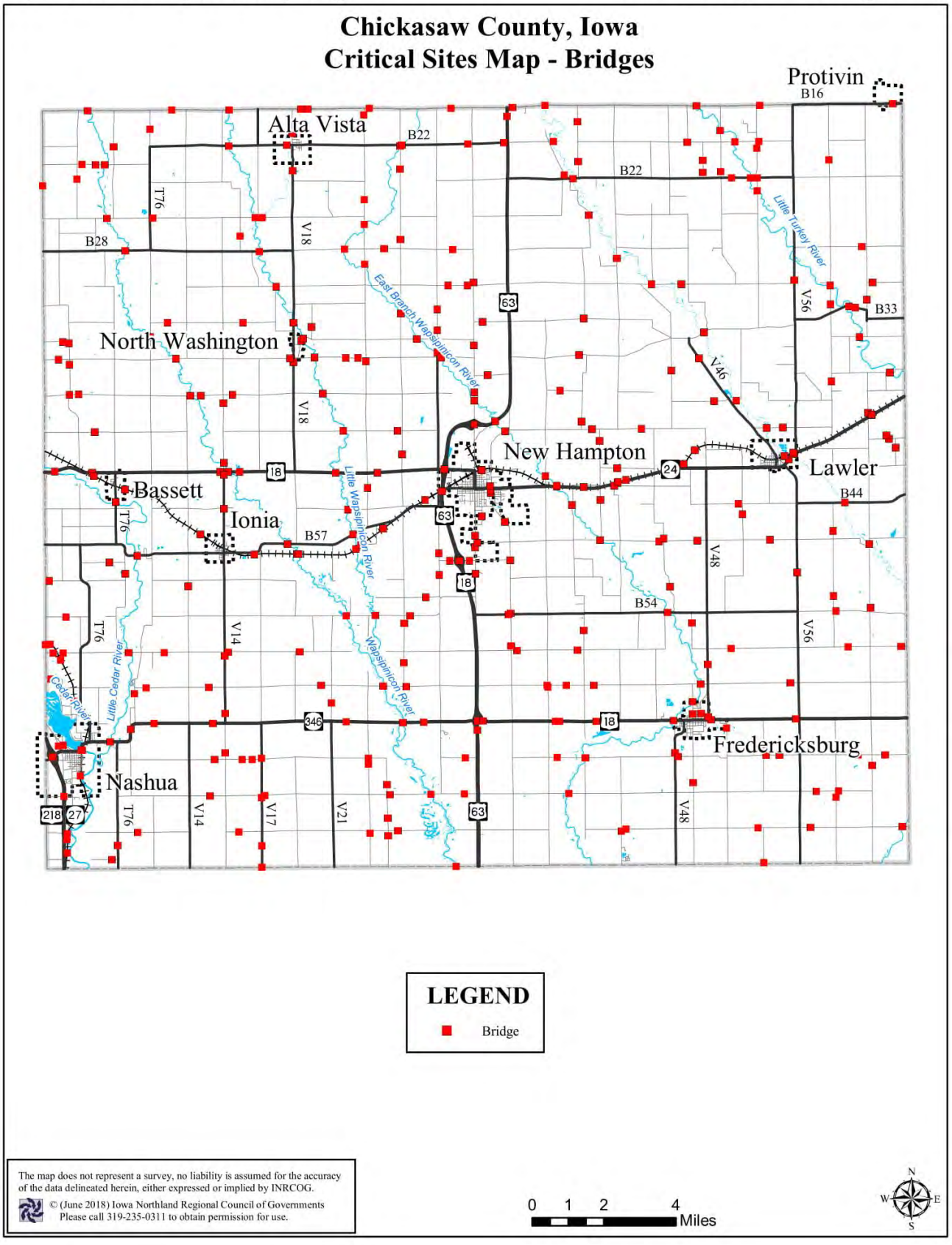


LEGEND

Anhydrous Ammonia Storage

0 1 2 4 Miles

N W E S


Chickasaw County, Iowa
Critical Sites Map - Bridges
Protivin
B16
Alta Vista
B22
B22
T76
V18
B28
Little Turkey River
V56
B33
East Branch Wapsipinicon River
63
North Washington
V18
V46
New Hampton
Lawler
18
24
Bassett
B44
T76
Ionia
B57
63
Little Wapsipinicon River
V48
18
B54
T76
V14
V56
Little Cedar River
Cedar River
Wapsipinicon River
348
18
Fredericksburg
Nashua
218
27
T76
V14
V17
V21
63
V48
LEGEND
Bridge
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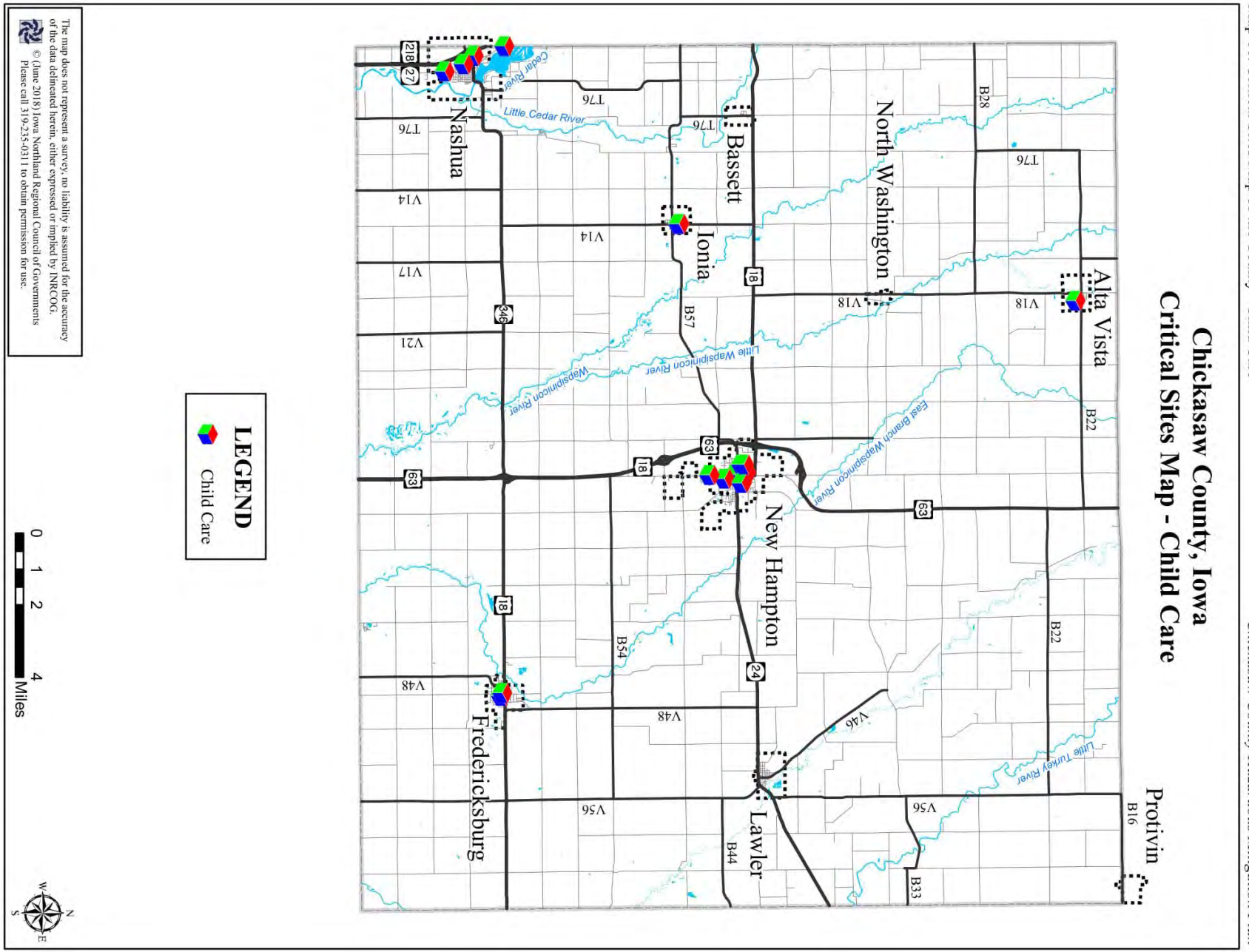
0 1 2 4
Miles
N
W
E
S


Chickasaw County, Iowa
Critical Sites Map - Child Care
Alta Vista
Protivin
Bassett
Ionia
Nashua
New Hampton
Lawler
Fredericksburg
North Washington
Little Cedar River
Cedar River
Little Wapsipinicon River
Wapsipinicon River
East Branch Wapsipinicon River
Little Turkey River
LEGEND
Child Care
0 1 2 4
Miles
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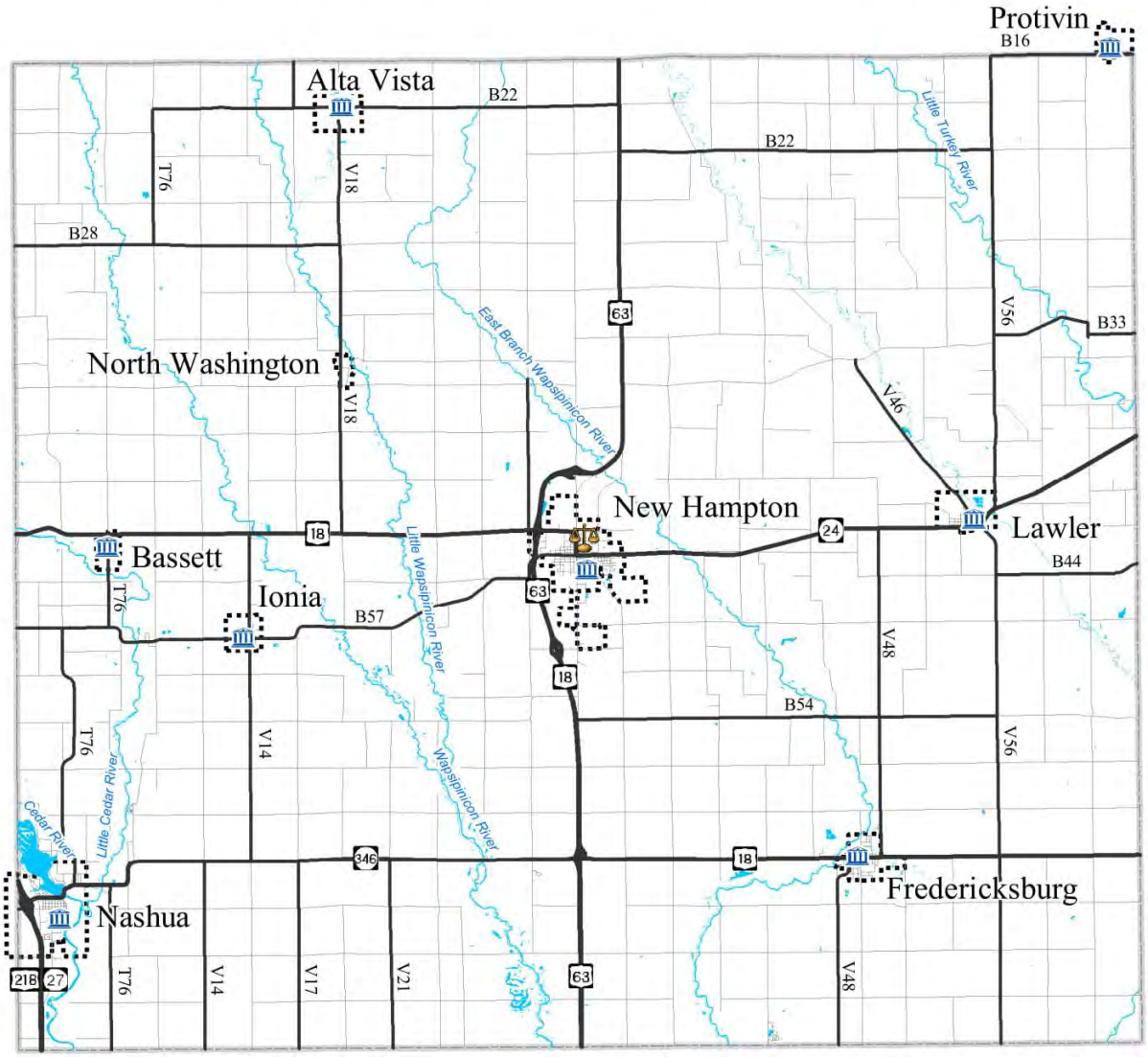
Chickasaw County, Iowa
Critical Sites Map - Courthouse and City Halls



LEGEND

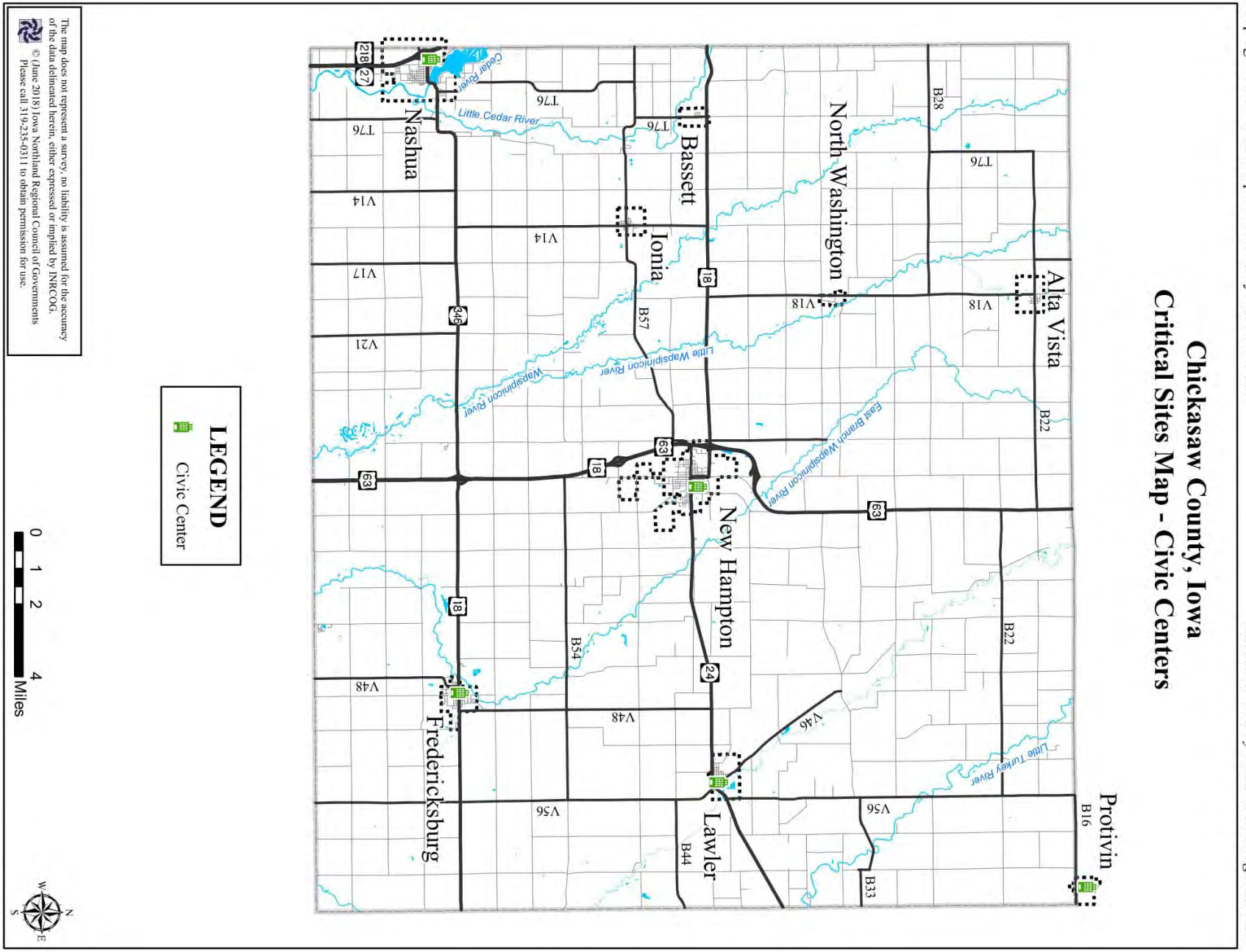
City Hall

Courthouse

0 1 2 4 Miles

N W E S

Map 6g: Critical Sites Map of the County - Civic Centers



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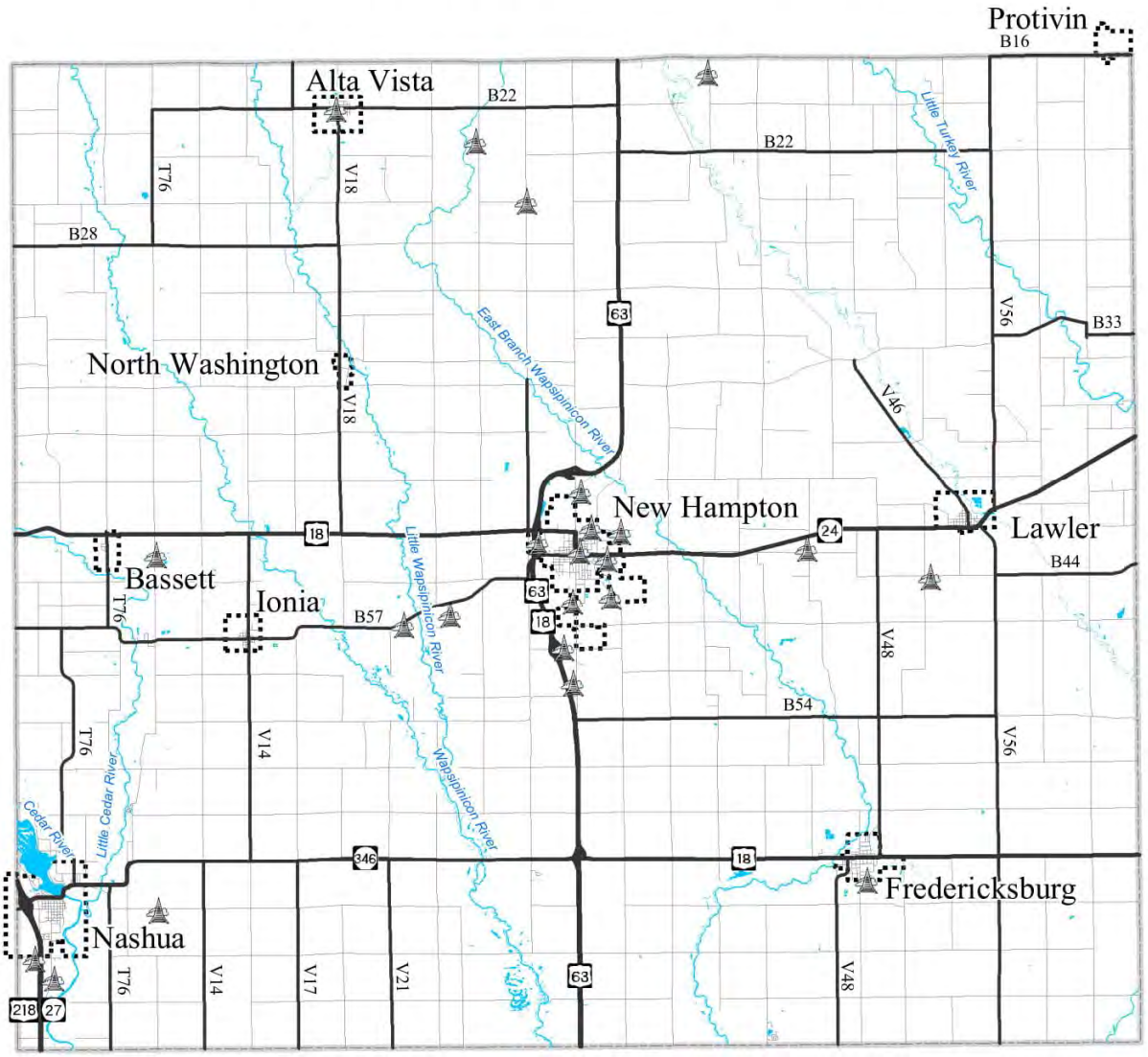
Chickasaw County Hazardous Mitigation Plan

