LINN COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

2019–2024

Jurisdictions include Linn County cities, school districts, and unincorporated areas.

This plan maintains Hazard Mitigation Assistance funding eligibility for participating jurisdictions from _____ to _____.

Prepared by the East Central Iowa Council of Governments in partnership with Linn County, the cities of Cedar Rapids and Marion, and Iowa Homeland Security and Emergency Management Department.

IOWA HOMELAND SECURITY AND EMERGENCY MANAGEMENT

LINN COUNTY

CEDAR RAPIDS
City of Five Seasons

ECICOG
EAST CENTRAL IOWA COUNCIL OF GOVERNMENTS
YOUR REGIONAL PLANNING AGENCY

City of MARION IOWA

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Introduction

Local Hazard Mitigation Planning Overview

The primary purpose of hazard mitigation planning is to identify how a community can minimize the negative impacts—such as death, injury, property damage, and community disruption—of natural, technological, and human-caused hazards. For the State of Iowa and Linn County, recurring natural disasters such as windstorms, flooding, and severe winter storms have made local hazard mitigation planning an essential activity.

The primary purpose of hazard mitigation planning is to identify how a community can minimize the negative impacts of natural, technological, and human-caused hazards.

Communities also engage in hazard mitigation planning to maintain a local government's eligibility to apply for FEMA's Hazard Mitigation Assistance funding, which includes the following grant programs:

Hazard Mitigation Grant Program

The HMGP provides funding for long-term hazard mitigation measures following major disaster declarations. Funding is available to implement projects in accordance with State, territorial, federally-recognized tribal, and local priorities.

Pre-Disaster Mitigation

The PDM program provides funds on an annual basis for hazard mitigation planning and the implementation of mitigation projects. FEMA provides funding measures to reduce or eliminate overall risk from natural hazards.

Flood Mitigation Assistance

The FMA program provides funds on an annual basis so that measures can be taken to reduce or eliminate the risk of flood damage to buildings insured under the National Flood Insurance Program.

The secondary purpose of hazard mitigation planning is to maintain a local government's eligibility to apply for the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Assistance (HMA) funding, which includes the Pre-Disaster Mitigation (PDM) program, Hazard Mitigation Grant Program (HMGP), and the Flood Mitigation Assistance (FMA) program. HMGP grant funding is made available following a Presidential Disaster Declaration while PDM and FMA funding is nationally competitive and awarded on an annual cycle. Upon approval of this plan, the county, cities, and school districts included in this plan are eligible to apply for HMA funding to complete their mitigation strategy.

The importance of hazard mitigation planning was recognized at the federal level in the Robert T. Stafford Disaster Relief and Emergency Assistance Act, which was amended most recently by the Disaster Mitigation Act of 2000 (DMA 2000). The current federal requirements for local hazard mitigation planning that are required for eligibility for HMA are contained in Title 44 of the Code of Federal Regulations §201.6. DMA 2000 repealed previously established mitigation planning provisions and replaced them with requirements that emphasize the need to coordinate mitigation planning and implementation.

Local hazard mitigation plans are required to 1) document the planning process, 2) identify hazards and assess risks, 3) document jurisdictions' mitigation strategies and priorities, and 4) if applicable provide an update to the previously approved local plan(s). The participating jurisdictions are required to formally adopt the plan in order for the plan to be approved by FEMA.

Title 44 of the Code of Federal Regulations §201.6 codifies the requirements all hazard mitigation plans must include to maintain eligibility for HMA grants for participating jurisdictions. Where specific requirements are met in the plan, they will be cited throughout following this example:

Requirement §201.6 (c)(2)(i): (c) *Plan content.* The plan shall include the following:…(2) The risk assessment shall include: (i) A description of the type, location, and extent 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.

Linn County Multi-Jurisdictional Hazard Mitigation Plan

Plan Background

This plan is a multi-jurisdictional plan for Linn County, Iowa, and participating local jurisdictions within or overlapping it. It is an update to the *Linn County Multi-Jurisdictional Hazard Mitigation Plan 2014–2019*. The development of the plan was funded by a HMGP planning grant awarded to Linn County. The funding was awarded after Federal Disaster Declaration DR-4281 was issued in Iowa. Linn County and the cities of Cedar Rapids and Marion contributed to the local match requirement for the grant. To fulfill the requirements of the grant, Linn County contracted with the East Central Iowa Council of Governments (ECICOG), which is a regional planning agency. Linn County regularly contracts with ECICOG because of its extensive experience in planning and grant administration.

This plan fulfills the requirements of the Stafford Act, DMA 2000, and Title 44 of the Code of Federal Regulations §201.6. Throughout the development of this plan, the consultant balanced grant requirements, applicable federal legislation, and local priorities to provide Linn County an approved, value-added plan.

Plan development began in May 2017 after Linn County received grant funding and contracted with a planning consultant. Plan development was a multi-year process that involved collaboration among local officials, staff, and residents. The planning consultant facilitated research, public meetings, and a public comment period. The plan was submitted to the Iowa Homeland Security and Emergency Management Department (IHSEMD) and the Federal Emergency Management Agency (FEMA) for review in _____. A final version of this plan was approved on _____. Upon approval and adoption by participating jurisdictions, this plan is effective for five years and maintains eligibility for HMA funding.

Plan Participants

The planning area for a multi-jurisdictional hazard mitigation plan includes multiple jurisdictions with common climate and geography. Jurisdictions are either contiguous or located in close proximity. In Iowa, the planning area for a multi-jurisdictional plan typically includes an entire county. In Linn County, the planning area includes the unincorporated areas, cities, and school districts. Not all school districts participated in this plan. See Table 1 for a full list of jurisdictions included in this plan.

Table 1: Linn County Multi-Jurisdictional Hazard Mitigation Plan Participants

Participant	2014–2019 Plan	2019–2024 Plan
County		
Linn	✓	✓
City		
Alburnett	✓	✓
Bertram	✓	✓
Cedar Rapids	✓	✓
Center Point	✓	✓
Central City	✓	✓
Coggon	✓	✓
Ely	✓	✓
Fairfax	✓	✓
Hiawatha	✓	✓
Lisbon	✓	✓
Marion	✓	✓
Mount Vernon	✓	✓
Palo	✓	✓
Prairieburg	✓	✓
Robins	✓	✓
Springville	✓	✓
Walford[1]		✓
Walker	✓	✓
School District		
Alburnett		✓
Cedar Rapids		✓
Center Point-Urbana	✓	✓
College	✓	✓
Linn-Mar		✓
Mount Vernon		✓

Plan Development

> Requirement §201.6 (c)(1): (c) The plan shall include the following: (1) Documentation of 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.

A hazard mitigation plan is the product of a multi-year planning process that involves collaboration between officials, staff, and residents in participating jurisdictions. In Iowa, the process typically is completed by a coordinator, usually a planner, who works with each jurisdiction, IHSEMD, and FEMA Region VII. The primary goals of the coordinator are to ensure the planning process and final document focus on the mitigation priorities of participating jurisdictions and fulfill regulatory requirements.

Grant Funding

The Linn County Multi-Jurisdictional Hazard Mitigation Plan began in May 2017 when Linn County was awarded HMGP funding from the State of Iowa to update their hazard mitigation plan. Linn County committed to coordinating the plan development process with a regional planning agency. Along with Linn County, the cities of Cedar Rapids and Marion contributed to a local match of 15% of the plan update costs. The primary point of contact with Linn County was the Linn County Planning and Development Department.

Planning Consultant

In May 2017, the County contracted with the East Central Iowa Council of Governments (ECICOG), a regional planning agency. Linn County has worked with the agency since its establishment in 1972 as an intergovernmental council. Planning staff at ECICOG possess specific knowledge and experience in hazard mitigation planning, having prepared the previously approved Linn County Multi-Jurisdictional Hazard Mitigation Plan, as well as the multi-jurisdictional hazard mitigation plans in Iowa, Johnson, and Washington counties. For more information about ECICOG, visit the agency website at www.ecicog.org.

During the beginning phases of the plan development, Alicia Presto, a planner at ECICOG, was the primary consultant coordinating plan development. Starting in October 2017, Tom Gruis, also a planner at ECICOG, became the primary consultant to complete the plan development process, which ended _____.

Review and Research

Throughout the plan development process, existing documents and data for each jurisdiction were reviewed for relevance and potential inclusion in this plan. Of the jurisdictions that did not participate in the *Linn County Multi-Jurisdictional Hazard Mitigation Plan 2014–2019*, none had a FEMA-approved single-jurisdiction hazard mitigation plan. Several school jurisdictions that did not participate in the previously approved plan participated in the plan update and established their hazard priorities and mitigation strategies.

> Requirement §201.6 (b)(3): (b) In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:… (3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

Other documents incorporated into the content of this plan include local regulatory documents, planning and procedure documents, and maps. Jurisdictions included in this plan are diverse in purpose and size so the types of documents available vary for each jurisdiction. In each jurisdiction's Operations & Resources table, the jurisdiction-specific documents incorporated into the content of this plan are described. A valuable source of information, referenced often in this plan, is the *2013 Iowa Hazard Mitigation Plan* prepared by the IHSEMD.

In addition to existing documents, extensive research was completed to include current information for each jurisdiction in the plan. The bulk of this research consists of database searches for hazard event information relevant to Linn County. The databases used are cited throughout the plan. To incorporate local perspectives, discussion with planning committee members and local media coverage were also used to include current information.

To ensure this plan meets regulatory requirements, the October 2011 version of the *Local Mitigation Plan Review Guide,* provided by the FEMA, was referenced regularly throughout the plan development process. The planning process was designed to meet or exceed the basic requirements presented in the guide for a multi-jurisdictional plan.

Planning Meetings

A planning kickoff meeting was held on November 15, 2017 to provide participating Linn County jurisdictions with an overview of hazard mitigation planning, HMA grant programs, and the planning process. A make-up meeting was held on January 5, 2018 for the following communities that were unable to attend the kickoff meeting: Alburnett Community School District, Center Point-Urbana Community School District, Linn-Mar Community School District, and the City of Springville. The planner met separately with the City of Robins on April 24, 2018 to hold a make-up meeting.

> Requirement §201.6 (b)(2): (b) An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:… (2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process

Following the kickoff meeting, the planning consultant worked directly with a primary contact in each jurisdiction. Providing assistance to the planning consultant, the primary contact identified and personally invited members of the local community to serve on the local planning committee, scheduled one or more planning meetings, and posted public meeting notices. To maintain an open plan development process, one public meeting was held in each jurisdiction, except Cedar Rapids, which held two public meetings. Each person who attended the planning meetings, regardless of whether or not they were initially identified by the primary contact, was

considered a member of the jurisdiction's planning committee. A schedule of the local planning meetings is shown in Table 2.

Table 2: Schedule of Local Planning Meetings

Jurisdiction	Local Planning Meeting Dates
County	
Linn County	February 26, 2018
City	
Alburnett	September 25, 2018
Bertram	February 21, 2018
Cedar Rapids	January 15, 2018; February 2, 2018
Center Point	April 25, 2018
Central City	February 22, 2018
Coggon	March 6, 2018
Ely	February 6, 2018
Fairfax	January 16, 2018
Hiawatha	January 16, 2018
Lisbon	December 20, 2017
Marion	January 23, 2018
Mount Vernon	January 17, 2018
Palo	April 12, 2018
Prairieburg	May 8, 2018
Robins	October 31, 2018
Springville	July 12, 2018
Walker	February 16, 2018
School District	
Alburnett	January 25, 2018
Cedar Rapids	January 23, 2018
Center Point-Urbana	January 29, 2018
College	December 21, 2017
Linn-Mar	March 8, 2018
Mt. Vernon	February 27, 2018

For the local planning meetings, a consistent set of agenda items, shown on the next page, was followed regardless of jurisdiction type and size. Cedar Rapids followed the same agenda but covered the agenda items over two meetings. The planning consultant prepared documentation for each meeting to provide information about the agenda items for the planning committee members' review. For review and future updates of this plan, the members of a planning committee can provide valuable context. Documentation for all planning meetings include the following items: 1) public notice, 2) agenda, 3) sign-in sheet, 4) community summary, and 5) minutes. The documentation for each jurisdiction is included in the appendix.

Planning Meeting Agenda

1. Consultant and planning committee introductions
2. Hazard mitigation planning overview
3. Hazard Mitigation Assistance funding programs overview
4. Linn-County Multi-Jurisdictional Hazard Mitigation Plan goals
5. Review and update risk assessment
6. Review and update critical facilities
7. Review and update vulnerable populations
8. Review and update operations and resources
9. Review and update mitigation strategy
10. Prioritize mitigation strategy
11. Discuss next steps in plan development process

Progress Reports

To provide updates, the planning consultant prepared periodic progress reports that were sent to each participating jurisdictions. The reports included basic plan development process information, completed activities, and a timeline for completing remaining activities. The planning consultant also prepared the required quarterly progress reports for Linn County's planning grant. The completed reports were submitted to both the state and Linn County Planning and Development. Regular updates were given to the Linn County Board of Supervisors by the Planning and Development Department.

Public Comment

The 30-day public comment period for this plan began _____ and ended _____. A draft of the plan was available on the East Central Iowa Council of Governments' website, and a news release with information about the public comment period was sent to each participating jurisdiction, local media, and emergency management coordinators in surrounding counties—Buchanan, Delaware, Jones, Cedar, Johnson, Iowa, and Benton. Specifically inviting surrounding counties to participate in the public comment period allows for potential regional cooperation beyond the planning area because the mitigation strategies and action plans are not yet finalized.

Before the full draft of the plan was released for public comment, the planning consultant gave local planning committees the option to review and verify that the plan information reflects the discussion at planning meetings. The majority of initial planning committee comments were to clarify the jurisdiction's mitigation strategy. Since this plan affects eligibility for mitigation project

funding, jurisdictions wanted to ensure the overall mitigation strategy reflected local risk and priorities.

During the formal public comment period, comments could be submitted through an online electronic form on the East Central Iowa Council of Governments' website, the planning consultant's email, or by mail. During the public comment period, there were no comments submitted to the planning consultant.

> Requirement §201.6 (b)(1): (b) An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:… (1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;

Plan Writing

This plan was written by the planning consultant at the East Central Iowa Council of Governments based on the ongoing review of existing documents, research, and discussion at planning meetings with each jurisdiction's planning committee. Plan writing was an ongoing activity throughout the plan development process. In addition to comments received during the public comment period, the planning committee in each jurisdiction provided feedback.

Plan Review and Revision

During the public comment period, the draft version of this plan was concurrently reviewed by the Iowa Department of Homeland Security's hazard mitigation planner and FEMA Region 7 plan reviewers. Required plan edits included the following:

PLAN REVIEW SCHEDULE

Public Comment Period:
State Review Submission:
FEMA Final Review Submission:

Plan Approval and Adoption

This multi-jurisdictional hazard mitigation plan was submitted for public comment, review, and approval on _____. An initial review of the plan was completed by Iowa's hazard mitigation planner. After the state review process, the plan was submitted to the FEMA Region 7 plan reviewers for final review and approval on _____. After necessary edits were completed and Linn County adopted the initial draft of the plan through a resolution on _____, the plan was approved on _____.

PLAN APPROVAL AND INITIAL ADOPTION DATE
Plan Approval:
Plan Adoption:

[1] The City of Walford is located in both Benton County and Linn County. It participated in the Benton County hazard mitigation plan and is eligible for HMA funding through that plan. The City was consulted for this plan to determine if any critical infrastructure was located in Linn County and if the City wanted to add any mitigation strategies during this planning period. One critical facility is located in the Linn County (see page 194). The City did not have any mitigation strategies to add during the planning period. Their mitigation strategies are included for reference (see page 322).

Plan Goals

Throughout the development process of this plan, goals were used as a guide for planning committee discussion and final decision making. Jurisdiction representatives reviewed the goals in the 2014–2019 hazard mitigation plan and example goals provided by the planning consultant. In the 2014–2019 hazard mitigation plan, most jurisdictions adopted the planning goals shown below, but six jurisdictions adopted different goals. Many of the jurisdiction-specific goals are similar to the mutual goals. For the plan update, all of the jurisdictions adopted the example goals, shown below, with a minor change to "residents," which was amended to "residents (or students)" to be compatible with participation by school districts.

> Requirement §201.6 (c)(3)(i): (c) The plan shall include the following:… (3) A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools. This section shall include: (i) A description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

2014–2019 Goals (mutual)

1. Protect the health and safety of residents (or students), visitors, staff, and emergency personnel (paid or volunteer) during and after hazard events.
2. Minimize losses to existing and future structures in hazard areas. Critical facilities are priority structures.
3. Maintain local services and infrastructure in order to reduce community, economic, and environmental disruption during and after hazard events.
4. Educate residents (or students) and visitors about local hazards and the resources available in the community.
5. Apply public funds to hazard mitigation projects in an efficient and fair manner to minimize dependence on state and federal resources.

Example Goals

1. Protect the health and safety of residents, visitors, staff, and emergency personnel (paid or volunteer) during and after hazard events.
2. Minimize losses to existing and future structures in hazard areas. Critical facilities are priority structures.
3. Maintain local services and infrastructure in order to reduce community, economic, and environmental disruption during and after hazard events.
4. Educate residents and visitors about hazards and the resources available.
5. Use public funds in a cost effective and fair manner.

Attendees decided to adopt the example goals with the addition of "(or students)" added following "residents" in goal 1 and 4, see below.

HAZARD MITIGATION GOALS UPDATE

1. Protect the health and safety of residents (or students), visitors, staff, and emergency personnel (paid or volunteer) during and after hazard events.
2. Minimize losses to existing and future structures in hazard areas. Critical facilities are priority structures.
3. Maintain local services and infrastructure in order to reduce community, economic, and environmental disruption during and after hazard events.
4. Educate residents (or students) and visitors about hazards and the resources available.
5. Use public funds in a cost effective and fair manner.

Community Profile

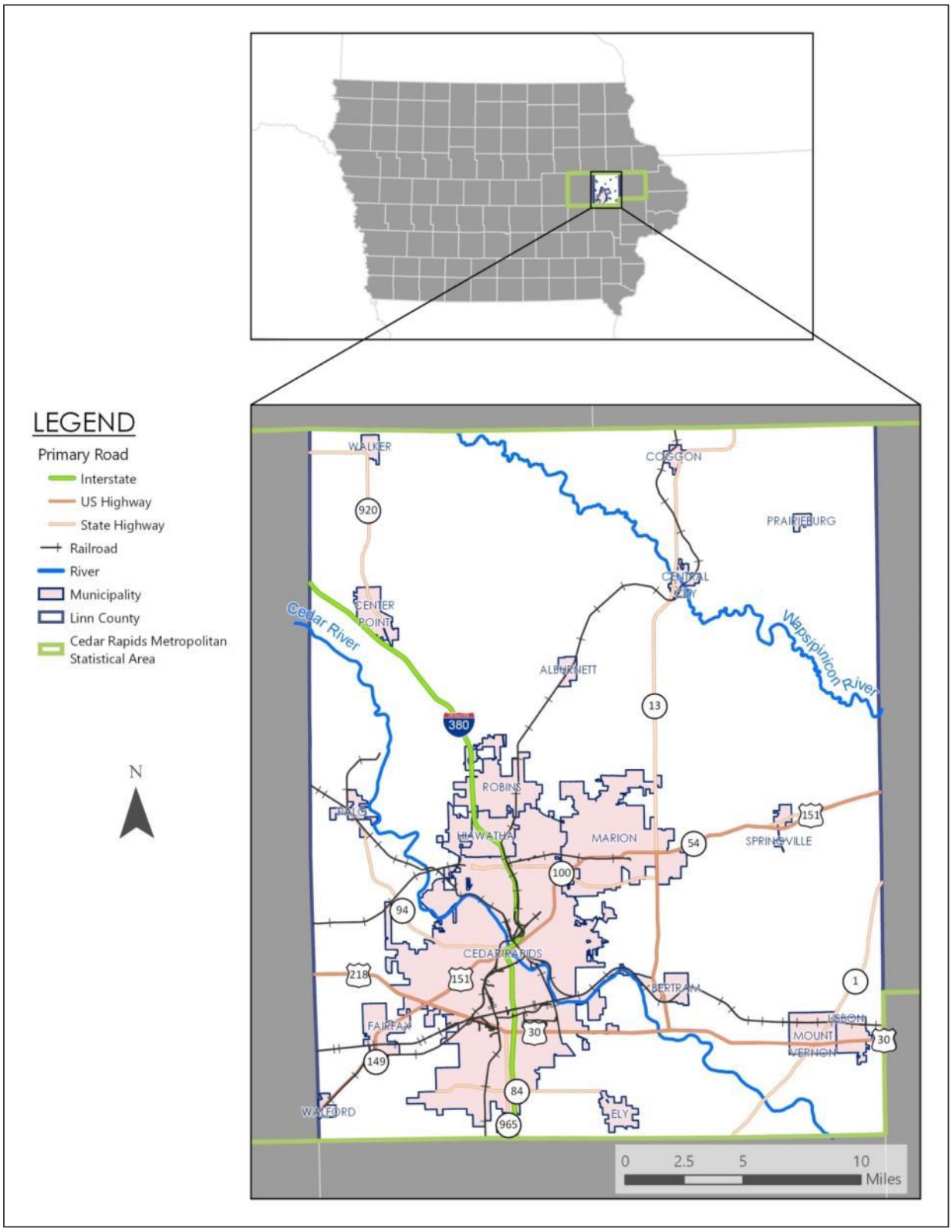
Planning Area and Population

> Requirement §201.6 (d)(3): (d) Plan review… (3) A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it within 5 years in order to continue to be eligible for mitigation project grant funding.

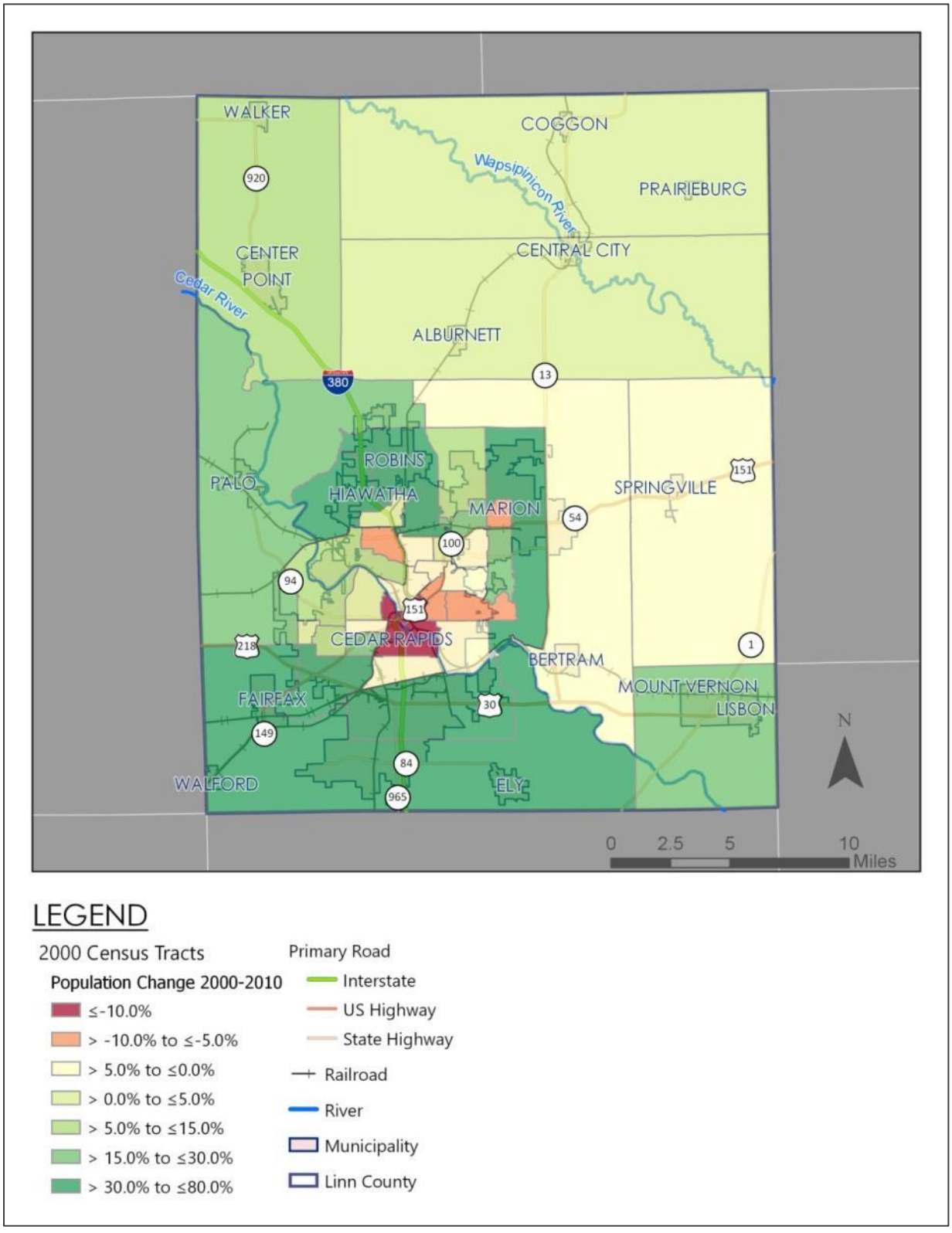
Linn County is located in east central Iowa. The county experienced growth between the 2000 and 2010 Censuses, from 191,701 to 211,226 residents, or 10.2%. The U.S. Census Bureau Population Estimates[2] for 2016 exhibits further growth since 2010, with an estimate of 221,661 residents, or 4.9% growth since 2010. If the growth rate remains unchanged until 2020, the County would experience 8.4% growth for the decade. The majority of residents live in the Cedar Rapids Metropolitan Area, the contiguous municipalities of Cedar Rapids, Marion, Hiawatha, Robins, and Fairfax. Over 20,000 residents live in unincorporated areas of the County. Refer to Map 1 for the location of cities within the Linn County Planning Area.

According to the U.S. Census Bureau, Linn County is part of the Cedar Rapids Metropolitan Statistical Area (MSA), which includes Benton County and Jones County, immediately to the west and east, respectively. Refer to Map 1. From 2010 through 2016, the MSA experienced growth of 3.8%, so Linn County has grown faster than the MSA as a whole. There is a wide variation of population growth or decline within the County, as well. Map 2 shows the population change within the county at the census tract level from 2000 to 2010. The highest growth areas are around and to the south of the central part of the metropolitan area, with some tracts growing over 50%. Development pressure to the south likely comes from the Iowa City Metropolitan Statistical Area, one of Iowa's fastest growing metropolitan statistical areas from 2010–2016, directly south of Linn County. Within Cedar Rapids and in areas to the east, growth was slightly or moderately negative. Several tracts had significant, greater than 10%, population loss. These tracts are along the Cedar River and contain areas inundated by floodwater in 2008. Many of the property buyouts by the City of Cedar Rapids following the flood occurred in these areas. Population growth in the northern part of the county was slightly or moderately positive.

Map 1: Linn County Planning Area



Map 2: Linn County Population Change 2000–2010 by Census Tract



The largest city in Linn County is Cedar Rapids, with an estimated 2016 population of 131,127 according to the U.S. Census Bureau. After Cedar Rapids, Marion is the second-largest city, with an estimated population of 38,480 in 2016. No other city has over 10,000 residents. The median city population in the county in 2016 was 2,150, in Ely (which has had the median population since 2010). The smallest city in the county is Prairieburg, which had an estimated population of 181 in 2016. Refer to Table 3. Table 3 also shows the population growth for each jurisdiction during the same period. The areas of high growth for census tracts from 2000–2010 are consistent with the growth of jurisdictions from 2010–2016.[3] It is important to note where the highest rates of growth are occurring in the county because these areas may not yet have the appropriate capacity to protect a developed or more densely populated area from hazards.