Chickasaw County, Iowa
Critical Sites Map - Communication Towers

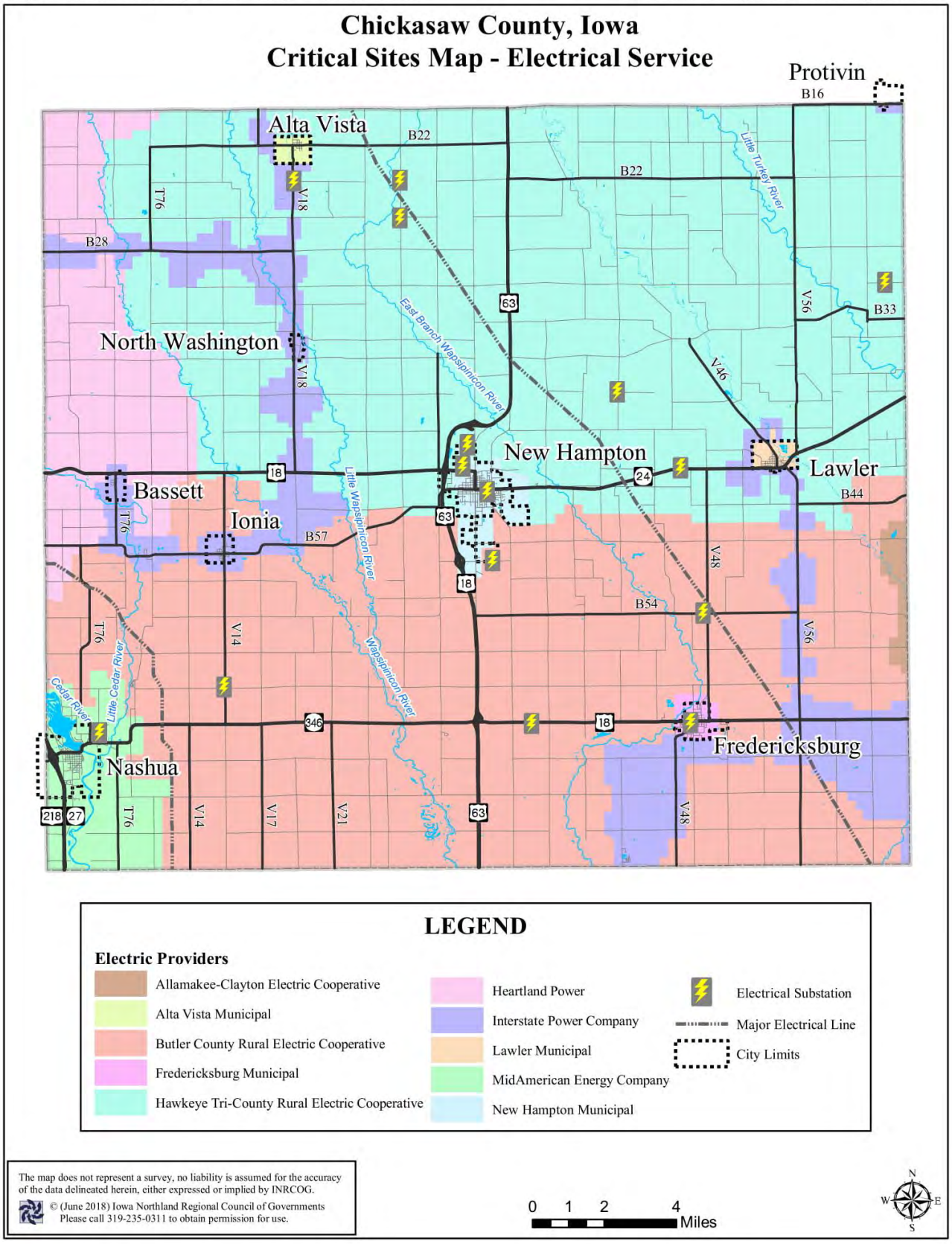


LEGEND

Communication Tower

0 1 2 4 Miles

N W E S


Chickasaw County, Iowa
Critical Sites Map - Electrical Service
Protivin
B16
Alta Vista
B22
T76
V18
B28
North Washington
East Branch Wapsipinicon River
63
V56
B33
Little Turkey River
V46
New Hampton
18
24
Lawler
B44
Bassett
Ionia
B57
Little Wapsipinicon River
V48
B54
V14
Little Cedar River
Cedar River
Wapsipinicon River
346
Nashua
218
27
V17
V21
Fredericksburg
LEGEND
Electric Providers
Allamakee-Clayton Electric Cooperative
Alta Vista Municipal
Butler County Rural Electric Cooperative
Fredericksburg Municipal
Hawkeye Tri-County Rural Electric Cooperative
Heartland Power
Interstate Power Company
Lawler Municipal
MidAmerican Energy Company
New Hampton Municipal
Electrical Substation
Major Electrical Line
City Limits
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0 1 2 4
Miles
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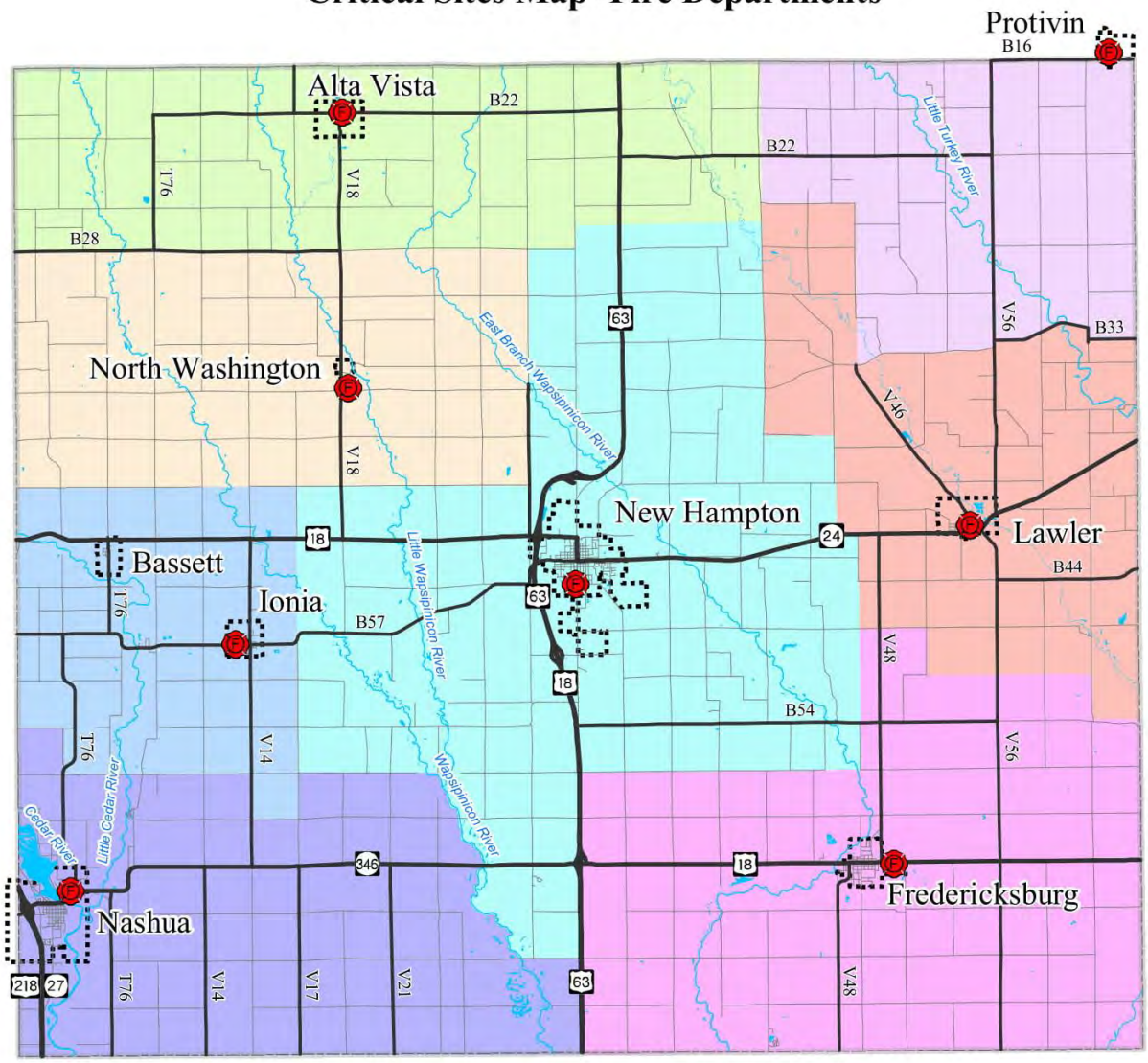
Chickasaw County, Iowa
Critical Sites Map -Fire Departments



LEGEND

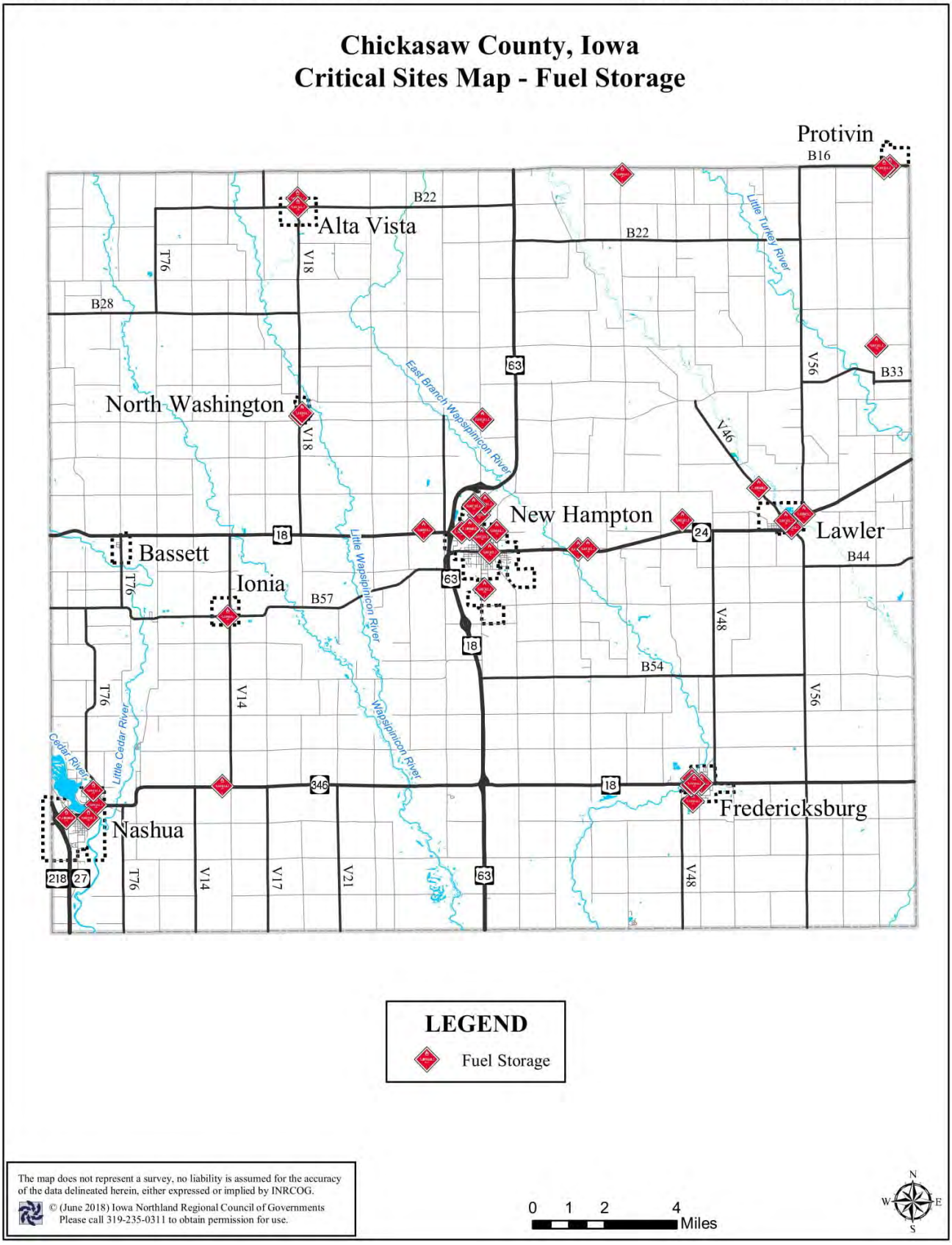
Fire Station

Fire District

- Alta Vista
- Fredericksburg
- Ionia
- Lawler
- Nashua
- New Hampton
- North Washington
- Protivin

0 1 2 4 Miles

N W E S


Chickasaw County, Iowa
Critical Sites Map - Fuel Storage
Protivin
B16
Alta Vista
B22
T76
V18
B28
North Washington
East Branch Wapsipinicon River
63
V56
B33
Little Turkey River
V46
New Hampton
Lawler
18
24
B44
Bassett
Ionia
B57
Little Wapsipinicon River
B54
V48
V14
Cedar River
Little Cedar River
Wapsipinicon River
346
Fredericksburg
Nashua
218
27
V17
V21
LEGEND
Fuel Storage
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0 1 2 4
Miles
N
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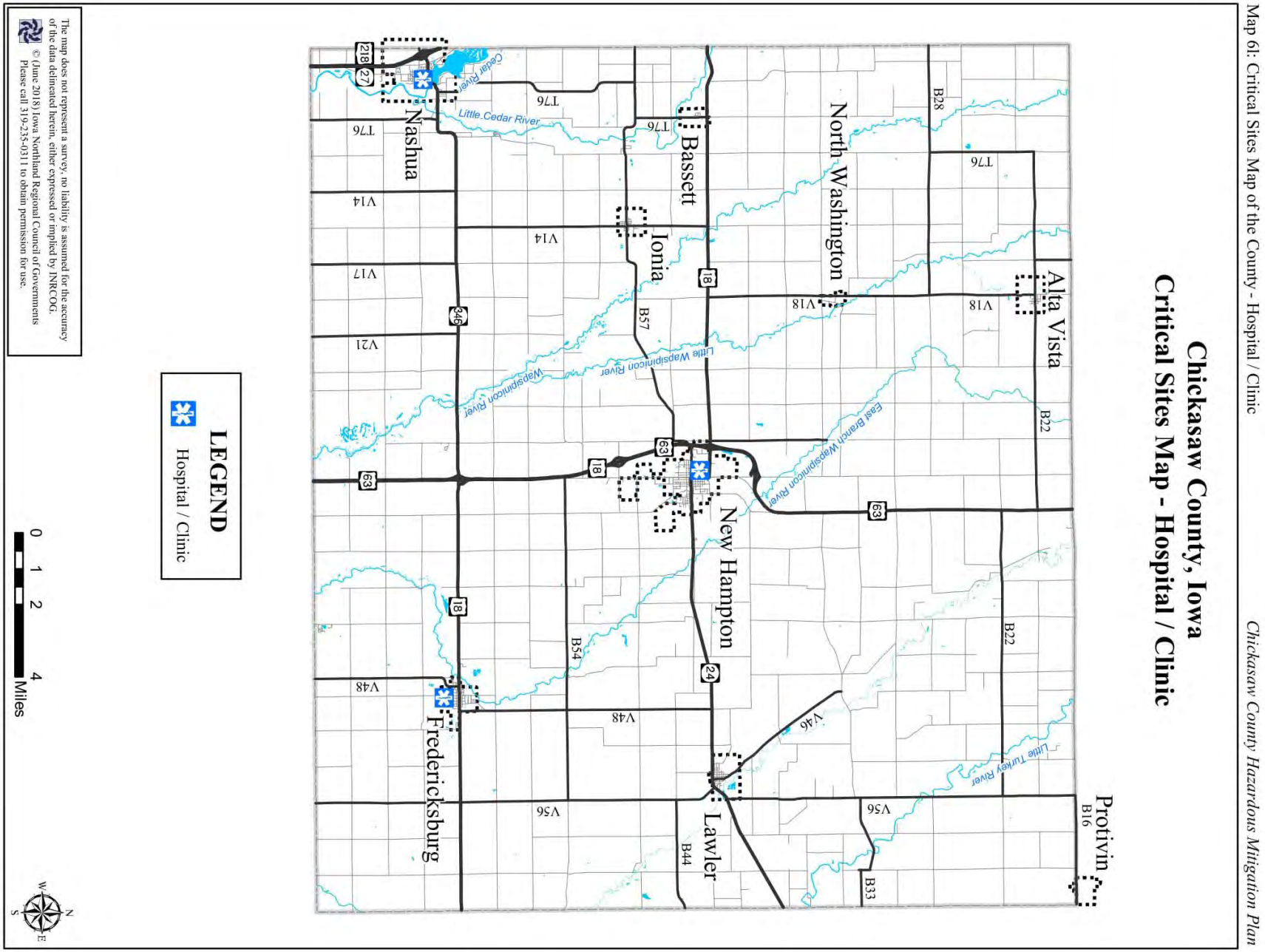
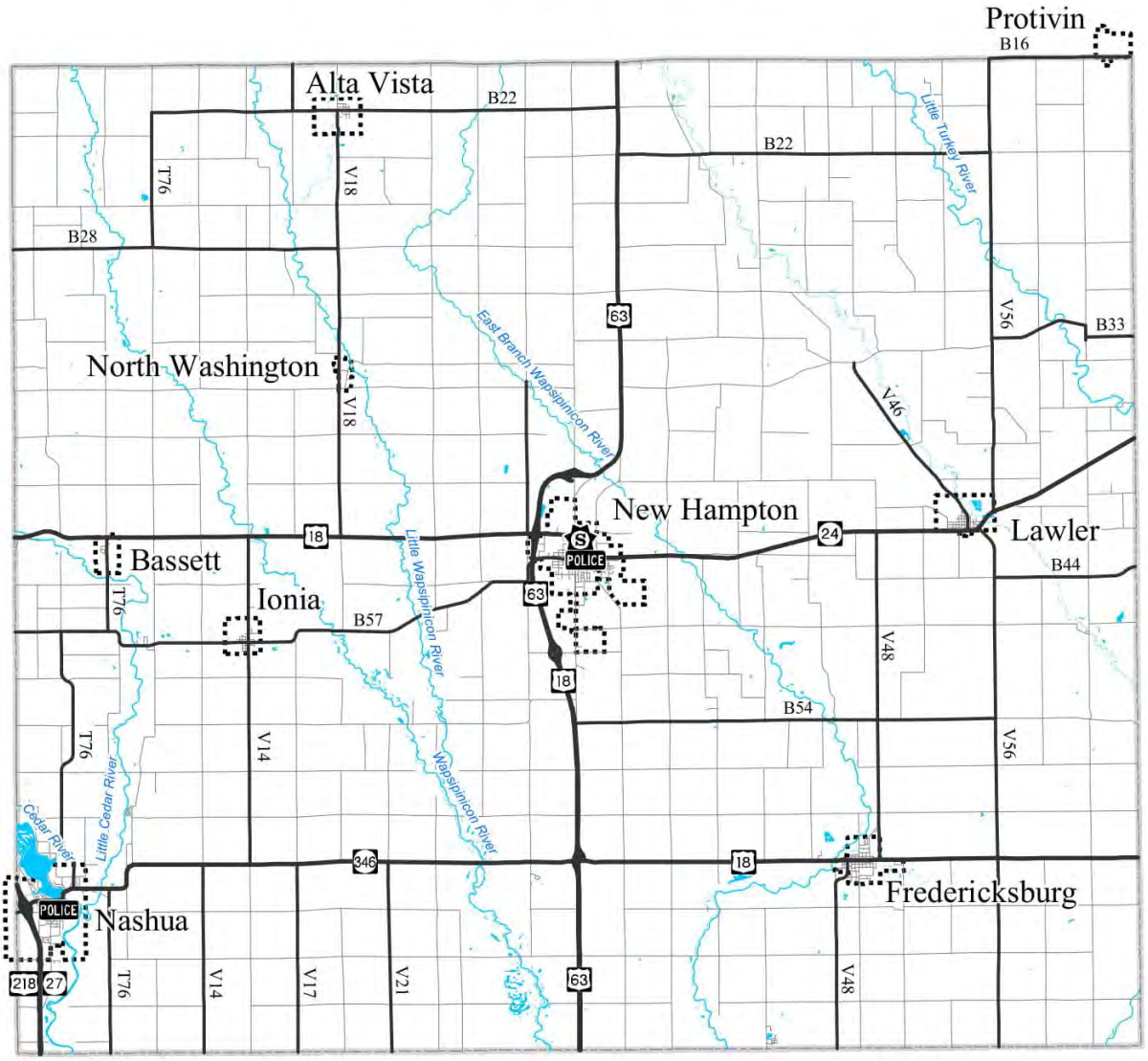
S

Map 61: Critical Sites Map of the County - Hospital / Clinic

Chickasaw County Hazardous Mitigation Plan



Chickasaw County, Iowa
Critical Sites Map - Law Enforcement



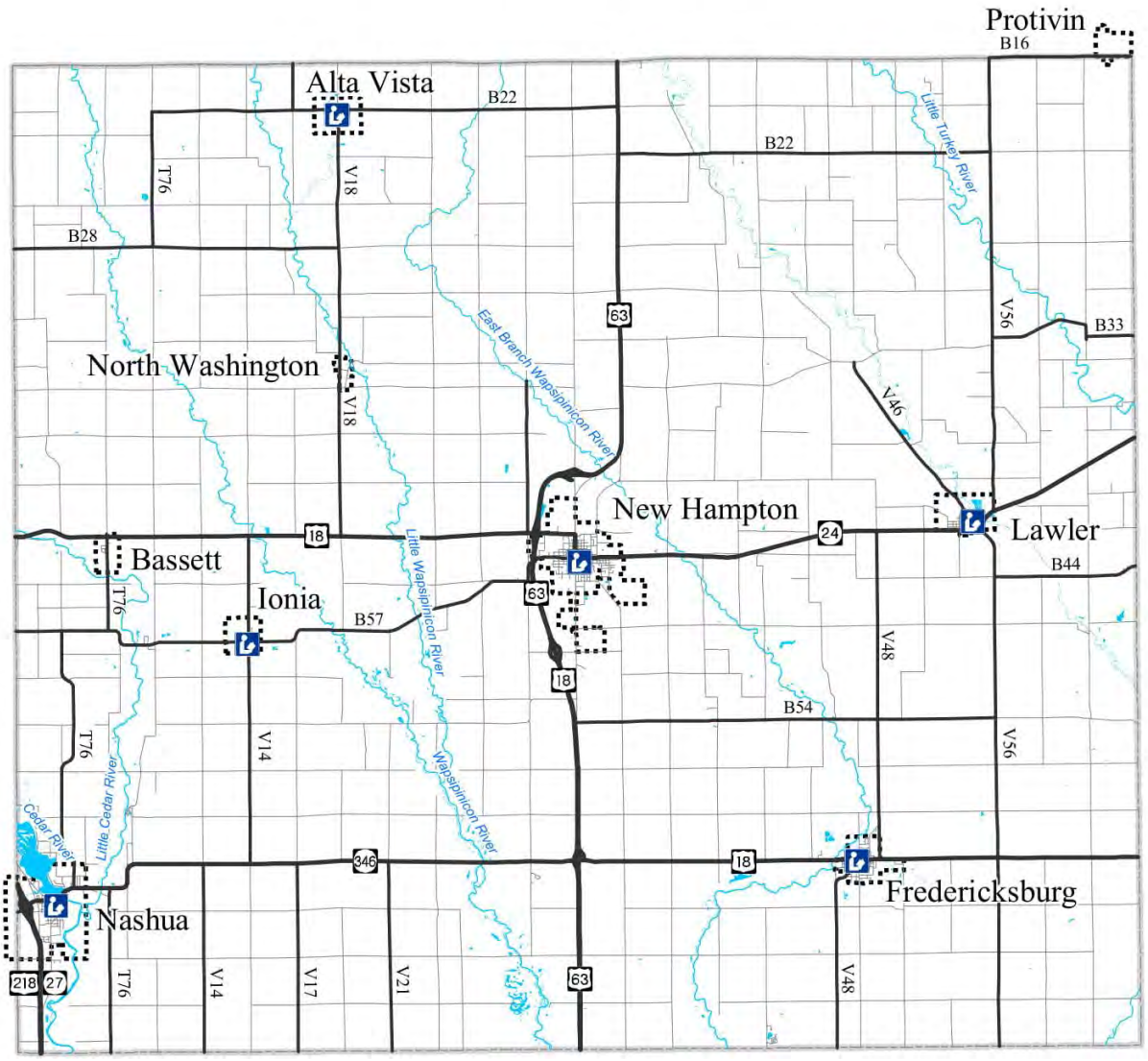
LEGEND

- County Sherriff
- POLICE — Police

0 1 2 4 Miles

N W E S

Chickasaw County, Iowa
Critical Sites Map - Library



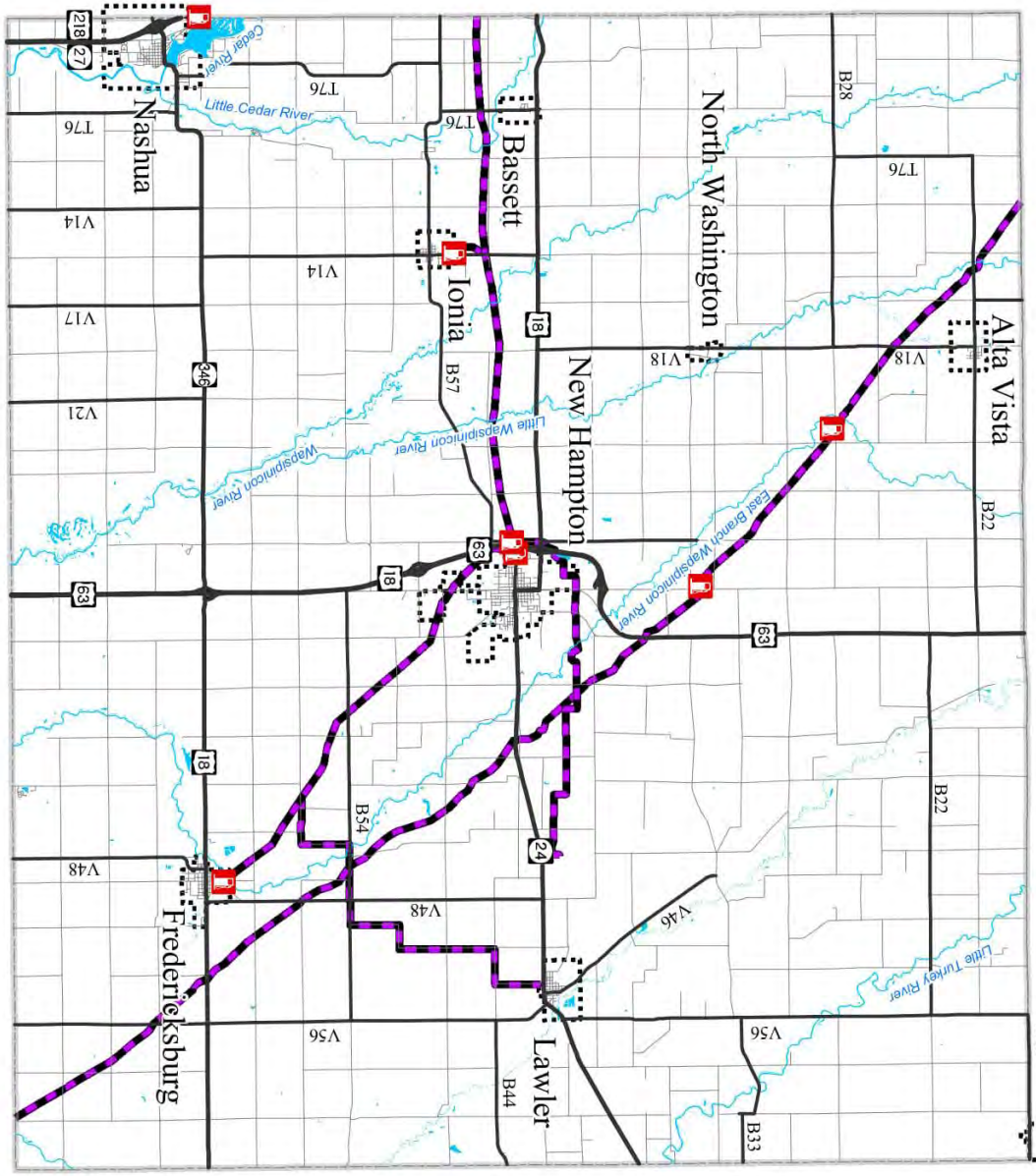
LEGEND

Library

0 1 2 4 Miles

N W E S

Chickasaw County, Iowa
Critical Sites Map - Natural Gas Service



LEGEND

- Natural Gas Regulator Station
- Pipeline

0 1 2 4 Miles

N W E S

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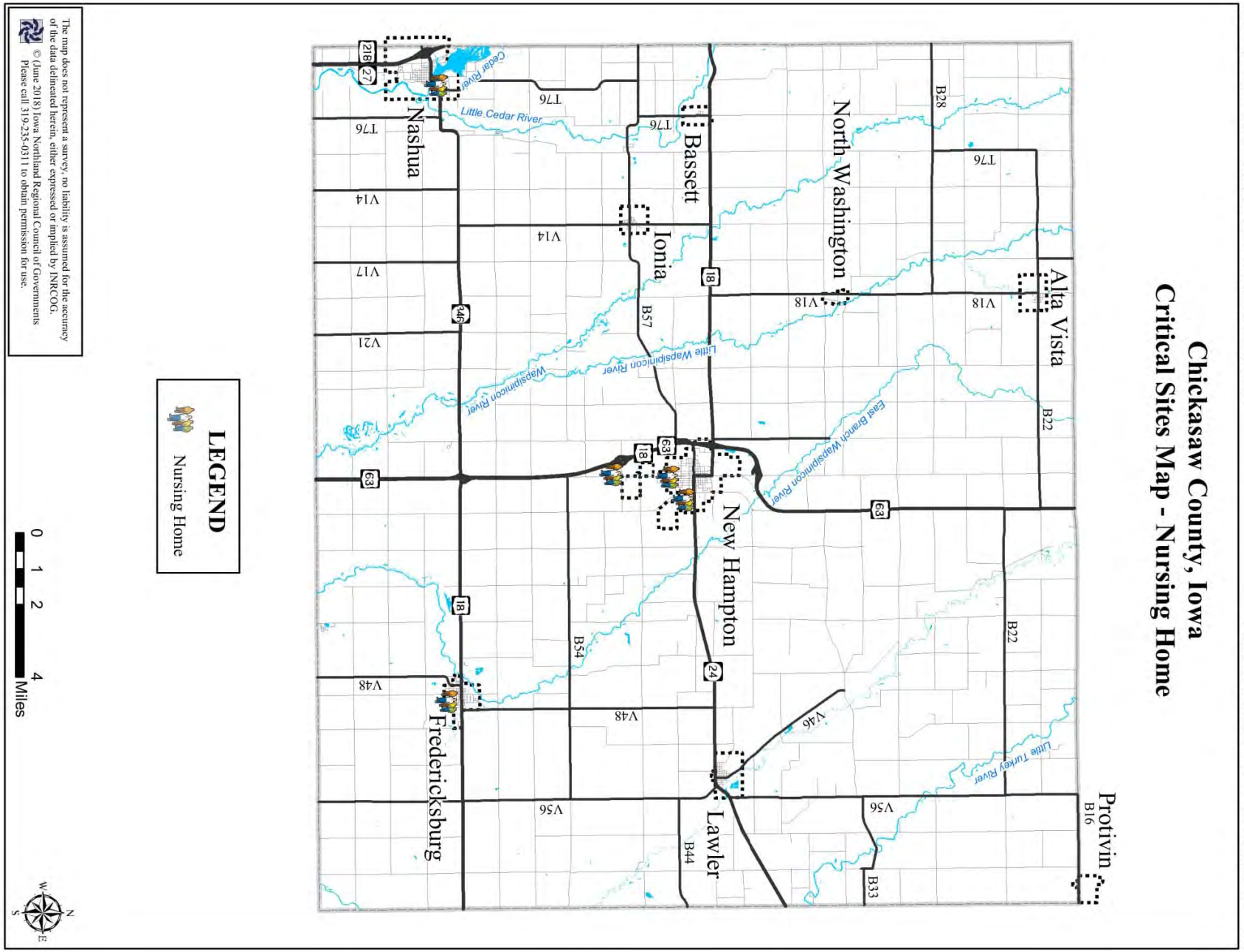
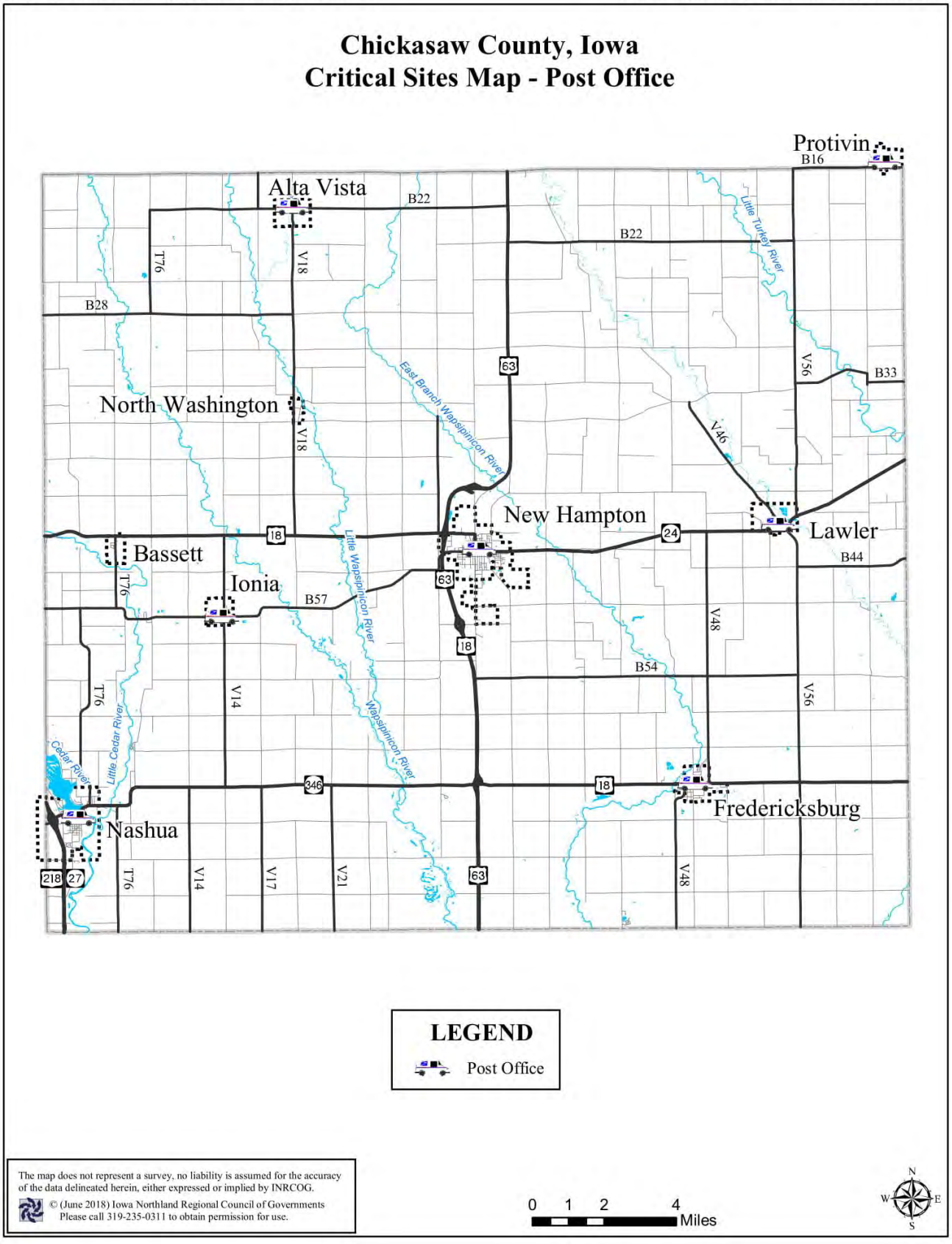
Map 6p: Critical Sites Map of the County - Nursing Home