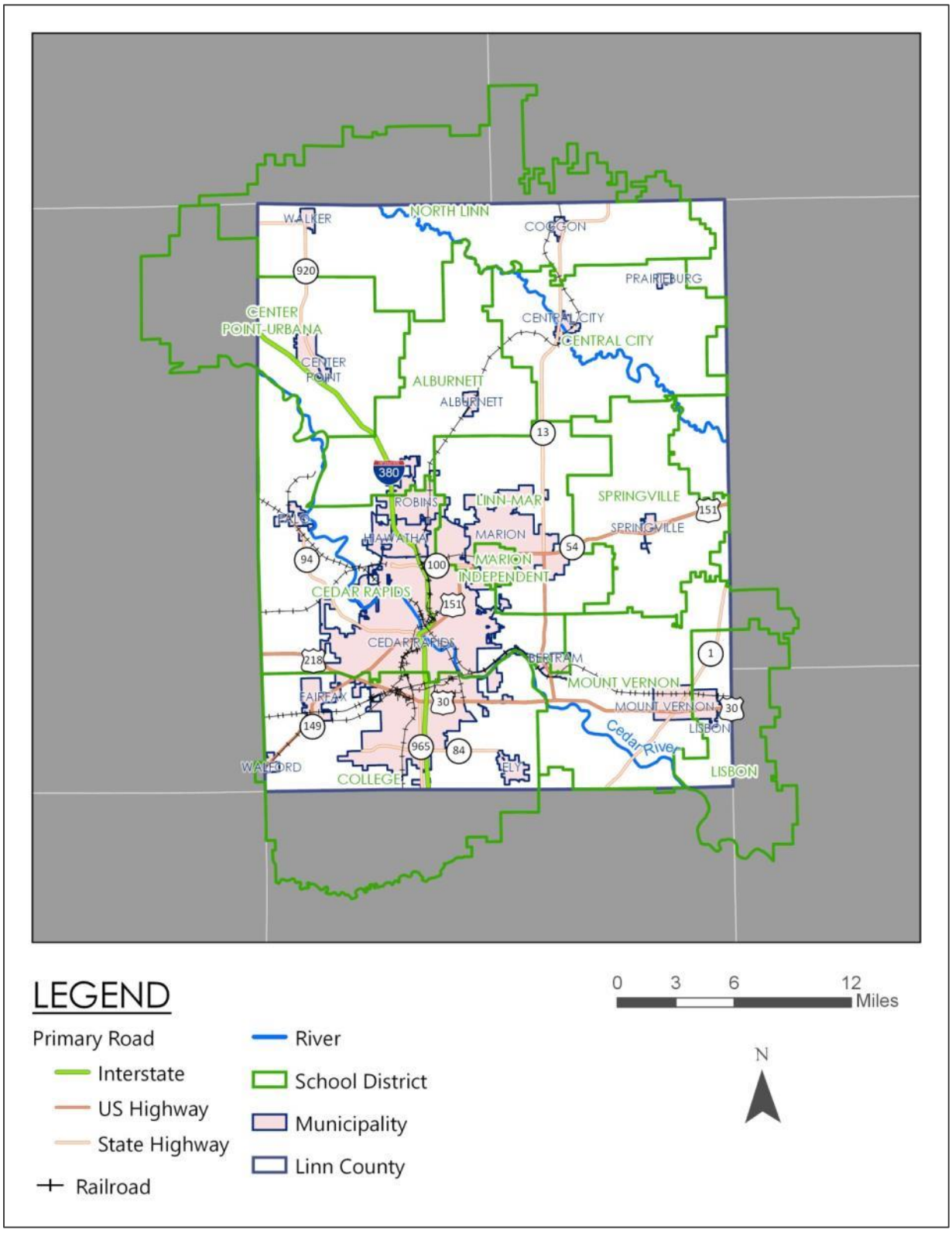
Table 3: Linn County 2010 Census and 2016 Population Estimates

Jurisdiction	2010 Census	2016 Population Estimate	Percent Change
Cedar Rapids Metropolitan Statistical Area	257,941	267,799	3.68%
Linn County	211,226	221,661	4.71%
Linn County, unincorporated	20,655	20,909	1.21%
Alburnett	673	699	3.72%
Bertram	294	295	0.34%
Cedar Rapids	126,326	131,127	3.66%
Center Point	2,421	2,524	4.08%
Central City	1,257	1,276	1.49%
Coggon	658	667	1.35%
Ely	1,776	2,150	17.40%
Fairfax	2,123	2,563	17.17%
Hiawatha	7,024	7,212	2.61%
Lisbon	2,152	2,208	2.54%
Marion	34,768	38,480	9.65%
Mount Vernon	4,506	4,444	-1.40%
Palo	1,026	1,077	4.74%
Prairieburg	178	181	1.66%
Robins	3,142	3,535	11.12%
Springville	1,074	1,135	5.37%
Walford (pt.)	382	393	2.80%
Walker	791	786	-0.64%

School Districts

Eleven community school districts provide education services to kindergarten- through twelfth-grade students throughout Linn County. In many areas, school districts also provide amenities to the public, such as a libraries and recreation opportunities. In addition to county and city governments, school districts were included in this plan to maintain Hazard Mitigation Assistance (HMA) funding eligibility to mitigate or reduce the potential impacts of hazards on their students, staff, and visitors. Refer to Map 3 for school districts in Linn County.

Map 3: Linn County Planning Area School Districts



The largest school district in Linn County in terms of enrollment is the Cedar Rapids district, which had over 17,000 students in the 2016–2017 school year. Similar to the difference in city populations throughout the County, districts serving students outside of Cedar Rapids are significantly smaller in terms of enrollment. The smallest school district in Linn County is the Springville district, with 369 students in the 2016–2017 school year. Refer to Table 4 for enrollments by district and a comparison to 2013–2014 enrollments.

Table 4: Linn County School District Certified Enrollment 2013–2014 and 2016–2017 School Years[4]

District	2013–2014 Enrollment	2016–2017 Enrollment
Alburnett	544.5	515.3
Cedar Rapids	16,864.7	17,091.7
Center Point–Urbana	1,318.4	1,364.1
Central City	479.3	478.8
College	4,685.3	5,086.6
Linn-Mar	6,943.0	7,312.5
Lisbon	699.5	662.9
Marion Independent	1,864.0	1,934.5
Mount Vernon	1,095.1	1,124.2
North Linn	698.2	641.2
Springville	373.1	368.8
Total	35,565.1	36,580.6

[2] Accessed through the Iowa State Data Center, https://www.iowadatacenter.org/data/estimates, 2/7/2018
[3] Population change for cities is compared to census tracts because data is not collected at the Census Tr44act level for the population estimates.
[4] The enrollment figures for 2013–2014 are different than those displayed in the previously approved plan. The Iowa Department of Education released certified enrollments by district and county until 2013–2014. The only data available since is certified enrollments by district. This table reflects the same data for both periods.

Risk Assessment

Introduction

A risk assessment was completed in a basic three-step process for Linn County. First, hazards that can affect the planning area were identified. Second, possible impacts of each hazard were identified. And third, based on historical occurrences, potential severity, and local knowledge, a priority level was assigned to each hazard.

Hazard Identification

In the 2013 Iowa Hazard Mitigation Plan, a statewide risk assessment identifies a broad spectrum of hazards that can occur in the state, including natural, technological, and human-caused hazards. For Linn County, all the hazards in the statewide plan are included in the risk assessment in order to prepare as complete a mitigation strategy as possible. As is the case statewide, variations in where hazards can occur within Linn County exist, so detailed profiles for each hazard are prepared to reflect those variations. All hazards included in Linn County's risk assessment are listed below.

Natural Hazards

A natural hazard is an event occurring due to climate, geology, or hydrology that will negatively impact people or the environment.

- Animal, Plant, and Crop Disease
- Drought
- Earthquake
- Expansive Soils
- Extreme Heat
- Flood
- Grass or Wildland Fire
- Human Disease
- Landslide
- Severe Winter Storm
- Sinkholes
- Thunderstorm, Lightning, and Hail
- Tornado and Windstorm

Technological Hazards

A technological hazard is an event involving a man-made structure, equipment, or substance that will negatively impact people or the environment.

- Hazardous Materials Incident
- Infrastructure Failure
- Levee and Dam Failure
- Radiological Incident
- Transportation Incident

Human Caused Hazards

A human-caused hazard is an event occurring due to intentional human actions that will negatively impact people or the environment.

- Terrorism

Hazard Impact Assessment

To understand the potential impact of hazards that can occur in Linn County, profiles were prepared using historical data, existing hazard mitigation plans, local knowledge, and the risk assessment criteria in the 2013 Iowa Hazard Mitigation Plan. Hazard profiles include a description of the hazard and possible areas of impact. Although Linn County is a geographically small portion of Iowa, there are variations, sometimes to a large degree, in where hazards are likely to occur. For this risk assessment, hazards are categorized as countywide hazards or local hazards. The hazard profiles also summarize the historical occurrences, probability of future occurrences, potential magnitude and severity, amount of warning time available, and typical duration of each hazard.

> Requirement §201.6 (c)(2): (c) The plan shall include the following:…(2) A risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards… The risk assessment shall include: (i) A description of the type, location, and extent 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. (ii) A description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community…

Hazard Prioritization Criteria

The information provided in the hazard impact assessment—probability, magnitude and severity, warning time, and duration—reflects the hazard prioritization criteria used in the *2013 Iowa Hazard Mitigation Plan*. To determine the extent a mitigation strategy should focus on one or more hazards, the full set of hazards that can potentially affect Linn County were prioritized utilizing these criteria. Each criterion of the prioritization process is detailed in Table 5–Table 8. In the hazard profiles, each element of the assessment is discussed in the context of Linn County. In the following chapter, the scores for all four criteria for each hazard are tabulated, and a priority level based on a weighted average of those scores is assigned, completing the multi-jurisdictional risk assessment.

Probability 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. See scoring criteria in Table 5.

Table 5: Probability Scoring Criteria

Score		Description
1	Unlikely	Less than 10% probability in any given year, history of events is less than 10%, or event is unlikely but there is a possibility of occurrence
2	Occasional	Greater than 10% up to 19% probability in any given year, history of events is greater than 10% up to 19%, or the event could possibly occur
3	Likely	Greater than 19% up to 33% probability in any given year, history of events is greater than 20% up to 33%, or the event is likely to occur
4	Highly Likely	More than 33% probability in any given year, history of events is greater than 33% likely, or the event is highly likely to occur

The magnitude and severity of the impacts of a hazard event is related directly to the extent that a hazard affects the community. It is rated using technical measures specific to the hazard, which are ideally determined with standard scientific scales. This is also a function of when the event occurs, year-round or seasonal, the location affected, the resilience of the community, and the effectiveness of emergency response and disaster recovery efforts. See scoring criteria in Table 6.

Table 6: Magnitude/Severity Scoring Criteria

Score		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	Greater than 10% up to 25% of property severely damaged, shutdown of facilities and services for more than a week, and/or injuries/illnesses that do not result in permanent disability
3	Critical	Greater than 25% up to 50% of property severely damaged, shutdown of facilities and services for at least 2 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 or the speed of onset is the amount of warning time available before a hazard occurs. The average rather than shortest or longest warning time is considered in the hazard assessment. For many natural hazards, there is a considerable amount of warning time as opposed to the human caused hazards that occur instantaneously or without any significant warning time. See scoring criteria in Table 7.

Table 7: Warning Time Scoring Criteria

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

Duration is the typical amount of time that the community is impacted by a hazard. As an example, a snowstorm will likely last several hours, whereas a lightning strike would last less than a second. See scoring criteria in Table 8.

Table 8: Duration Scoring Criteria

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

Data Limitations

Data collected for many of the natural hazards is from the National Centers for Environmental Information (NCEI). This database is the most comprehensive and detailed available for natural hazards; however, there are some limitations. Information from this source can be queried by county, but the data returned is for an event. For example, if a tornado started in Benton County, moved through part of Linn County, and then continued into Buchanan County, it would be counted as one event. Data for injuries, fatalities, and storm damage would be presented for the whole event in a set of query results for Linn County, even if some of those effects occurred outside of Linn County.

Conversely, NCEI data is for reported effects, so damage that occurred may not be represented in the data. For example, a wind event on July 11, 2011 with a reported magnitude of 70 knots has an episode narrative that states, “Widespread damage was seen from Vinton, IA to Dubuque, IA, with numerous downed power lines and large trees blown down,” while the reported property damage is $0.00. Despite these limitations, the NCEI data provides a comprehensive overview of the frequency of hazard events, and often detailed information about hazard effects is included.

Natural Hazards

Animal, Plant, and Crop Disease

Definition of Hazard

This natural hazard is an outbreak of disease or infestation that can be transmitted from animal to animal or plant to plant. The outbreak may have an adverse effect on human health, significant economic implications, cause significant crop production losses, and/or significant environmental damage.

Potential Hazard Area

The potential hazard area for the animal, plant, and crop disease hazard is primarily rural or recreation areas throughout the county, although this hazard can affect urban areas.

Historical Occurrences

In Iowa, there are several major reportable animal diseases, which include the Avian Flu, Bovine Spongiform Encephalopathy (BSE or Mad Cow Disease), Chronic Wasting Disease, Exotic Newcastle Disease, Foot and Mouth Disease, Johne's disease, Pseudorabies, Scrapie, and West Nile Virus. Reports from the Iowa Department of Agriculture and Land Stewardship (IDALS) and the Center for Food Security and Public Health at Iowa State University indicate minimal or no recent cases of most reportable animal diseases in Iowa. The IDALS website reports only three Animal Health Alert Network alerts since August 2012[5].

In 2014–2015, the U.S. saw the largest ever outbreak of highly pathogenic avian influenza, with Iowa one of the hardest-hit states in the nation. The H5N2 strain struck 70 premises of commercial or backyard flocks in Iowa, and nationwide, over 50 million commercial birds were lost to the virus or depopulation efforts meant to stop the spread of the disease.[6] The outbreak led to an estimated $1.6 billion in direct losses and a $3.3 billion impact in the US economy (1-10).[7] In Iowa, the affected area was in the northwestern part of the state. There were no reported incidents in Linn County;[8] however, the outbreak demonstrates the magnitude and volatility of communicable disease that occurs periodically in the United States.

In the past decade, cases of Scrapie, which affects sheep, have significantly decreased.[9] Five areas in Iowa have confirmed cases of Chronic Wasting Disease (CWD) in captive White Tail Deer. Four of those herds have been depopulated. CWD has also been observed in wild deer populations in three Iowa counties. All diagnosed cases, both domestic and wild, are outside of Linn County.[10] Across Iowa, there were 15 cases of West Nile Virus in horses 2016. There were no cases of West Nile Virus reported in Linn County, but there was one confirmed case in a neighboring county.[11] In addition, there were 12 confirmed cases of rabies in Iowa in 2015, which was 20% lower than the previous year, and 8 of those cases were observed in wild

animals. There were no confirmed cases in Linn County, and there were only two confirmed cases in eastern Iowa counties.[12]

Plant disease and infestations occur throughout Iowa, but most cases are relatively isolated and have not reached an outbreak level. For Iowa's major crops, chemical and non-chemical methods are used to prevent and manage disease and infestations. Reports from Iowa State University Extension and Outreach have confirmed cases of historically uncommon crop diseases like Physoderma, which is a fungus that can cause corn stalks to break, and Goss's Wilt, a bacterium that can destroy a corn plant. Disease affecting seedlings in corn and soybean crops were reported in 2013, primarily in southeast Iowa. In addition, pest populations that are resistant to genetic modification and chemical management methods have been confirmed across Iowa.

As for Iowa's landscape, a major concern is the Emerald Ash Borer, which is a beetle that infests and kills ash trees. In early 2014, the presence of the borer was confirmed in eastern Iowa. The presence of the beetle was confirmed in Linn County, in Cedar Rapids, in 2015. It has also be found in Toddville (2016) and Lisbon (2017).[13] A statewide quarantine is in place to prevent the spread of the insect to other states. Iowans are discouraged from transporting fire wood to other counties in the state to prevent a statewide infestation.

Probability

Minimal historical occurrences indicate that an animal, plant, or crop disease will not likely become a major outbreak in Linn County. According to the *2013 Iowa Hazard Mitigation Plan*, the probability of an outbreak in Iowa is also unlikely, with the exception of the Emerald Ash Borer. Having been confirmed in the county, an Emerald Ash Borer outbreak is likely.

Magnitude and Severity

If a major outbreak of an animal, plant, or crop disease were to occur in Linn County, areas beyond the county could potentially be impacted. If animals are affected, a major disease could significantly limit or eliminate the ability to move, slaughter, and export animals and animal products, which could result in a shutdown of facilities. A major disease outbreak could have widespread public health and economic impacts in Iowa, the nation, and potentially the world. If crops and plants are affected there could be similar impacts to public health and industries associated with crops. For some disease and infestations, there could also be major environmental damage.

Warning Time

Animals and plants that are infected with a disease or pests can transmit the disease or pest before the issue is realized. Iowa would only have warning time if an event occurred in another state or region.

Duration

Response and recovery from a major disease or infestation is lengthy, with some producers potentially unable to sustain operation. In addition, diseases and infestations can reoccur, causing repeated losses.

Drought

Definition of Hazard

Drought is a prolonged lack of precipitation that produces severe dry conditions. Four types of drought conditions are relevant in Iowa: meteorological drought, hydrological drought, agricultural drought, and socioeconomic drought. A meteorological drought is a lack of precipitation. A hydrological drought is a decline in surface and groundwater. An agricultural drought is a lack of moisture in soil, and a socioeconomic drought is a shortage of water that affects people's daily usage.

Potential Hazard Area

The potential hazard area for drought in Linn County is countywide due to the widespread nature of this hazard. Typically, rural areas in Linn County are more severely impacted by this hazard.

Historical Occurrences

Since 1996, Linn County has experienced four major periods of drought recorded over several months. In total, the reported crop damage was over $21 million. The majority of crop damage, nearly $15 million, occurred in August 2003, which is a prime month in Iowa's growing season. The remainder of crop damage was reported during the growing season in 2005. Refer to Table 9.

Table 9: Linn County Drought Events 1996–2016

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
LINN (ZONE)	08/01/2003	0	0	0.00K	14.880M
	07/01/2005	0	0	0.00K	4.560M
	08/01/2005	0	0	0.00K	1.970M
	09/01/2005	0	0	0.00K	0.00K
	10/01/2005	0	0	0.00K	0.00K
	11/01/2005	0	0	0.00K	0.00K
	12/01/2005	0	0	0.00K	0.00K
	01/01/2006	0	0	0.00K	0.00K
	07/10/2012	0	0	0.00K	0.00K
	08/07/2012	0	0	0.00K	0.00K
	11/01/2012	0	0	0.00K	0.00K
	09/10/2013	0	0	0.00K	0.00K
	10/01/2013	0	0	0.00K	0.00K
Count/Total	13	0	0	0.00K	21.410M

Source: National Centers for Environmental Information, November 2017

After August 2005, there is no reported crop damage in Linn County due to drought conditions. Aside from the recorded period of drought in 2012, all drought conditions were recorded in months outside of Iowa's prime growing season. The most recent drought conditions in Linn County were reported in October 2013.

Probability

Based on the major periods of drought, the probability estimate for drought conditions occurring in Linn County is between 20% and 30% in any given year. Multiple short-term drought conditions or long-term drought conditions could occur in Linn County, Iowa, and the Midwest region of the United States. Overall, the probability estimate is based on historical occurrences, the *2013 Iowa Hazard Mitigation Plan*, and local knowledge in Linn County.

Magnitude and Severity

Droughts are typically widespread, affecting a large area. If a drought occurs in Linn County, it is likely most of eastern Iowa or even the entire Midwest United States is experiencing drought conditions. Local conditions, primarily intensity, vary during a widespread drought.

People are vulnerable during a drought if water supplies are significantly reduced, but typically there are secondary sources of water that can prevent negative health impacts due to lack of water. Most often, people are affected by higher food prices during and after major periods of drought. Wildlife and livestock are more likely to be vulnerable during a drought when there is a limited supply of water.

The agricultural sector of the economy, especially in Iowa, would be impacted if widespread and long-term drought conditions were to occur. Due to reliance on precipitation and water supply for irrigation, crops are extremely vulnerable. Most often, rural areas experience the majority of negative impacts.

A long-term, severe drought can decrease stream flow and water table levels, which can limit the amount of water available to residents. In certain circumstances, it may be necessary to place restrictions on industries that use large amounts of water.

Fire suppression may be challenging during drought conditions due to dry vegetation and limited water supply. The majority of property losses would likely be livestock and crops. Infrastructure can also be affected due to drying soils and low water levels around dams.

In Linn County, widespread drought conditions could severely damage 10% of property, primarily crops. Although the potential magnitude and severity of drought conditions would be considered negligible countywide, the direct impacts on rural areas may be critical. If drought conditions were severe enough to significantly reduce water supply, urban areas in Linn County could be directly impacted.

Warning Time

Drought warning is directly related to the ability to predict conditions that produce drought, primarily precipitation and temperature. There are many variables, and it is difficult to predict a drought in advance. An area may already be in a drought before it is recognized. While drought

warning may not come until the drought is already occurring, the secondary effects may be predicted weeks in advance.

Duration

Drought conditions are part of normal climate fluctuations in the United States. According to Iowa and Linn County's drought history, most drought events affect the state for a period of a few months; however, climate variability can cause drought conditions for a period of a year or more.

Earthquake

Definition of Hazard

An earthquake is sudden shaking or vibration of the earth that may impose a direct threat to life and property. The shaking or vibration is caused by the breaking and shifting or rock beneath the earth's surface. The three general classes of earthquakes are tectonic, volcanic, and artificially produced.

Potential Hazard Area

The potential hazard area for an earthquake in Linn County is countywide.

Historical Occurrences

According to the Iowa Geological and Water Survey, twelve earthquakes with epicenters in Iowa have been reported. The first reported earthquake occurred in 1867 near Sidney in southwest Iowa. The most recent earthquake occurred in 1948 near Oxford, which is approximately 20 miles south of Linn County. The most severe earthquake occurred near Davenport in southeast Iowa in 1934, but there was only minor damage reported. None of these events were instrumentally recorded.

Other earthquakes, with an epicenter outside of Iowa, have mildly affected the state. According to the United States Geological Service, the earliest reported earthquakes that were felt in Iowa occurred in 1811 and 1812 and originated in the New Madrid Seismic Zone. Other earthquakes originating in Illinois and Missouri have been felt in Iowa, and each event has resulted in minimal or no damage.

Probability

Iowa is located in low risk earthquake zones, Seismic Zones 0 and 1, which indicates a low probability of a major earthquake affecting the state. Iowa is northwest of the New Madrid Seismic Zone, which has the potential to produce large earthquakes that can impact the state including Linn County. Based on recurrence intervals for small earthquakes, scientists estimate a 90% chance of a Richter magnitude 6.0 earthquake in the New Madrid Seismic Zone by 2040, which may likely be the next earthquake to affect Linn County. It should be noted, a 5.2 magnitude earthquake occurred in April 2008.

Magnitude and Severity

In the past, earthquakes with an epicenter in Iowa have not had a major impact in Linn County. Assuming low magnitude earthquakes will continue to occur in Iowa, impacts in Linn County would likely be minor, if any. Earthquakes that originate outside of Iowa could potentially impact the state and Linn County. Estimated effects of a Richter scale 6.5 magnitude earthquake along the New Madrid Seismic Zone suggest that southern Iowa could experience impacts as severe as trembling buildings, some broken dishes and cracked windows. For most areas, impacts will be vibrations similar to the passing of a heavy truck, like rattling of dishes, creaking walls, and swinging of suspended objects. The impacts of an earthquake originating in the New Madrid Seismic Zone would likely be minor in Linn County or negligible.

There are two common scales for categorizing the magnitude of an earthquake: the Richter Scale and the Modified Mercalli Intensity Scale. The Richter scale, a logarithmic scale, measures the amount of energy released by an earthquake. An increase of 0.2 on the scale corresponds to a doubling of energy.

The Mercalli Intensity Scale measures the magnitude of an earthquake according to the effects of the event, e.g. "VIII Severe—Damage slight in specially designed structures; considerable damage in ordinary substantial buildings…" Despite different measurements, the scales are correlated because additional effects are more likely to occur from an event of certain magnitude. The relationship is shown in the table below.

Richter Scale	Mercalli Intensity	Description
1.0–1.9	I	Micro
2.0–2.9	I–II	Minor
3.0–3.9	III–IV	
4.0–4.9	IV–VI	Light
5.0–5.9	VI–VII	Moderate
6.0–6.9	VIII to X	Strong
7.0–7.9	X-XII	Major
8.0–8.9		Great
9.0+		

Warning Time

Earthquake forecasting is an inexact science. Even in areas that are well monitored, scientists rarely predict earthquakes. Realistically, there would be minimal or no warning before an earthquake in Linn County.

Duration

An earthquake occurs in just a few seconds, but a community can be affected for hours, weeks, and even years after the event. Due to an overall low risk, an earthquake event would likely impact Linn County for a few hours at the most.

Expansive Soils

Definition of Hazard

Soils and soft rock that tend to swell or shrink excessively due to changes in moisture content are commonly known as expansive soils. 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.

Potential Hazard Areas

The potential hazard areas include areas of the county with high clay content soil. Refer to the risk assessment maps, Map 4 through Map 7.

Historical Occurrences

There are no documented expansive soil events for the state or Linn County. Due to the time period over which impacts from expansive soils occur, there may be expansive soil events in the state that were not documented. The availability of data on expansive soils varies across the United States. Clay content information is available but the presence of high clay content does not necessarily indicate expansive soils.

Probability

Based on a lack of historical occurrences in the state and Linn County, the probability of a major expansive soils event is unlikely but is possible based on the presence of high clay content soils throughout the county.

Magnitude and Severity

Expansive soils events have minimal, if any, direct impacts on humans. Impacts commonly involve swelling clays beneath areas covered by buildings, slabs of concrete, and/or asphalt. The most extensive damage from expansive soils occurs to highways and streets.

Houses and one-story commercial buildings are more susceptible to being damaged by expansive soils than multi-story buildings, which are usually heavy enough to counter swelling pressure. Common damage to buildings includes sticking doors, uneven floors, and cracked foundations, floors, walls, ceilings, and windows.

Warning Time

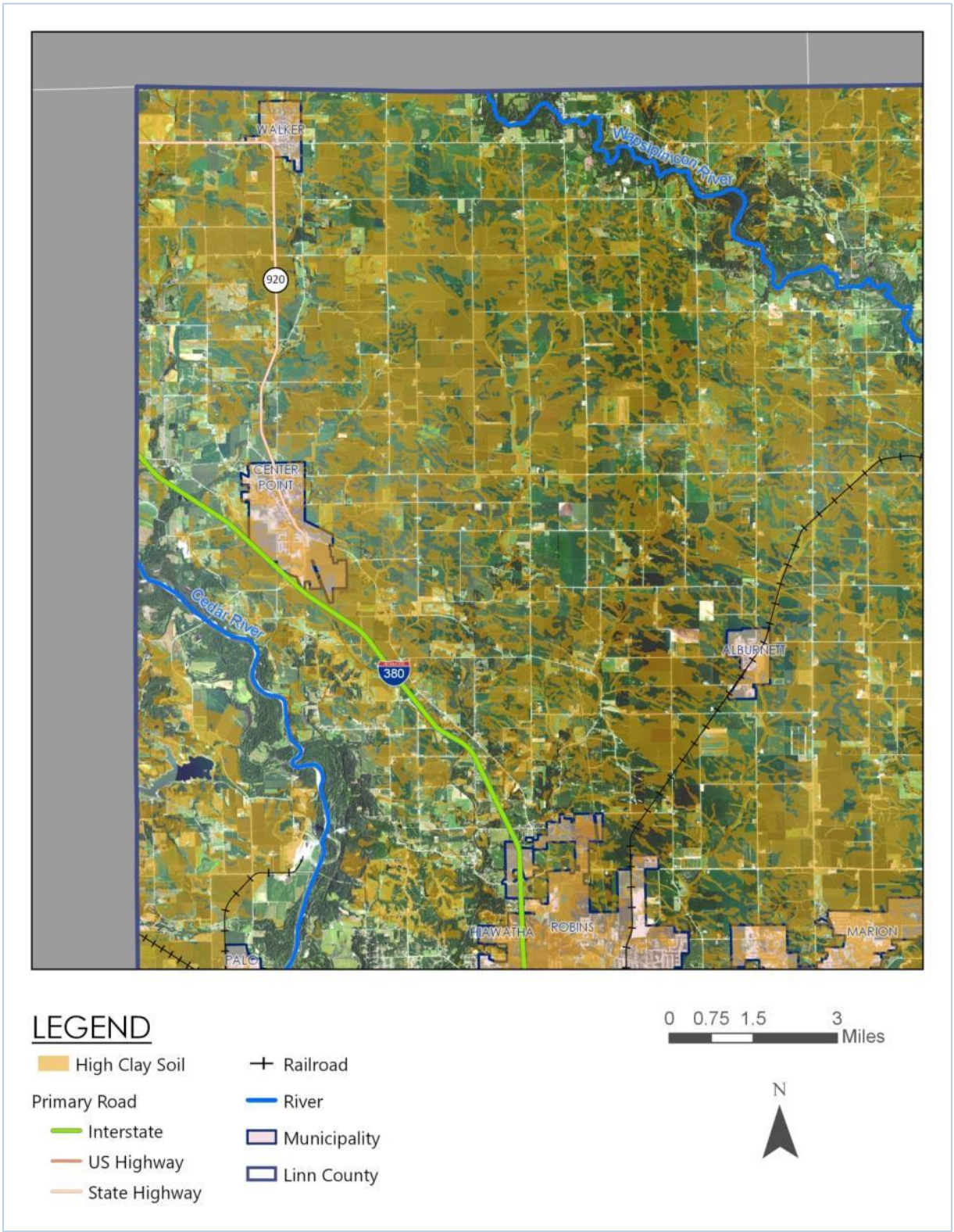
The warning time for expansive soils is consistent with other geologic hazards, which occur slowly over time. The presence of expansive soils is often realized after damage occurs.

Duration

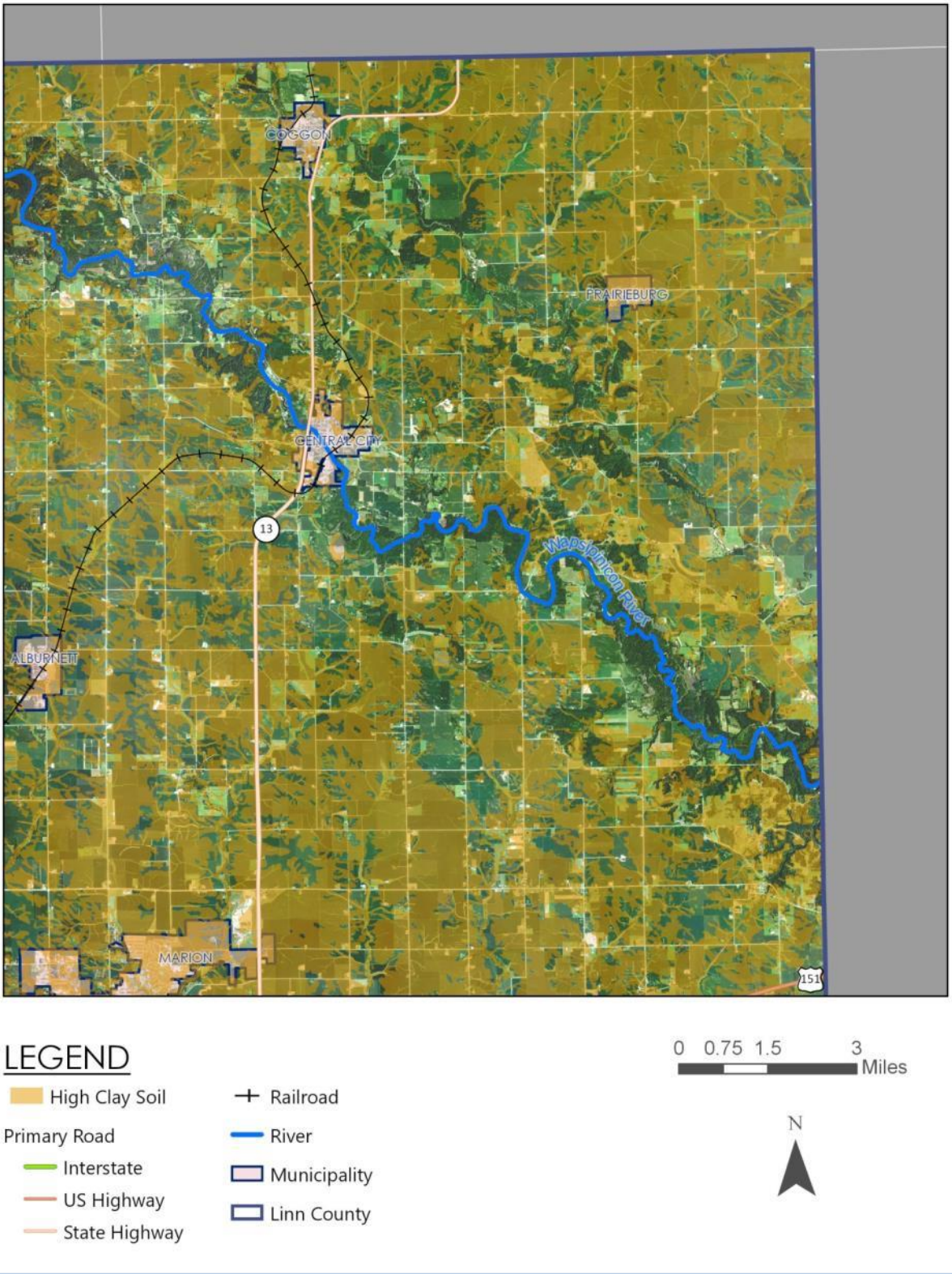
Because the effects of expansive soils develop slowly over time, the response to expansive soils is limited in Iowa, but the most severe cases can result in washed out roads. Response to expansive soils in Iowa is usually coupled with response to river and flash flood events.

Risk Assessment Maps

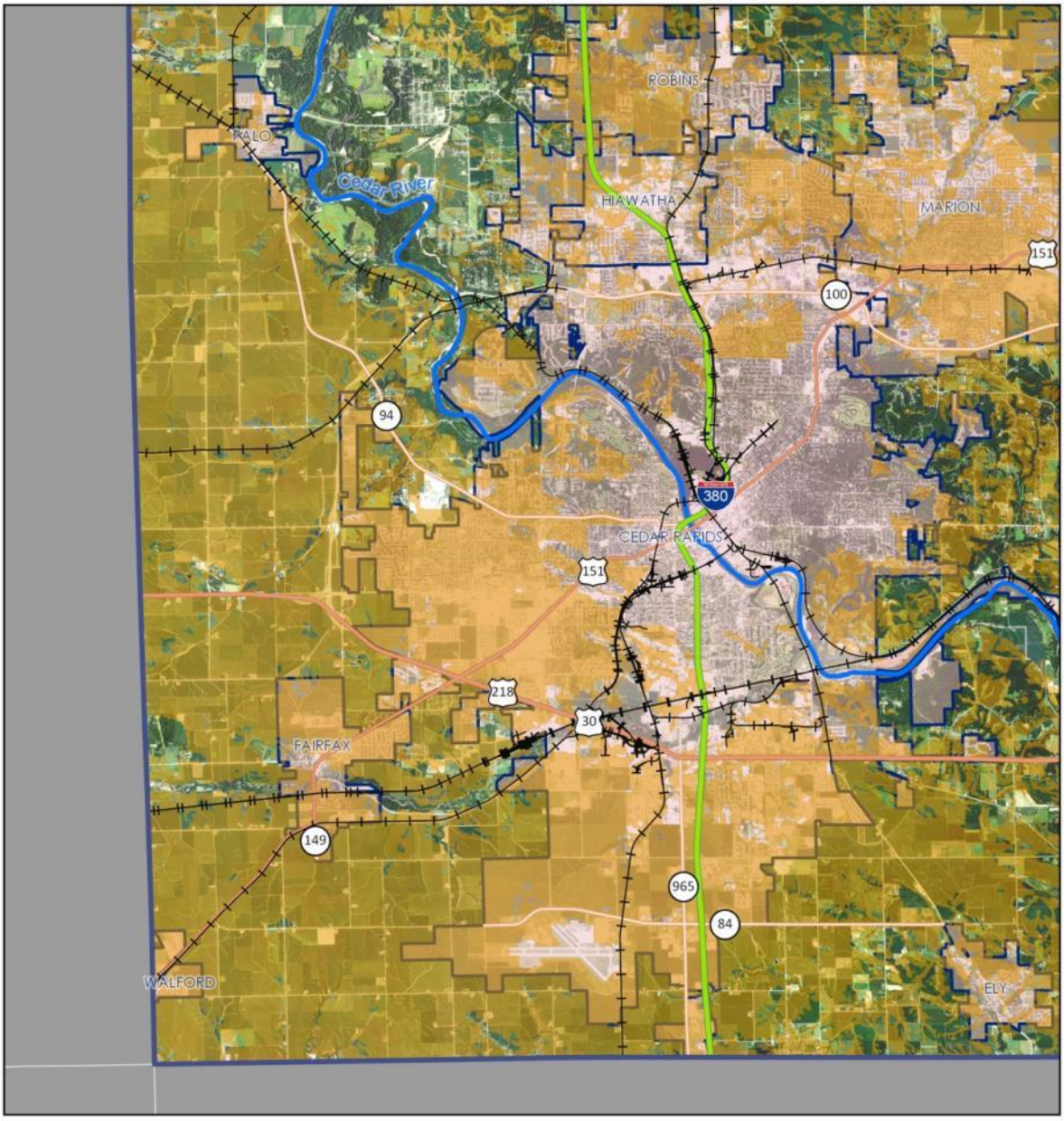
Map 4: Linn County Section 1 High Clay Soil



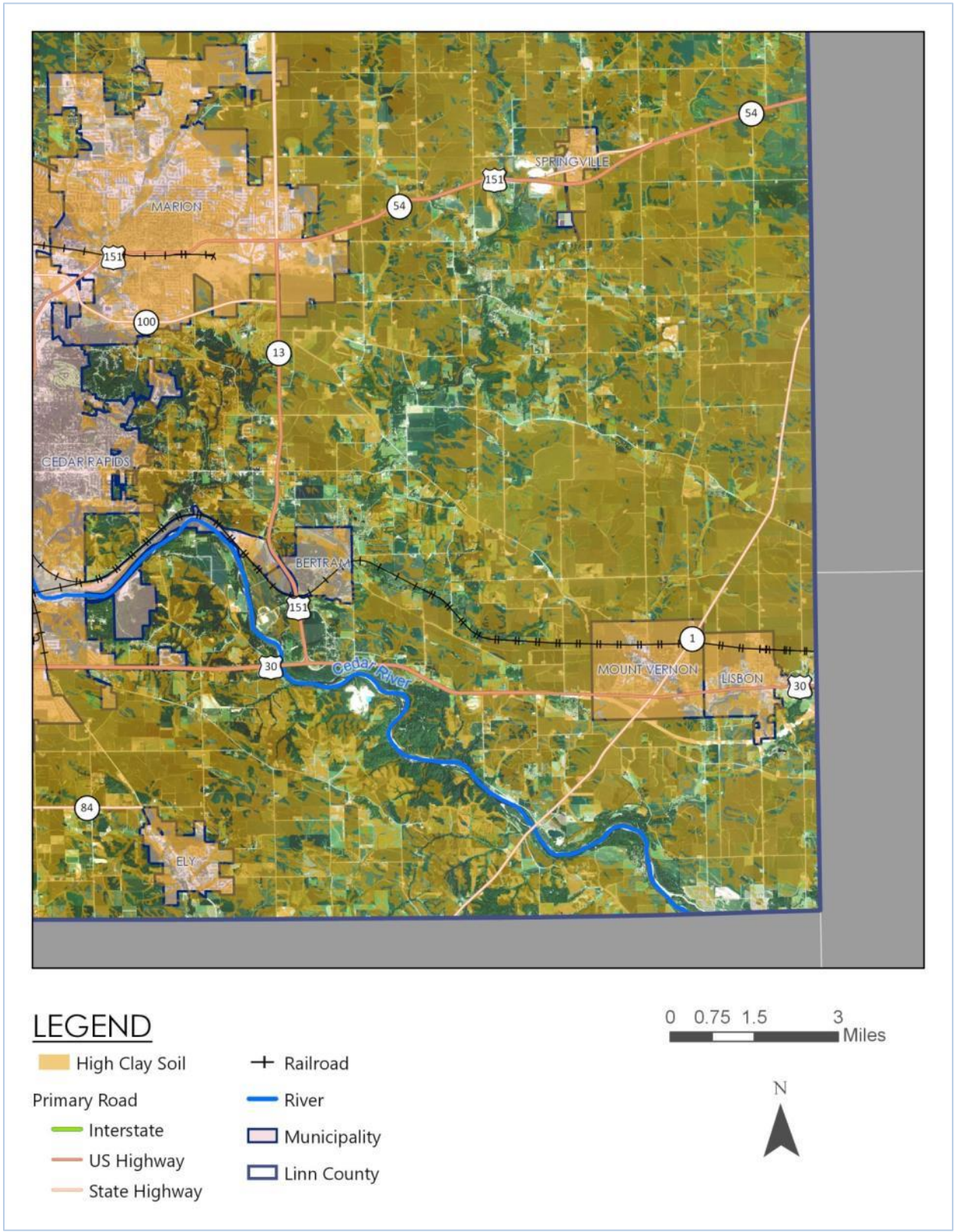
Map 5: Linn County Section 2 High Clay Soil



Map 6: Linn County Section 3 High Clay Soil



Map 7: Linn County Section 4 High Clay Soil



Extreme Heat

Definition of Hazard

Extreme heat is a temperature hotter or more humid than average for a location at that time of year. This includes three successive days of 90+ degrees Fahrenheit or one day with a temperature or heat index in excess of 100 degrees Fahrenheit.

Potential Hazard Area

The potential hazard area for an extreme heat event in Linn County is countywide.

Historical Occurrences

Since 1996, Linn County has experienced four heat events. Refer to Table 10. As defined by the National Centers for Environmental Information (NCEI), a heat event occurs whenever heat index values meet or exceed locally established advisory thresholds. A heat event, as defined by the NCEI, does not fully meet the description of an extreme heat event in Iowa, but data from the NCEI is the most comprehensive data available.

Table 10: Linn County Heat and Excessive Heat Events 1996–2016

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
LINN (ZONE)	07/25/1997	0	0	0.00K	0.00K
	07/19/1999	0	0	0.00K	0.00K
	07/04/2012	0	0	0.00K	0.00K
	08/26/2013	0	0	0.00K	0.00K
Count/Total	4	0	0	0.00K	0.00K

Source: National Centers for Environmental Information, November 2017

Among all occurrences, there were no reported deaths, injuries, property damage, or crop damage.

Probability

Historical occurrences indicate that extreme heat events are occasional in Linn County, but local experience and the potential for higher than normal temperatures due to climate change may increase the likelihood of an extreme heat event occurring in the state and Linn County. The probability is likely for an extreme heat event to occur in Linn County.

Magnitude and Severity

An extreme heat event typically affects a large geographic area, sometimes as large as an entire region in the United States. If an extreme heat event were to occur in Linn County, the entire county and beyond would likely be impacted.

Humans, outdoor pets, and livestock are vulnerable during extreme heat events. Heatstroke, sunstroke, cramps, exhaustion, and fatigue can be caused by prolonged heat exposure and/or physical activity. Certain groups of people, such as the young, elderly, and outdoor workers, are especially vulnerable to extreme heat events.

In urban areas, the heat island effect and air stagnation can exacerbate already dangerous conditions for humans and animals during an extreme heat event. In Linn County, the Cedar Rapids metropolitan area is the largest and most dense urban area. In rural areas, which comprise the majority of Linn County, livestock loss and reduced crop yields can occur in extreme heat events. Throughout the county, extreme heat events can damage buildings and infrastructure, which can result in shutdown of facilities for an extended period. Based on historical occurrences, the magnitude and severity of an extreme heat event in Linn County would likely be negligible; although, more severe impacts are possible.

Warning Time

Extreme heat events are predictable within a few degrees approximately three days before the event may occur. Variations in local conditions can affect the actual temperature within a matter of hours or even minutes so warning time may be less. With as much warning time as possible, the National Weather Service will initiate alert procedures when the heat index is expected to exceed 105 degrees for at least two consecutive days.

Duration

By definition, an extreme heat event occurs when there are three consecutive days with a 90+ degree Fahrenheit temperature or one day with a 100+ degree Fahrenheit temperature or heat index. Based on past extreme heat events in the state and Linn County, an event can last a week or longer.

Flood

Definition of Hazard

In a flash flood event, water levels rise at an extremely fast rate with minimal to no warning. Common causes include heavy precipitation over a short period of time, rapid snowmelt, ice jam release, frozen ground, saturated soil, or impermeable surfaces like pavement.

In a river flood event, water levels of a tributary or body of water exceed capacity and cover adjacent land that is not typically covered by water. In this plan, flooding of creeks and other water bodies is included in this hazard.

Potential Hazard Area

The potential hazard areas for a flood are generally the areas designated as a floodplain by the Federal Emergency Management Agency. Refer to the risk assessment maps, Map 8 through Map 11. As the only mapped hazard with a countywide assessment priority level of 1, the flood hazard zones are also displayed, on a more localized scaled, in the critical facilities maps, starting on 165. It should be noted that flooding is not limited to designated floodplains because uncommon climate conditions and changes in development patterns can affect what areas ultimately experience water inundation.

Flash flooding can occur in any area of Linn County. Certain areas have a greater potential to be affected due to factors such as low elevation, nearby waterways, insufficient storm water management, intense urban or agricultural development, etc. All jurisdictions in the planning area have identified at least minor flash flood issues, but most have persistent issues due to insufficient implementation of storm water management practices.

Historical Occurrences

Since 1996, there have been 44 documented flash flood events throughout Linn County. Refer to Table 11. It should be noted, the National Centers for Environmental Information (NCEI) identifies the area where a flash flood event began in Linn County and not necessarily the only areas of the county impacted by the event.

Table 11: Linn County Flash Flood Events 1996–2016

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
COUNTYWIDE	02/20/1997	0	0	0.00K	0.00K
CEDAR RAPIDS	06/11/1999	0	0	0.00K	0.00K
CEDAR RAPIDS	06/04/2002	0	0	0.00K	0.00K
SPRINGVILLE	06/04/2002	0	0	0.00K	0.00K

Table 11: Linn County Flash Flood Events 1996–2016, continued

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
NORTHEAST PORTION	06/04/2002	0	0	0.00K	0.00K
ROBINS	06/04/2002	0	0	0.00K	0.00K
CEDAR RAPIDS	05/17/2004	0	0	10.00K	0.00K
MARION	05/21/2004	0	0	10.00K	0.00K
MARION	05/22/2004	0	0	10.00K	0.00K
COGGON	04/02/2007	0	0	0.00K	0.00K
CEDAR RAPIDS	06/22/2007	0	0	0.00K	0.00K
CEDAR RAPIDS	06/22/2007	0	0	0.00K	0.00K
CEDAR RAPIDS	07/16/2007	0	0	1.00K	0.00K
CEDAR RAPIDS	04/25/2008	0	0	0.00K	0.00K
COVINGTON	06/05/2008	0	0	0.00K	0.00K
CENTER PT	06/08/2008	0	0	0.00K	0.00K
MIDWAY	06/12/2008	0	0	0.00K	0.00K
ELY	07/02/2008	0	0	15.00K	0.00K
CEDAR RAPIDS AIRPARK	07/24/2009	0	0	0.00K	0.00K
HIAWATHA	08/26/2009	0	0	0.00K	0.00K
COGGON	08/27/2009	0	0	500.00K	0.00K
PALO	06/15/2010	0	0	5.00K	0.00K
CENTER PT	06/15/2010	0	0	10.00K	0.00K
PALO	06/18/2010	0	0	0.00K	0.00K
MARION MC BRIDE ARPT	07/12/2010	0	0	0.00K	0.00K
CEDAR RAPIDS	06/10/2011	0	0	0.00K	0.00K
CEDAR RAPIDS	08/04/2012	0	0	0.00K	0.00K
WALKER	04/17/2013	0	0	250.00K	0.00K
WALKER	05/29/2013	0	0	0.00K	0.00K
CENTRAL CITY	06/26/2013	0	0	0.00K	0.00K
CEDAR RAPIDS	06/29/2014	0	0	0.00K	0.00K
MT VERNON	06/29/2014	0	0	0.00K	0.00K
CEDAR RAPIDS	06/29/2014	0	0	0.00K	0.00K
CEDAR RAPIDS	06/30/2014	0	0	0.00K	0.00K
CEDAR RAPIDS	06/30/2014	1	1	0.00K	0.00K
CEDAR RAPIDS	04/09/2015	0	0	0.00K	0.00K
BEVERLY	06/11/2015	0	0	0.00K	0.00K
CEDAR RAPIDS	06/11/2015	0	0	0.00K	0.00K
HIAWATHA	06/11/2015	0	0	0.00K	0.00K
CEDAR RAPIDS	06/22/2016	0	0	0.00K	0.00K
CEDAR RAPIDS	08/11/2016	0	0	0.00K	0.00K
HIAWATHA	08/11/2016	0	0	0.00K	0.00K
HIAWATHA	09/08/2016	0	0	1.00K	0.00K
CEDAR RAPIDS	09/23/2016	0	0	1.00K	0.00K
Count/total	44	1	1	813.00K	0.00K

Source: National Centers for Environmental Information, November 2017

For the reported flash flood events, one death and one injury occurred during a heavy rain event on June 30, 2014, when two teenage boys were swept into a large storm sewer. Flash flooding also resulted in over $800,000 in property damage reported. Of all property damage, $500,000 occurred during one flash flood event that began near Coggon in August 2009. Another flash flood event began near Walker in June 2013, which resulted in $250,000 in property damage. Other flash flood events with reported property damage had totals of $15,000 or less.

In Linn County, 25 river flood events have occurred since 1996, but the flood event that began near Center Point on the Cedar River in 2008 caused at least $750 million in property damage. Refer to Table 12. The record crest on the Cedar River in Cedar Rapids occurred on June 13, 2008 at 31.12 feet, almost 20 feet higher than the 12-foot flood stage. Residential, commercial, and industrial areas along the river were severely damaged. Flooding also forced the closure of major travel routes in eastern Iowa including Interstate 80 and Interstate 380. A section of Interstate 80 between Iowa City and Davenport was closed, and the designated detour added over 100 miles to the regular travel route. Flooding from Coralville Lake, which is south of Linn County, resulted in the closure of I-380 between Interchanges 4 and 10. This section of Interstate 380 is between the Cedar Rapids and Iowa City metropolitan area, which is a heavily traveled route.

Table 12: Linn County River Flood Events 1996–2016

Location	County/Zone	Date	Deaths	Injuries	Property Damage	Crop Damage
LINN (ZONE)	LINN (ZONE)	05/09/1996	0	0	0.00K	0.00K
CEDAR RAPIDS	LINN CO.	06/14/1998	0	0	2.00K	0.00K
COUNTYWIDE	LINN CO.	10/14/1998	0	0	0.00K	0.00K
LINN (ZONE)	LINN (ZONE)	05/17/1999	0	0	0.00K	0.00K
CEDAR RAPIDS	LINN CO.	06/11/1999	0	0	0.00K	0.00K
HIAWATHA	LINN CO.	06/11/1999	0	0	0.00K	0.00K
CEDAR RAPIDS	LINN CO.	06/12/1999	0	0	0.00K	0.00K
LINN (ZONE)	LINN (ZONE)	07/23/1999	0	0	0.00K	0.00K
LINN (ZONE)	LINN (ZONE)	06/01/2000	0	0	0.00K	0.00K
CEDAR RAPIDS	LINN CO.	06/01/2000	0	0	0.00K	0.00K
COUNTYWIDE	LINN CO.	02/24/2001	0	0	0.00K	0.00K
LINN (ZONE)	LINN (ZONE)	04/15/2001	0	0	0.00K	0.00K
CEDAR RAPIDS	LINN CO.	05/10/2001	0	0	0.00K	0.00K
CEDAR RAPIDS	LINN CO.	10/22/2001	0	0	0.00K	0.00K
CEDAR RAPIDS	LINN CO.	07/11/2002	0	0	0.00K	0.00K
COUNTYWIDE	LINN CO.	08/12/2002	0	0	0.00K	0.00K
LINN (ZONE)	LINN (ZONE)	05/24/2004	0	0	0.00K	0.00K
LINN (ZONE)	LINN (ZONE)	06/03/2004	0	0	0.00K	0.00K
CEDAR RAPIDS	LINN CO.	04/01/2008	0	0	0.00K	0.00K
CENTER PT	LINN CO.	06/01/2008	0	0	750.000M	0.00K
HIAWATHA	LINN CO.	05/30/2013	0	0	0.00K	0.00K
COVINGTON	LINN CO.	06/01/2013	0	0	0.00K	0.00K
TODDVILLE	LINN CO.	06/23/2014	0	0	0.00K	0.00K
HIAWATHA	LINN CO.	07/01/2014	0	0	0.00K	0.00K

Table 12: Linn County River Flood Events 1996–2016, continued

Location	County/Zone	Date	Deaths	Injuries	Property Damage	Crop Damage
COVINGTON	LINN CO.	09/26/2016	0	0	2.200M	0.00K
Count/total	25		0	0	752.202M	0.00K

Source: National Centers for Environmental Information, November 2017

Before 1996, the most recent severe flood event in Linn County occurred in 1993. The widespread flooding throughout Iowa and the Midwest United States is commonly called the Great Flood of 1993. The Cedar River crested at 19.83 feet and severely flooded areas of downtown Cedar Rapids. Other notable flood events in Linn County include a flood event in 1851 that set the prior record crest for the Cedar River, which is 20 feet.

> Requirement §201.6 (c)(2)(ii): [The plan shall include the following:] (ii) A description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. All plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods.

Flooding is a persistent natural hazard in Linn County causing millions of dollars in property damage. In certain areas of the county, several properties have been damaged by multiple flood events. These properties are considered repetitive flood loss properties. The technical definition for a repetitive flood loss property, as defined by the National Flood Insurance Program (NFIP), is a property that has received two or more claim payments through NFIP of more than $1,000 within a ten-year period. As of November 2017, there were 31 repetitive loss properties in Linn County, with the majority being located in Cedar Rapids. Refer to Table 13 for a breakdown of the jurisdiction where these properties are generally located. Due to privacy restrictions, the exact location is not available.

Table 13: Repetitive Loss Properties by Jurisdiction

Community Name	Losses	Properties	Mitigated Properties	Insured Properties	Property Types
Cedar Rapids	63	27	10	13	Busi-nonres (4), other res (1), other nonres (6), single family (16)
Central City	10	5	1	3	Single family (5)
Coggon	2	1	0	0	Single family
Linn County	25	10	5	6	Single family (10)
Marion	5	2	0	0	Single family (2)
Palo	9	4	0	0	Single family (4)
Robins	2	1	0	0	Other nonres
Walker	4	2	0	0	Single family (2)

Source: Iowa Department of Natural Resources, December 2018

Repetitive loss properties are a concern, not only because the residents who live in these structures are exposed to the negative impacts of flood multiple times, but because these properties are a significant draw on the funds available in the NFIP.

Probability

Historical occurrences indicate that flash flood events can occur nearly annually in Linn County. Since 2007, multiple flash flood events have occurred each year in Linn County. When considering probability, though, the local planning committees considered the probability of the severe flash flood events that could cause injury, death, or shutdown of facilities. Minor flash floods occur frequently and most jurisdictions have procedures to mitigate injury, death, or damage from these events. Based on local knowledge, the probability is likely that a major flash flood event will occur in Linn County. This is between 20% and 30% in any given year. For river flood events, the estimated probability is highly likely, which is more than 33% in any given year. The probability estimate for flood hazards in Linn County is based on historical occurrences and local knowledge.

Magnitude and Severity

With flood hazard mapping from multiple sources, vulnerability of life and property to river flooding is well identified in Linn County. FEMA has delineated the probable extent of the 100-year flood hazard areas in Linn County. These maps are Flood Insurance Rate Maps (FIRMs), which show properties that have a 1% chance in any given year to be affected by floods. For the designated floodplain in Linn County, refer to the risk assessment maps.

In addition to current FIRMs, the Iowa Flood Center, Iowa Department of Natural Resources (IDNR), and FEMA partnered to develop the Iowa Flood Information System (IFIS). The IFIS is a web interface with interactive flood mapping and forecasting features that can be used to understand potential flood risk. To explore the information available for Linn County on this system, visit the following website: http://ifis.iowafloodcenter.org/ifis/en/. Figure 1 and Figure 2, on page 55, show two of the tools provided by IFIS. In the future, more detailed flood risk information will be provided through the RiskMap program, which is partnership between FEMA and IDNR to provide watershed based information and solutions.

A flash flood event can impact areas far from a tributary or body of water. Streets can become swift moving rivers, and basements can become deathtraps because flash floods can fill them with water in minutes. Nearly half of all flash flood fatalities are auto-related. Motorists often try to traverse water-covered roads and bridges and are swept away by the current. Recreational vehicles and mobile homes located in low-lying areas can also be swept away by the water.

Buildings, infrastructure, and land can be eroded, extensively damaged, or completely destroyed in a flood event. Disruption or complete shutdown of essential facilities and services like major travel routes, water distribution, and wastewater treatment facilities often occurs during severe flood events. Depending on severity, overall disruption may occur just a few hours causing minor inconveniences or up to months causing major environmental and economic impacts in the county and state.

Potential impacts of flooding include injury and loss of life. River flooding does not have as high of risk to human as does flash flooding mostly because of the slow onset of river flooding. People in a flood zone, downstream from a dam or levee, or in low-lying areas are especially vulnerable in any type of flood event. In addition, people located in areas with narrow stream channels, saturated soil, or on land with large amounts of impermeable surfaces are likely to be impacted in the event of a significant rainfall.

Warning Time

Flash floods are somewhat unpredictable, but there are factors that can indicate the likelihood of a flash flood event occurring in an area. Flash floods can occur within a few minutes or hours of excessive rainfall, a dam or levee failure, or a sudden release of water held by an ice jam. Weather surveillance radar is being used to improve monitoring capabilities of intense rainfall. Knowledge of the watershed characteristics, modeling, monitoring, and warning systems like the Iowa Flood Information System increases the predictability of flash floods. Depending on the location in the watershed, warning times can be increased. The National Weather Service forecasts the height of flood crests, the data, and time the flow is expected to occur at a particular location.

Gages along streams and rain gages provide information for flood warnings. Advanced warning is possible for river flood events because a flood usually develops over the course of several days. The National Weather Service provides flood forecasts for Iowa, and now, the Iowa Flood Information System provides information and forecasts. Flood warnings are issued over mass notification systems and television stations. People in the path of river floods usually have time to take appropriate actions to limit harm to themselves and property.

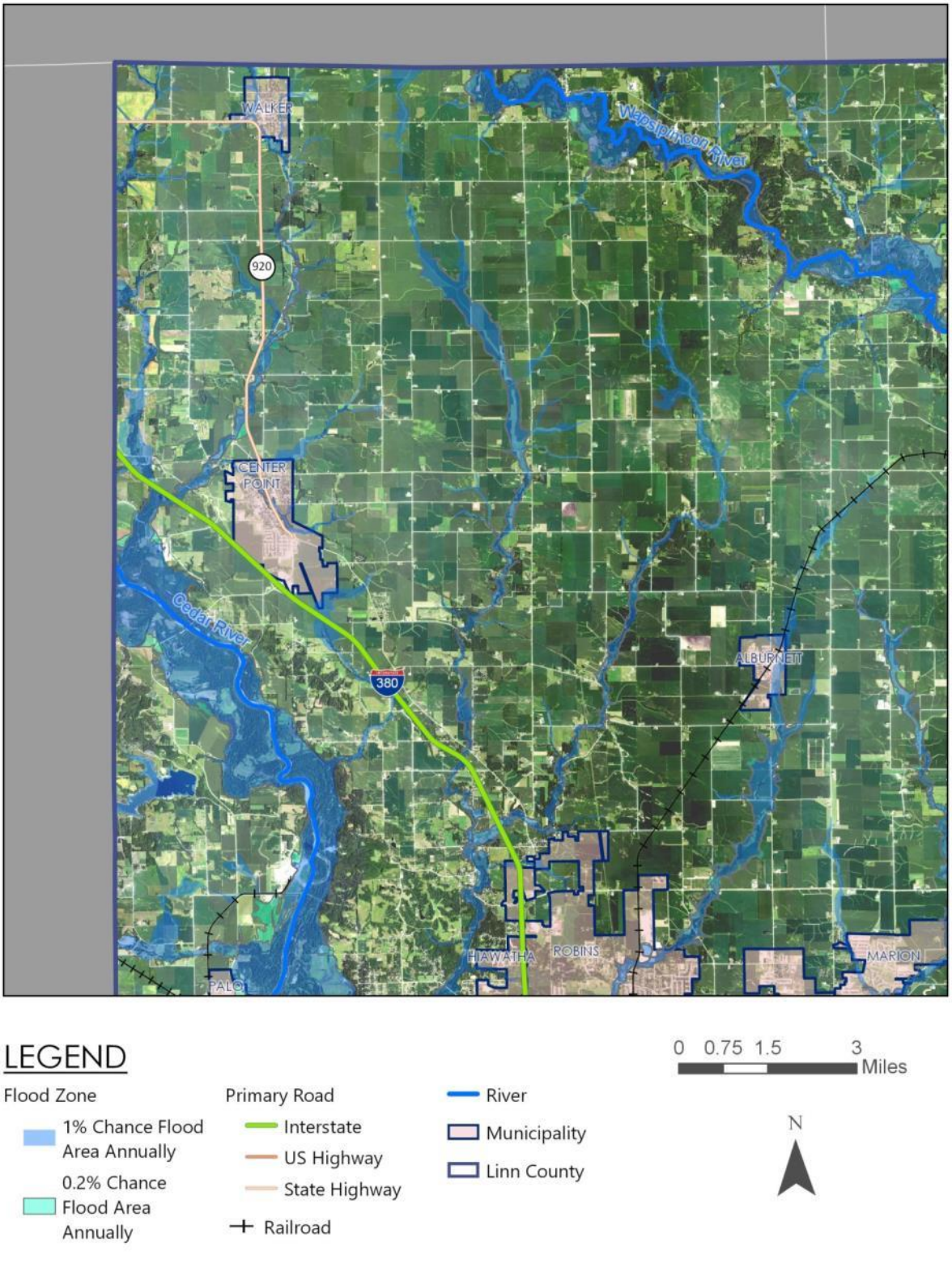
Duration

Response to a flash flood event is usually shorter term relative to a river flood event, requiring just days or weeks depending on the severity of the event. Response to a river flood event is usually extensive and requires days and even up to years to adequately recover.