Chickasaw County Hazardous Mitigation Plan




Chickasaw County, Iowa
Critical Sites Map - Post Office
Protivin
B16
Alta Vista
B22
T76
V18
B28
North Washington
East Branch Wapsipinicon River
63
Little Turkey River
V56
B33
V46
New Hampton
Lawler
18
24
B44
Bassett
Ionia
B57
Little Wapsipinicon River
V48
B54
V14
Cedar River
Little Cedar River
Wapsipinicon River
346
Fredericksburg
Nashua
218
27
V17
V21
LEGEND
Post Office
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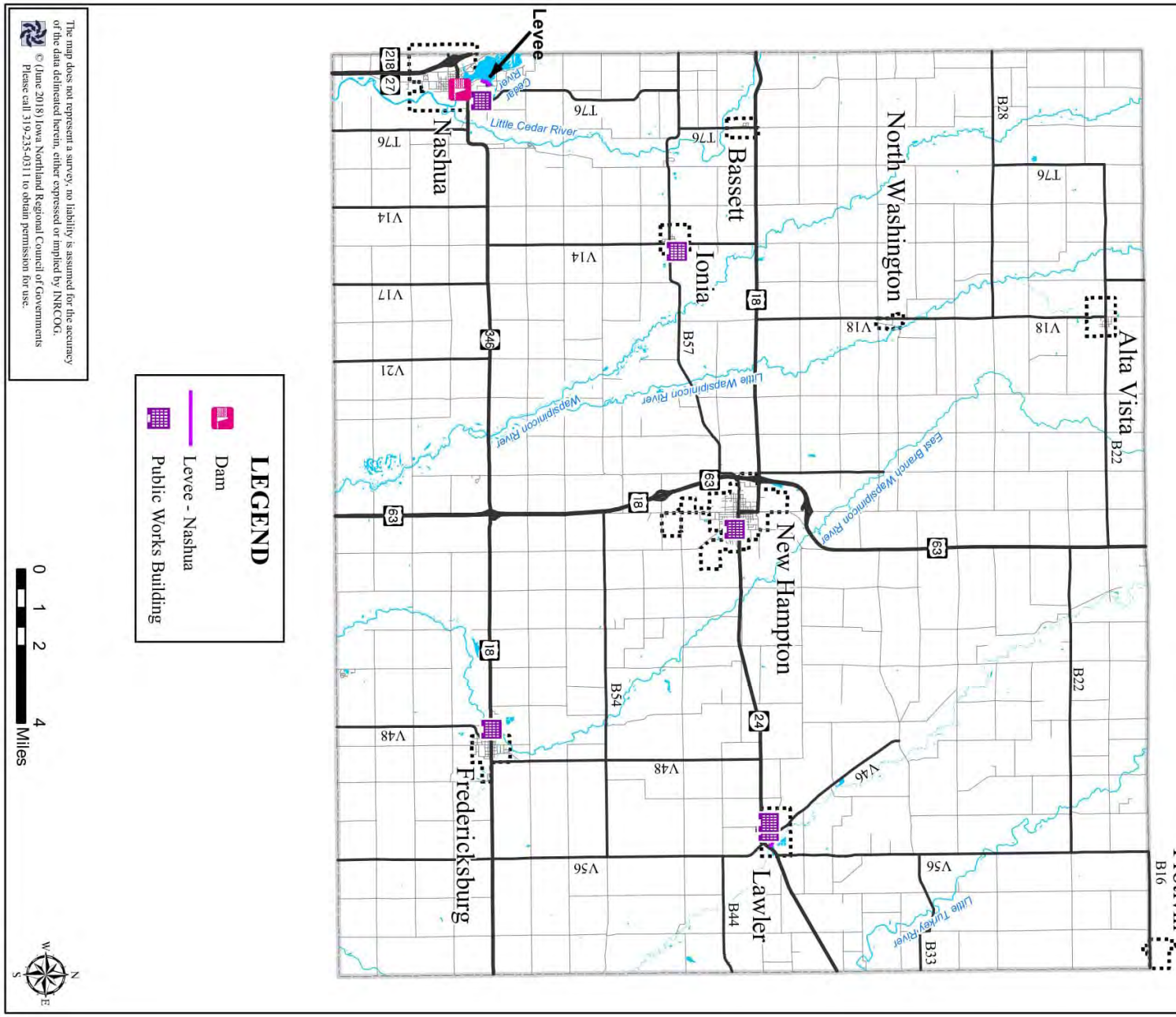
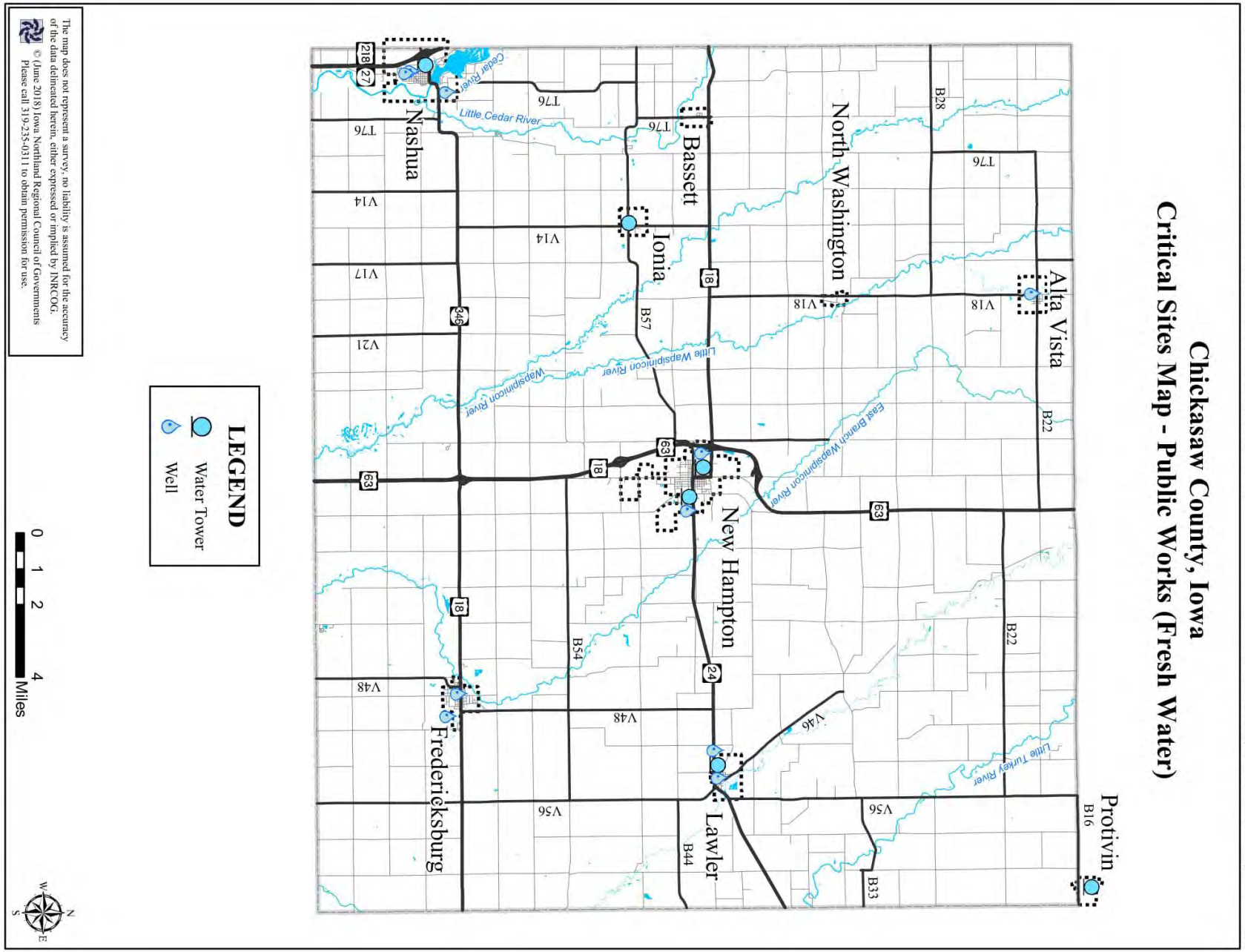
0 1 2 4
Miles
N
W
E
S



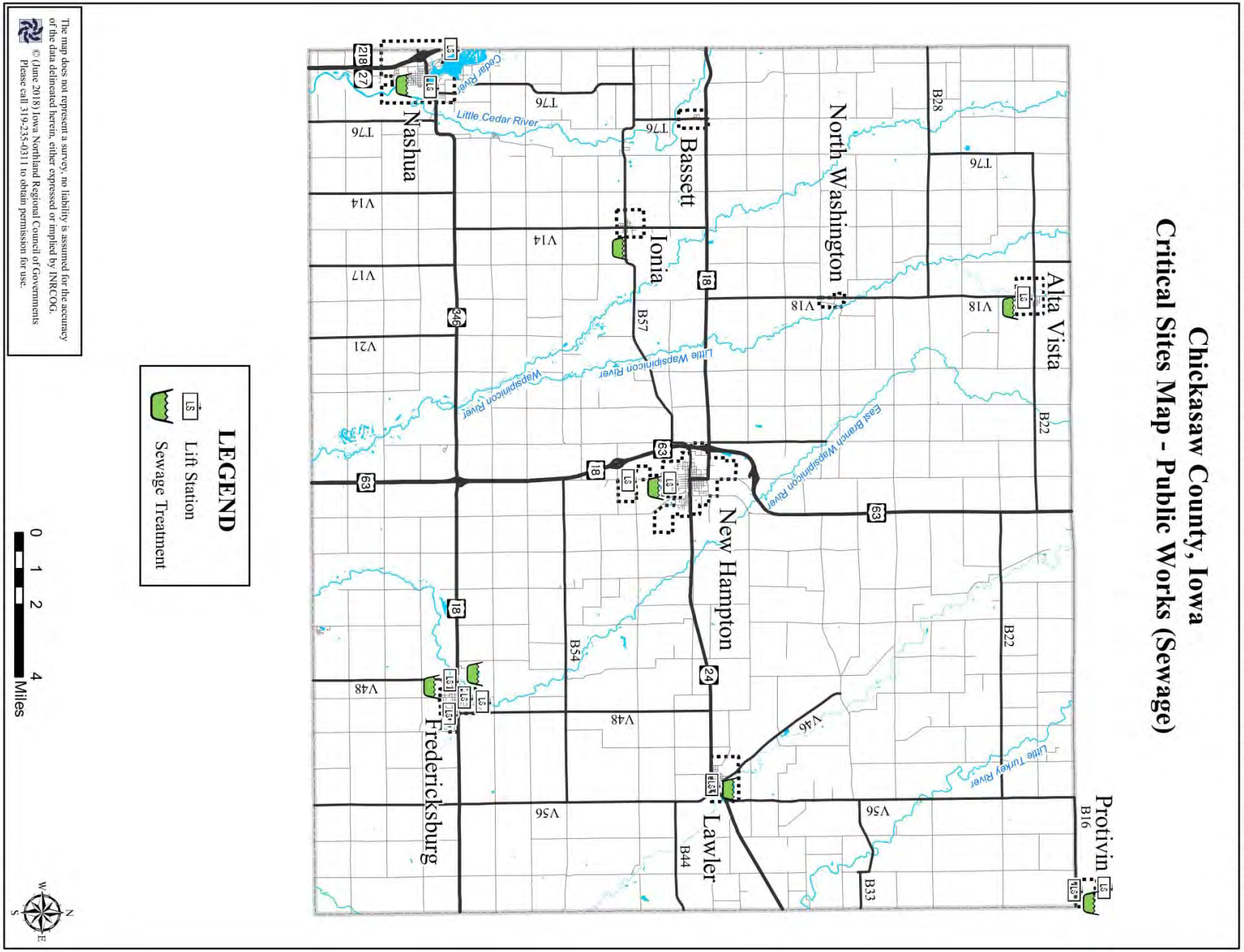
Map 6r: Critical Sites Map of the County - Public Works (Levees and Public Works) *Chickasaw County Hazardous Mitigation Plan*

Map 6s: Critical Sites Map of the County - Public Works (Fresh Water) *Chickasaw County Hazardous Mitigation Plan*

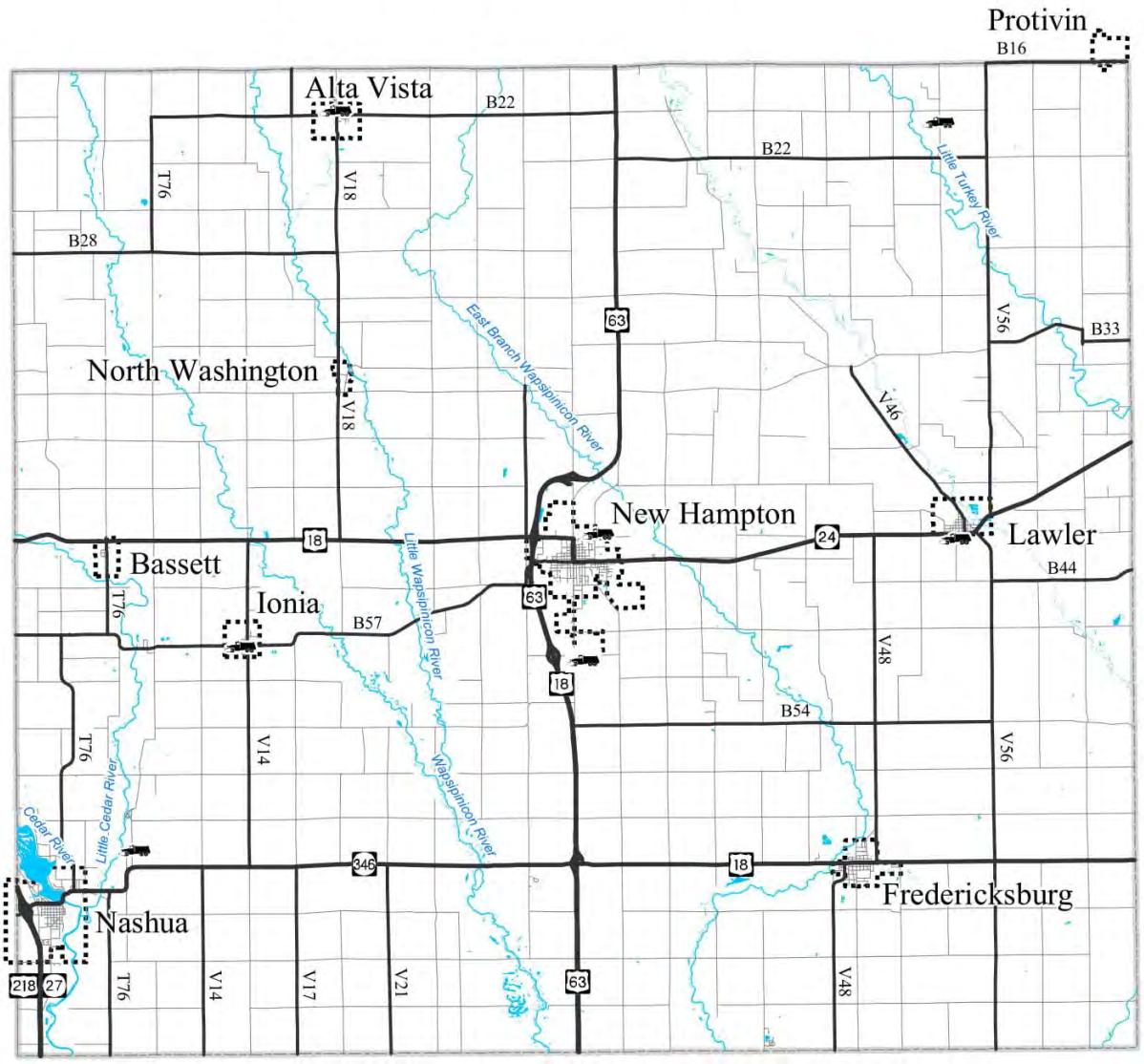


Map 6t: Critical Sites Map of the County - Public Works (Sewage)