Risk Assessment Maps

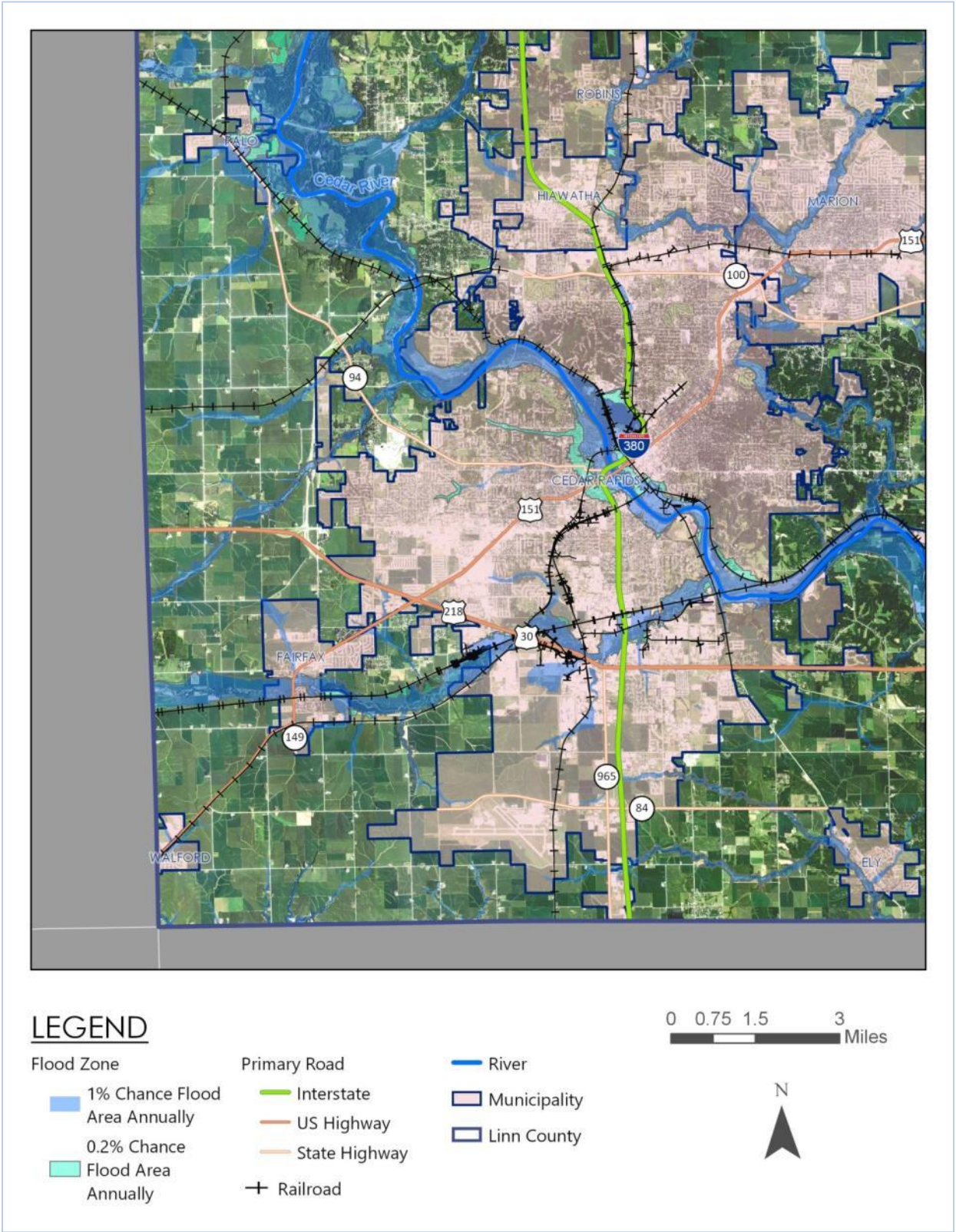
In this plan, available floodplain maps are used as an indicator of potential flood risk. The risk assessment maps for flood show the areas in Linn County designated as the 100 year or 500 year floodplain. Respectively, the risk at the edge of these areas is approximately 1% and 0.2% in any given year. Property located nearer the potential source of flooding in designated floodplain areas is likely to be impacted by more frequent flooding. In addition, property outside of designated floodplain areas may be vulnerable to flash flooding. The risk assessment maps are based on the most recent information available from the Federal Emergency Management Agency (FEMA). Current Flood Insurance Rate Maps (FIRMs) in Linn County are effective April 5, 2010.

Map 8: Linn County Section 1 Flood Hazard Zones



Map 9: Linn County Section 2 Flood Hazard Zones

Map 10: Linn County Section 3 Flood Hazard Zones



Map 11: Linn County Section 4 Flood Hazard Zones

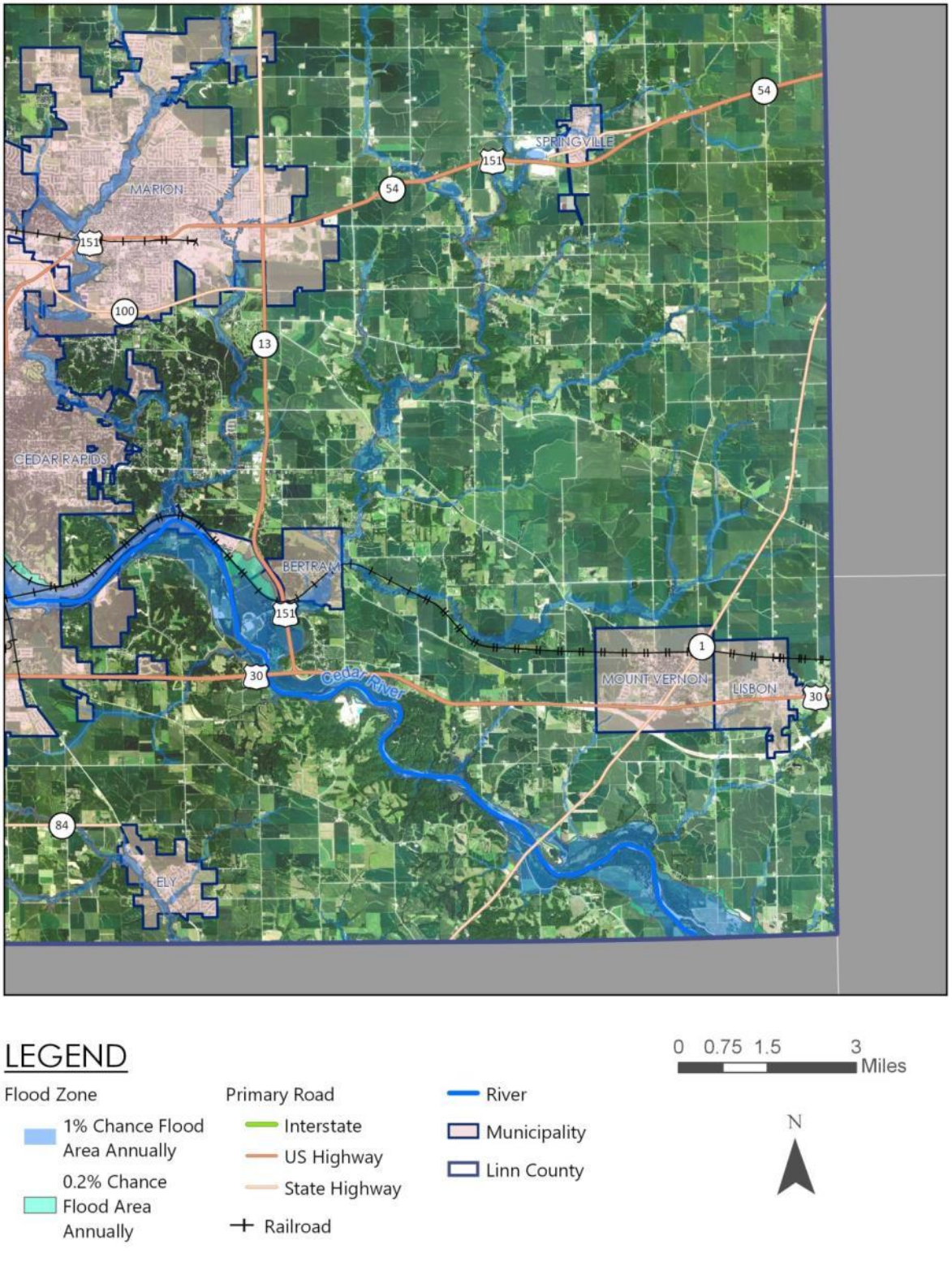


Figure 1: IFIS Flood Inundation Map Tool

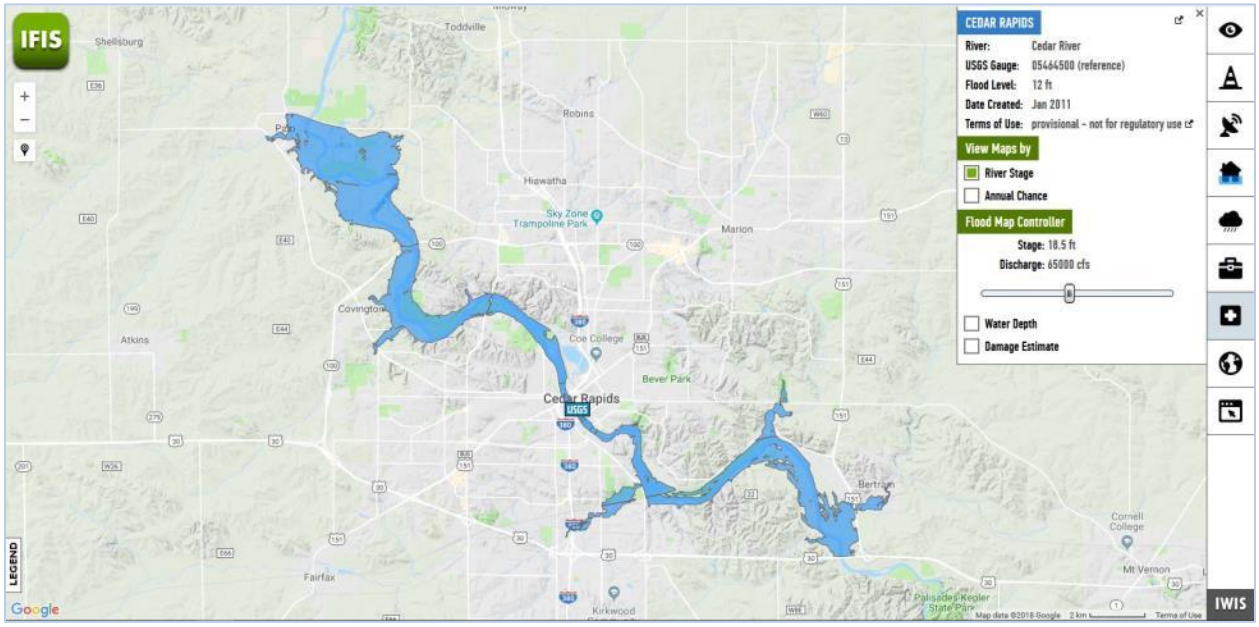
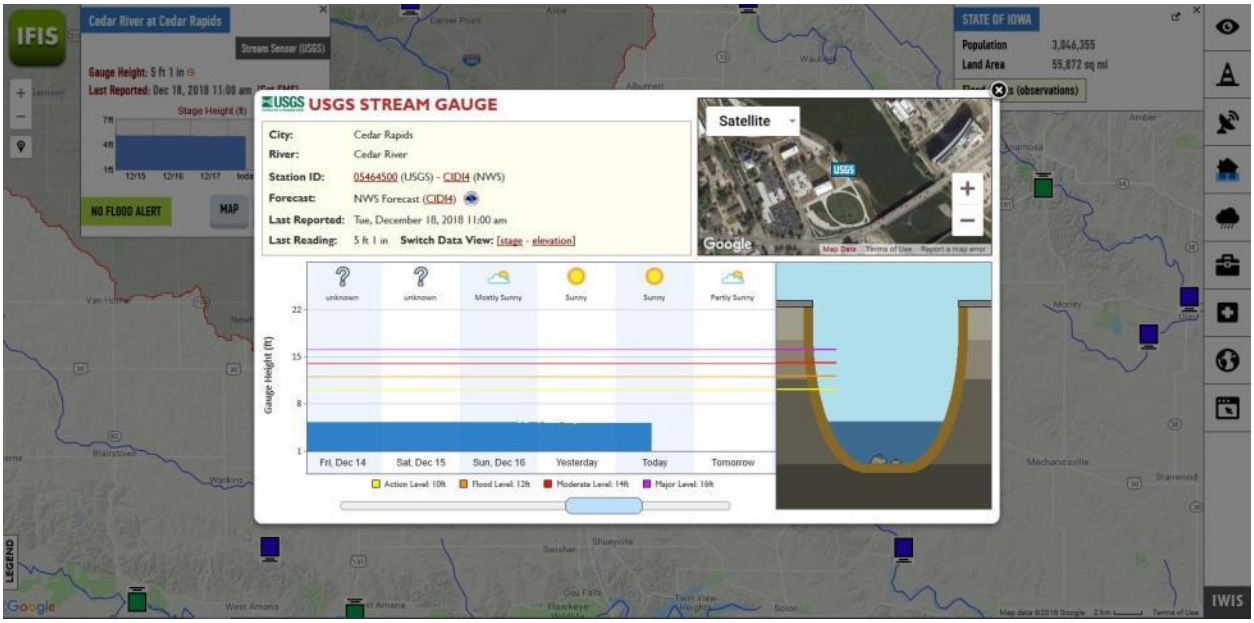


Figure 2: IFIS Stream Gauge Data Tool



Grass and Wildland Fire

Definition of Hazard

A grass or wildland fire is an uncontrolled fire that threatens life and property in a rural or wooded area. Grass and wildland fires can occur when conditions are favorable, such as periods of drought when natural vegetation would be drier and subject to combustibility.

Potential Hazard Area

The potential hazard area for major grass and wildland fires in Linn County is primarily rural, wooded, and grassy right-of-way areas. Some recreation areas in Linn County are wooded and/or grassy so they are also potential hazard areas.

Historical Occurrences

In Iowa, there have been no grass or wildland fire events that would be considered historically significant. Grass fires are reported throughout Linn County every year, but none of these fires were substantial enough to be a major threat to life and property. Prescribed burning is used in Linn County to manage vegetation but also the risk of grass and wildland fire events.

Probability

Manageable grass fires will occur in Linn County on an annual basis. The estimated probability of a major grass fire occurring is like likely, which is between 20% and 30% probability in any given year. It should be noted that the probability of occurrence may be relatively high during dry and drought conditions. The probability estimate for grass and wildland fire events occurring in Linn County is based primarily on local knowledge.

Magnitude and Severity

Wildfires are most destructive in the western United States, but this particular hazard has become a frequent and damaging phenomenon nationwide. People choosing to live in rural, grassy, and wooded areas are extremely vulnerable to fires. The emergency response personnel who respond to grass and wild land fire are also extremely vulnerable.

Iowa is most often affected by grass fires, which are usually contained and extinguished before there is a threat to life and property. Most grass fires are contained to highway and rail right-of-way ditches and are less than a few acres in size. Wind can turn a small flame into a multi-acre grass fire within a matter of minutes. Fires often burn large portions of field crops during harvest. A dry field can ignite easily from a spark or overheated equipment. Overall, the potential extent is dependent upon conditions such as moisture, wind, and land cover. Areas throughout Linn County are vulnerable, especially rural, grass, and wooded areas.

Warning Time

Most grass and wildland fires occur without warning and spread quickly. Overall, warning time depends upon conditions such as moisture, wind, and land cover. Methods for forecasting fire potential have become more accurate, and a useful outlook is issued by the National Interagency Fire Center and the National Oceanic and Atmospheric Agency (NOAA) Storm Prediction Center.

Duration

The majority of Iowa wildfires occur within a short duration in grassy areas. Approximately half of the fires are prescribed burns that are supervised by trained experts.

Human Disease

Definition of Hazard

A human disease event is a medical, health, or sanitation threat to the general public such as contamination, epidemics, plagues, and insect infestation. A human disease event requires regular, frequent, and time information regarding individual cases to prevent and control spread of the disease.

Potential Hazard Area

The potential hazard area for human disease events in Linn County is countywide.

Historical Occurrences

In Iowa, there are 49 reportable communicable diseases and infectious conditions that hospitals and other health care providers must report to their county public health department. Linn County Public Health investigates these diseases and maintains reports, which are shared with the Iowa Department of Public Health (IDPH) and the Centers for Disease Control and Prevention (CDC). IDPH releases an annual report of notifiable and other diseases. Table 14 displays the cases for common reportable diseases for Linn County for the even years from 2006–2016. Blank records indicate the communicable disease/infectious condition was not included in that year's report. For all reported diseases, there were low numbers of cases reported each year. This fact is reinforced by the reporting in 2014 and 2016 of outbreaks in Iowa by county. In the 2012 and earlier reports, outbreaks were reported by region rather than county. Between 2014 and 2016, Linn County had outbreak investigations conducted only for norovirus, bacillus, and cryptosporidium.[1415]

Table 14: Common Reportable Diseases for Linn County 2006–2016

Communicable Disease/ Infectious Condition	2006	2008	2010	2012	2014	2016
Campylobacteriosis	15	35	47	45	53	62
Chlamydia		687	862	986	1062	
Cryptosporidiosis	1	14	49	16	24	37
E. coli (STEC)	5	2	7	10	11	22
Giardia	22	9	28	24	14	13
Gonorrhea		284	235	230	108	
Hepatitis A	0	9	0	0	0	4
Hepatitis B, chronic	1	12	13	17	18	28
Legionellosis	1	0	0	1	1	2
Lyme disease	10	5	8	13	19	42

Table 14: Common Reportable Diseases for Linn County 2006–2016, continued

Communicable Disease/ Infectious Condition	2006	2008	2010	2012	2014	2016
Mumps	102	1	0	1	1	22
Pertussis	11	12	83	288	7	1
Salmonellosis	21	26	49	29	36	56
Shigellosis	2	13	2	2	4	5
Tuberculosis		2	4	4	5	

Source: Center for Acute Disease Epidemiology, Iowa Department of Public Health, even-year annual reports of notifiable diseases

In the recent annual reports of notifiable diseases, the surveillance of influenza has its own dedicated chapter. According to the 2016 annual report, the 2016–2017 flu season was worse in nearly every measure compared to the 2015–2016 season.[16] 135 influenza-related deaths occurred during that season, and Iowa reported "widespread" statewide influenza activity to the CDC, which is the highest level of activity, for 12 consecutive weeks. While the rate of infections from influenza increases and decreases annually in a fairly predictable manner, many people will have some immunity from previous exposures and vaccinations, and receiving an annual inoculation can help prevent the spread of and hospitalizations due to influenza. In contrast, pandemic flu occurs when a new strain of the influenza causes a global outbreak. People have little to no immunity to these viruses because there is not past exposure to them or similar viruses. They can also occur any time of year, i.e. they are not seasonal.[17] According the *2013 Iowa Hazard Mitigation Plan*, there have been four influenza pandemics in Iowa since 1900. The pandemics occurred approximately 30 years apart. The most recent, the H1N1 outbreak in 2009–2010, killed fewer people in Iowa than the 2016–2017 seasonal flu, 41 compared to 135.[18]

Probability

Historically, pandemics occur approximately every 30 years in Iowa. Influenza occurs every year in nearly every country in the world. The virus spreads through a population for a few months and will disappear or move to another country due to travel. Influenza usually occurs in the fall and winter months in the United States, but this type of human disease event is typically manageable at the local level. Overall, the probability of a major human disease event occurring in Linn County is unlikely but there is a possibility of occurrence.

Magnitude and Severity

If a human disease event were to occur, the area of effect, severity of symptoms, or loss of human life would be determined by the communicability and virulence of the disease. A neighborhood, entire city or county, and beyond could be impacted. As such, public health agencies work to reduce the spread of diseases in Iowa. Agencies use community-based prevention, monitor current infectious disease trends, and provide early detection and treatment for infected persons.

Because society is extremely mobile, diseases can move rapidly across the state and nation within months, weeks, and even days. Many diseases on the national notification list result in

serious illness and even death. Some diseases are treatable, but for others, only the symptoms are treatable.

Typically the people who are especially vulnerable during a human disease event are the elderly, young, people with chronic medical conditions, and people who engage in high risk behaviors. People who travel internationally and have high exposure to potential vectors of disease are the most susceptible. According the *2013 Iowa Hazard Mitigation Plan*, more than 20% of Iowa's population is considered high risk. With such a high percentage of the population at risk, the magnitude and severity of a human disease event can reach a critical level.

Warning Time

Being the first to diagnose diseases, a healthcare provider is the first line of defense in a human disease event. Linn County Public Health, the Iowa Department of Public Health, and the U.S. Centers for Disease Control monitor reports submitted by healthcare providers, hospitals, and labs to identify patterns. Monitoring agencies are proactive in providing information to the health care community on medical concerns.

The public is reminded to prepare for typical human disease events like influenza before the common time of year this virus spreads throughout Iowa and the United States. For other human disease events, the public is informed of initial outbreaks, which are confirmed cases of a disease, so for most human disease events there is minimal to no warning.

When there is a potential for a human disease event such as contamination of water supplies from infrastructure failure, flooding, or other hazards, there is also minimal to no warning for the public. The Iowa Department of Natural Resources and local governments issue warning as soon as possible, but the contamination is already present in water supplies.

Duration

Response to highly infectious diseases occurs continuously, but the direct effects of a human disease event such as pandemic influenza can occur for months at a time. A major example is the H1N1 influenza in August of 2009.

Landslide

Definition of Hazard

A landslide occurs when rock, earth, or debris moves down a slope under the force of gravity and water. Landslides may be small or large and can move at slow or very high speed. In addition to geological conditions, landslides can occur because of rainstorms, fires, earthquakes, and development that modifies slope and drainage.

Potential Hazard Area

The potential hazard area for landslides in Linn County is primarily limited to areas of the county with steep slopes. It should be noted that steep slopes are an estimate of the potential hazard area, because a landslide could occur in other areas of Linn County. Refer to the risk assessment maps, Map 12 through Map 15.

Historical Occurrences

There are no documented landslide events in Linn County.

Probability

Landslides typically do not occur in Linn County because the required soil and topographic conditions are not present. For this risk assessment, steep slopes are considered a potential risk for landslide type events. Overall, the probability of a landslide occurring in Linn County is unlikely but possible.

Magnitude and Severity

People occupying structures overlooking steep slopes or located at the bottom of a steep slope are vulnerable. These types of structures are a small percentage of homes and commercially occupied structures in Iowa. Injuries and deaths are unlikely unless a landslide occurred suddenly leaving no time to evacuate. Historic landslide events in Iowa have affected just the immediate surrounding area with no widespread impacts.

Warning Time

Landslides are often involved in or triggered by other natural hazards. Landslides and flooding are often related because precipitation, runoff, and ground saturation combine to destabilize soil and rock. For this reason, landslides can be detected if high potential landslide areas are monitored.

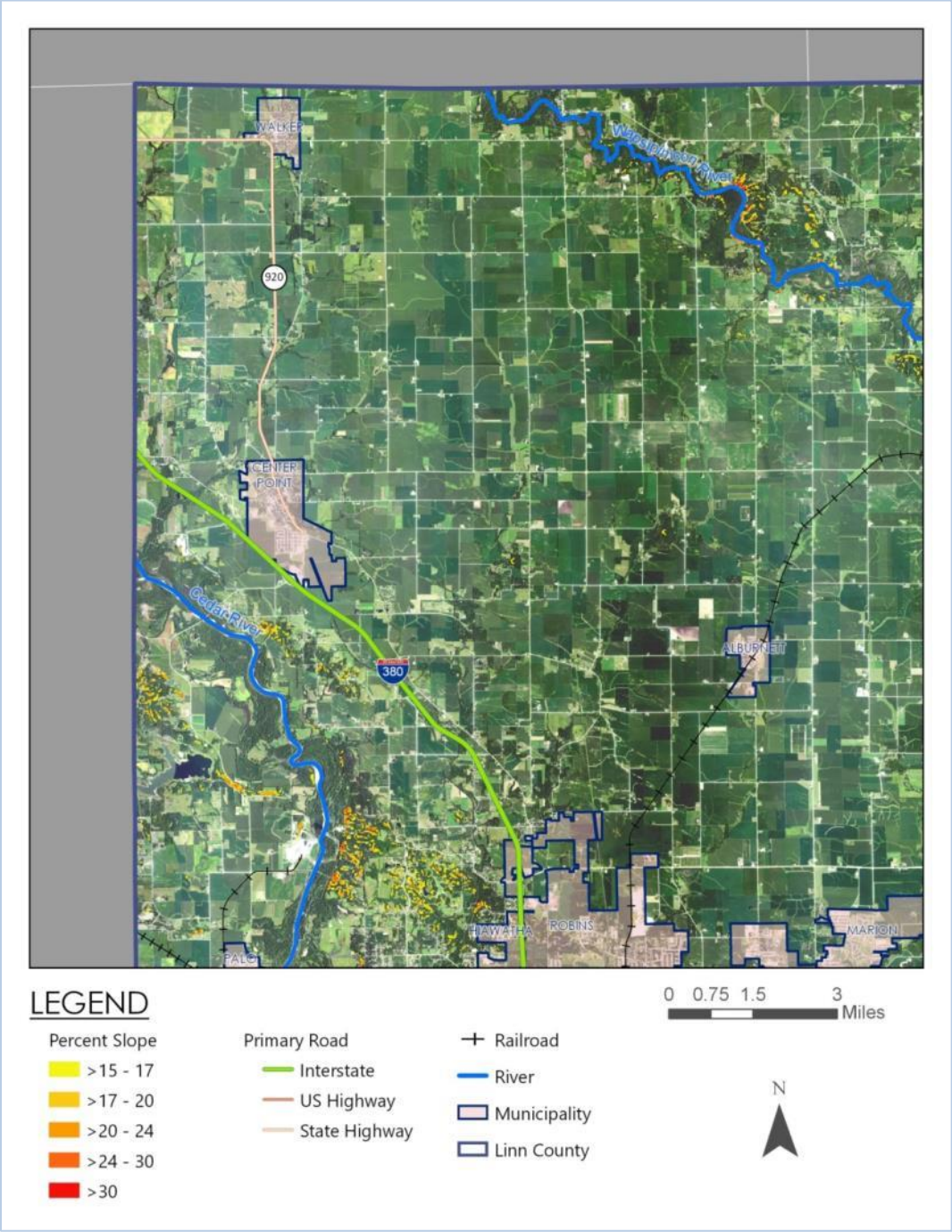
Duration

Response to a landslide is usually limited to the site where the landslide occurred unless a transportation route is involved. Traffic must be redirected and facilities must be restored, which can prolong the amount of time the landslide affects a community. For the fairly minor landslides that can occur in Iowa, the duration is most likely short term.

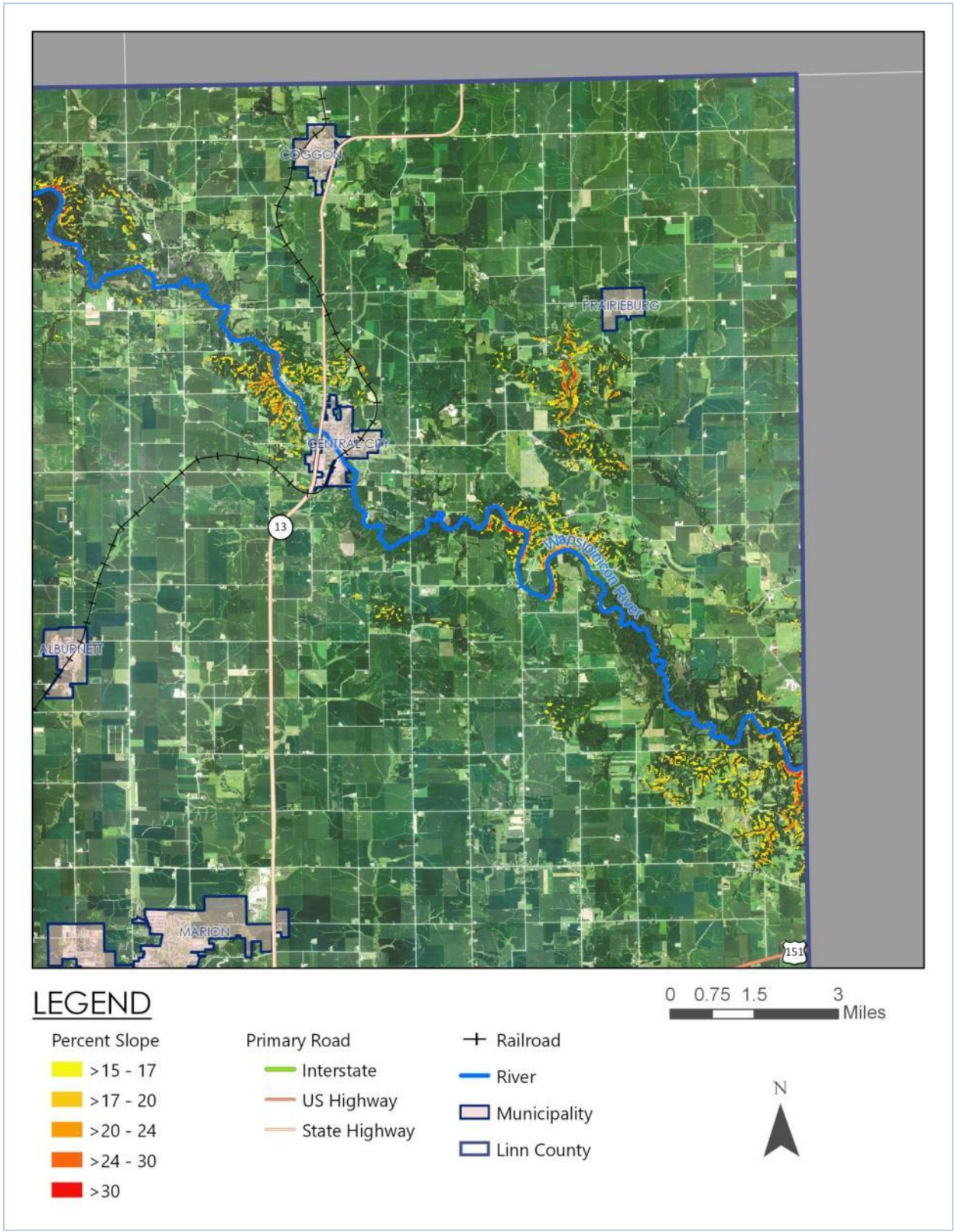
Risk Assessment Maps

Steep slopes are used as an indicator of potential landslide risk. The risk assessment maps for landslides show the areas in Linn County with 14% or greater slope. It should be noted, the Linn County Code of Ordinances designate slopes of 15% or greater as steep slopes. The maps are based on the most recent information available from the Iowa Department of Natural Resources.

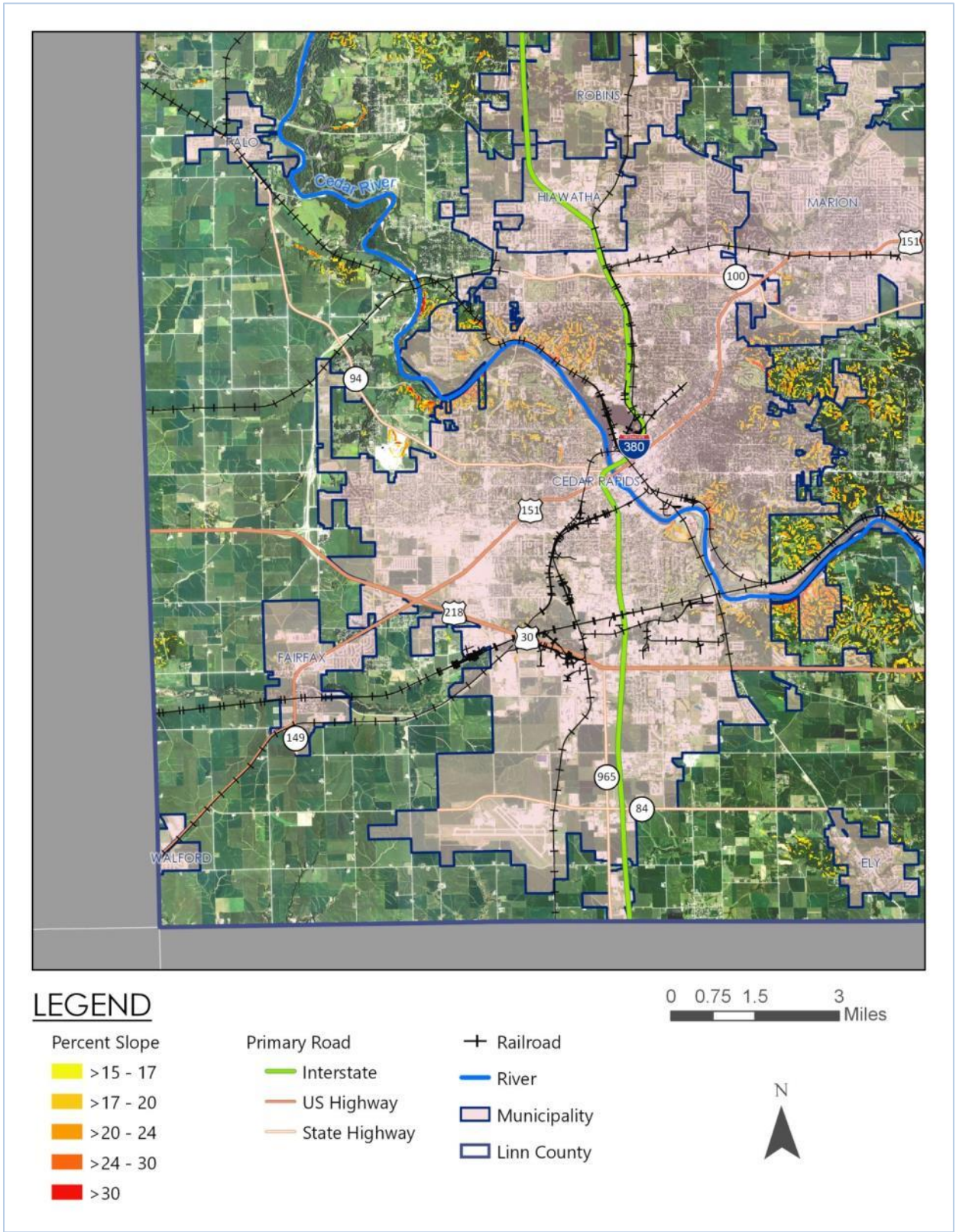
Map 12: Linn County Section 1 Steep Slopes



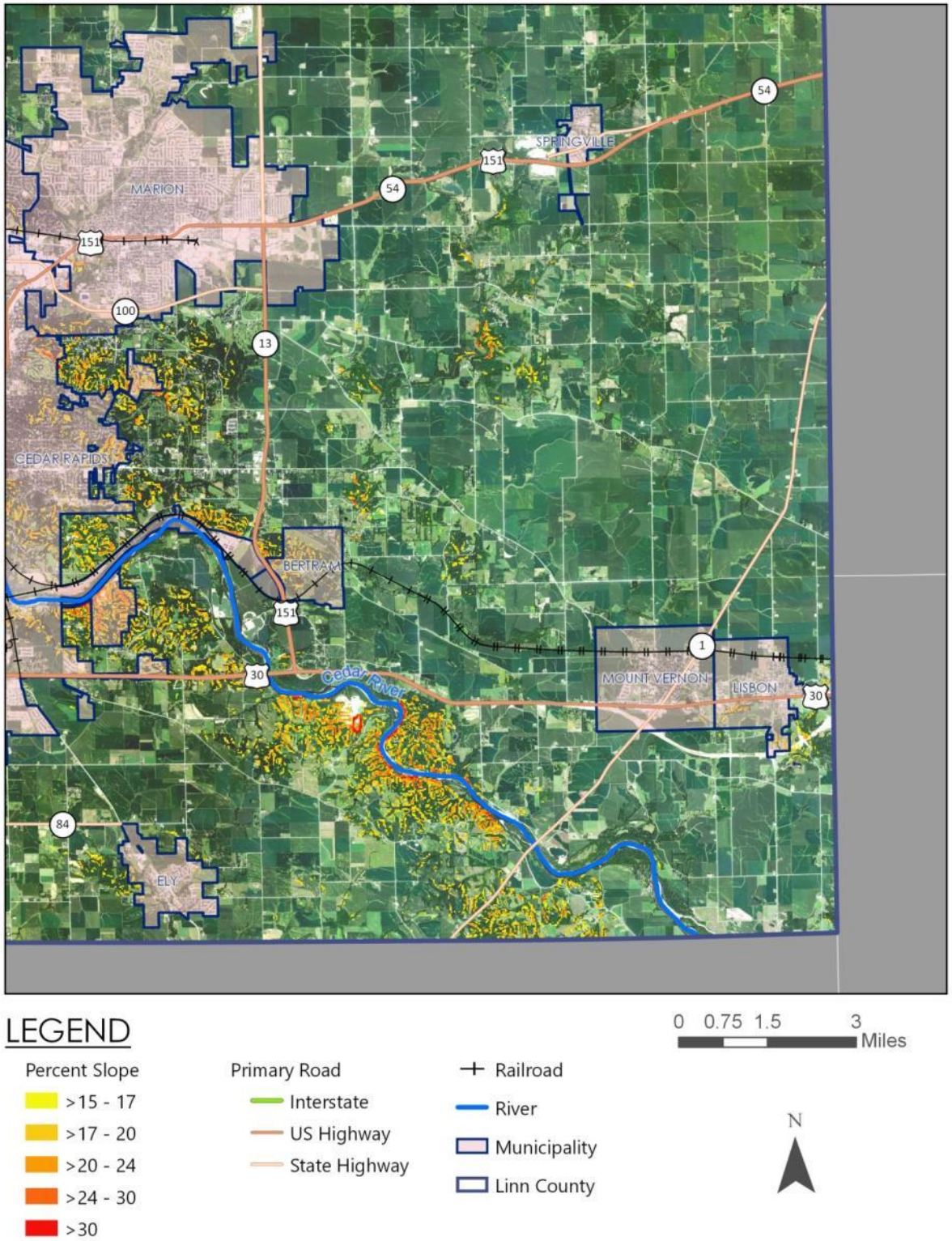
Map 13: Linn County Section 2 Steep Slopes



Map 14: Linn County Section 3 Steep Slopes



Map 15: Linn County Section 4 Steep Slopes



Severe Winter Storm

Definition of Hazard

Severe winter storm conditions that affect daily activities can include blizzard conditions, heavy snow, blowing snow, freezing rain, heavy sleet, and extreme cold.

Blizzard conditions are defined as winter storms lasting at least three hours with sustained winds of 35 mph or more, reduced visibility of ¼ mile or less, and whiteout conditions.

Potential Hazard Area

The potential hazard area for a severe winter storm in Linn County is countywide.

Historical Occurrences

Since 1996, there have been 55 recorded winter storm events in Linn County. In most years, there were one or more winter storm events. The only years without a major winter storm event were 2004–2006, 2011, and 2016, although a blizzard event and a heavy snow event occurred in Linn County during 2005. For all the winter storm events, there were no deaths, injuries, or damage reported. Refer to Table 15.

Table 15: Linn County Winter Storm Events 1996–2016

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
LINN (ZONE)	01/26/1996	0	0	0.00K	0.00K
	11/14/1996	0	0	0.00K	0.00K
	12/25/1996	0	0	0.00K	0.00K
	12/27/1996	0	0	0.00K	0.00K
	01/09/1997	0	0	0.00K	0.00K
	01/15/1997	0	0	0.00K	0.00K
	01/24/1997	0	0	0.00K	0.00K
	02/03/1997	0	0	0.00K	0.00K
	11/14/1997	0	0	0.00K	0.00K
	01/20/1998	0	0	0.00K	0.00K
	02/28/1998	0	0	0.00K	0.00K
	12/06/1998	0	0	0.00K	0.00K
	12/06/1998	0	0	0.00K	0.00K
	12/30/1998	0	0	0.00K	0.00K
	01/01/1999	0	0	0.00K	0.00K
	01/18/1999	0	0	0.00K	0.00K
	03/05/1999	0	0	0.00K	0.00K
	03/08/1999	0	0	0.00K	0.00K

Table 15: Linn County Winter Storm Events 1996–2016, continued

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
LINN (ZONE)	12/16/1999	0	0	0.00K	0.00K
	12/19/1999	0	0	0.00K	0.00K
	12/23/1999	0	0	0.00K	0.00K
	01/03/2000	0	0	0.00K	0.00K
	01/17/2000	0	0	0.00K	0.00K
	01/19/2000	0	0	0.00K	0.00K
	01/29/2000	0	0	0.00K	0.00K
	02/13/2000	0	0	0.00K	0.00K
	02/17/2000	0	0	0.00K	0.00K
	12/10/2000	0	0	0.00K	0.00K
	02/08/2001	0	0	0.00K	0.00K
	02/23/2001	0	0	0.00K	0.00K
	03/15/2001	0	0	0.00K	0.00K
	03/01/2002	0	0	0.00K	0.00K
	01/28/2003	0	0	0.00K	0.00K
	02/14/2003	0	0	0.00K	0.00K
	03/04/2003	0	0	0.00K	0.00K
	12/01/2007	0	0	0.00K	0.00K
	12/22/2007	0	0	0.00K	0.00K
	02/05/2008	0	0	0.00K	0.00K
	02/16/2008	0	0	0.00K	0.00K
	03/28/2009	0	0	0.00K	0.00K
	12/08/2009	0	0	0.00K	0.00K
	01/06/2010	0	0	0.00K	0.00K
	12/23/2010	0	0	0.00K	0.00K
	01/11/2012	0	0	0.00K	0.00K
	01/30/2013	0	0	0.00K	0.00K
	02/21/2013	0	0	0.00K	0.00K
	02/26/2013	0	0	0.00K	0.00K
	03/04/2013	0	0	0.00K	0.00K
	12/21/2013	0	0	0.00K	0.00K
	02/17/2014	0	0	0.00K	0.00K
	01/05/2015	0	0	0.00K	0.00K
	02/01/2015	0	0	0.00K	0.00K
	02/25/2015	0	0	0.00K	0.00K
	11/20/2015	0	0	0.00K	0.00K
	12/28/2015	0	0	0.00K	0.00K
Count/Total	55	0	0	0.00K	0.00K

Source: National Centers for Environmental Information, November 2017

In addition to winter storms, there have been seven blizzard events recorded in Linn County since 1996. There were no deaths or injuries reported, but a small amount of damage was reported in January 2005. The blizzard event in 2005 occurred in year with no other major winter storms. Refer to Table 16.

Table 16: Linn County Blizzard Events 1996–2016

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
LINN (ZONE)	01/26/1996	0	0	0.00K	0.00K
	03/09/2002	0	0	0.00K	0.00K
	01/22/2005	0	0	5.00K	0.00K
	12/20/2008	0	0	0.00K	0.00K
	12/09/2009	0	0	0.00K	0.00K
	02/01/2011	0	0	0.00K	0.00K
	12/19/2012	0	0	0.00K	0.00K
Count/Total	7	0	0	5.00K	0.00K

Source: National Centers for Environmental Information, November 2017

Another type of severe winter weather is heavy snow events, and since 1996, there have been eighteen such events in Linn County. There were no directly attributable deaths or injuries reported. Two of the events had a total of $25,000 in damage reported, which is relatively low. Refer to Table 17.

Table 17: Linn County Heavy Snow Events 1996–2016

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
LINN (ZONE)	01/18/1996	0	0	0.00K	0.00K
	10/26/1997	0	0	0.00K	0.00K
	12/24/1997	0	0	0.00K	0.00K
	03/08/1998	0	0	0.00K	0.00K
	04/07/2000	0	0	0.00K	0.00K
	12/01/2000	0	0	0.00K	0.00K
	12/01/2000	0	0	0.00K	0.00K
	12/18/2000	0	0	0.00K	0.00K
	12/20/2000	0	0	0.00K	0.00K
	12/23/2000	0	0	0.00K	0.00K
	12/28/2000	0	0	0.00K	0.00K
	01/01/2001	0	0	0.00K	0.00K
	01/26/2001	0	0	0.00K	0.00K
	02/05/2004	0	0	5.00K	0.00K
	01/05/2005	0	0	20.00K	0.00K
	12/18/2008	0	0	0.00K	0.00K
	01/09/2009	0	0	0.00K	0.00K
	01/13/2009	0	0	0.00K	0.00K
Count/Total	17	0	0	25.00K	0.00K

Source: National Centers for Environmental Information, November 2017

In Iowa, ice storm events typically cause the human loss and property damage associated with severe winter weather, if any. Since 1996, there were seven ice storm events in Linn County. Refer to Table 18. In December 2007, one death occurred due to an icy branch from a tree falling and hitting a man's head in Cedar Rapids. In terms of reported property damage, the most severe ice storm event was in February 2007 with nearly $1 million in property damage. In some areas, there was up to seven inches of accumulated ice. This storm occurred over a

widespread area in combination with blizzard conditions. Thousands of people lost power and travel was dangerous for several days.

Table 18: Linn County Ice Storm Events 1996–2016

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
LINN (ZONE)	12/15/2000	0	0	0.00K	0.00K
	01/28/2001	0	0	0.00K	0.00K
	02/07/2001	0	0	0.00K	0.00K
	02/24/2007	0	0	989.00K	0.00K
	12/11/2007	1	0	0.00K	0.00K
	12/08/2008	0	0	0.00K	0.00K
	12/23/2009	0	0	0.00K	0.00K
Count/Total	7	1	0	989.00K	0.00K

Source: National Centers for Environmental Information, November 2017

Considering the severe winter storm hazard, extreme cold and wind chill is included the definition because it a dangerous component of Iowa's winter season. There have been eight extreme cold or wind chill events reported in Linn County since 2000. There were no extreme cold or wind chill events recorded for Linn County from 1996–1999. Refer to

Table 19: Linn County Extreme Cold/Wind Chill Events 1996–2016

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
LINN (ZONE)	12/16/2000	0	0	0.00K	0.00K
	12/21/2000	0	0	0.00K	0.00K
	12/23/2000	0	0	0.00K	0.00K
	02/02/2007	0	0	0.00K	0.00K
	01/24/2008	0	0	0.00K	0.00K
	01/29/2008	0	0	0.00K	0.00K
	02/10/2008	0	0	0.00K	0.00K
	01/14/2009	0	0	0.00K	0.00K
	01/05/2014	0	0	0.00K	0.00K
	01/22/2014	0	0	0.00K	0.00K
Count/Total	10	0	0	0.00K	0.00K

Source: National Centers for Environmental Information, November 2017

Often, extreme cold occurs several times during a severe winter like the three events recorded in both 2000 and 2008. In several years, there were no extreme cold or wind chill events recorded in Linn County, indicating a milder winter.

Probability

According to the *2010 Iowa Hazard Mitigation Plan*, most counties will likely experience two or three winter storms during winter months with a severe winter storm occurring every 3 to 5 years. A snowfall of six inches or more from one storm occurs in approximately half of Iowa winters, while a large winter storm event of 10 inches or more occurs once every 3 years.

Historical occurrences indicate that several winter storm events can occur annually in Linn County. When considering probability, though, the local planning committees considered the probability of the severe winter storm events that could cause injury, death, or shutdown of facilities. In Linn County, winter storm events occur frequently but most jurisdictions have procedures to reduce the risk of injury, death, or damage from these events. Based on local knowledge, a severe winter storm is likely with a probability of 20% to 30% in any given year. The frequency of severe winter storm events depends on the overall severity of a particular winter season. As historical data indicates, Linn County can be affected by several severe winter storm events in one year, but there can also be a year with few or no severe winter storm events.

Magnitude and Severity

Winter storms usually impact several counties during a single event. Due to size and environmental changes as a storm travels across a region, there will be local variation in storm intensity and quantity of precipitation. The presence of snow or ice, high winds, and low temperatures can make a significant difference in how a severe winter storm event will impact a community.

According to the *2010 Iowa Hazard Mitigation Plan*, the leading cause of death during winter storm events is transportation accidents. About 70% of winter-related deaths occur in automobiles, and about 25% are due to people caught in a severe storm. Emergency services such as police, fire, and ambulance are sometimes unable to respond due to poor road conditions.

During a winter storm event, people, pets, and livestock are susceptible to frostbite and hypothermia. The people primarily at risk are engaged in outdoor activity such as shoveling snow, digging out vehicles, or assisting stranded motorists. The elderly or very young are also vulnerable during a winter storm event. Businesses and schools often close during extreme cold or heavy snow conditions to protect the safety of patrons, workers, students, and bus drivers.

Heavy snows, blizzards, and ice storms can immobilize transportation systems, damage trees and power lines, and collapse buildings and communications towers. The potential for drifting snow is substantially higher in open country than in urban areas where buildings, trees, and other features obstruct the wind. Severe ice storms have caused total electric power outages over large areas of Iowa and rendered assistance unavailable to those in need due to impassable roads.

Regarding the transportation system, the Iowa Department of Transportation, county road departments, and local governments are responsible for snow removal of snow and treatment of snow streets and highways. Severe winter storm conditions can slow or stop the flow of vital supplies and disrupt emergency services. In addition, the emergency needs of remote or isolated residents for food or fuel, as well as for feed, water and shelter for livestock may be difficult to fulfill.

In Linn County, a severe winter storm can reach a critical level primarily due to the potential risk of human injury and death. It is possible a shutdown of services and facilities could last more

than one week if the storm causes major power outages. This severity estimate is based on historical occurrences, the *2010 Iowa Hazard Mitigation Plan*, and local knowledge.

Warning Time

The National Weather Service has developed effective weather notifications that are promptly and widely distributed to the public. Notifications made by the National Weather Service include winter storm watch, winter storm warning, blizzard warning, winter weather advisory, and freeze advisory.

Radio, television, weather alert radios, and even smart phone applications provide current weather information. For winter storm events accurate information is available up to a few days in advance.

Duration

Although a severe winter storm typically occurs over several hours, the event can have lasting impacts on a community beyond a week. Dangerous road conditions and/or electrical power outage can affect a community, especially rural areas, for an extended period of time. It is also possible that a severe winter storm event can last several days due to multiple storms events occurring in short period of time.

Sinkholes

Definition of Hazard

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 localized collapse. The primary cause of most subsidence are human activities such as underground mining, groundwater or petroleum withdraw, and drainage of organic soils. Sinkholes are also caused by erosion of limestone in subsurface areas.

Potential Hazard Areas

The potential hazard area for sinkholes is relatively limited in Linn County. There are multiple documented sinkholes in the county, and there are areas with potential karst topography that can develop sinkholes. Refer to the risk assessment maps, Map 16 through Map 19. This potential hazard area is an estimate, because sinkholes could potentially occur anywhere in Linn County.

Historical Occurrences

Currently, there are multiple sinkholes documented in the Robins and Hiawatha area, and there are five other sinkholes documented in unincorporated areas of the county. These historical occurrences are based on a geographic information system database from the Iowa Department of Natural Resources (IDNR).

Probability

Currently, there are multiple sinkholes documented throughout Linn County. Potential karst topography indicates the potential for sinkholes to develop, because karst topography is characterized by the dissolution of layers of soluble bedrock. Areas of Linn County have potential karst topography, so there is a potential but unlikely probability of sinkholes to develop. The probability of sinkholes occurring in Linn County is estimated as occasional, which is between 10% and 19% in any given year.

Magnitude and Severity

Sinkholes can aggravate flooding potential, and collapses due to the sudden formation of sinkholes or the collapse of an abandoned mine may destroy buildings, roads and utilities. Damage consists primarily of direct structural damage, property loss, and depreciation of land values. Generally, land subsidence poses a greater risk to property than to life. Damage to property, facilities, and infrastructure would only occur if the event undermined foundations.

In Linn County, areas that could potentially be affected by sinkholes are likely limited to areas with documented sinkholes and potential karst topography. Overall, the documented sinkholes have not caused major problems. Any sinkholes or potential for sinkholes are typically mitigated

in the design and/or construction process for infrastructure and structures. There are no coal mines documented by the Iowa Department of Natural Resources.

Warning Time

Regional lowering occurs gradually over time, while the collapse of infrastructure such as streets can occur suddenly. It is possible for a sinkhole to form over time but not be detected until sudden or major collapse, so warning time can be quite minimal.

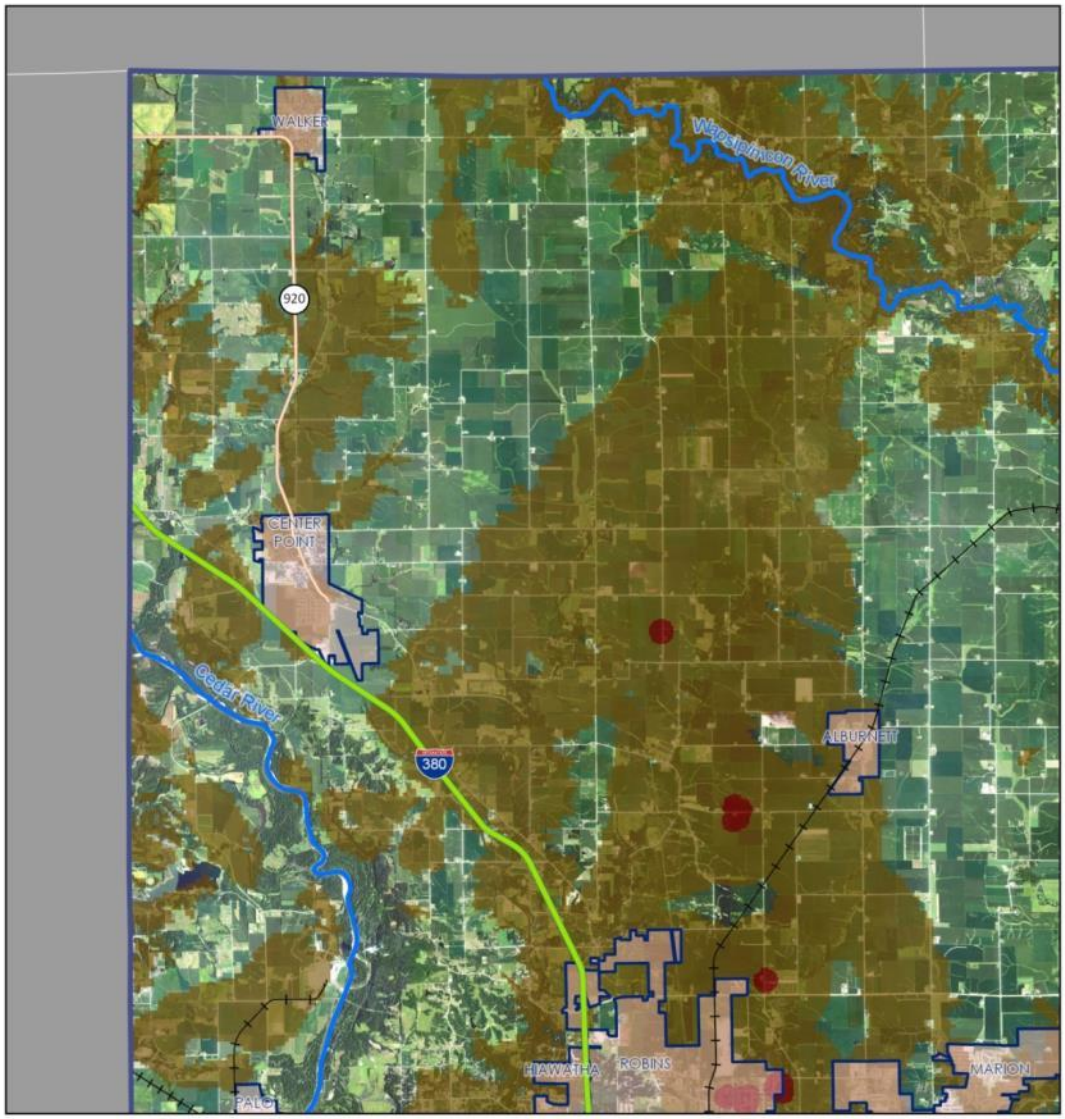
Duration

The response tied to sinkholes is related to securing the immediate threat to life and property including immediate reroute of traffic from the affected infrastructure and search and rescue in the case of structural collapse.