Chickasaw County Hazardous Mitigation Plan



Chickasaw County, Iowa
Critical Sites Map - Road Maintenance

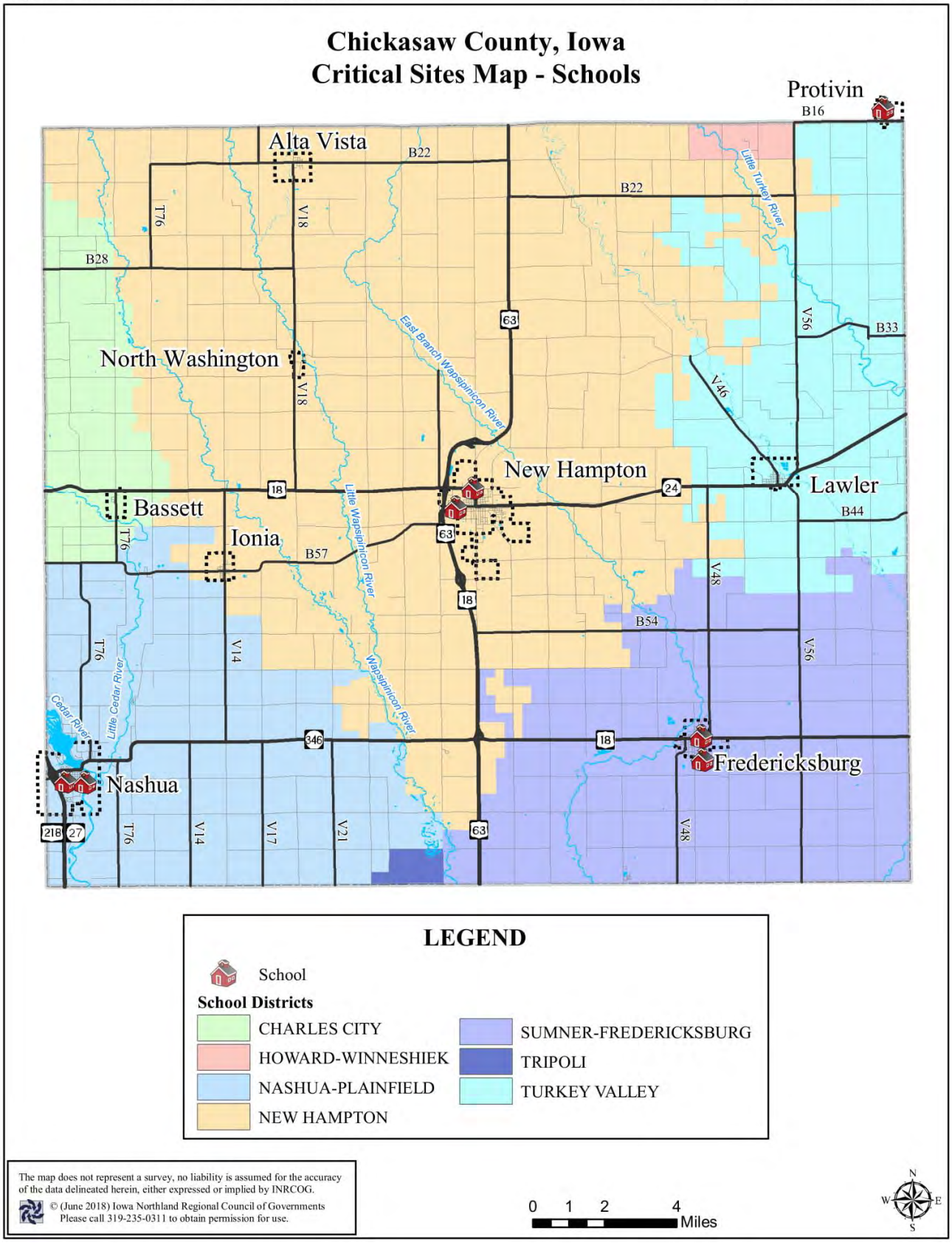


LEGEND

Road Maintenance

0 1 2 4 Miles

N W E S


Chickasaw County, Iowa
Critical Sites Map - Schools
Protivin
B16
Alta Vista
B22
T76
V18
B28
North Washington
East Branch Wapsipinicon River
63
Little Turkey River
V56
B33
V46
New Hampton
Lawler
18
24
B44
Bassett
Ionia
B57
Little Wapsipinicon River
V48
B54
V14
Little Cedar River
Cedar River
Wapsipinicon River
346
Fredericksburg
Nashua
218
27
V17
V21
LEGEND
School
School Districts
CHARLES CITY
HOWARD-WINNESHIEK
NASHUA-PLAINFIELD
NEW HAMPTON
SUMNER-FREDERICKSBURG
TRIPOLI
TURKEY VALLEY
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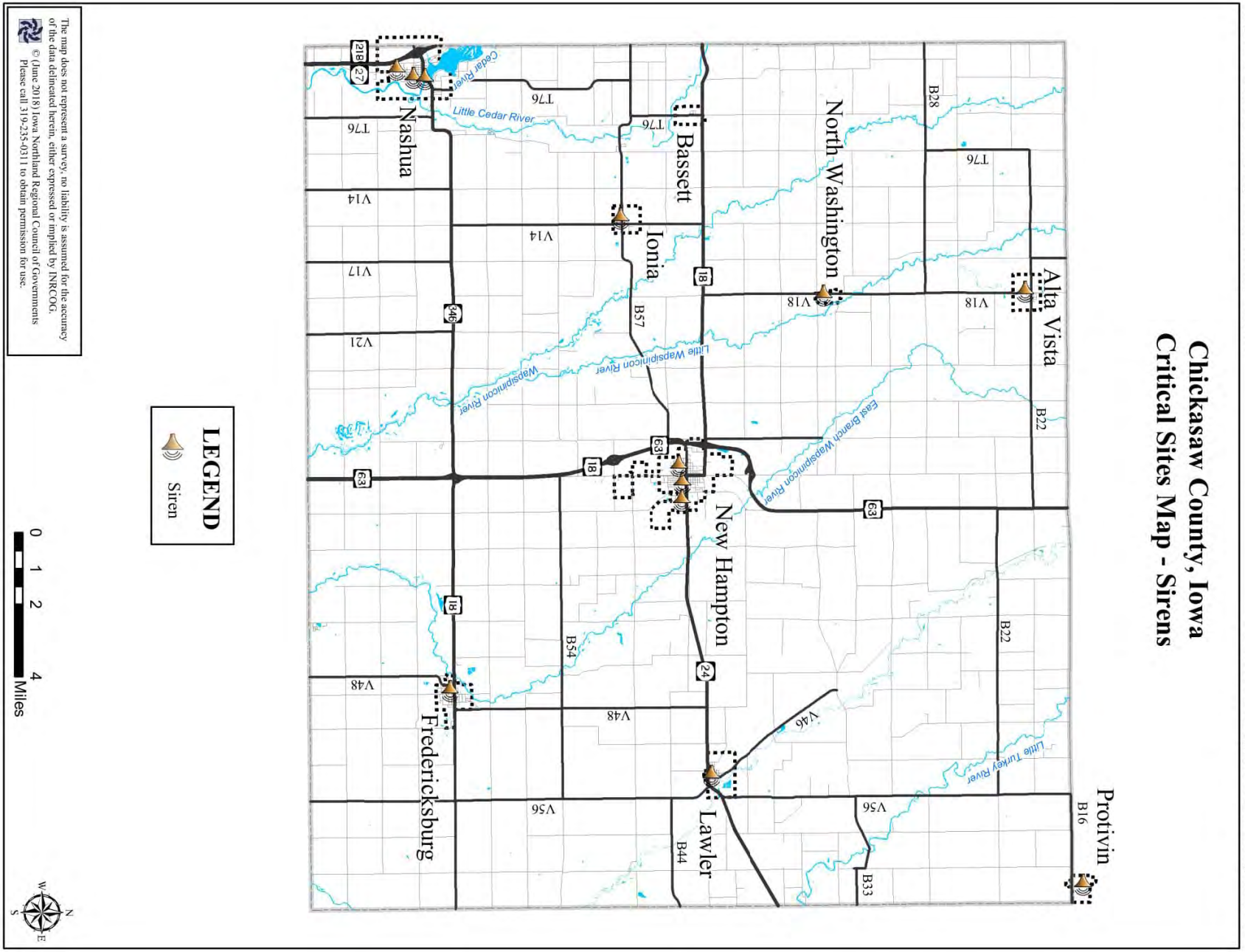
0 1 2 4
Miles
N
W
E
S

Chickasaw County, Iowa
Critical Sites Map - Sirens



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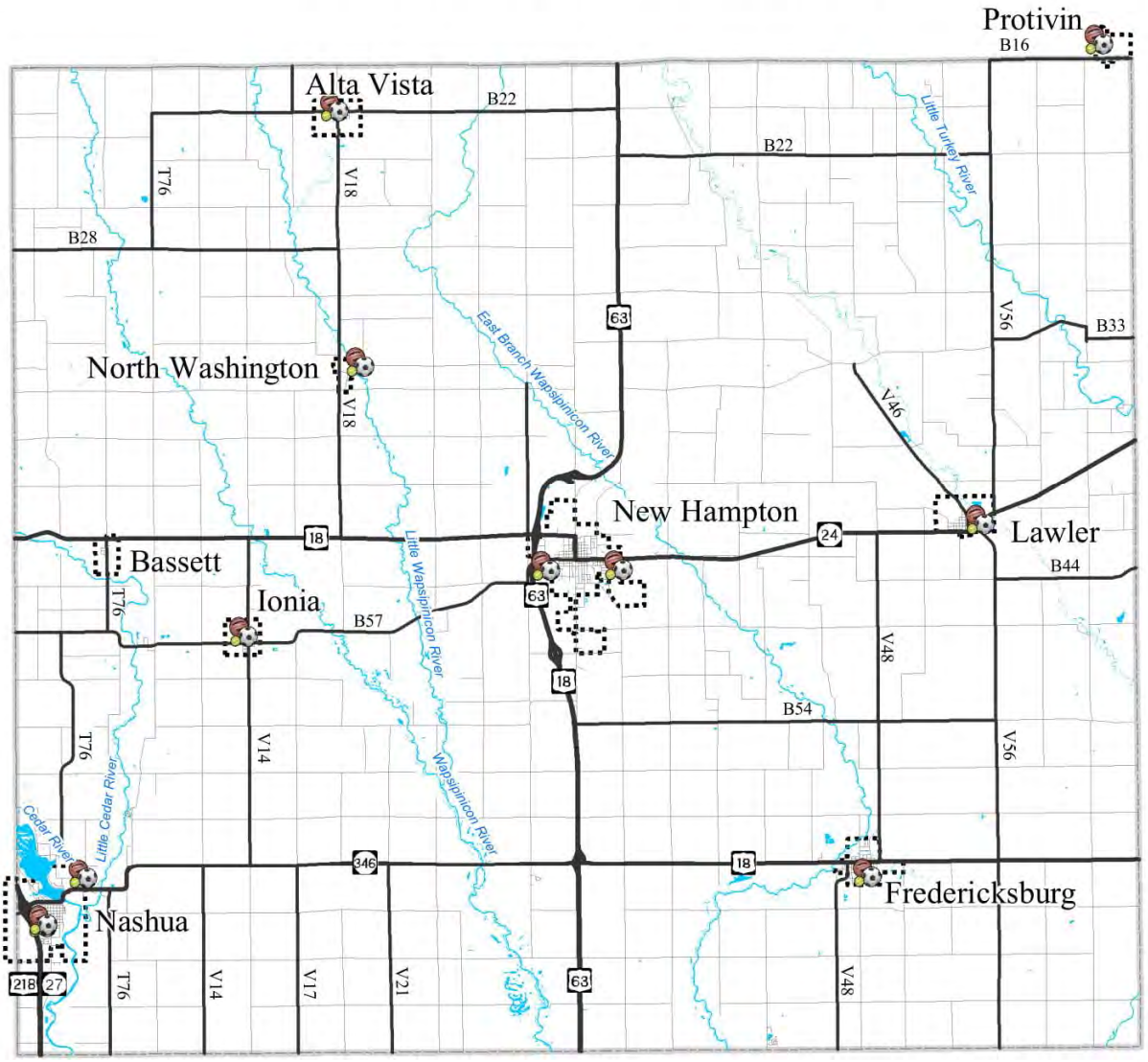
Chickasaw County, Iowa
Critical Sites Map - Sports Complex