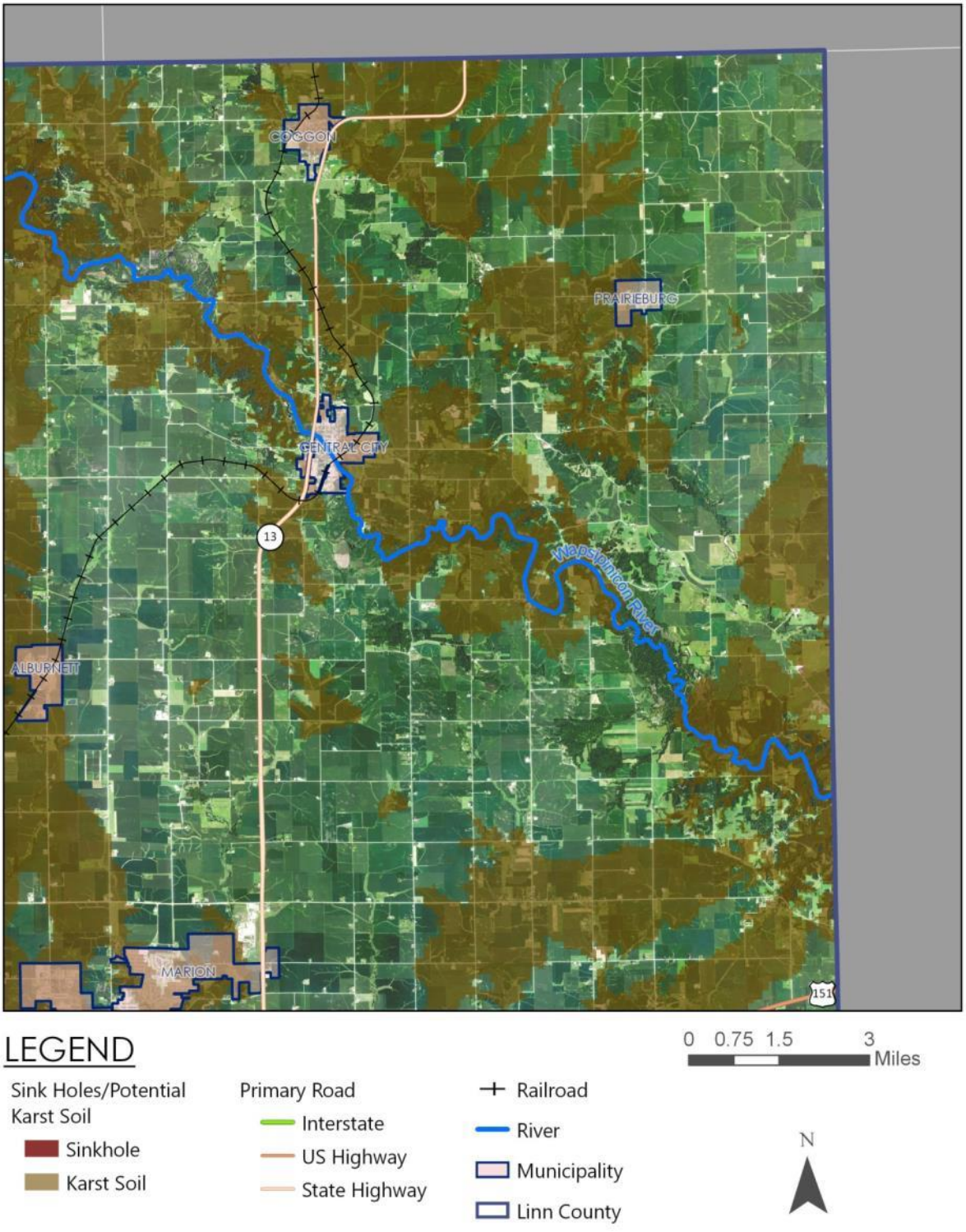
Risk Assessment Maps

Documented sinkholes and potential karst soils are used as an indicator of potential sinkholes risk. The risk assessment maps for landslide show the areas in Linn County with potential karst soils. The maps are based on the most recent information available from the IDNR.

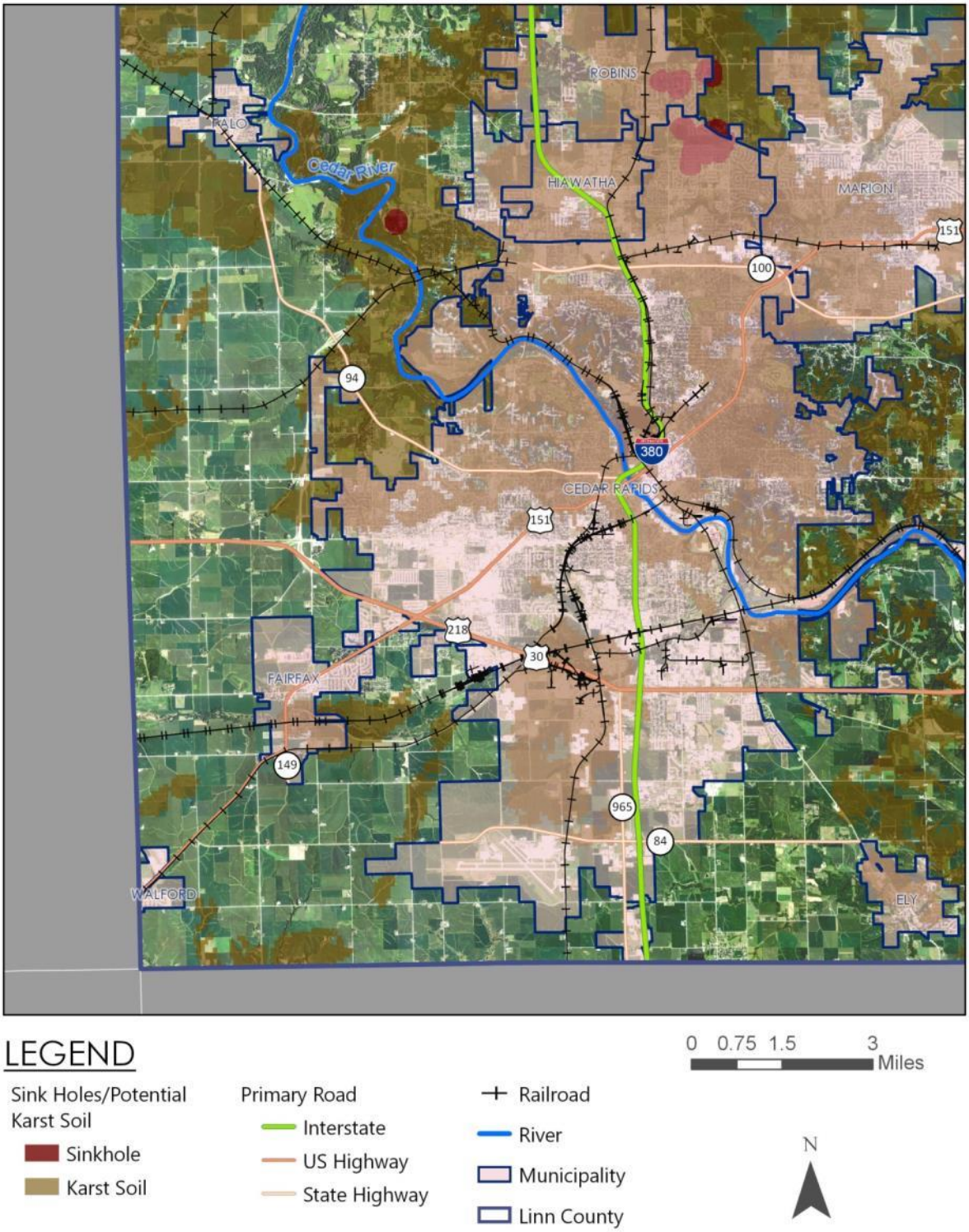
Map 16: Linn County Section 1 Potential Karst Soil



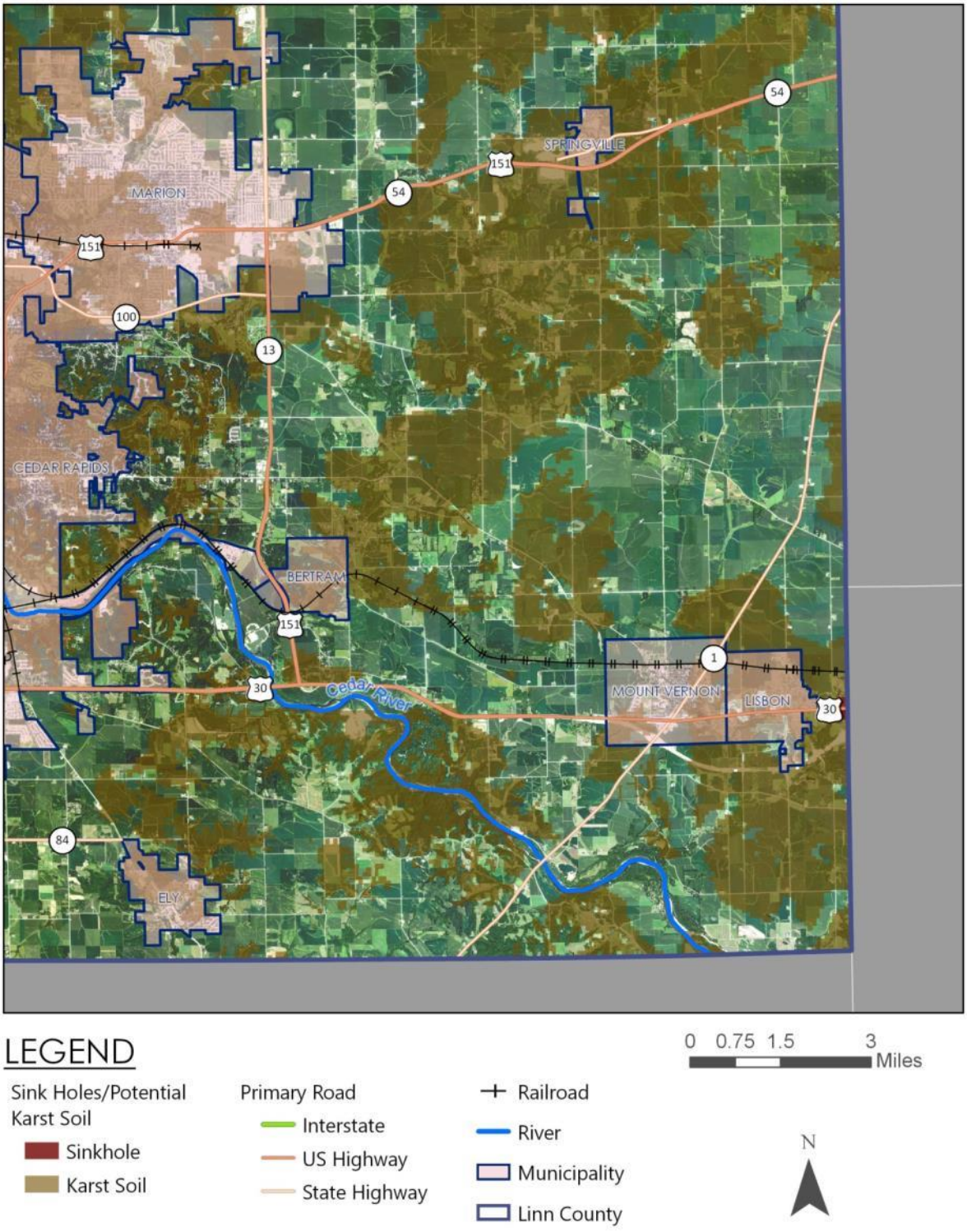
Map 17: Linn County Section 2 Potential Karst Soil



Map 18: Linn County Section 3 Potential Karst Soil



Map 19: Linn County Section 4 Potential Karst Soil



Thunderstorm, Lightning, and Hail

Definition of Hazard

A thunderstorm can occur singly, in clusters, or in lines resulting in heavy rains, winds reaching or exceeding 58 mph, producing a tornado, or hail. Most thunderstorms produce only thunder, lightning, and rain.

Severe storms, however, can produce tornadoes, straight-line winds, microbursts above 58 mph, lightning, hailstorms, and flooding. The National Weather Service considers a thunderstorm severe if it produces hail at least 1 inch in diameter, winds 58 mph or higher, or tornadoes.

Straight-line winds can often exceed 60 mph, are common occurrences, and are often mistaken for tornadoes. A number of thunderstorms have caused other hazards such as flash flooding, river flooding, and tornadoes.

Lightning is an electrical discharge that results from the buildup of positive and negative charges within a thunderstorm. The temperature of lightning can reach 50,000 degrees Fahrenheit in a split second. The rapid heating, expansion, and then cooling of air near lightning creates thunder.

A hailstorm is an outgrowth of a severe thunderstorm in which pellets or irregularly shaped lumps of ice, otherwise known as hail, fall with rain. Hail can be smaller than a pea or as large as a softball.

Potential Hazard Area

The potential hazard area for thunderstorm, lightning, and hail in Linn County is countywide.

Historical Occurrences

Since 1996, there have been 306 thunderstorm events recorded in Linn County. Thunderstorms are the most frequently occurring natural hazard in Linn County. There are several thunderstorms every year, and multiple storms often develop in the same area within just a few days. From the recorded thunderstorm events, there has been one death, ten injuries, and over $8 million in reported property and crop damage. The majority of property damage occurred over several thunderstorm events in Cedar Rapids in 2003. Because Cedar Rapids is the most densely developed area in county, it often sustains higher amounts of damage. Overall, every community in the county has experienced a thunderstorm event that resulted in property or crop damage. Refer to Table 20.

Table 20: Linn County Thunderstorm Wind Events 1996–2016

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
CEDAR RAPIDS	08/19/1996	0	0	0.00K	0.00K
CEDAR RAPIDS ARPT	08/19/1996	0	0	0.00K	0.00K
MARION	08/19/1996	0	0	0.00K	0.00K
CENTRAL CITY	08/19/1996	0	0	0.00K	0.00K
MT VERNON	05/18/1997	0	0	20.00K	0.00K
FAIRFAX	05/18/1997	0	0	0.00K	0.00K
CENTER PT	06/21/1997	0	0	0.00K	0.00K
CENTRAL CITY	06/21/1997	0	0	0.00K	0.00K
TROY MILLS	06/21/1997	0	0	0.00K	0.00K
PRAIRIEBURG	06/21/1997	0	0	0.00K	0.00K
ALBURNETT	09/16/1997	0	0	0.00K	0.00K
CEDAR RAPIDS	09/16/1997	0	0	0.00K	0.00K
SPRINGVILLE	09/16/1997	0	0	0.00K	0.00K
CEDAR RAPIDS	06/12/1998	0	0	1.00K	0.00K
CEDAR RAPIDS	06/18/1998	0	1	0.00K	0.00K
MT VERNON	06/18/1998	0	0	5.00K	0.00K
FAIRFAX	06/18/1998	0	0	0.00K	0.00K
CEDAR RAPIDS ARPT	06/29/1998	0	0	0.00K	0.00K
CEDAR RAPIDS ARPT	06/29/1998	0	0	0.00K	0.00K
CEDAR RAPIDS	06/29/1998	0	0	0.00K	0.00K
CEDAR RAPIDS	05/16/1999	0	2	500.00K	0.00K
WALKER	05/16/1999	0	0	20.00K	0.00K
CEDAR RAPIDS	06/10/1999	0	0	0.00K	0.00K
MT VERNON	07/02/1999	0	0	8.00K	0.00K
PALO	07/02/1999	0	0	0.00K	0.00K
CEDAR RAPIDS	05/08/2000	0	0	0.00K	0.00K
CEDAR RAPIDS	05/08/2000	0	0	2.00K	0.00K
CEDAR RAPIDS	05/08/2000	0	0	1.00K	0.00K
(CID)CEDAR RAPIDS AR	06/01/2000	0	0	0.00K	0.00K
MT VERNON	06/01/2000	0	0	2.00K	0.00K
CEDAR RAPIDS	07/09/2000	0	0	0.25K	0.00K
HIAWATHA	08/06/2000	0	0	2.00K	0.00K
CENTER PT	11/01/2000	0	0	0.00K	0.00K
PALO	05/10/2001	0	0	50.00K	0.00K
TODDVILLE	05/10/2001	0	0	2.00K	0.00K
CEDAR RAPIDS	06/14/2001	0	0	0.00K	0.00K
CEDAR RAPIDS	06/14/2001	0	0	0.00K	0.00K
PALO	07/08/2001	0	0	0.00K	0.00K
CEDAR RAPIDS	07/08/2001	0	0	0.00K	0.00K
CEDAR RAPIDS	07/08/2001	0	0	0.00K	0.00K
CEDAR RAPIDS	07/08/2001	0	0	0.00K	0.00K
HIAWATHA	07/08/2001	0	0	0.00K	0.00K
MT VERNON	07/08/2001	0	0	0.00K	0.00K
SPRINGVILLE	07/08/2001	0	0	0.00K	0.00K
CENTRAL CITY	07/21/2001	0	0	0.00K	0.00K
SPRINGVILLE	07/21/2001	0	0	0.00K	0.00K
CEDAR RAPIDS	03/09/2002	0	0	0.00K	0.00K
WALKER	04/18/2002	0	0	0.00K	0.00K
ELY	07/18/2002	0	0	0.00K	0.00K
MT VERNON	07/18/2002	0	0	0.00K	0.00K
MARION	07/28/2002	0	0	0.00K	0.00K
ELY	07/28/2002	0	0	0.00K	0.00K

Table 20: Linn County Thunderstorm Wind Events 1996–2016, continued

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
CEDAR RAPIDS	07/28/2002	0	0	0.00K	0.00K
CEDAR RAPIDS	07/29/2002	0	0	0.00K	0.00K
MT VERNON	08/12/2002	0	0	0.00K	0.00K
CEDAR RAPIDS	04/30/2003	0	0	0.00K	0.00K
CEDAR RAPIDS	05/04/2003	0	0	1.000M	0.00K
CEDAR RAPIDS	07/05/2003	0	0	100.00K	0.00K
PALO	07/20/2003	0	0	250.00K	30.00K
CENTER PT	07/20/2003	0	0	250.00K	30.00K
CEDAR RAPIDS	07/20/2003	0	0	5.000M	0.00K
CENTER PT	08/20/2003	0	0	3.00K	0.00K
LAFAYETTE	08/20/2003	0	0	3.00K	0.00K
CEDAR RAPIDS	08/25/2003	0	0	150.00K	0.00K
FAIRFAX	05/17/2004	0	0	15.00K	10.00K
CEDAR RAPIDS	05/21/2004	0	0	10.00K	5.00K
CEDAR RAPIDS	05/23/2004	0	0	5.00K	0.00K
CEDAR RAPIDS	05/23/2004	0	0	8.00K	0.00K
CEDAR RAPIDS	05/23/2004	0	0	12.00K	0.00K
CENTER PT	08/03/2004	0	0	15.00K	7.00K
PALO	08/26/2004	0	0	3.00K	0.00K
HIAWATHA	08/26/2004	0	1	20.00K	0.00K
FAIRFAX	08/26/2004	0	0	10.00K	0.00K
MARION ARPT	08/26/2004	0	0	20.00K	10.00K
FAIRFAX	05/11/2005	0	0	2.00K	0.00K
CEDAR RAPIDS	05/12/2005	0	0	0.50K	0.00K
CEDAR RAPIDS	06/04/2005	0	0	0.00K	0.00K
MT VERNON	06/04/2005	0	0	0.00K	0.00K
CEDAR RAPIDS	06/08/2005	0	0	0.00K	0.00K
FAIRFAX	06/25/2005	0	0	8.00K	0.00K
WAUBEEK	06/29/2005	0	0	7.00K	12.00K
PRAIRIEBURG	06/29/2005	0	0	12.00K	4.00K
WALKER	07/21/2005	0	0	0.00K	2.00K
FAIRFAX	04/13/2006	0	0	0.50K	0.00K
CEDAR RAPIDS	06/03/2006	0	0	0.00K	0.00K
TODDVILLE	06/21/2006	0	0	4.00K	0.00K
COUNTYWIDE	07/17/2006	0	0	3.00K	20.00K
FAIRFAX	07/17/2006	0	0	0.00K	0.00K
CEDAR RAPIDS	07/17/2006	0	0	0.00K	0.00K
MARION	07/25/2006	0	0	3.00K	0.00K
CEDAR RAPIDS	07/25/2006	0	0	1.00K	0.00K
CENTER PT	08/10/2006	0	0	0.00K	0.00K
MARION	08/10/2006	0	0	0.00K	0.00K
MARION	08/10/2006	0	0	0.00K	0.00K
FAIRFAX	08/10/2006	0	0	0.00K	15.00K
SPRINGVILLE	08/10/2006	0	0	4.00K	0.00K
VIOLA	08/10/2006	0	0	4.00K	0.00K
PRAIRIEBURG	04/02/2007	0	0	0.00K	0.00K
LISBON	06/07/2007	0	0	0.00K	0.00K
CEDAR RAPIDS	06/21/2007	0	0	0.00K	0.00K
WAUBEEK	07/04/2007	0	0	10.00K	5.00K
CEDAR RAPIDS	07/09/2007	0	0	5.00K	0.00K
CEDAR RAPIDS	07/16/2007	0	0	0.00K	0.00K
CEDAR RAPIDS	07/16/2007	0	0	0.00K	0.00K

Table 20: Linn County Thunderstorm Wind Events 1996–2016, continued

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
CEDAR RAPIDS	07/16/2007	0	0	0.00K	0.00K
COVINGTON	07/16/2007	0	0	0.00K	0.00K
MARION	07/16/2007	0	0	0.00K	0.00K
MARION	07/16/2007	0	0	0.00K	0.00K
MARION	07/16/2007	0	0	0.00K	0.00K
FAIRFAX	07/17/2007	0	0	0.00K	5.00K
ALBURNETT	07/18/2007	0	0	25.00K	0.00K
CENTRAL CITY	07/18/2007	0	0	5.00K	0.00K
TROY MILLS	07/18/2007	0	0	0.00K	0.00K
WALKER	07/18/2007	0	0	0.00K	0.00K
MT VERNON	07/18/2007	0	0	0.00K	0.00K
CENTRAL CITY	07/18/2007	0	0	0.00K	0.00K
TROY MILLS	09/18/2007	0	0	0.00K	0.00K
CEDAR RAPIDS	09/21/2007	0	0	0.00K	0.00K
CEDAR RAPIDS	09/21/2007	0	0	5.00K	0.00K
CEDAR RAPIDS	09/30/2007	0	0	0.00K	0.00K
CEDAR RAPIDS	09/30/2007	0	0	15.00K	0.00K
SPRINGVILLE	10/02/2007	0	0	0.00K	0.00K
MARION	05/25/2008	0	0	0.00K	0.00K
MARION	05/25/2008	0	0	5.00K	0.00K
CEDAR RAPIDS	05/25/2008	0	0	0.00K	0.00K
CEDAR RAPIDS	05/25/2008	0	0	0.00K	0.00K
(CID)CEDAR RAPIDS AR	05/25/2008	0	0	0.00K	0.00K
MARION	05/25/2008	0	0	0.00K	0.00K
MARION	05/30/2008	0	0	0.00K	0.00K
(CID)CEDAR RAPIDS AR	06/08/2008	0	0	0.00K	0.00K
MARION	06/08/2008	0	0	15.00K	0.00K
CEDAR RAPIDS	06/08/2008	0	0	0.00K	0.00K
MARION	06/08/2008	0	0	0.00K	0.00K
ROBINS	06/08/2008	0	0	0.00K	0.00K
MARION MC BRIDE ARPT	06/08/2008	0	0	25.00K	0.00K
MARION	06/08/2008	0	0	0.00K	0.00K
CEDAR RAPIDS	06/08/2008	0	0	0.00K	0.00K
MARION	06/08/2008	0	0	0.00K	0.00K
(CID)CEDAR RAPIDS AR	06/14/2008	0	0	0.00K	0.00K
FAIRFAX	06/25/2008	0	0	0.00K	0.00K
PRAIRIEBURG	07/02/2008	0	0	0.00K	0.00K
CEDAR RAPIDS	07/07/2008	0	0	0.00K	0.00K
CEDAR RAPIDS	07/07/2008	0	0	0.00K	0.00K
MT VERNON	07/12/2008	0	0	0.00K	0.00K
MARION	07/19/2008	0	0	0.00K	0.00K
WALKER	06/19/2009	0	0	250.00K	0.00K
WALKER	06/19/2009	0	0	0.00K	0.00K
TROY MILLS	06/19/2009	0	0	25.00K	0.00K
CENTER PT	06/19/2009	0	0	0.00K	0.00K
WALKER	06/23/2009	0	0	0.00K	0.00K
CEDAR RAPIDS	06/23/2009	0	0	0.00K	0.00K
CEDAR RAPIDS	06/23/2009	0	0	0.00K	0.00K
CEDAR RAPIDS	06/23/2009	0	1	0.00K	0.00K
(CID)CEDAR RAPIDS AR	06/23/2009	0	0	0.00K	0.00K
CEDAR RAPIDS	06/23/2009	0	0	0.00K	0.00K
CEDAR RAPIDS	06/23/2009	0	0	0.00K	0.00K

Table 20: Linn County Thunderstorm Wind Events 1996–2016, continued

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
CEDAR RAPIDS	06/23/2009	0	0	0.00K	0.00K
CEDAR RAPIDS	06/23/2009	0	0	0.00K	0.00K
CEDAR RAPIDS	06/23/2009	0	0	0.00K	0.00K
CEDAR RAPIDS	06/23/2009	0	0	0.00K	0.00K
CEDAR RAPIDS	07/24/2009	0	0	0.00K	0.00K
CEDAR RAPIDS	07/24/2009	0	0	0.00K	0.00K
CEDAR RAPIDS	08/09/2009	0	0	0.00K	0.00K
CEDAR RAPIDS ARPT	08/09/2009	0	0	0.00K	0.00K
CEDAR RAPIDS ARPT	08/09/2009	0	0	0.00K	0.00K
CEDAR RAPIDS	08/09/2009	0	0	0.00K	0.00K
CEDAR RAPIDS	08/09/2009	0	0	0.00K	0.00K
ALBURNETT	04/05/2010	0	0	1.00K	0.00K
WALKER	04/05/2010	0	0	1.00K	0.00K
CEDAR RAPIDS	04/05/2010	0	0	0.00K	0.00K
CEDAR RAPIDS	04/05/2010	0	0	0.00K	0.00K
CEDAR RAPIDS	04/05/2010	0	0	1.00K	0.00K
BEVERLY	04/06/2010	0	0	1.00K	0.00K
(CID)CEDAR RAPIDS AR	06/18/2010	0	0	0.00K	0.00K
(CID)CEDAR RAPIDS AR	06/18/2010	0	0	0.00K	0.00K
MT VERNON	06/18/2010	0	0	10.00K	0.00K
CEDAR RAPIDS	06/18/2010	0	0	5.00K	0.00K
HIAWATHA	06/18/2010	0	0	0.00K	0.00K
HIAWATHA	06/18/2010	0	0	0.00K	0.00K
CEDAR RAPIDS	05/29/2011	0	0	0.00K	0.00K
COVINGTON	06/08/2011	0	0	0.00K	0.00K
HIAWATHA	06/08/2011	0	0	0.00K	0.00K
HIAWATHA	06/08/2011	0	0	0.00K	0.00K
MARION	06/08/2011	0	0	0.00K	0.00K
ROBINS	06/08/2011	0	0	0.00K	0.00K
ROBINS	06/08/2011	0	0	10.00K	0.00K
ALBURNETT	06/08/2011	0	0	0.00K	0.00K
ROBINS	06/08/2011	0	0	0.00K	0.00K
MARION	06/08/2011	0	0	150.00K	0.00K
MARION	06/08/2011	0	0	0.00K	0.00K
MARION	06/08/2011	0	0	0.00K	0.00K
CEDAR RAPIDS	07/11/2011	0	0	0.00K	0.00K
MARION	07/11/2011	0	0	0.00K	0.00K
CENTER PT	07/11/2011	0	0	0.00K	0.00K
CEDAR RAPIDS	07/11/2011	0	0	0.00K	0.00K
CEDAR RAPIDS	07/11/2011	0	0	0.00K	0.00K
CENTER PT	07/11/2011	0	0	0.00K	0.00K
WALKER	07/11/2011	0	0	20.00K	0.00K
MT VERNON	07/11/2011	0	0	5.00K	0.00K
TODDVILLE	07/11/2011	0	0	0.00K	0.00K
CENTER PT	07/11/2011	0	0	25.00K	0.00K
PALO	07/11/2011	0	0	0.00K	0.00K
CENTER PT	07/11/2011	0	0	0.00K	0.00K
ALBURNETT	07/11/2011	0	0	25.00K	0.00K
TODDVILLE	07/11/2011	0	0	25.00K	0.00K
WALKER	07/11/2011	0	0	50.00K	0.00K
MARION ARPT	07/22/2011	0	0	0.00K	0.00K
HIAWATHA	07/22/2011	0	0	0.00K	0.00K

Table 20: Linn County Thunderstorm Wind Events 1996–2016, continued

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
MT VERNON	07/22/2011	0	0	10.00K	0.00K
HIAWATHA	07/24/2011	0	0	0.00K	0.00K
HIAWATHA	07/24/2011	0	0	0.00K	0.00K
MT VERNON	07/24/2011	0	0	2.00K	0.00K
HIAWATHA	08/08/2011	0	0	0.00K	0.00K
ELY	04/14/2012	0	0	0.00K	0.00K
(CID)CEDAR RAPIDS AR	06/29/2012	0	0	0.00K	0.00K
WESTERN	06/29/2012	0	0	25.00K	0.00K
CEDAR RAPIDS	06/29/2012	0	0	0.00K	0.00K
CEDAR RAPIDS	06/29/2012	0	0	0.00K	0.00K
MARION	06/29/2012	0	0	0.00K	0.00K
MARION	06/29/2012	0	0	0.00K	0.00K
CENTER PT	06/29/2012	0	0	0.00K	0.00K
HIAWATHA	06/29/2012	0	0	0.00K	0.00K
BEVERLY	06/29/2012	0	0	0.00K	0.00K
MARION	06/29/2012	0	0	0.00K	0.00K
CENTER PT	06/29/2012	0	0	0.00K	0.00K
CENTER PT	06/29/2012	0	0	5.00K	0.00K
CEDAR RAPIDS	06/29/2012	0	0	0.00K	0.00K
SPRINGVILLE	06/29/2012	0	0	0.00K	0.00K
SPRINGVILLE	06/29/2012	0	0	0.00K	0.00K
SPRINGVILLE	06/29/2012	0	0	0.00K	0.00K
CENTRAL CITY	06/29/2012	0	0	25.00K	0.00K
COVINGTON	06/29/2012	0	0	30.00K	0.00K
CEDAR RAPIDS	06/29/2012	0	0	0.00K	0.00K
SPRINGVILLE	06/29/2012	0	0	0.00K	0.00K
CEDAR RAPIDS	07/25/2012	0	0	0.00K	0.00K
(CID)CEDAR RAPIDS AR	07/25/2012	0	0	0.00K	0.00K
CEDAR RAPIDS	07/25/2012	0	0	0.00K	0.00K
MT VERNON	07/25/2012	0	0	0.00K	0.00K
(CID)CEDAR RAPIDS AR	08/04/2012	0	0	0.00K	0.00K
CEDAR RAPIDS	08/04/2012	0	0	0.00K	0.00K
CEDAR RAPIDS	08/04/2012	0	0	0.00K	0.00K
CEDAR RAPIDS	08/04/2012	0	0	0.00K	0.00K
(CID)CEDAR RAPIDS AR	08/04/2012	0	0	0.00K	0.00K
HIAWATHA	08/04/2012	0	0	0.00K	0.00K
CEDAR RAPIDS	08/04/2012	0	0	0.00K	0.00K
ELY	08/04/2012	0	0	0.00K	0.00K
CEDAR RAPIDS	08/04/2012	0	0	0.00K	0.00K
MT VERNON	09/05/2012	0	0	0.00K	0.00K
(CID)CEDAR RAPIDS AR	09/07/2012	0	0	0.00K	0.00K
CEDAR RAPIDS	05/19/2013	0	0	0.00K	0.00K
CEDAR RAPIDS	05/19/2013	0	0	0.00K	0.00K
(CID)CEDAR RAPIDS AR	05/19/2013	0	0	0.00K	0.00K
CEDAR RAPIDS	05/19/2013	0	0	0.00K	0.00K
COVINGTON	05/19/2013	0	0	0.00K	0.00K
MARION	05/19/2013	0	0	0.00K	0.00K
PARIS	05/19/2013	0	0	0.00K	0.00K
ALBURNETT	06/21/2013	0	0	0.00K	0.00K
CEDAR RAPIDS	06/21/2013	0	0	0.00K	0.00K
BERTRAM	06/26/2013	0	0	0.00K	0.00K
CEDAR RAPIDS	07/22/2013	0	0	0.00K	0.00K