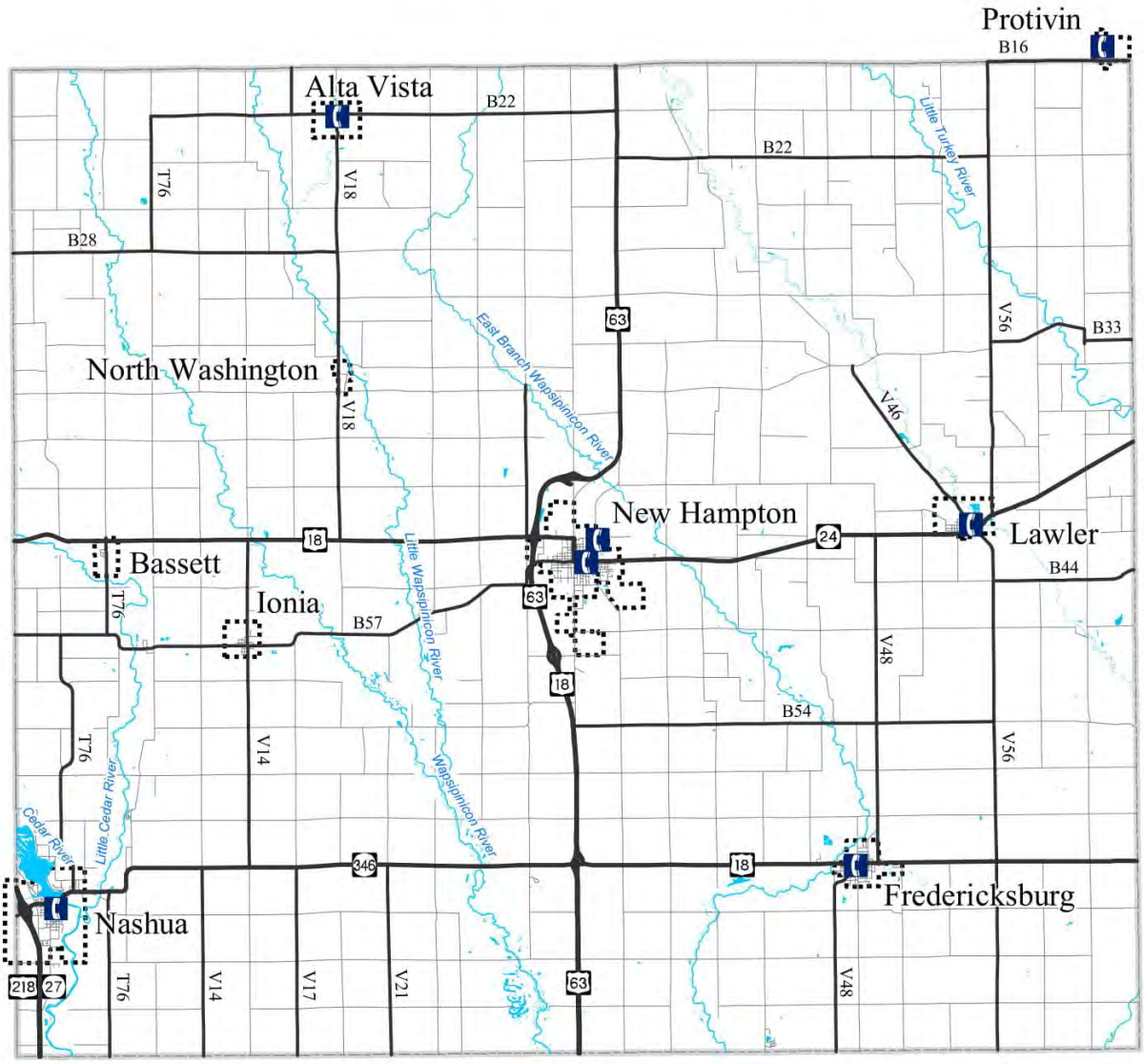
LEGEND

Sports Complex

0 1 2 4 Miles

N W E S

Chickasaw County, Iowa
Critical Sites Map - Telephone



LEGEND

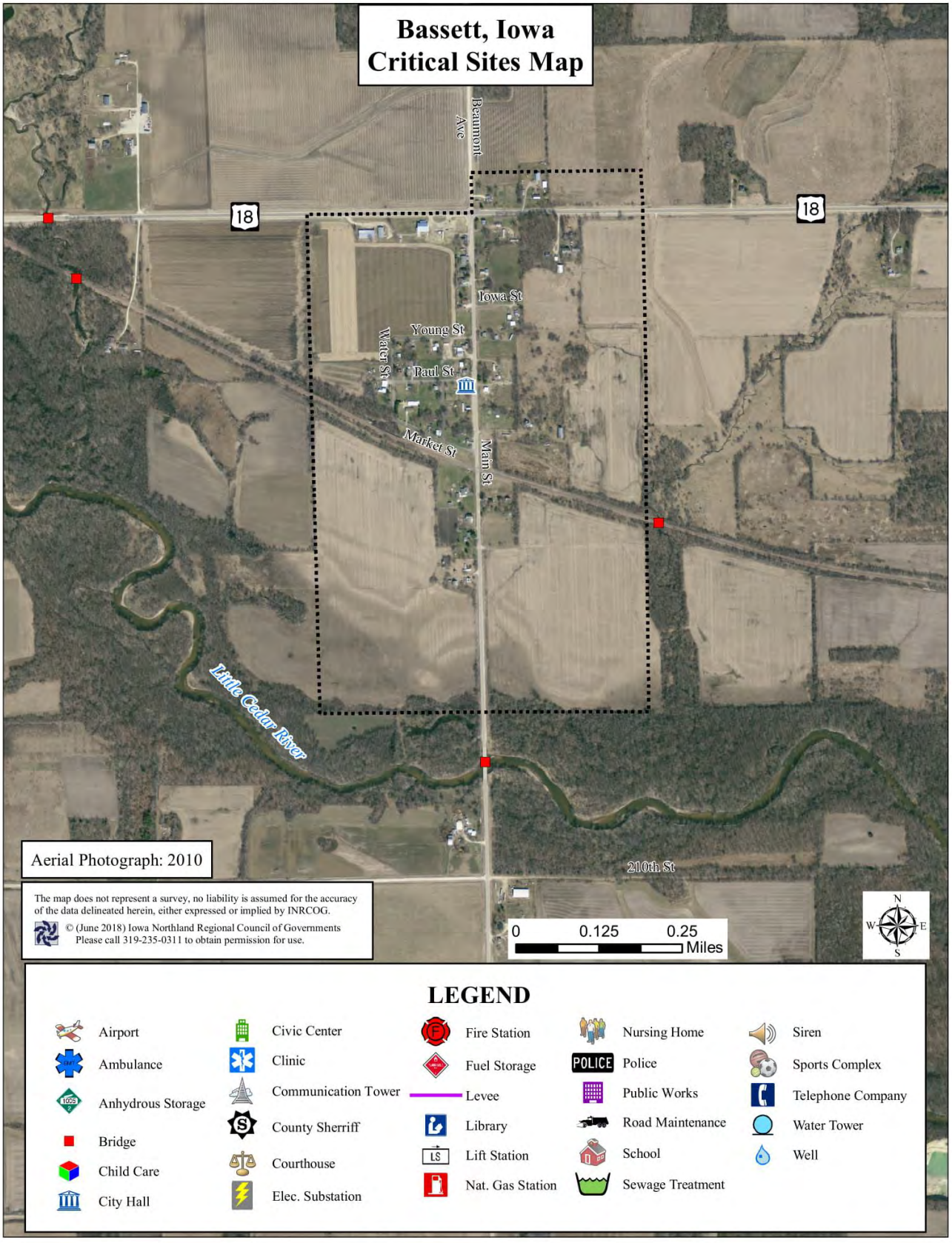
Telephone Company

0 1 2 4 Miles

N W E S

Map 7a: Critical Sites Map of the City

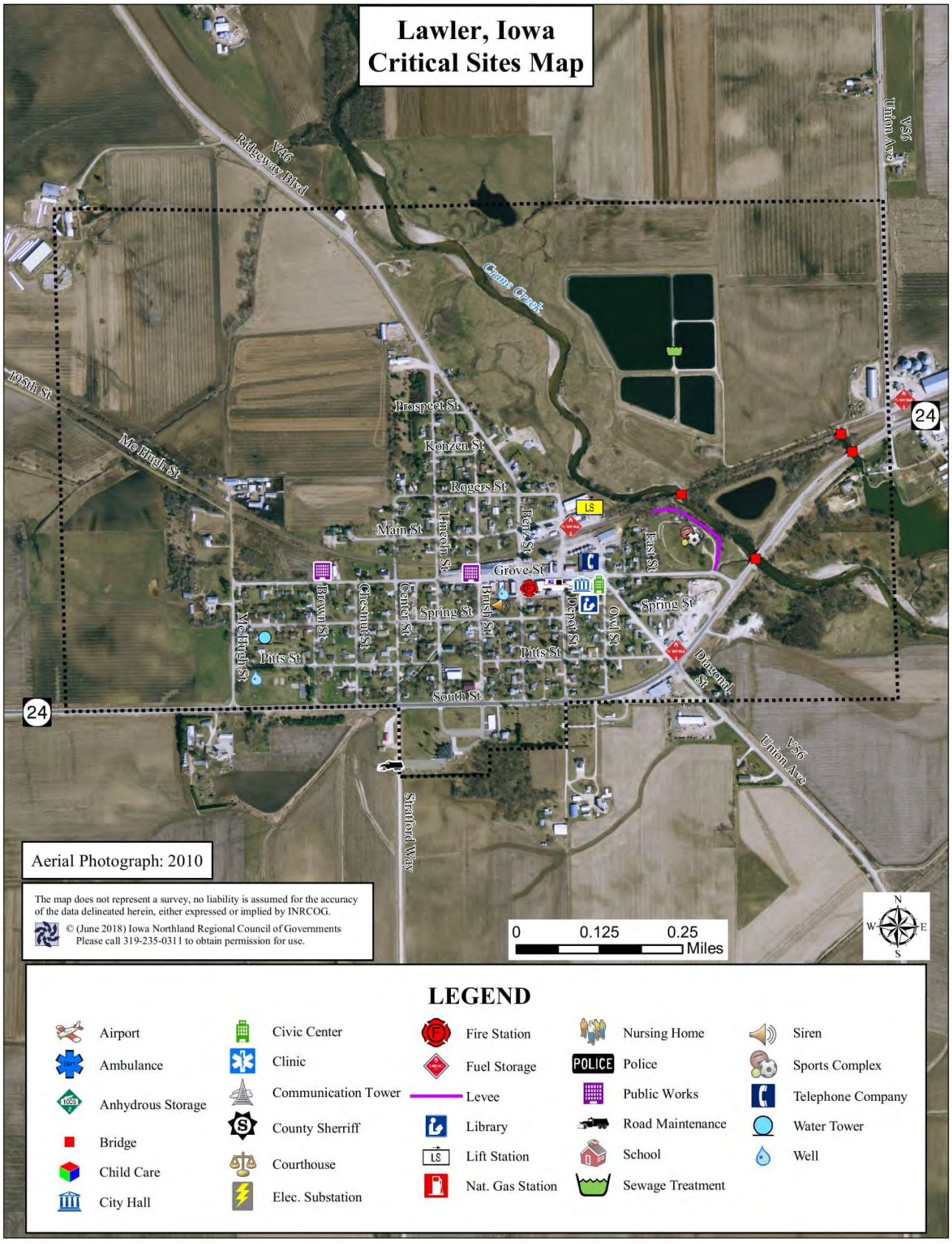
Map 7b: Critical Sites Map of the City



Map 7c: Critical Sites Map of the City

Chickasaw County Hazardous Mitigation Plan

Map 7d: Critical Sites Map of the City


Lawler, Iowa
Critical Sites Map
V46
Ridgeway Blvd
V56
Union Ave
Crane Creek
195th St
Mc Hugh St
Prospect St
Konzen St
Rogers St
Main St
Lincoln St
Bond St
East St
Grove St
Brown St
Chestnut St
Center St
Spring St
Bush St
Depot St
O.W. St
Spring St
Mc Hugh St
Pitts St
Pitts St
Diagonal St
South St
24
24
Stratford Way
V56
Union Ave
LS
Aerial Photograph: 2010
The map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
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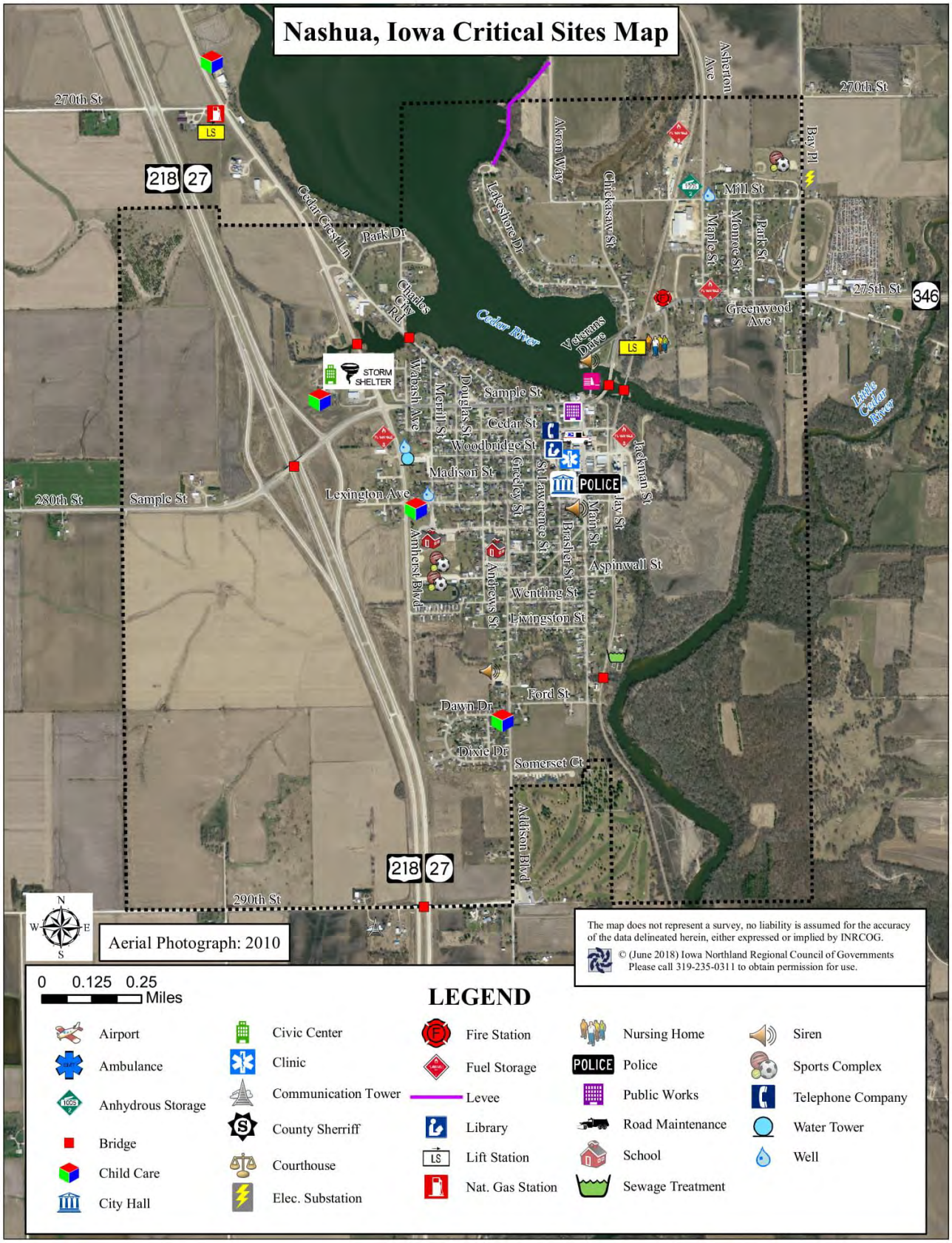
0
0.125
0.25
Miles
N
W
E
S
LEGEND
Airport
Ambulance
Anhydrous Storage
Bridge
Child Care
City Hall
Civic Center
Clinic
Communication Tower
County Sherriff
Courthouse
Elec. Substation
Fire Station
Fuel Storage
Levee
Library
Lift Station
Nat. Gas Station
Nursing Home
POLICE
Police
Public Works
Road Maintenance
School
Sewage Treatment
Siren
Sports Complex
Telephone Company
Water Tower
Well

Map 7f: Critical Sites Map of the City

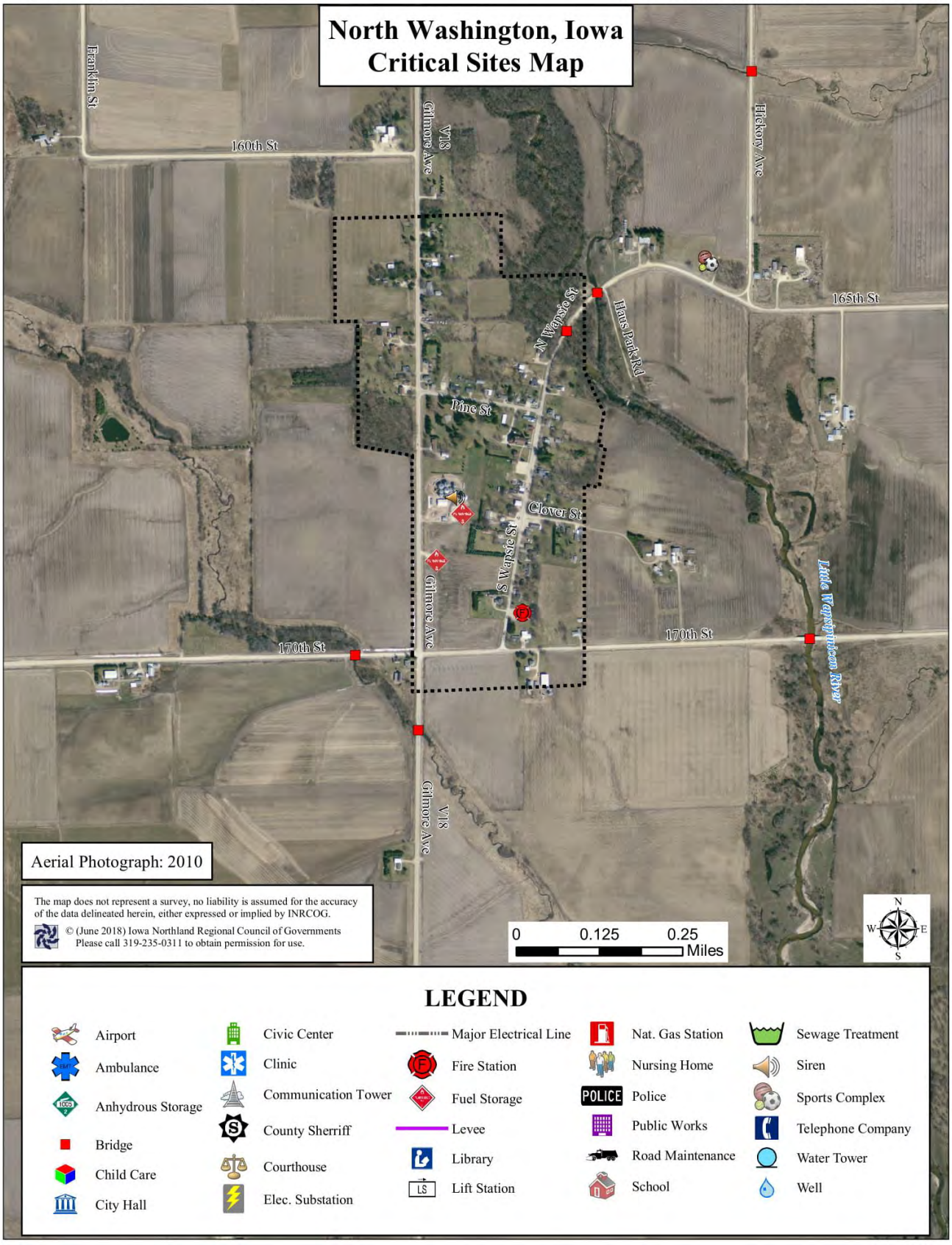
Chickasaw County Hazardous Mitigation Plan



Map 7g: Critical Sites Map of the City

Chickasaw County Hazardous Mitigation Plan

Map 7h: Critical Sites Map of the City



ATTACHMENT 2: PLAN ADOPTION RESOLUTIONS

JURISDICTION	DATE OF PLAN ADOPTION
Chickasaw County	November 19, 2018
City of Alta Vista	
City of Fredericksburg	
City of Ionia	
City of Lawler	
City of Nashua	
City of New Hampton	
City of North Washington	
Nashua-Plainfield Community School District	
New Hampton Community School District	

Chickasaw County

RESOLUTION 11-19-18-49

A RESOLUTION OF THE CHICKASAW COUNTY, IOWA, BOARD OF SUPERVISORS ADOPTING A MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN FOR CHICKASAW COUNTY.

WHEREAS, the Chickasaw County Board of Supervisors and Emergency Management Commission have authorized the development of a Multi-Jurisdictional Hazard Mitigation Plan for Chickasaw County; and

WHEREAS, the Multi-Jurisdictional Hazard Mitigation Planning Committee of the Chickasaw 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 Chickasaw County, Iowa Board of Supervisors herewith adopts the Chickasaw 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 November 2018.

Chair

ATTEST:

County Auditor

City of Alta Vista

City of Fredericksburg

City of Ionia

City of Lawler

City of Nashua

City of New Hampton

City of North Washington

Nashua-Plainfield Community School District

New Hampton Community School District

ATTACHMENT 3: STATUS OF 2012 HAZARD MITIGATION PLAN

OVERALL HMP UPDATE CHANGES

All of the jurisdiction's that participated in the 2018 plan update were also part of the county's first multi-jurisdictional hazard mitigation plan developed in 2013. The first step in the planning process was for each participating jurisdiction reviewed the County's 2013 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	**MJ-HMP**	**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 – 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 Bremer County and all jurisdictions • Updated disaster historical occurrences • Updated average assessment scores for Bremer 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	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
		  o Community Profiles, transportation, developments, and utility providers
		  o Demographic data
		  o New list of hazards and analysis criteria
		  o Vulnerability analysis of critical facilities, populations, and estimated property loss
		  o NFIP status and repetitive loss status, where applicable
		  o Current mitigation activities
		  o 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 2013 plan. The following tables state the status of the actions in the 2013 plan.

CHICKASAW COUNTY – STATUS OF 2013 HAZARD MITIGATION ACTIVITIES	
Mitigation Action	**Committee Determination/Comments**
Continue to encourage the use of Iowa One Call - 811	Continuing to improve
Educate the public on all hazard events – awareness, prevention, risks, recovery	Ongoing
Identify alternative water sources	Ongoing
Maintain a fully-equipped and well trained fire department and first responders	Continuing to improve
Maintain NFIP Membership	Ongoing
Continue Flood Mitigation through buyouts	As Needed
Update FEMA flood maps	Ongoing
Enforce Floodplain Ordinance	As Needed
Elevate flood-prone structures	As Needed
Utilize filter strips	Continuing to improve
Creation of detention basins / wetland areas	Ongoing
Encourage the installation of back flow valves	Ongoing
Coordinate flood control efforts	Ongoing
Invest in flood control infrastructure	Continuing to improve
Increase distribution of NOAA Weather Radios	Lack of funding
Backup and protect county data	Continuing to improve
Coordinate, organize, plan, and train local jurisdictions on storm readiness	Continuing to improve
Continue utility improvements to reduce risk from hazards	Ongoing
Purchase and maintain backup generators at public facilities	As Needed
Continue volunteer recruitment and training for storm spotters	As Needed

Maintain county roads and equipment	Continuing to improve
Bury utility lines	Ongoing
Construct, maintain, and operate storm shelters	Ongoing
Review and update applicable response and recovery plans	Continuing to improve
Construct tornado shelters in at-risk locations	Ongoing
Identify and develop tornado safe room alternatives (i.e., park restroom/shelter, etc.)	As Needed
Review and analyze traffic data to better serve the public needs and safety	Ongoing
Install and maintain stop lights at railroad crossings	As Needed
Enhance accident response time	As Needed
Develop and maintain list of cooling shelters	Continuing to improve
Continue community assistance efforts for at-risk populations	Ongoing
Maintain mutual aid agreements	Ongoing
Continue to maintain adequate training and preparedness for hazards and post-hazard	Ongoing
Regulate burn bans	Continuing to improve
Improve consistency in the communication system to enhance ability to prepare and response appropriately to a hazard	Continuing to improve
Increase the number of media outlets to communicate with residents (i.e., websites, social media, newspapers, flyers, etc.)	Continuing to improve
Continue to conduct incident command system training	Continuing to improve
Maintain and distribute public information officers contact list	Ongoing
Maintain and updated, as needed, the continuity of government plan	As Needed
Marketing, promoting, and encouragement of the use of buffer zones and filter strips along streams, lakes, and rivers	As Needed
Identify and fill/cap of abandoned wells	Continuing to improve
Identify locations and development of wetlands/detention ponds	Ongoing
Use of GIS mapping for locating, responding, and preparation for hazards against critical facilities	Ongoing
Development and enforcement of a storm water management program	Continuing to improve

Coordinate with area emergency management agencies, responders, industries, and the public	Ongoing
Regularly conduct response drills	As Needed
Secure hazardous materials	Ongoing
Continue training in HAZMAT reporting	As Needed
Increase drop site awareness (when, where, how to properly dispose of materials)	As Needed
Establish a fund to mitigate a HAZMAT release where there is no responsible party	Continuing to improve
Maintain compliance with the County's Emergency Response Plan	Ongoing
Coordinate efforts with the NE Iowa Hazardous Materials Response Team and Department of Natural Resources	Ongoing
Continuously update County's firewall software	Ongoing
Maintain training for law enforcement entities and equipment capacity	Continuing to improve
Coordinate with other Federal, State, and Local law enforcement entities	Continuing to improve
Maintain First Responders capacity and training	Continuing to improve
Implement effective potential employee screening program to identify those individuals who may be considered a danger to the community and government	Continuing to improve
Encourage proper construction techniques on infrastructure development and improvement	Ongoing
Determine which diseases are most likely to impact the county and develop strategies to prevent/reduce their occurrence	As Needed
Monitor the health of plants and animals	As Needed
Complete, maintain, and inform the public on the Foreign Animal Disease Plan	Continuing to improve
Regulate dumping by enforcing an environmentally friendly policy	Ongoing
Discourage tree and shrubbery removal in vulnerable areas	Ongoing
Devious contractor awareness	Continuing to improve
Water testing after flooding events	Ongoing

CITY OF ALTA VISTA– STATUS OF 2013 HAZARD MITIGATION ACTIVITIES	
Mitigation Action	**Committee Determination/Comments**
Educate the public on proper steps to protect their property and self during an event	Ongoing
Place lightning arrestors on power lines	As needed/when work is needed on current
Purchase and install surge protector equipment on critical municipally-owned electronic equipment	Lack of funding
Backup critical city data and stored off-site	In fireproof files on site
Maintain tree-trimming policies	Ongoing
Acquire backup generation capabilities at critical facilities (i.e., city hall, fire department, telephone office, etc.	Have 3, working on getting more
Maintain a backup fuel supply	Ongoing, have a 300-gallon fuel tank
Regularly inspect propane connections	LP provider does this
Divide community electrical circuits to reduce the loss of power throughout the community	Ongoing
Purchase and install early warning siren to be a replacement or an additional siren in the community	Have one working, working on getting second
Recruit and train volunteer storm watchers/tornado spotters	Fire Department does this
Identify locations and construct a public tornado shelter in vulnerable areas of town	Lack of funding
Construct tornado safe rooms in homes, businesses, etc.	Lack of funding
Work with local businesses and County EMA to ensure Tier II reports are being filed	Done by DNR
Encourage citizens to keep hazardous materials secured	Not doing
Establish and enforce designated routes for the transport of hazardous materials	Not doing
Maintain law enforcement contract to monitor large storage supplies of hazardous materials	Ongoing through Waterloo Fire
Maintain contract for HAZMAT response	Ongoing
Ensure first responders are aware of response plans for local facilities	Ongoing

Maintain a well-trained and equipped Street Department	Ongoing
Implement and enforce sidewalk clearance ordinance	Ongoing
Maintain tree-trimming policies	Ongoing
Designate and maintain heating shelters	Ongoing
Implement and review annually an incident command standard operating procedure in local fire responder organizations	Ongoing
Maintain a well-trained and equipped fire department	Ongoing
Encourage the use of smoke detectors, sprinkler systems and fire extinguishers	Ongoing
Identify needs of fire department and purse funding for: a replacement of old and worn-out bunker gear, fully outfit department with new SCBA's, and other items as they become needed	Ongoing
Consider adopting and developing a regular building inspections program	Ongoing
Maintain supply of sandbags	None obtained
Acquire additional water pumps	Lack of funding
Maintain a viable law enforcement department, capable of responding to all hazards	Contract with County
Secure vulnerable critical sites throughout the community; including, but not limited to: locks on all critical facilities, fences at some critical facilities, security cameras, alarms, increase patrols, automatic locks.	Ongoing
Continue to treat and monitor water supply	Ongoing
Construct new wastewater treatment facility to meet current standards	Ongoing
Ensure proper signage along transportation network to control flow of traffic	Ongoing
Implement and enforce burning bans when necessary	Ongoing
Restrict water usage, as necessary, to maintain water supply	Ongoing
Continue to cooperate with Health Department and local medical facilities to help insure effectiveness of prevention (vaccinations/immunizations), detection, and response mechanisms	Ongoing
Maintain sanitary conditions at all public facilities	Ongoing
Identify and remove dangerous buildings throughout the community	Try to as needed

CITY OF FREDERICKSBURG – STATUS OF 2013 HAZARD MITIGATION ACTIVITIES	
Mitigation Action	**Committee Determination/Comments**
Continue to follow monitoring requirements set forth by the Iowa DNR	In Process, check for annual changes
Consider development of a storm water management program	Not Started, lack of funding
Educate the public on preparedness, avoidance, and recovery from hazards to reduce the loss of life and property	On-Going
Encourage the use of buffer and filter strips	Not Started
Continue participation in the National Flood Insurance Program	On-Going
Maintain, enforce, and update Zoning and Floodplain Ordinances as needed	On-Going
Ensure proper training of Floodplain Manager	Not Doing, lack of funding
Flood proof structures in the floodplain	Not Doing, no building in flood plain
Continue with improvements to the storm sewer system	On-Going, lack of funding
Develop and maintain a plan for sandbagging in the community	On-Going
Continue to provide necessary training for Fire Department personnel, law enforcement personnel, and ambulance crews for all hazard response	On-Going
Maintain existing equipment and purchase needed firefighting equipment	In Process
Maintain existing 28E agreements with surrounding communities for mutual aid assistance	On-Going
Consider adopting building codes	No inspector
Continue to make necessary updates to and enforce the city guidelines for burning	On-Going
Create an annual fire inspection program for commercial and industrial properties	On-Going
Encourage local utility to install surge protectors on major electric lines	Lack of information
Continue working with the Northeast Iowa Response Group	On-Going
Ensure hazardous materials are reported (Tier II reports) in accordance with applicable laws	On-Going
Continue to enforce tree inspection and trimming program	On-Going, started new initiative

Work with local utility to develop a program for burying existing power lines	On-Going, doing several per year
Purchase new generators for emergency power in needs of need at the main lift station and well	Completed
Backup electronic data at City Hall and emergency response locations and store off-site	On-Going
Continue to enforce snow ordinance	On-Going
Establish heating sites for at-risk populations	On-Going
Regularly review and amend fire, medical, and hazardous response standard operating procedures	On-Going
Install GPS in all emergency vehicles to speed response routes and monitoring location of said vehicles	Not Started, part of 5 year plan
Maintain a list of available translators in the community	Not Started
Evaluate current terrorism mitigation efforts	On-Going
Increase security measures taken to protest and secure critical facilities in community	Not Started, fenced and secured
Encourage the installation of back-flow valves in structures to prevent contamination of water supply	On-Going
Construct rigid barriers around sites that store explosive materials	Not Needed
Continue community cooperation with Iowa One Call	On-Going
Encourage immunizations and vaccinations	On-Going
Educate and train city personnel on all hazards that could impact the community	On-Going
Develop a NOAA Weather Radio awareness program	Not Started
Maintain access to Geiger counters for first responders	Not Started
Update and install improved signage along roadways, as it become necessary	On-Going
Construct tornado shelters/safe rooms at the elementary and middle schools, and community center	Not Doing
Develop a tornado safe room awareness program	On-Going
Maintain weather spotter training	On-Going, provide yearly
Develop and maintain a plan for rationing water use within the community	On-Going, can use social media

Establish local cooling sites for at-risk populations	On-Going, city hall
Encourage citizens to plant shade trees near dwellings	Have a tree committee
Update Emergency Response Plan as needed	Not Started INRCOG and EMA
Develop and update as needed, a continuity of operations plan	On-Going
Develop a list of structures to be used as gathering sites in the event of an emergency situation	On-Going fire and EMA

CITY OF IONIA– STATUS OF 2013 HAZARD MITIGATION ACTIVITIES	
Mitigation Action	**Committee Determination/Comments**
Have sandbags on hand and train firemen	Completed
Keep people trained in weather spotting	On-Going
First responders trained to handle all hazards	On-Going
Fire Department training	On-Going
Continue to work with County and their programs	On-Going
Continue to work with the County Sheriff's office	On-Going
Continue to improve (repair as needed) City Hall and Sewer System	Completed (for now)
Continue enforcing building codes	On-Going
Continue to clean out storm drains	On-Going
Educate public on hazards	On-Going
Maintain all mutual aid agreements	On-Going
Update Emergency Response Plan	In-progress

CITY OF LAWLER – STATUS OF 2013 HAZARD MITIGATION ACTIVITIES	
Mitigation Action	**Committee Determination/Comments**
Continue to follow monitoring requirements set forth by the Iowa DNR	On-Going following DNR
Consider the development of a storm water management program	On-Going, working on funding
Continue to participation in the National Flood Insurance Program	On-Going only one structure in flood plain
Widen and clear the southwest drainage channel of Crane Creek and widen Brush Street culvert	Completed
Construct a berm and clear growth and debris in northwest drainage channel of Crane Creek	Long-Term lack of funding
Maintain, enforce, and update Zoning and Floodplain Ordinances as needed	On-Going
Continue to enforce and update, as needed, the 2012 Building Code	On-Going building code enforced when needed
Ensure proper training and certification of Floodplain Manager	On-Going
Flood proof structures in the floodplain	On-Going updating maps
Continue to provide necessary training to Fire Department and other emergency response personnel	On-Going training done as required
Maintain existing and purchase new firefighting equipment as needed	On-Going grant opportunities
Maintain existing mutual aid agreements with surrounding communities for mutual aid emergency assistance	On-Going mutual aid agreements
Enforce city guidelines for burning	On-Going
Create an annual fire inspection program for commercial and industrial properties	Long-Term
Work with local utility provider to install surge protectors on major electric lines	On-Going
Purchase additional generators to provide emergency power in times of need	Completed
Provide education to the public on how to prevent/prepare, respond, and recover from hazard events	On-Going public meeting as needed
Construct barriers around fixed HAZMAT storage sites that are located near transportation routes	Not Doing
Continue the tree inspection and trimming program	On-Going trim as needed for city properties and electric lines
Work with local utility provider to develop a program to bury existing utility lines	Long-Term

Maintain existing redundant grid within the city	On-Going
Maintain a list of individuals in the community who require oxygen systems	On-Going
Enforce snow ordinance	On-Going
Maintain a heating facility for individuals at city hall	On-Going
Regularly review and amend fire, medical, and hazardous material response standard operating procedures	On-Going
Install GPS in all emergency vehicles to speed response times and monitor vehicle location during an emergency	Long-Term
Evaluate current terrorism mitigation efforts	On-Going
Increase security measures taken to protect and secure city facilities and utilities	Updated Recently
Improve public awareness of existing evacuation plans	On-Going
Develop a NOAA Weather Radio awareness program	On-Going
Complete installation of improved warning equipment at railroad crossings	On-Going/In progress
Complete installation of street lighting at poorly lit intersections	Short-Term
Develop a tornado safe room awareness program	On-Going
Continue weather spotter training	On-Going
Develop a plan for rationing water use within the community	On-Going
Maintain a cooling facility at city hall for at-risk population	On-Going
Update emergency response plan as needed	On-Going
Consider the use of incident command process	On-Going/Continued Training
Develop a continuity of operations plan and recovery ordinance	Long-Term

CITY OF NASHUA – STATUS OF 2013 HAZARD MITIGATION ACTIVITIES	
Mitigation Action	**Committee Determination/Comments**
Educate the Public.	On-Going
Evaluate and make improvements to outdoor warning siren network.	On-Going
Encourage residents to purchase NOAA weather radios.	On-Going
Recruit and train volunteer firefighters in storm watching/tornado spotting.	On-Going
Encourage the construction tornado safe rooms in homes, businesses, and schools.	On-Going
Encourage residents to enroll in a community notification system, such as 'Code Red'.	Not Doing
Encourage the utility provider to install lightning arrestors on power lines.	Not Doing
Purchase and install surge protector equipment on critical municipally owned electronic equipment.	On-Going
Backup critical city data and store offsite.	On-Going
Encourage the utility provider to bury overhead utility lines.	On-Going
Encourage and ensure the utility provider maintains tree-trimming policies.	On-Going
Acquire backup generator capability for the new well.	Completed
Work with local businesses and County EMA to ensure Tier II reports are being filed.	On-Going
Maintain law enforcement monitoring of large storage supplies of hazardous materials (i.e. Anhydrous Ammonia)	On-Going
Maintain contract for service with Northeast Iowa Response Group for HAZMAT response.	On-Going
Ensure first responders are aware of any response plans for local facilities.	
Maintain employee training efforts to help ensure compliance with all OSHA regulations.	On-Going
Maintain first responder training to properly handle HAZMAT incidents.	On-Going
Enforce designated truck carrier routes for the transport of Hazardous Materials.	On-Going
Purchase and maintain generators for critical facilities throughout the community.	On-Going

Maintain backup fuel supplies.	On-Going
Encourage energy conservation.	On-Going
Designate the Welcome Center as a shelter.	On-Going
Enforce floodplain ordinance and remain member of the National Flood Insurance Program.	Completed
Require back flow valves on the sanitary sewer connections in all new construction.	On-Going
Explore potential steps to reduce illegal inflow and infiltration into the sanitary sewer.	On-Going
Continue to remove structures from identified flood hazard areas, as needed.	On-Going
Floodproof structures in or near the flood hazard areas.	On-Going
Reinforce areas along the south end of dam with permanent concrete wall.	On-Going
Consider certification training for the flood manager.	Completed
Consider the purchase of sandbagging machine to expedite the filling of sandbags during a flood event.	On-Going
Continue to have local supply of sandbags on hand for future flood events.	On-Going
Elevate lift station south of Highway 346 and east of Cedar River.	On-Going
Flood proof the wastewater treatment plant with a floodwall, per the provisions of the recent HMGP award from FEMA.	On-Going
Study the effect of a total dam breach/failure on downriver properties within the city.	2-3 years
Explore areas within the city where “green storm water management” practices would be appropriate and beneficial.	Jun-11
Maintain list of potential translators to be called upon in case of an emergency.	On-Going
Upgrade radio equipment as needed or required by law.	On-Going
Maintain list of emergency contacts.	On-Going
Maintain a well-trained and equipped public works department.	On-Going
Enforce sidewalk clearance ordinance.	On-Going
Designate heating shelter(s)	On-Going

Continue improving cooling shelters plan to be used during extreme heat events.	On-Going
Conduct citizen welfare checks for vulnerable populations.	On-Going
Maintain a viable law enforcement agency, capable of properly responding to this type of an event.	On-Going
Ensure that proper signage is in place to facilitate a controlled flow of traffic.	On-Going
Continue to inspect bridges for safety and maintenance issues.	On-Going
Maintain training, equipment and facilities for the Fire Department and Ambulance Service.	On-Going
Maintain list of fallout shelters.	On-Going
Gather a militia should the U.S. Military not be able to respond	Not Doing
Secure vulnerable critical sites throughout the community.	On-Going
Maintain and update anti-virus software, as needed	On-Going
Keep open flow of information and cooperate with the FBI and other government agencies.	On-Going
Implement Storm Water Management program.	On-Going
Implement Wellhead Protection Program.	On-Going
Implement and encourage erosion control measures.	On-Going
Continue and encourage use of monitoring wells.	On-Going
Continue to treat and monitor water supply.	On-Going
Identify and map areas of past contamination.	On-Going
Adopt and enforce new well ordinance.	On-Going
Encourage residents to have and maintain Smoke Detectors/Sprinkler Systems/Fire Extinguishers	Not Doing
Improve water distribution system.	On-Going
Install dry hydrants in and around community.	On-Going
Implement burning bans when severe drought occurs.	Not Doing
Restrict water usage as necessary in times of severe drought in order to maintain water supply.	On-Going

Encourage residents to use the yard waste facility instead of burning.	On-Going
Continue inspection of dam structure	On-Going
Continue to test the various dam components on an annual basis.	On-Going
Encourage the Fire Department to attend pipeline incident response training.	On-Going
Place tile in back of curbs on any new street construction.	On-Going
Continue to cooperate with Health Department and local medical facilities to help insure effectiveness of prevention, detection, and response mechanisms.	On-Going
Encourage vaccinations	On-Going
Spray for mosquitoes, other insects. Also, use granular inserts into standing water for same purpose.	On-Going
Consider enforcing the local building codes.	On-Going
Maintain regular building inspections.	On-Going
Identify and remove dangerous buildings throughout the community.	On-Going
Continue to seek housing rehabilitation grants for eligible and willing homeowners	On-Going
Maintain teasers and training on the use of such devices.	On-Going
Encourage erosion control measures.	On-Going
Continue to monitor and repair sinkholes, should they develop.	On-Going
Inspect any water or utility lines that might be near a sinkhole.	On-Going
Secure the area around a sinkhole with a barrier.	On-Going
Continue to inspect and maintain levee	On-Going

CITY OF NEW HAMPTON– STATUS OF 2013 HAZARD MITIGATION ACTIVITIES	
Mitigation Action	**Committee Determination/Comments**
Educate the public on proper steps to prevent/reduce/protect/recover from hazard events	Maintaining warning devices
Install backup generators at identified critical facilities: local wells, hospital, schools, police station, fire station, etc.	Ongoing
Encourage the planting of trees for shade	Yes, not in boulevard
Maintain community swimming pool and water slide	Ongoing with improvements
Establish cooling shelters for at-risk populations	Completed
Purchase and install additional early warning sirens	Completed
Construct public tornado shelters in vulnerable areas of town: New Hampton Elementary, Middle, and High Schools, near mobile home court, hospital, nursing home, industrial park, and St. Joe's Catholic School	All facilities are available
Encourage the construction of tornado safe rooms	Suggest to residents
Recruit and train volunteer storm watchers/tornado spotters	EMA and Fire Dept
Maintain a well-trained and equipped street department	Ongoing
Designate heating shelters	Schools, hospitals, and churches
Enforce existing ordinances	As needed
Maintain a viable law enforcement department, capable of properly responding to all types of hazard events	Ongoing
Secure vulnerable critical sites throughout the community with: locks, fences, security cameras, alarms, increase patrols, automatic locks, etc.	Locks and gates installed
Maintain a well-trained and equipped fire department, capable of properly responding to all types of hazard events. Identified need for new equipment truck, larger fire station, aerial rig, GPS for vehicles, and thermal imaging cameras.	Do not have aerial rig
Analyze and improve water distribution system	Ongoing
Consider expanding fire code to entire community	Completed by code
Work with local businesses/industries and County EMA to ensure Tier II reports are	Water department completes this

being filed	
Maintain contract for HAZMAT response	Ongoing, with the County
Ensure first responders are aware of any response plans for local facilities	Ongoing
Continue to treat and monitor drinking water supply and wastewater	Ongoing, staff monitors
Ensure proper signage is in place to facilitate a controlled flow of traffic	Ongoing, updating periodically
Maintain list of potential translators to be called upon in case of an emergency	Ongoing, local residents assists with this
Implement burning bans when necessary	Ongoing, along with county
Restrict water usage when necessary	Ongoing, when needed
Implement the usage of surge protectors	Ongoing, all city buildings do this
Purchase and install squirrel guards around transformers	Ongoing, done by power plant
Enforce the use of Iowa One Call	Ongoing, us daily
Acquisition and removal of flood prone structures	Ongoing
Continue to make improvements to storm water system	Ongoing, construction occurs annually
Elevation of structures in the floodplain	Ongoing, being enforced
Continue participation in the National Flood Insurance Program	Ongoing
Purchase portable water pumps	Ongoing, street department has these
Require back flow valves in all new construction	Encouraging homeowners

CITY OF NORTH WASHINGTON – STATUS OF 2013 HAZARD MITIGATION ACTIVITIES	
Mitigation Action	**Committee Determination/Comments**
Educate the public on hazards	Ongoing as needed
Training and equipping the Fire Department	As needed
Continue to send firefighters and council members to weather spotting classes	As needed
Continue to use the County Sheriff Office for law enforcement	Ongoing
Continue to maintain tornado sirens	Ongoing
Maintain all mutual aid agreements	Ongoing, As needed

ATTACHMENT 4: PLANNING COMMITTEE & PUBLIC INVOLVEMENT MATERIALS

MEETING #1:

Dear Chickasaw County Communities,

Chickasaw County's Emergency Management Commission recently signed a contract to update the Multi-Jurisdictional Hazard Mitigation Plans (MJ-HMP) for the unincorporated area, as well as cities and school districts within the county. This is an update to the most recent plan, completed in 2014, which your community was a part of.

This planning process is important in identifying the potential impacts of various hazards as well as mitigation actions and strategies which can be implemented to reduce the negative impacts caused by natural, technological, and human-caused hazards within each community as well as the region. In addition, updating this plan is a federal requisite to for participating jurisdictions to become or remain eligible for mitigation grant programs offered by FEMA.

The first public planning meeting will be held February 13th, 2018 at 5:30 P.M. at 260 Prospect St. New Hampton, Iowa 50659. Parking can be found at the rear of the building. During this meeting, we will discuss the purpose and benefits of a multi-jurisdictional hazard mitigation plan, project budget, and planning process/scope of work. **The primary focus on this meeting will be reviewing and updating the status of projects as well as the community profiles of participating jurisdictions from the existing plan.**

The MJ-HMP process requires that we actively seek public input including the development of a Planning Committee. Each jurisdiction is responsible for identifying individuals from your community to represent your jurisdiction on the Committee. Typical representatives include:

- Mayor
- Council member(s)
- City Administrator/City Clerk/Deputy Clerk
- Public works
- Parks and Recreation
- Police/Law Enforcement
- Fire Department
- Planning and Zoning
- Building Official
- Waste Management
- Emergency Medical Services
- Schools (especially if there is an interest for a tornado safe room to be located in the schools)
- Libraries
- Health Department
- Other interested citizens

Please forward this email along to any city department, local groups, or citizens that may be interested in participating. The Committee's role is to provide information directly into the plan in the form of assessing the current and new hazards for each jurisdiction, reviewing and developing goals, and reviewing and identifying hazard action steps all jurisdictions should consider over the five-year life of the plan update.

This first meeting is to update and assess the progress communities have made since the last plan was written. Future meeting dates are yet to be scheduled, but are expected to take place in the early months of 2018.

Upon completion of the planning sessions, the final draft update will be presented to the Emergency Management Commission for recommendation and then on to the Board of Supervisors for adoption prior to submission to the Iowa Emergency Management Division and Federal Emergency Management Agency for review and approval. Ultimately, each participating jurisdiction will be asked to adopt the plan as well. More specifics regarding requirements will be explained at future meetings.

Thank you in advance for your time and cooperation. If you should have any comments or questions, please feel free to contact myself at (319)235-0311 or rmckinley@lnrcog.org. Or contact Austen Seely, Chickasaw County Emergency Management Coordinator, at (641)394-2406 or aseely@windstram.net.