Table 20: Linn County Thunderstorm Wind Events 1996–2016, continued

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
PRAIRIEBURG	07/22/2013	0	0	0.00K	0.00K
WESTERN	09/19/2013	0	0	0.00K	0.00K
CEDAR RAPIDS	09/19/2013	0	0	0.00K	0.00K
HIAWATHA	09/19/2013	0	0	0.00K	0.00K
BEVERLY	04/27/2014	0	0	0.00K	0.00K
(CID)CEDAR RAPIDS AR	05/20/2014	0	0	0.00K	0.00K
CEDAR RAPIDS	06/16/2014	0	0	0.00K	0.00K
BEVERLY	06/16/2014	0	0	0.00K	0.00K
CEDAR RAPIDS	06/16/2014	0	0	0.00K	0.00K
CEDAR RAPIDS	06/16/2014	0	0	0.00K	0.00K
CEDAR RAPIDS	06/16/2014	0	0	0.00K	0.00K
CEDAR RAPIDS	06/16/2014	0	0	0.00K	0.00K
CEDAR RAPIDS	06/17/2014	0	0	0.00K	0.00K
FAIRFAX	06/30/2014	1	1	0.00K	0.00K
(CID)CEDAR RAPIDS AR	06/30/2014	0	0	0.00K	0.00K
CEDAR RAPIDS	06/30/2014	0	0	0.00K	0.00K
CEDAR RAPIDS	06/30/2014	0	0	0.00K	0.00K
ROBINS	06/30/2014	0	0	0.00K	0.00K
CEDAR RAPIDS	06/30/2014	0	0	0.00K	0.00K
CEDAR RAPIDS	06/30/2014	0	0	0.00K	0.00K
CEDAR RAPIDS	06/30/2014	0	4	0.00K	0.00K
MARION	06/30/2014	0	0	0.00K	0.00K
MARION	06/30/2014	0	0	0.00K	0.00K
MARION	06/30/2014	0	0	0.00K	0.00K
MARION	06/30/2014	0	0	0.00K	0.00K
CEDAR RAPIDS	06/30/2014	0	0	0.00K	0.00K
WHITTIER	06/30/2014	0	0	0.00K	0.00K
MARION EVANS ARPT	06/30/2014	0	0	200.00K	0.00K
MARION	06/30/2014	0	0	0.00K	0.00K
MARION	06/30/2014	0	0	0.00K	0.00K
PRAIRIEBURG	06/30/2014	0	0	0.00K	0.00K
PALO	06/30/2014	0	0	0.00K	0.00K
VIOLA	06/30/2014	0	0	0.00K	0.00K
MARION	06/30/2014	0	0	0.00K	0.00K
ALBURNETT	06/22/2015	0	0	0.00K	0.00K
PALO	11/11/2015	0	0	0.00K	0.00K
CEDAR RAPIDS	05/26/2016	0	0	0.00K	0.00K
CEDAR RAPIDS	05/26/2016	0	0	0.00K	0.00K
CEDAR RAPIDS	07/06/2016	0	0	0.00K	0.00K
(CID)CEDAR RAPIDS AR	07/06/2016	0	0	0.00K	0.00K
MARION	07/06/2016	0	0	0.00K	0.00K
ELY	07/06/2016	0	0	0.00K	0.00K
PALO	07/17/2016	0	0	0.00K	0.00K
CEDAR RAPIDS	07/17/2016	0	0	0.00K	0.00K
WALKER	08/04/2016	0	0	0.00K	0.00K
CEDAR RAPIDS	08/04/2016	0	0	0.00K	0.00K
Count/Total	306	1	10	8.547M	155.00K

Source: National Centers for Environmental Information, November 2017

Considering lightning, there have been 14 major events recorded in Linn County since 1996. In all except one, the lightning events occurred in the Cedar Rapids metropolitan area. Two lightning related deaths occurred in different events in 2005 and 2015, and three lightning

related injuries occurred during different events in 1997, 2001, and 2005. Overall, the reported property damage totals $183,000. The largest amounts of damage were reported in June 2011 and September 2012. A house in Cedar Rapids was struck by lightning and caught fire in 2011, and a building on the Cornell College campus in Mount Vernon was struck by lightning in 2012. Refer to Table 21.

Table 21: Linn County Lightning Events 1996–2016

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
CEDAR RAPIDS	06/21/1997	0	0	15.00K	0.00K
CEDAR RAPIDS	07/27/1997	0	1	0.00K	0.00K
CEDAR RAPIDS	06/04/2000	0	0	20.00K	0.00K
CEDAR RAPIDS	08/05/2000	0	0	6.00K	0.00K
CEDAR RAPIDS	10/03/2000	0	0	0.00K	0.00K
FAIRFAX	07/08/2001	0	1	0.00K	0.00K
MARION	10/22/2004	0	0	2.00K	0.00K
(CID)CEDAR RAPIDS AR	09/04/2005	1	1	0.00K	0.00K
CEDAR RAPIDS	04/13/2006	0	0	0.00K	0.00K
CEDAR RAPIDS	06/22/2007	0	0	25.00K	0.00K
CEDAR RAPIDS	06/22/2007	0	0	15.00K	0.00K
COVINGTON	06/10/2011	0	0	50.00K	0.00K
MT VERNON	09/07/2012	0	0	50.00K	0.00K
PALO	06/20/2015	1	0	0.00K	0.00K
Count/Total	14	2	3	183.00K	0.00K

Source: National Centers for Environmental Information, November 2017

Because hail often accompanies a thunderstorm, hail events are also frequent in Linn County. Since 1996, there have been 228 recorded hail events in the county. There are no deaths or injuries reported, but there is over $6 million in reported property and crop damage. The majority of damage, approximately $5 million, occurred during a hail event in May 2003 in Fairfax and Cedar Rapids. Aside from this major event, a hail event in September 2010 resulted in $500,000 of reported damage in Marion. All other hail events resulted in $250,000 or less in reported property damage, and the majority of hail events resulted in relatively small amount of damage. Refer to Table 22.

Table 22: Linn County Hail Events 1996-2016

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
VIOLA	04/19/1996	0	0	0.00K	0.00K
CEDAR RAPIDS	05/18/1997	0	0	0.00K	0.00K
COGGON	05/18/1997	0	0	0.00K	0.00K
COGGON	06/21/1997	0	0	0.00K	0.00K
PRAIRIEBURG	06/21/1997	0	0	0.00K	0.00K
COGGON	06/18/1998	0	0	14.00K	0.00K
ELY	05/18/2000	0	0	0.00K	0.00K
CEDAR RAPIDS	05/18/2000	0	0	0.00K	0.00K
PALO	05/18/2000	0	0	0.00K	0.00K

Table 22: Linn County Hail Events 1996-2016, continued

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
CEDAR RAPIDS	05/18/2000	0	0	0.00K	0.00K
PALO	06/01/2000	0	0	0.00K	0.00K
WALKER	07/26/2000	0	0	0.00K	0.00K
MARION	09/10/2000	0	0	0.00K	0.00K
PRAIRIEBURG	09/11/2000	0	0	0.00K	0.00K
CEDAR RAPIDS	09/11/2000	0	0	0.00K	0.00K
FAIRFAX	05/10/2001	0	0	0.00K	0.00K
CEDAR RAPIDS	05/10/2001	0	0	0.00K	0.00K
CEDAR RAPIDS	05/10/2001	0	0	50.00K	0.00K
CEDAR RAPIDS	05/10/2001	0	0	0.00K	0.00K
ALBURNETT	05/10/2001	0	0	0.00K	0.00K
WALKER	12/05/2001	0	0	0.00K	0.00K
FAIRFAX	03/09/2002	0	0	0.00K	0.00K
ALBURNETT	05/30/2002	0	0	0.00K	0.00K
SPRINGVILLE	05/30/2002	0	0	0.00K	0.00K
MARION	05/30/2002	0	0	0.00K	0.00K
SPRINGVILLE	05/30/2002	0	0	0.00K	0.00K
SPRINGVILLE	05/30/2002	0	0	0.00K	0.00K
CEDAR RAPIDS	06/04/2002	0	0	0.00K	0.00K
PALO	06/04/2002	0	0	0.00K	0.00K
MARION	07/28/2002	0	0	0.00K	0.00K
FAIRFAX	05/10/2003	0	0	3.000M	0.00K
CEDAR RAPIDS	05/10/2003	0	0	0.00K	0.00K
CEDAR RAPIDS	05/10/2003	0	0	2.000M	0.00K
CEDAR RAPIDS	05/14/2003	0	0	250.00K	0.00K
(CID)CEDAR RAPIDS AR	05/14/2003	0	0	0.00K	0.00K
HIAWATHA	05/14/2003	0	0	0.00K	0.00K
HIAWATHA	06/18/2003	0	0	0.00K	0.00K
SPRINGVILLE	07/05/2003	0	0	15.00K	10.00K
COGGON	07/31/2003	0	0	200.00K	10.00K
CEDAR RAPIDS	08/25/2003	0	0	30.00K	0.00K
CEDAR RAPIDS	05/07/2004	0	0	0.00K	0.00K
CEDAR RAPIDS	05/07/2004	0	0	0.00K	0.00K
TODDVILLE	05/07/2004	0	0	0.00K	5.00K
HIAWATHA	05/07/2004	0	0	0.00K	2.00K
ROBINS	05/07/2004	0	0	20.00K	2.00K
MARION	05/07/2004	0	0	20.00K	2.00K
SPRINGVILLE	05/07/2004	0	0	20.00K	10.00K
FAIRFAX	05/17/2004	0	0	0.00K	2.00K
CEDAR RAPIDS	05/17/2004	0	0	5.00K	0.00K
FAIRFAX	05/17/2004	0	0	5.00K	10.00K
(CID)CEDAR RAPIDS AR	05/17/2004	0	0	10.00K	0.00K
MT VERNON	05/17/2004	0	0	0.00K	5.00K
CEDAR RAPIDS	05/21/2004	0	0	4.00K	0.00K
SPRINGVILLE	05/21/2004	0	0	5.00K	0.00K
MARION	10/22/2004	0	0	8.00K	0.00K
WALKER	06/04/2005	0	0	3.00K	0.00K
CEDAR RAPIDS	06/04/2005	0	0	0.00K	0.00K
HIAWATHA	06/29/2005	0	0	0.00K	0.00K
LISBON	04/02/2006	0	0	1.00K	0.00K
CEDAR RAPIDS	04/13/2006	0	0	0.00K	0.00K
ALBURNETT	04/13/2006	0	0	0.00K	0.00K
ALBURNETT	04/13/2006	0	0	8.00K	0.00K
FAIRFAX	04/13/2006	0	0	2.00K	0.00K
CEDAR RAPIDS	04/13/2006	0	0	8.00K	0.00K
CEDAR RAPIDS	04/13/2006	0	0	3.00K	0.00K
CEDAR RAPIDS	04/13/2006	0	0	10.00K	0.00K
CEDAR RAPIDS	04/13/2006	0	0	50.00K	0.00K
HIAWATHA	04/13/2006	0	0	4.00K	0.00K

Table 22: Linn County Hail Events 1996-2016, continued

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
CEDAR RAPIDS	04/13/2006	0	0	2.00K	0.00K
CEDAR RAPIDS	04/13/2006	0	0	0.00K	0.00K
MARION	04/13/2006	0	0	0.00K	0.00K
LISBON	04/13/2006	0	0	2.00K	0.00K
CEDAR RAPIDS	04/13/2006	0	0	2.00K	0.00K
FAIRFAX	04/13/2006	0	0	3.00K	0.00K
CEDAR RAPIDS	04/13/2006	0	0	0.00K	0.00K
CEDAR RAPIDS	04/16/2006	0	0	0.00K	0.00K
TODDVILLE	06/06/2006	0	0	0.00K	0.00K
MARION	06/06/2006	0	0	0.00K	0.00K
CEDAR RAPIDS	06/06/2006	0	0	5.00K	0.00K
MARION	06/06/2006	0	0	0.00K	0.00K
BERTRAM	06/06/2006	0	0	0.00K	0.00K
CEDAR RAPIDS	06/06/2006	0	0	0.00K	0.00K
PALISADES KEPLER SP	06/06/2006	0	0	0.00K	0.00K
MARION	07/25/2006	0	0	0.00K	0.00K
VIOLA	07/25/2006	0	0	2.00K	1.00K
MARION	08/10/2006	0	0	0.00K	0.00K
CEDAR RAPIDS	03/31/2007	0	0	0.00K	0.00K
MT VERNON	03/31/2007	0	0	0.00K	0.00K
MARION	04/02/2007	0	0	0.00K	0.00K
TODDVILLE	04/02/2007	0	0	0.00K	0.00K
LAFAYETTE	04/02/2007	0	0	0.00K	0.00K
CEDAR RAPIDS	07/16/2007	0	0	0.00K	0.00K
CEDAR RAPIDS	07/16/2007	0	0	0.00K	0.00K
MARION MC BRIDE ARPT	07/16/2007	0	0	0.00K	0.00K
CEDAR RAPIDS	07/16/2007	0	0	0.00K	0.00K
CEDAR RAPIDS	07/16/2007	0	0	0.00K	0.00K
CEDAR RAPIDS	08/15/2007	0	0	0.00K	0.00K
CEDAR RAPIDS	08/15/2007	0	0	0.00K	0.00K
CEDAR RAPIDS	08/15/2007	0	0	0.00K	0.00K
ELY	08/15/2007	0	0	0.00K	0.00K
PALO	04/25/2008	0	0	0.00K	0.00K
CEDAR RAPIDS	06/12/2008	0	0	0.00K	0.00K
BERTRAM	06/12/2008	0	0	0.00K	0.00K
SPRINGVILLE	06/12/2008	0	0	0.00K	0.00K
CEDAR RAPIDS	06/14/2008	0	0	0.00K	0.00K
MT VERNON	06/15/2008	0	0	0.00K	0.00K
MARION	06/25/2008	0	0	0.00K	0.00K
PRAIRIEBURG	07/02/2008	0	0	0.00K	0.00K
PRAIRIEBURG	07/02/2008	0	0	0.00K	0.00K
CEDAR RAPIDS	04/25/2009	0	0	0.00K	0.00K
CENTER PT	04/26/2009	0	0	0.00K	0.00K
LAFAYETTE	04/26/2009	0	0	0.00K	0.00K
COGGON	04/26/2009	0	0	0.00K	0.00K
LAFAYETTE	06/19/2009	0	0	0.00K	0.00K
CENTER PT	07/24/2009	0	0	0.00K	0.00K
LAFAYETTE	04/05/2010	0	0	0.00K	0.00K
CENTRAL CITY	04/05/2010	0	0	0.00K	0.00K
COGGON	04/05/2010	0	0	0.00K	0.00K
PARIS	04/06/2010	0	0	0.00K	0.00K
CEDAR RAPIDS	04/06/2010	0	0	0.00K	0.00K
MARION	04/06/2010	0	0	0.00K	0.00K
BEVERLY	05/25/2010	0	0	0.00K	0.00K
CENTER PT	06/18/2010	0	0	0.00K	0.00K
FAIRFAX	06/18/2010	0	0	0.00K	0.00K
BERTRAM	07/23/2010	0	0	0.00K	0.00K
MARION	07/23/2010	0	0	0.00K	0.00K

Table 22: Linn County Hail Events 1996-2016, continued

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
CEDAR RAPIDS	07/23/2010	0	0	0.00K	0.00K
MARION	07/23/2010	0	0	0.00K	0.00K
MARION	07/23/2010	0	0	0.00K	0.00K
HIAWATHA	09/21/2010	0	0	0.00K	0.00K
HIAWATHA	09/21/2010	0	0	0.00K	0.00K
MARION	09/21/2010	0	0	500.00K	0.00K
MARION	09/21/2010	0	0	0.00K	0.00K
CEDAR RAPIDS	09/21/2010	0	0	0.00K	0.00K
MARION	09/21/2010	0	0	0.00K	0.00K
CEDAR RAPIDS	09/21/2010	0	0	0.00K	0.00K
CENTER PT	03/22/2011	0	0	0.00K	0.00K
(CID)CEDAR RAPIDS AR	04/03/2011	0	0	0.00K	0.00K
HIAWATHA	04/03/2011	0	0	0.00K	0.00K
CENTRAL CITY ARPT	04/03/2011	0	0	0.00K	0.00K
PRAIRIEBURG	04/03/2011	0	0	0.00K	0.00K
ELY	05/22/2011	0	0	0.00K	0.00K
MT VERNON	05/22/2011	0	0	0.00K	0.00K
WAUBEEK	06/08/2011	0	0	0.00K	0.00K
ROBINS	06/08/2011	0	0	0.00K	0.00K
PRAIRIEBURG	06/08/2011	0	0	0.00K	0.00K
PRAIRIEBURG	06/08/2011	0	0	0.00K	0.00K
CENTER PT	06/08/2011	0	0	0.00K	0.00K
HIAWATHA	06/08/2011	0	0	0.00K	0.00K
CEDAR RAPIDS	06/08/2011	0	0	0.00K	0.00K
MARION	06/08/2011	0	0	0.00K	0.00K
CEDAR RAPIDS	06/08/2011	0	0	0.00K	0.00K
CEDAR RAPIDS	06/08/2011	0	0	0.00K	0.00K
CEDAR RAPIDS	06/08/2011	0	0	0.00K	0.00K
CEDAR RAPIDS	06/08/2011	0	0	0.00K	0.00K
CEDAR RAPIDS	06/08/2011	0	0	0.00K	0.00K
MARION	06/08/2011	0	0	0.00K	0.00K
CEDAR RAPIDS	06/08/2011	0	0	0.00K	0.00K
MARION ARPT	06/08/2011	0	0	0.00K	0.00K
CEDAR RAPIDS	06/08/2011	0	0	0.00K	0.00K
CEDAR RAPIDS	06/08/2011	0	0	0.00K	0.00K
MT VERNON	06/08/2011	0	0	0.00K	0.00K
HIAWATHA	08/08/2011	0	0	0.00K	0.00K
CEDAR RAPIDS	08/08/2011	0	0	0.00K	0.00K
HIAWATHA	08/08/2011	0	0	0.00K	0.00K
HIAWATHA	08/08/2011	0	0	0.00K	0.00K
CEDAR RAPIDS	08/08/2011	0	0	0.00K	0.00K
CEDAR RAPIDS	08/08/2011	0	0	0.00K	0.00K
SPRINGVILLE	03/31/2012	0	0	0.00K	0.00K
HIAWATHA	03/31/2012	0	0	0.00K	0.00K
HIAWATHA	03/31/2012	0	0	0.00K	0.00K
HIAWATHA	03/31/2012	0	0	0.00K	0.00K
CEDAR RAPIDS	03/31/2012	0	0	0.00K	0.00K
MARION MC BRIDE ARPT	03/31/2012	0	0	0.00K	0.00K
MARION	03/31/2012	0	0	0.00K	0.00K
CEDAR RAPIDS	03/31/2012	0	0	0.00K	0.00K
MARION	03/31/2012	0	0	0.00K	0.00K
CEDAR RAPIDS	03/31/2012	0	0	0.00K	0.00K
MARION	03/31/2012	0	0	0.00K	0.00K
CEDAR RAPIDS	04/09/2013	0	0	0.00K	0.00K
CEDAR RAPIDS	04/09/2013	0	0	0.00K	0.00K
CEDAR RAPIDS	04/09/2013	0	0	0.00K	0.00K
MARION	08/05/2013	0	0	0.00K	0.00K
WESTERN	09/19/2013	0	0	0.00K	0.00K

Table 22: Linn County Hail Events 1996-2016, continued

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
MARION	02/20/2014	0	0	0.00K	0.00K
ALBURNETT	05/20/2014	0	0	0.00K	0.00K
PARIS	05/20/2014	0	0	0.00K	0.00K
LAFAYETTE	05/20/2014	0	0	0.00K	0.00K
ALBURNETT	05/20/2014	0	0	0.00K	0.00K
LAFAYETTE	05/20/2014	0	0	0.00K	0.00K
CENTER PT	05/20/2014	0	0	0.00K	0.00K
MT VERNON	06/16/2014	0	0	0.00K	0.00K
PRAIRIEBURG	06/16/2014	0	0	0.00K	0.00K
CEDAR RAPIDS	04/09/2015	0	0	0.00K	0.00K
SPRINGVILLE	04/09/2015	0	0	0.00K	0.00K
TODDVILLE	06/20/2015	0	0	0.00K	0.00K
PALO	06/20/2015	0	0	0.00K	0.00K
ROBINS	06/20/2015	0	0	0.00K	0.00K
MARION MC BRIDE ARPT	06/20/2015	0	0	0.00K	0.00K
MARION MC BRIDE ARPT	06/20/2015	0	0	0.00K	0.00K
MARION	06/20/2015	0	0	0.00K	0.00K
SPRINGVILLE	06/20/2015	0	0	0.00K	0.00K
MARION	06/20/2015	0	0	0.00K	0.00K
PALO	06/22/2015	0	0	0.00K	0.00K
PALO	06/22/2015	0	0	0.00K	0.00K
PALO	06/22/2015	0	0	0.00K	0.00K
TODDVILLE	06/22/2015	0	0	0.00K	0.00K
PALO	06/22/2015	0	0	0.00K	0.00K
HIAWATHA	06/22/2015	0	0	0.00K	0.00K
ROBINS	06/22/2015	0	0	0.00K	0.00K
MARION MC BRIDE ARPT	06/22/2015	0	0	0.00K	0.00K
ELY	06/22/2015	0	0	0.00K	0.00K
MARION MC BRIDE ARPT	06/22/2015	0	0	0.00K	0.00K
MARION MC BRIDE ARPT	06/22/2015	0	0	0.00K	0.00K
CEDAR RAPIDS	06/22/2015	0	0	0.00K	0.00K
MARION	06/22/2015	0	0	0.00K	0.00K
MARION	06/22/2015	0	0	0.00K	0.00K
MARION	06/22/2015	0	0	0.00K	0.00K
MARION	06/22/2015	0	0	0.00K	0.00K
PARALTA	06/22/2015	0	0	0.00K	0.00K
CEDAR RAPIDS	06/22/2015	0	0	0.00K	0.00K
CEDAR RAPIDS	06/22/2015	0	0	0.00K	0.00K
CEDAR RAPIDS	06/22/2015	0	0	0.00K	0.00K
CEDAR RAPIDS	06/22/2015	0	0	0.00K	0.00K
CENTER PT	06/24/2015	0	0	0.00K	0.00K
CENTER PT	06/24/2015	0	0	0.00K	0.00K
CENTRAL CITY	06/24/2015	0	0	0.00K	0.00K
TODDVILLE	05/30/2016	0	0	0.00K	0.00K
Count/Total	228	0	0	6.261M	59.00K

Source: National Centers for Environmental Information, November 2017

In combination, the thunderstorm, lightning, and hail hazard is the most frequently occurring natural hazard in Linn County. Every community has been affected, although not every community has reported injuries, deaths, or damage. The urban areas, due to relatively dense development, have been affected more severely than rural areas in terms of reported property damage.

Probability

Iowa experiences on average between 30 and 50 thunderstorm days per year. Several of these thunderstorm days include Linn County each year. Because of the humid continental climate in Iowa, the conditions that create severe thunderstorms are typically present. To become severe, a storm needs moisture to form clouds and rain, relatively warm and unstable air that can rise rapidly, and weather fronts and convective systems that lift air masses.

In Linn County, it is highly likely a thunderstorm and lighting event will occur at least once each year, if not several times during a severe summer season. Thunderstorm and lightning events are one of the mostly frequently occurring hazards in Linn County. This probability estimate is based historical occurrences, the *2013 Iowa Hazard Mitigation Plan*, and local knowledge.

Based on historical occurrences in Linn County, a hail event is highly likely with a probability of occurring at least once each year. In a year with severe weather, Linn County will highly likely experience several hail events in the spring and summer months.

Magnitude and Severity

Severe thunderstorms can be quite expansive with areas of localized severe conditions. Most severe thunderstorm cells are 5 to 25 miles wide with a larger area of heavy rain and strong winds around the main cell. Depending on the size, a thunderstorm can affect several or just one community in Linn County.

Thunderstorms and lightning can cause death, serious injury, and substantial property damage. Those in unprotected areas, mobile homes, or automobiles during a storm are at risk. Sudden strong winds often accompany a severe thunderstorm and may blow down trees across, power lines, homes, mobile homes, and businesses. High winds can also push vehicles off the road. Straight-line winds are typically responsible for most damage during a thunderstorm event.

Lightning presents the greatest immediate danger to people and livestock during a thunderstorm. It is the second most frequent weather-related killer in the U.S. with nearly 100 deaths and 500 injuries each year according to the *2010 Iowa Hazard Mitigation Plan*. Floods and flash floods are the number one cause of weather related deaths in the United States. Livestock and people who are outdoors, especially under a tree or other natural lightning rods, in or on water, or on or near hilltops are at risk from lightning. The power of lightning's electrical charge and intense heat can electrocute people and livestock on contact, split trees, ignite fires, and cause electrical failures.

Thunderstorms can produce hail that can cause injury, damage homes and businesses, break glass, and destroy vehicles. Flash floods and tornadoes can develop during thunderstorms as well. People who are in automobiles or along low-lying areas when flash flooding occurs and people who are in mobile homes are vulnerable to the impacts of severe thunderstorms. One or more severe thunderstorms occurring over a short period, especially on saturated ground, can lead to flooding and cause extensive power and communication outages as well as agricultural damage.

In Linn County, when a future thunderstorm event occurs, the magnitude and severity will likely be limited. Injuries will likely not result in permanent disability, although one thunderstorm has resulted in one death. Severe damage could affect 10% to 25% of Linn County, and any facility shutdown could last a week or more.

The land area affected by a hail event is often the same size or smaller than the area affected by the storm that produces the hail. Typically, a hail event occurs within a 15 mile diameter around the center of the storm. Historical hail events in Linn County have been widespread overall due to the storms moving through an entire community.

Hail events are rarely a direct cause of death but can cause injuries to humans, pets, and livestock that are outdoors during a storm. Hail can cause widespread damage to buildings, infrastructure, and vehicles. Damage to buildings is usually limited to damaged windows, roofs, and exteriors.

Agricultural crops are extremely vulnerable because a hailstorm can strip leaves or completely destroy plants. The peak time for hailstorm events to occur in Iowa coincides with the agricultural season making hail damage a common risk. Factoring agricultural crop damage, hailstorm events can cause millions in damage annually in Iowa. It is important to note, most of the financial impacts of hail damage are covered by crop and hazard insurance.

In a future hail event in Linn County, the magnitude and severity of the event is likely to be limited based on historical occurrences. For property damage, 10% to 25% could be severely damaged, and injuries would not likely result in permanent disability. There is a possibility that some facilities and services may shutdown, but the period of time would likely be short, lasting less than a week.

Warning Time

The National Weather Service issues severe thunderstorm watches and warnings as well as statements about severe weather and localized storms. These messages are broadcast over NOAA Weather Alert Radios and area television and radio stations. Weather forecasting and severe weather warnings issued by the National Weather Service usually provide residents and visitors adequate warning time, which is 12 to 24 hours. Problems arise when warnings are ignored or not understood by residents and visitors.

Hail events can usually be predicted in conjunction with a severe storm that has conditions suitable for creating hail. The National Weather Service issues severe thunderstorm watches and warnings as well as statements about what type of severe weather might be produced during a storm. These messages are broadcast over NOAA Weather Alert Radios, television, and regular radio stations. Most often, warnings provide residents and visitors adequate time to prepare for a storm, which is approximately 12 to 24 hours in advance. Some hail events, though, may occur without warning during periods of volatile severe weather, typically when conditions are ideal for a tornado.

Duration

Depending on the size and severity of a thunderstorm and lightning event, the negative impacts can affect a community for a relatively short period of time. Typically, thunderstorm and lightning events that occur in conjunction with other hazards like flash flood, flood, hail, tornado, etc. affect a community for an extended period of time due to damage and shutdown of facilities and services. Independently, a thunderstorm and lightning event will likely impact Linn County for less than a day.