- PUBLIC MEETING AGENDA-

Chickasaw County Multi-Jurisdictional Hazard Mitigation Plan Meeting #1

Date: February 13th, 2018

Time: 5:30 PM

Place: 260 E. Prospect Street
New Hampton, Iowa 50659

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1. Welcome and Introductions
2. Review Meeting Information and Timeline
3. Provide Updates for Existing Mitigation Action Steps
4. Review and Update Community Profiles
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:
Ryan McKinley / INRCOG / (319) 235-0311 / rmckinley@lnrcog.org

Multi-Jurisdictional Hazard Mitigation Plan Meeting

2/13/18

Last Name (print)	First Name (print)	Email	Agency	Position	Attended on Day 1	Attended on Day 2	Provided Data Week of Date 3
Seely	Austen	aj.seely@chickasawcounty...	Chickasaw EMA	Coordinator	X		
Kroenecke	Shain	ShainR@AvoKenPC.com	F'burg Mayor	Mayor	X		
Fibikar	Eric	LOcrewchief0@gmail.com	Lawler Fire	Chief	X		
Tenge	Everett		Alta Vista	Mayor	X		
Crooks	Kevin		" "	Councilman	X		
King	Dale		City of Lawler	Councilmen	X		
Laures	Amy		City of AV	Council	X		
LAURES	LARRY		AV Fire	Assit Chief	X		
Palo	Reed	rpalo@macic.riss.net	CCSO	Chief Deputy	X		
Cerwinske	Scott	driftbuster89@Gmail.com	Nashua	Council	X		
Taylor	Randy	rstaylor@iowatelecom.net	Ionia	City Mayor	X		
Day	Derek	derekday73@gmail.com	Ionia	Fire Chief	X		
Gorres	Randy	gorresr@mercyhealth.com	N. H.	Hospital	X		
Muetenthies	Mark	MARKMuetenthies@Mail.com	Lawler	Mayor	X		
Kuhn	Matthew	mk4nhcc@gmail.com	New Hampton City	council	X		
Babcock	Kathy	K.Babcock@chickasawcoia.org	CCPH	Administrator	X		
Schutte	Stan	Stan S.Schutte@chickasawco.ia.org		EM	X		
Scheidel	Jeremy	JPScheidel@Yahoo.com	Lawler	Council Lawler Fire	X		
Mitchll	James	jmitch24@hotmail.com	Fredericksburg	Council Fire	X		

Multi-Jurisdictional Hazard Mitigation Plan Meeting

2/13/18

Last Name (print)	First Name (print)	Email	Agency	Position	Attended on Day 1	Attended on Day 2	Provided Data Week of Date 3
Armbrecht	Ray	fburgfire@gmail.com	Fredericksburg Fire	Fire Chief	X		
Kolbet	Suellen	nhcityclerk@windstream.net	City of NH	City Clerk	X		
Geerts	Steve	stevegeerts@hotmail.com	NH Fire Chickasaw Co.	Fire Chief Supervisor	X		
Hanson	Timothy	hansman65@hotmail.com	North Washington FD	Firefighter	X		

Chickasaw County
Multi-Jurisdictional Hazard Mitigation Plan Update
Planning Committee Meeting #1

February 13th, 2018

The first meeting of the Chickasaw County Hazard Mitigation Planning Committee was called to order by Ryan McKinley at 5:30 PM. The meeting was held at the Chickasaw County Community Services Building (260 East Prospect Street, New Hampton, Iowa).

The following persons were present: Austen Seely, Chickasaw County EMA Coordinator; Shain Kroenecke, Fredericksburg Mayor; Eric Fibiker, Lawler Fire Chief; Everett Tenge, Alta Vista Mayor; Kevin Crooks, Alta Vista City Council; Dale King, Lawler City Council; Amy Laures, Alta Vista City Council; Larry Laures, Alta Vista Fire Department; Reed Palo, Chickasaw County Sheriff's Office; Scott Cerwinske, Nashua City Council; Randy Taylor, Ionia Mayor; Derek Day, Ionia Fire Department; Randy Gomes, New Hampton Hospital; Mark Mueterthies, Lawler Mayor; Matthew Kuhn, New Hampton City Council; Kathy Babcock, Chickasaw County Public Health; Staci Shutte, Chickasaw County EMA Office; Jeremy Scheidel, Lawler City Council and Fire Department; James Mitchell, Fredericksburg City Council and Fire Department; Ray Armbrecht, Fredericksburg Fire Department; Suellen Kolbet, New Hampton City Clerk; Steve Geerts, Chickasaw County Board of Supervisors and New Hampton Fire Department; and Timothy Hanson, North Washington Fire Department.

Participants were welcomed and introductions were made.

Meeting information and the timeline for the input process and the project were passed-out to those present. Most notably, the expiration of the current Chickasaw County Plan was discussed, January 16th, 2019, with the goal of having the new plan in-place prior to expiration.

McKinley handed-out the existing action steps for each jurisdiction within the current plan. He then instructed each entity to review their list of actions or projects and then to provide updates as to progress accomplishing said actions. McKinley then collected the marked-up copies of the action steps so that they could be integrated into the new plan.

McKinley then reviewed the Community Profiles for each entity, asking each to carefully go over the information each provides and to offer changes to said profiles. He explained that these profiles form the majority of jurisdictional overviews in the plan's appendices. McKinley then explained that he would be collecting those profiles, ahead of the next meeting if possible, but if not, at the next meeting.

Those present discussed the future meeting dates of the Committee. McKinley informed members that we would be combining meetings to lessen the number of actual meetings, but that the County would have the same level of work to complete.

The meeting adjourned at approximately 7:00 PM.

Respectfully submitted,

Ryan McKinley

MEETING #2:

Dear Chickasaw County Communities,

Please accept this correspondence as an invitation to attend the upcoming Chickasaw County Multi-Jurisdictional Hazard Mitigation Plan (MJ-HMP) meeting. This will be the second meeting to discuss the Chickasaw County Multi-Jurisdictional Hazard Mitigation Plans for the unincorporated area, cities and school districts within the county. This is an update to the most recent plan, completed in 2014, which your community was a part of. The first meeting was held on February 13th, 2018.

This planning process is important in identifying the potential impacts of various hazards as well as mitigation actions and strategies which can be implemented to reduce the negative impacts caused by natural, technological, and human-caused hazards within each community as well as the region. In addition, updating this plan is a federal requisite to for participating jurisdictions to become or remain eligible for mitigation grant programs offered by FEMA.

The second public planning meeting will be held March 13th, 2018 at 6:00 P.M. at 260 Prospect St. New Hampton, Iowa 50659. Parking can be found at the rear of the building. During this meeting, we will discuss the purpose and benefits of a multi-jurisdictional hazard mitigation plan, project budget, and planning process/scope of work. **The primary focus on this meeting will be focusing on evaluating past and potential impacts of hazards, identifying potential vulnerabilities, and updates to various other elements of the plan.**

To ensure accuracy, and the timely completion of this update, it is important that each jurisdiction have representatives that can address their local initiatives and projects. **Please share this meeting invitation with city staff, elected officials, committee members, or volunteers that may have an interest in participating.** Typical representatives include:

- Mayor/Council member(s)
- City Clerk/Deputy Clerk
- Public works (Water and Streets/Waste Water)
- Parks and Recreation
- Police/Law Enforcement
- Fire Department
- Planning and Zoning
- Building Official
- Waste Management
- Emergency Medical Services (ambulance)
- Schools (especially if there is an interest for a tornado safe room to be located in the schools)
- Library
- Health Department
- Other interested citizens

Please forward this email along to any city department, local groups, or citizens that may be interested in participating.

Thank you in advance for your time and cooperation. If you should have any comments or questions, please feel free to contact myself at (319)235-0311 or rmckinley@inrcog.org. Or contact Austen Seely, Chickasaw County Emergency Management Coordinator, at (641)394-2406 or ai.seely@chickasawcoia.org.

- PUBLIC MEETING AGENDA-

Chickasaw County Multi-Jurisdictional Hazard Mitigation Plan Meeting #2

Date: March 13th, 2018

Time: 6:00 PM

Place: 260 E. Prospect Street
New Hampton, Iowa 50659

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1. Welcome and Introductions
2. Review Meeting Information and Timeline
3. Review and Update Hazard Assessment Scores
4. Identify potential mitigation actions and concerns of top hazards
5. Set Next Meeting Date
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:
Ryan McKinley / INRCOG / (319) 235-0311 / rmckinley@inrcog.org

Multi-Jurisdictional Hazard Mitigation Plan Meeting

2/13/18

Last Name (print)	First Name (print)	Email	Agency	Position	Attended on Day 1	Attended on Day 2	Provided Data Week of Date 3
Ambrecht	Kay	fburgfire@gmail.com	Fredericksburg Fire	Fire Chief	X	X	
Kolbet	Suellen	nhcityclerk@windstream.net	City of NH	City Clerk	X		
Geerts	Steve	stevegeerts@hotmail.com	NH Fire Chicka.	Fire Chief, Supervisor	X		
Hanson	Timothy	hansman65@hotmail.com	North Washington FD	Firefighter	X		
Clemens	Karen	karengcc@windstream.net	City of NH	Deputy Clerk		X	
Cerwinske	Scott		Nashua	Council	X	X	
Johnson	Tom		Nashua	Fire Dept		X	
Muetertries	Mark		Lawler	Mayor		X	
King	Dale		Lawler	City Council		X	
Larsen	Deb	dlarsen0908@gmail.com	N.H.	Mayor		X	
Geerts	Steve	stevegeerts@hotmail.com	NH Fire	Chief	X	X	
Gorres	Randy	gorresr@mercyhealth.com	MMC-NH	Safety Officer	X	X	
Scheidel	Jeremy	JPScheidel@yahoo.com	Lawler Fire, Lawler City	Fire, Council	X	X	

Multi-Jurisdictional Hazard Mitigation Plan Meeting

2/13/18 3/13/18

Last Name (print)	First Name (print)	Email	Agency	Position	Attended on Day 1	Attended on Day 2	Provided Data Week of Date 3
Seely	Austen	aj.seely@chickasawcounty...	Chickasaw EMA	Coordinator	X	X	
Kloenecke	Shain	ShainKO@AVOKEMBC.com	F'burg Mayor	Mayor	X	X	
Fibikar	Eric	lowcrewchief08@gmail.com	Lawler Fire	Chief	X		
Tenge	Everett		Alta Vista	Mayor	X	X	
Crooks	Kevin		" "	Councilman	X	X	
King	Dale		City of Lawler	Councilmen	X	X	
Lawres	Amy		City of AV	Council	X	X	
Lawres	Larry		AV Fire	Assis Chief	X	X	
Palo	Reed	rpalo@mcic.rissnet	CCSO	Chief Deputy	X		
Cerwinske	Scott	driftbuster89@Gmail.com	Nashua	Council	X		
Taylor	Randy	rstaylor@iowatelecom.net	Ionia	City Mayor	X		
Day	Derek	derekday73@gmail.com	Ionia	Fire Chief	X	X	
Gorres	Randy	gorresr@mercyhealth.com	N.H.	Hospital	X		
Muetterthies	Mark	MARKMuetterthies@Gmail.com	Lawler	Mayor	X		
Kuhn	Matthew	mk4nhcc@gmail.com	New Hampton City	Council	X		
Babcock	Kathy	K.Babcock@chickasawcoia.org	CCPH	Administrator	X		
Schutte	Stan	Stan.Schutte@chickasawco.ia.org		EH	X		
Scheidel	Jeremy	JPScheidel@yahoo.com	Lawler	Council, Fire	X		
Mitchell	James	jmitch.24@hotmail.com	Fredericksburg	Council Fire	X	X	

Chickasaw County
Multi-Jurisdictional Hazard Mitigation Plan Update
Planning Committee Meeting #2

March 13th, 2018

The second meeting of the Chickasaw County Hazard Mitigation Planning Committee was called to order by Ryan McKinley at 6:00 PM. The meeting was held at the Chickasaw County Community Services Building (260 East Prospect Street, New Hampton, Iowa).

The following persons were present: Austen Seely, Chickasaw County EMA Coordinator; Shain Kroenecke, Fredericksburg Mayor; Everett Tenge, Alta Vista Mayor; Kevin Crooks, Alta Vista City Council; Dale King, Lawler City Council; Amy Laures, Alta Vista City Council; Larry Laures, Alta Vista Fire Department; Derek Day, Ionia Fire Department; James Mitchell, Fredericksburg City Council and Fire Department; Ray Armbrecht, Fredericksburg Fire Department; Karen Clemens, City of New Hampton Deputy City Clerk; Scott Cerwinske, Nashua City Council; Tom Johnson, Nashua Fire Department; Mark Mueterthies, Lawler Mayor; Dale King, Lawler City Council; Deb Larsen, New Hampton Mayor; Steve Geerts, Chickasaw County Board of Supervisors and New Hampton Fire Department; Randy Gomes, New Hampton Hospital; and Jeremy Scheidel, Lawler City Council and Fire Department.

Participants were welcomed and introductions were made.

Meeting information and the timeline for the input process and the project were reviewed with those present.

McKinley handed-out the existing Hazard Analysis and Risk Assessment scores from the current plan. He also provided a Hazard Assessment Worksheet and Hazard Reference Sheet, which was then reviewed and discussed. Detailed Chickasaw County hazard event information was provided within the Reference Sheets, which show the historical record of said events by hazard. Participants were then asked to rate and score the hazards for their communities using the Worksheet. As an aside, any exempt hazards were to documented and provided to INRCOG as well.

McKinley then led discussion on the potential mitigation actions and concerns related to the top-scoring hazards. Using the existing actions and goals, each jurisdiction was then asked to list future or potential action steps for the life of the new plan, or five years. McKinley indicated he would collect this information and include it in the draft plan outside of the meeting.

Those present discussed the future meeting date(s) of the Committee.

The meeting adjourned at approximately 7:15 PM.

Respectfully submitted,

Ryan McKinley

MEETING #3:

- PUBLIC MEETING AGENDA-

Chickasaw County Multi-Jurisdictional Hazard Mitigation Plan Meeting #3

Date: September 24, 2018

Time: 6:00 PM

Place: 260 E. Prospect Street
New Hampton, Iowa 50659

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1. Welcome and Introductions
2. Review Meeting Information and Timeline
3. Review Hazard Assessment Scores
4. Address Any Missing Information in Plan
5. Discuss moving this to the Board of Supervisors
6. Adjourn

THIS IS A PUBLIC MEETING

MEMBERS OF THE COMMUNITY ARE INVITED TO ATTEND AND PARTICIPATE IN THIS MEETING

For Questions or Comments, contact:
Ryan McKinley / INRCOG / (319) 235-0311 / rmckinley@inrcog.org

Chickasaw County Multi-Jurisdictional Hazard Mitigation Plan Update
September 24, 2018 – 260 E. Prospect St. New Hampton, Iowa 50659
Meeting #3 - Attendance Sign-In Sheet

	Name (please print & sign)	Position/Title Agency/Department	Jurisdiction/ Organization	Email Address
1	Ryan McKinley	INRCOG Community Planner	INRCOG	—
2	[illegible]	Alta Vista City Council		—
3	Shain Kloenecke	Fredericksburg Mayor		ShainK@[illegible].com
4	[illegible]	Lawler - Mayor		
5	Karen Clemens	City NH Clerk		NHcityclerk@gmail.com
6	Deb Larsen	N Hampton Mayor		dlarsen0908@gmail.com
7	Jay Jurgens	Supt. NHCSD		j_jurgens@new-hampton.k12.ia.us
8	Keith Turner	Supt. Nashua-Plainfield		kturner@nashua-plainfield.k12.ia.us
9				
10				
11				
12				

1 | Page

Chickasaw County
Multi-Jurisdictional Hazard Mitigation Plan Update
Planning Committee Meeting #3

September 24th, 2018

The third meeting of the Chickasaw County Hazard Mitigation Planning Committee was called to order by Ryan McKinley at 6:00 PM. The meeting was held at the Chickasaw County Community Services Building (260 East Prospect Street, New Hampton, Iowa).

The following persons were present: Shain Kroenecke, Fredericksburg Mayor; Everett Tenge, Alta Vista Mayor; Kevin Crooks, Alta Vista City Council; Karen Clemens, City of New Hampton Deputy City Clerk; Mark Mueterthies, Lawler Mayor; Deb Larsen, New Hampton Mayor; Jay Jurrens, New Hampton Community School District Superintendent; Keith Turner, Nashua-Plainfield Community School District Superintendent.

Participants were welcomed and introductions were made.

Meeting information and the timeline for the input process and the project were reviewed with those present.

McKinley reviewed Hazard Assessment scores with those jurisdictions present, noting the ranking comparisons to the prior plan and between the jurisdictions that will be included in this update.

McKinley then requested outstanding information be provide to him as soon as possible, such a draft of the plan update could be prepared and finalized.

Those present discussed the planning process moving forward, specifically sending a draft to the Board of Supervisors for consideration. In order to submit the draft plan to Iowa Homeland Security and FEMA, we must have one local government adopt the plan. In this case, the Board of Supervisors will be the entity chosen to adopt the plan first so that it may be submitted to those agencies for review.

The meeting adjourned at approximately 7:00 PM.

Respectfully submitted,

Ryan McKinley

ATTACHMENT 5: HAZARD MITIGATION PLAN APPROVAL AND REVIEW DOCUMENTS

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

(1) ☐ Project on schedule

(2) ☐ Project completed

Project Cost Status

(1) ☐ Cost unchanged

(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	
Did the results achieve the goal and objective (s)? Explain how:	YES	NO	Additional comments or other outcomes:
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:

Jurisdiction: Chickasaw County; Cities of Alta Vista, Fredericksburg, Ionia, Lawler, Nashua, New Hampton, North Washington, Nashua-Plainfield Community School District, & New Hampton Community School District	**Title of Plan:** 2019 Updated Multi-Jurisdictional Hazard Mitigation Plan for Chickasaw County, Iowa	**Date of Plan:** January 2019
Local Point of Contact: Ryan McKinley **Title:** Community Planner **Agency:** INRCOG	**Address:** 229 E. Park Ave. Waterloo, IA 50703	
Phone Number: 319-235-0311	**E-Mail:** rmckinley@inrcog.org	
Funding Source: FEMA, HLSEM, Local		
State Reviewer:	**Title:**	**Date:**
FEMA Reviewer:	**Title:**	**Date:**
Date Received in FEMA Region VII		
Plan Not Approved		
Plan Approvable Pending Adoption		
Plan Approved		

Jurisdiction:	NFIP Status*	
	Y	**NP**
Chickasaw County	Y	
Alta Vista	Y	
Fredericksburg	Y	
Ionia		NP
Lawler	Y	
Nashua	Y	
New Hampton	Y	
North Washington	Y	
Nashua-Plainfield Community School District	Y	
New Hampton Community School District	Y	

*** Notes: Y = Participating NP = Not Participating in NFIP S- Sanctioned R-Rescinded**

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 1-7, Table 1.1		
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 3		
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	Pages 4-7, Table 1.1		
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 6, 97-99		
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 6, 97-99		
ELEMENT A: REQUIRED REVISIONS			

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 22-96, Appendices A-I		
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 22-96, Appendices A-I		
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 22-96, Appendices A-I		
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 22-96 Appendices A-I		
ELEMENT B: REQUIRED REVISIONS			
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 84, Appendices A-I		
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 84 Appendices A-I		
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	Page 84, Appendices A-I		
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-I		
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 93-96 Appendices A-I		
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 97-99 Appendices A-I		
ELEMENT C: REQUIRED REVISIONS			

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 84-96 Appendices A-I; Attachment 4		
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	Attachment 4		
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	Page 84-96, Appendices A-I		
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 3		
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))	Attachment 3		
ELEMENT E: REQUIRED REVISIONS			

SECTION 2: PLAN ASSESSMENT

A. Plan Strengths and Opportunities for Improvement

This section provides a discussion of the strengths of the plan document and identifies areas where these could be improved beyond minimum requirements.

Element A: Planning Process

Plan Strengths

Opportunities for Improvement

Element B: Hazard Identification and Risk Assessment

Plan Strengths

Opportunities for Improvement

Element C: Mitigation Strategy

Plan Strengths

Opportunities for Improvement

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 2010 State Hazard Mitigation Plan.