A hail event is typically short-term lasting not more than six hours. In most occurrences, hailstorm events are just a few minutes within a larger storm that can occur over several hours.

Tornado and Windstorm

Definition of Hazard

A tornado is a violent whirling wind with a rotating funnel shaped cloud extending down. Rotating wind speeds can exceed 300 mph and travel across the ground at average speeds of 25–30 mph. A tornado path can be a few yards to a mile wide, but an average tornado is a few hundred yards wide. A tornado can move over land for distances ranging from short hops to miles.

Before 2007, the Fujita Scale was used to rate the magnitude of a tornado. The scale is a range of values for wind speed, frequency, average damage path width, and potential damage. The current rating scale is the Enhanced Fujita Scale, which uses more accurate ranges for wind speed and more detailed analysis of damage.

Fujita Scale		Enhanced Fujita Scale	
Scale	**Wind Speed**	**Scale**	**Wind Speed**
F0	40–72 mph	EF0	68–85 mph
F1	73–112 mph	EF1	86–110 mph
F2	113–157 mph	EF2	111–135 mph
F3	158–206 mph	EF3	136–165 mph
F4	207–260 mph	EF4	166–200 mph
F5	261–318 mph	EF5	200+ mph

A windstorm is the extreme wind associated with severe storms. Windstorms may have a destructive path up to tens of miles wide. These events can produce straight line winds in excess of 64 knots. The Beaufort Scale, which ranges 0–12, is typically used to determine the magnitude of a windstorm.

Beaufort Scale	Description	Wind Speed
0	Calm	<1 knot
1	Light air	1–3 knots
2	Light breeze	4–6 knots
3	Gentle breeze	7–10 knots
4	Moderate breeze	11–16 knots
5	Fresh breeze	17–21 knots
6	Strong breeze	22–27 knots
7	Near gale	28–33 knots
8	Gale	34–40 knots
9	Strong gale	41–47 knots
10	Storm	48–55 knots
11	Violent storm	56–63 knots
12	Hurricane	>64 knots

Potential Hazard Area

The potential hazard area for a tornado and windstorm in Linn County is countywide.

Historical Occurrences

Since 1996, there have been 24 tornados in Linn County. In most years, there is at least one tornado and often several, but there were no tornados reported in 1996, 2002, and 2009–2013. In total, no deaths, five injuries, and over $3.8 million in property and crop damage has been reported. Refer to Table 23. The highest magnitude tornado occurred in May 2004 in Palo, and there was $300,000 in property and crop damage. The most damage occurred in Cedar Rapids in July 2003. Like all severe weather hazards, Cedar Rapids often sustains higher amounts of damage due to dense development.

Table 23: Linn County Tornados 1996–2016

Location	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
LISBON	05/18/1997	F1	0	0	0.00K	0.00K
CENTER PT	05/08/1998	F0	0	0	0.50K	0.00K
TODDVILLE	05/08/1998	F0	0	0	0.00K	0.00K
PALO	05/28/1998	F0	0	0	0.00K	0.00K
CEDAR RAPIDS AIRPARK	05/28/1998	F0	0	0	0.00K	0.00K
LISBON	06/18/1998	F0	0	0	0.00K	0.00K
CEDAR RAPIDS	06/10/1999	F0	0	0	0.00K	0.00K
COGGON	06/10/1999	F0	0	0	0.00K	0.00K
ALBURNETT	05/31/2000	F1	0	1	50.00K	0.00K
CEDAR RAPIDS	04/11/2001	F0	0	0	0.00K	0.00K
COVINGTON	07/20/2003	F2	0	0	500.00K	45.00K
CEDAR RAPIDS	07/20/2003	F2	0	0	2.000M	0.00K
MT VERNON	07/20/2003	F1	0	0	10.00K	10.00K
PALO	05/21/2004	F3	0	0	250.00K	50.00K
MARION	08/26/2004	F1	0	0	10.00K	0.00K
WHITTIER	08/26/2004	F1	0	0	0.00K	10.00K
WAUBEEK	06/29/2005	F0	0	0	0.00K	5.00K
MARION	04/13/2006	F0	0	0	70.00K	0.00K
PARIS	07/18/2007	EF1	0	0	50.00K	0.00K
LAFAYETTE	04/26/2009	EF1	0	0	500.00K	0.00K
LISBON MOHN ARPT	04/27/2014	EF0	0	0	0.00K	0.00K
CEDAR RAPIDS AIRPARK	12/23/2015	EF1	0	0	0.00K	0.00K
FAIRFAX	07/17/2016	EF2	0	4	250.00K	0.00K
COGGON	08/28/2016	EF0	0	0	0.00K	0.00K
Count/Total	24		0	5	3.691M	120.00K

Source: National Centers for Environmental Information, November 2017

A funnel cloud is a visible predictor for a tornado event. In Linn County there have been 13 funnel cloud events since 1996. See Table 24.

Table 24: Linn County Funnel Cloud Events 1996-2016

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
PALO	07/10/2000	0	0	0.00K	0.00K
(CID)CEDAR RAPIDS AR	05/10/2001	0	0	0.00K	0.00K
FAIRFAX	05/10/2001	0	0	0.00K	0.00K
CEDAR RAPIDS	05/10/2001	0	0	0.00K	0.00K
PRAIRIEBURG	05/10/2001	0	0	0.00K	0.00K
MT VERNON	05/10/2001	0	0	0.00K	0.00K
PALO	06/12/2002	0	0	0.00K	0.00K
PALO	06/12/2002	0	0	0.00K	0.00K
CEDAR RAPIDS	06/12/2002	0	0	0.00K	0.00K
CEDAR RAPIDS	07/20/2003	0	0	0.00K	0.00K
CEDAR RAPIDS	07/20/2003	0	0	0.00K	0.00K
(CID)CEDAR RAPIDS AR	05/17/2004	0	0	0.00K	0.00K
TROY MILLS	06/14/2016	0	0	0.00K	0.00K
Count/Total	13	0	0	0.00K	0.00K

Source: National Centers for Environmental Information, November 2017

Considering windstorms in general rather than tornados, there have been two strong wind events and twelve high wind events in Linn County. A high wind event is a windstorm with measurable wind speed that is gale force and stronger. Among all windstorm events, there were no deaths reported. Two injuries were reported during a high wind event in April 2016. On the other hand, over $800,000 in property and crop damage were reported. Refer to Table 25 and Table 26.

Table 25: Linn County Strong Wind Events 1996–2016

Location	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
LINN (ZONE)	04/23/2001		0	0	0.00K	0.00K
LINN (ZONE)	05/12/2010	35 kts. EG	0	0	0.50K	0.00K
Count/Total	2		0	0	0.50K	0.00K

Source: National Centers for Environmental Information, November 2017

Table 26: Linn County High Wind Events 1996–2016

Location	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
LINN (ZONE)	04/06/1997	50 kts.	0	0	250.00K	0.00K
LINN (ZONE)	09/29/1997	52 kts.	0	0	0.00K	0.00K
LINN (ZONE)	11/09/1998	53 kts.	0	0	0.00K	0.00K
LINN (ZONE)	02/25/2001	46 kts. M	0	0	0.00K	0.00K
LINN (ZONE)	02/11/2003	50 kts. MG	0	0	0.00K	0.00K
LINN (ZONE)	06/10/2003	50 kts. EG	0	0	500.00K	50.00K
LINN (ZONE)	10/26/2008	50 kts. EG	0	0	0.00K	0.00K
LINN (ZONE)	08/03/2009	53 kts. MG	0	0	5.00K	0.00K
LINN (ZONE)	05/11/2011	52 kts. EG	0	0	0.00K	0.00K
LINN (ZONE)	06/27/2011	52 kts. EG	0	0	0.00K	0.00K

Table 26: Linn County High Wind Events 1996–2016, continued

Location	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
LINN (ZONE)	02/19/2016	52 kts. MG	0	0	0.00K	0.00K
LINN (ZONE)	04/02/2016	50 kts. MG	0	2	0.00K	0.00K
Count/Total	12		0	2	755.00K	50.00K

Source: National Centers for Environmental Information, November 2017

Probability

According to the *2010 Iowa Hazard Mitigation Plan*, Iowa is ranked third in the nation for the number of tornadoes that occur per 10,000 square miles. From 1950–2010, Iowa averaged 47 tornado events per year. Most tornadoes occur in the spring and summer months, but tornadoes have occurred in every month of the year.

Tornado events do not occur every year in Linn County. When a tornado event does occur, there are typically several tornadoes produced within a short period of time affecting multiple areas in the county. Funnel cloud events, which indicate the strong chance of a tornado occurring, also do not occur annually, but several funnel clouds are typically spotted in a short period of time. The average period of time between tornado and funnel cloud events is approximately three years.

The entire United States is subject to various types of windstorm events. According to the *2010 Iowa Hazard Mitigation Plan*, Iowa is likely to experience 15–20 windstorm events per year. Windstorm events in Iowa are usually associated with thunderstorms and winter storms.

Looking toward the future, it is likely a tornado or windstorm event will occur in Linn County within the next five years. The estimated probability of a tornado event occurring is approximately once every three years. This probability estimate is based on historical occurrences, parameters defined in the *2013 Iowa Hazard Mitigation Plan*, and local knowledge.

Magnitude and Severity

The most severe tornado events that have occurred in Linn County are F2 and F3 rated, but the majority of tornadoes are F0 and F1. Based on historical occurrences, Linn County will most likely be affected by an EF0 or EF1 tornado in the next five years although a higher magnitude tornado is possible.

The most severe windstorm event that occurred in Linn County since 1996 had a wind speed of 53 knots, but generally the majority of windstorms had a wind speed in the 50 knots range. Based on historical occurrences, Linn County will most likely be affected by windstorm events rated 10 and 11 on the Beaufort scale, although hurricane winds are possible.

During a tornado and windstorm event, everyone located in or near the path of the tornado is vulnerable. There are several groups of people who are especially vulnerable during tornado events. These people include residents of mobile or manufactured homes, outdoor recreation and campground visitors, outdoor workers, motorists, elderly, young, disabled individuals with limited mobility, and residents or workers in buildings without basements.

Generally, the destructive path of a tornado is a few hundred feet in width, but stronger tornadoes can leave a path of devastation up to a mile wide. Large hail, strong straight-line winds, heavy rains, flash flooding, and lightning are also associated with severe storms and may cause significant damage to a wider area. In rare tornado events, entire neighborhoods and even communities have been destroyed.

Windstorms can have a destructive path that is several miles wide. Large hail, strong straight-line winds, heavy rains, flash flooding, and lightning are also associated with windstorms and may cause significant damage to a wider area. It is often difficult to separate windstorm and tornado damage when wind speed exceeds 64 knots.

Damage from a tornado or windstorm can range from broken tree branches, shingle damage to roofs, and broken windows all the way to complete destruction of well-constructed buildings, infrastructure, and large trees. Tornadoes can also impact critical services, especially electrical power. Buried services such as water and gas are less vulnerable but can be negatively affected by their system components located above ground.

For Iowa and Linn County, it is important to note varying degrees of crop damage can occur during a tornado or windstorm event. Wind can flatten fields, break plant stalks, or twist plants. Windstorm events can completely destroy a crop or cause limited damage than can reduce crop yields. Both circumstances can cause economic hardship for the agricultural sectors of Iowa and Linn County's economy.

If a tornado or windstorm were to occur in Linn County, the magnitude and severity would likely be limited. A future tornado event may result in injuries that do not result in permanent disability, 10% to 25% of a jurisdiction's property severely damaged, and shutdown of facilities and services for approximately a week. This magnitude and severity estimate is based on historical occurrences, parameters defined in the *2013 Iowa Hazard Mitigation Plan*, and local knowledge.

Warning Time

Advancement in weather forecasting has allowed tornado watches to be issued hours in advance of a tornado event. The best lead time is approximately 30 minutes. A tornado can change paths very rapidly limiting the amount of warning time for the people located in its path. Outside of weather forecasting, there may not be visible indicators of a tornado on the ground due to blowing dust or driving rain and hail, which limits the ability to spot and report a tornado.

A future tornado event in Linn County will likely have minimal, less than six hours, or no warning time. This warning time estimate is based on historical occurrences, the *2010 Iowa Hazard Mitigation Plan*, and local knowledge.

The National Weather Service has developed a windstorm warning system that issues windstorm watches 12 to 24 hours in advance. Advisories are issued when existing or imminent windstorms could impact an area. Similar to tornado warnings, the typical warning time for a windstorm is 30 minutes. It is important to note that Linn County activates the outdoor warning system for storm events that are predicted to have a wind speed of 70 mph or greater, which are rated 11 and greater on the Beaufort scale.

Duration

Normally a tornado will stay on the ground for no more than 20 minutes. However, a tornado can touch ground several times in different areas. Typically, local response during a tornado event is for the immediate threat to life and property. After a tornado event, local response is for the individuals, services, and structures that were negatively impacted by the tornado.

Based on historical occurrences in Linn County, a series of tornadoes can develop in a few hours prolonging the amount of time jurisdictions can be impacted by a tornado event but the event lasts less than six hours. In Linn County, a windstorm event can last several hours but usually not more than an entire day. This duration estimate is based on historical occurrences, the *2010 Iowa Hazard Mitigation Plan*, and local knowledge.

Technological Hazards

Hazardous Materials Incident

Definition of Hazard

Generally, a hazardous materials incident includes the accidental release of flammable, explosive, toxic, noxious, corrosive, oxidizing, or radioactive substances, irritants, or mixtures that can pose a risk to life, health, or property possibly requiring evacuation. A hazardous materials event includes fixed hazardous materials, transportation of hazardous materials, and pipeline transportation.

A fixed hazardous materials incident is the accidental release of hazardous materials during handling, storage, or production at a facility. Fixed incidents generally affect a localized area.

A transportation hazardous materials incident involves the accidental release of hazardous materials during the transport of materials. Transportation incidents generally affect the area where the incident occurs.

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. An underground 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.

Potential Hazard Area

The potential hazard area for a hazardous materials event is conditionally identified as the entire county. Areas surrounding facilities using hazardous materials, which are required to report materials through a Tier II form, or along transportation infrastructure are immediate potential hazard areas. Refer to the risk assessment maps, Map 20 through Map 24. Linn County contains 87 miles of gas transmission pipelines and 16 miles of hazardous liquid pipelines. If materials are released in the air or water, the potential hazard area may be expanded downwind or downstream of the incident.

Historical Occurrences

Since 2000, there have been 68 hazardous materials incidents in Linn County that involve 500 or more pounds or gallons of a hazardous material. Most incidents in Linn County involve a relatively small amount of materials and are well-contained. Data for all hazardous materials incidents are available through the Hazardous Substance Incident Tracking Database maintained by the Iowa Department of Natural Resources. Refer to Table 27 for hazardous materials incidents involving 500 or more pounds or gallons, none of which exceeded local capabilities. The number of reported spills in the recent past is lower than for the start of the

reporting period. Half of all the reported spills since 2000 occurred by 2005, see Figure 3 for a graph of reported spills since 2000.

Since 2000, the largest hazardous materials incident involved 400,000 gallons of cooling water in 2002. The most common hazardous material types released into the environment in Linn County include acids/bases, animal/vegetable product, inorganic chemical, and petroleum, which is largely due to the strong agricultural sector in Iowa (see Figure 4). Regardless of the amount of materials involved in a hazardous materials event, spillage in handling, storage, and transportation is most common.

Table 27: Linn County Hazardous Materials Events 500+ gallons/pounds 2000–2016

Reported Date	Mode	Type	Material Name	Amount	Unit
2/11/2000	Handling And Storage	Acids/Bases	Sodium hydroxide	12000	gal
1/8/2001	Handling And Storage	Inorganic Chemical	Process Wastewater - non organic	500	gal
5/31/2000	Handling And Storage	Inorganic Chemical	Process Wastewater - non organic	4000	gal
7/8/2000	Handling And Storage	Acids/Bases	Acetic acid	1000	gal
8/29/2000	Handling And Storage	Acids/Bases	Furfural	900	gal
5/9/2001	Other	Other Chemical	Wastewater	4000	gal
3/8/2002	Other	Other Chemical	Thickened Primary Sludge	500	gal
9/7/2001	Handling And Storage	Fertilizer/Pesticide	Ammonia (anhydrous) - Agricultural	6000	lbs
3/15/2000	Handling And Storage	Sulfur Dioxide	Sulfur dioxide	500	lbs
9/18/2001	Handling And Storage	Acids/Bases	Sodium hydroxide	3000	gal
3/8/2002	Handling And Storage	Animal/Vegetable Product	Soy meal process water	1000	gal
4/15/2002	Handling And Storage	Inorganic Chemical	Sulfuric Acid 93%	1200	gal
8/2/2002	Handling And Storage	Other Chemical	Sewage Sludge	97000	gal
8/12/2002	Handling And Storage	Animal/Vegetable Product	Corn starch	1500	gal
9/20/2002	Handling And Storage	Animal/Vegetable Product	Corn wet milling water	1830	gal
12/19/2002	Handling And Storage	Organic Chemical	Cooling water	400000	gal
12/29/2002	Handling And Storage	Acids/Bases	Sulfuric Acid	2500	gal
4/14/2003	Handling And Storage	Inorganic Chemical	Mill Water	4000	gal
6/17/2003	Handling And Storage	Organic Chemical	Cooling water	50000	gal
5/23/2000	Handling And Storage	Animal/Vegetable Product	Starch slurry	500	gal
7/13/2003	Handling And Storage	Acids/Bases	low pH water from Ion exchange tanks	100000	gal
4/13/2004	Transportation	Ammonia (anhydrous)	Anhydrous ammonia	3500	lbs
5/20/2004	Transformer	Organic Chemical	1,3-Butadiene	1400	lbs
7/26/2004	Handling And Storage	Acids/Bases	Hydrochloric acid	10000	gal

Table 27: Linn County Hazardous Materials Events 500+ gallons/pounds 2000–2016, continued

Reported Date	Mode	Type	Material Name	Amount	Unit
10/5/2004	Handling And Storage	Petroleum	Denatured Alcohol	5027	gal
10/22/2004	Transportation	Organic Chemical	Coal	710	ton
12/3/2004	Transportation	Ammonia (anhydrous)	Anhydrous ammonia	5484	lbs
12/17/2004	Handling And Storage	Animal/Vegetable Product	salt water	7000	gal
6/26/2001	Handling And Storage	Organic Chemical	Filtrate with sludge mixture	500	gal
1/31/2005	Handling And Storage	Inorganic Chemical	Process Wastewater - non organic	4000	gal
11/10/2005	Handling And Storage	Acids/Bases	low pH (3.3) cooling tower water	7560	gal
12/16/2005	Handling And Storage	Inorganic Chemical	Bilge Water	1800	gal
12/23/2005	Handling And Storage	Inorganic Chemical	Bilge Water	6480	gal
12/6/2006	Handling And Storage	Animal/Vegetable Product	Corn Syrup	1980	gal
1/2/2007	RR Incident	Petroleum	Diesel Fuel	1000	gal
8/14/2012	Transportation	Acids/Bases	Bio-solids	500	lbs
5/29/2007	Pipeline	Ammonia (anhydrous)	Anhydrous ammonia	612	gal
6/8/2007	Handling And Storage	Animal/Vegetable Product	salt water	1500	gal
6/16/2007	Transportation	Fertilizer Pesticide	32% liquid fertilizer	700	gal
12/10/2007	Handling And Storage	Petroleum	Diesel Fuel	1000	gal
12/23/2007	Handling And Storage	Animal/Vegetable Product	corn mash and water	22000	gal
2/19/2008	Other	Chlorine	Chlorine	100000	gal
2/22/2008	Other	Chlorine	Water	100000	gal
5/3/2008	Fire	Inorganic Chemical	Tires	50000	units
5/26/2008	Handling And Storage	Animal/Vegetable Product	Starch slurry	1000	gal
10/5/2008	Handling And Storage	Animal/Vegetable Product	corn mash and water	5000	gal
11/3/2008	Vandalism	Fertilizer/Pesticide	Ammonia (anhydrous) - Agricultural	1700	gal
10/23/2009	Handling And Storage	Inorganic Chemical	Process Wastewater - non organic	1350	gal
5/28/2010	Fire	Petroleum	Petroleum Contaminated Water	100000	gal
10/17/2010	Handling And Storage	Inorganic Chemical	Ammonia (anhydrous) - Industrial	935	lbs
6/30/2011	Handling And Storage	Chlorine	Water	750	gal
10/31/2013	Handling And Storage	Animal/Vegetable Product	Maltose	500	lbs
10/13/2011	Handling And Storage	Acids/Bases	Sodium hydroxide	10800	gal

Table 27: Linn County Hazardous Materials Events 500+ gallons/pounds 2000–2016, continued

Reported Date	Mode	Type	Material Name	Amount	Unit
3/15/2012	Handling And Storage	Inorganic Chemical	Ammonia (anhydrous) - Industrial	1156	lbs
12/22/2012	Handling And Storage	Petroleum	Jet A fuel	6000	gal
4/15/2013	Railroad	Petroleum	#1 Diesel Fuel	1500	gal
4/18/2013	Handling And Storage	Acids/Bases	Caustic Soda	1000	gal
5/13/2013	Transportation	Fertilizer/Pesticide	32% Liquid Nitrogen Fertilizer	700	gal
9/6/2013	Pipeline	Chlorine	Water	10000	gal
12/10/2005	Handling And Storage	Inorganic Chemical	Bilge Water	500	gal
10/31/2013	Handling And Storage	Chlorine	Water	14400	gal
6/20/2014	Fire	Petroleum	Mineral oil	3300	gal
10/9/2014	Handling And Storage	Animal/Vegetable Product	Molasses	575	gal
10/10/2014	Handling And Storage	Petroleum	Oil - Crude	3000	gal
9/14/2015	Other	Inorganic Chemical	Salt Solution	83000	gal
10/1/2015	Pipeline	Organic Chemical	Ethyl Alcohol (200 proof alcohol)	7000	gal
11/24/2016	Handling And Storage	Petroleum	Waste Oil	70000	gal
12/8/2016	Transportation	Animal/Vegetable Product	Egg product	42000	lbs

Source: Iowa DNR Hazardous Material Release Database, accessed November 2017

Figure 3: Hazardous Materials Spills by Year 500+ Gallons/Pounds

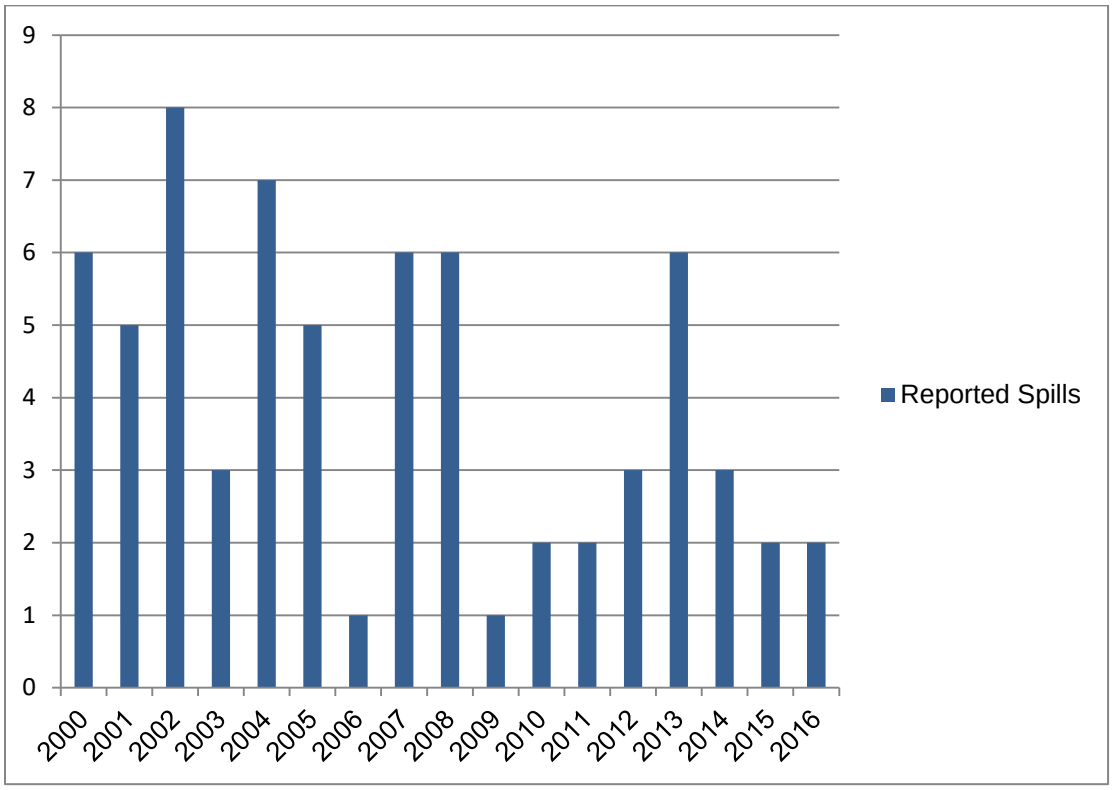
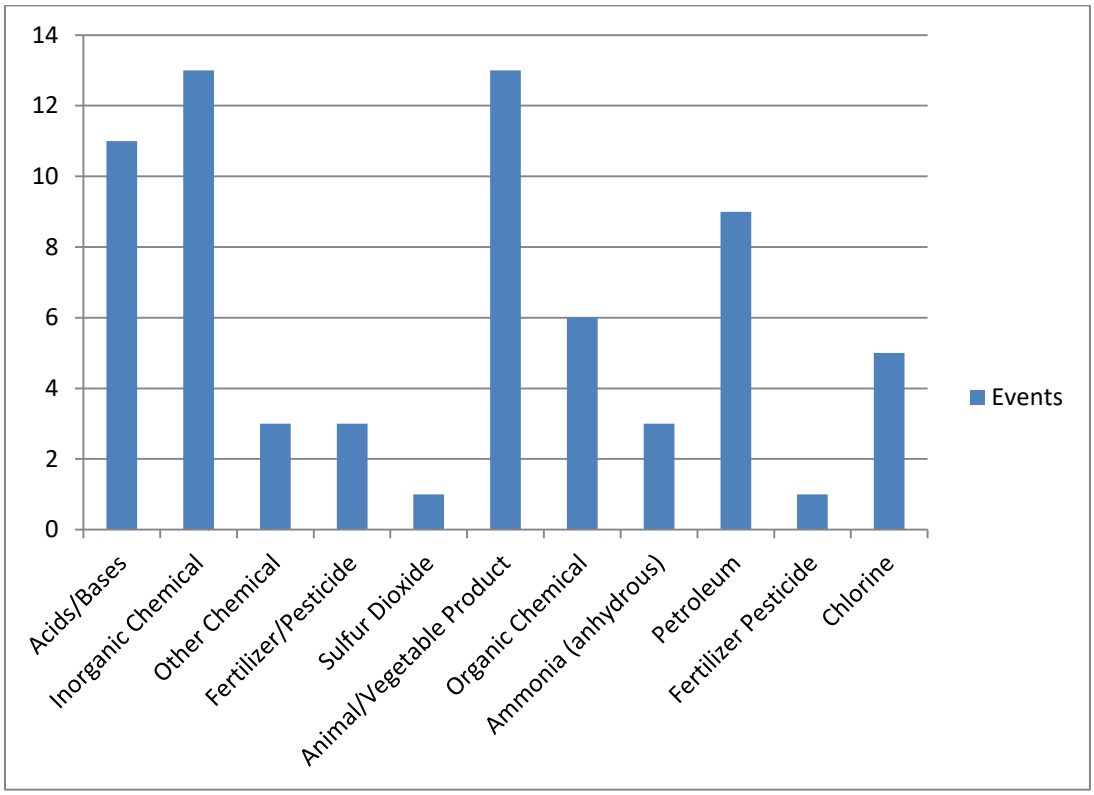


Figure 4: Hazardous Materials Spills by Type



Since 2000, there have been three pipeline transportation incidents in Linn County. The incidents involved anhydrous ammonia and water. Also, see Table 27 for pipeline transportation incidents in Linn County. The National Pipeline Mapping System (NPMS) map (refer to Map 24) displays only one incident. According to the Pipeline and Hazardous Materials Safety Administration, the NPMS does not including distribution or gas gathering pipelines.[19] In the incident shown in the NPMS, the incident occurred in 2004 and there were no fatalities or injuries.

Probability

Minor hazardous materials incidents occur frequently in Linn County. Most incidents are not a major threat due to small quantities or immediate containment. Any of the frequent incidents could become a major event if materials are released in a densely populated or environmentally sensitive area and/or involves a large amount of material.

The probability of a major hazardous materials incident occurring in Linn County is occasional, which is a probability between 10% and 19% in any given year. This probability estimate is based on historical occurrences and local capability to manage the common types of hazardous materials incidents.

Magnitude and Severity

People, pets, livestock, and vegetation in close proximity to facilities producing, storing, or transporting hazardous substances are at risk. Some hazardous materials may cause

immediate death, disablement, or sickness if absorbed through the skin, injected, ingested, or inhaled. Some chemicals may cause painful and damaging burns to skin if they come in direct contact with your body.

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

Most hazardous materials incidents are localized and are quickly contained or stabilized by the highly trained fire departments and/or 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 5 square miles or more. Many times, additional regions outside the immediately affected area are evacuated for precautionary reasons. More widespread effects occur when the material contaminates a source of 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.

Throughout Linn County, there are fixed facilities with hazardous materials—farm cooperatives, manufacturers, waste and water treatment facilities, etc. In addition, Linn County has major travel routes including Interstate 380, Highway 30, 100, and 13, railroad lines, and pipelines. Refer to the risk assessment maps for transportation incident.

Hazardous materials incidents can be widespread and severe, but historical occurrences in Linn County have had a negligible impact. It is most likely potential hazardous materials incidents will continue to have negligible impacts, although it is possible an incident can be severe.

Warning Time

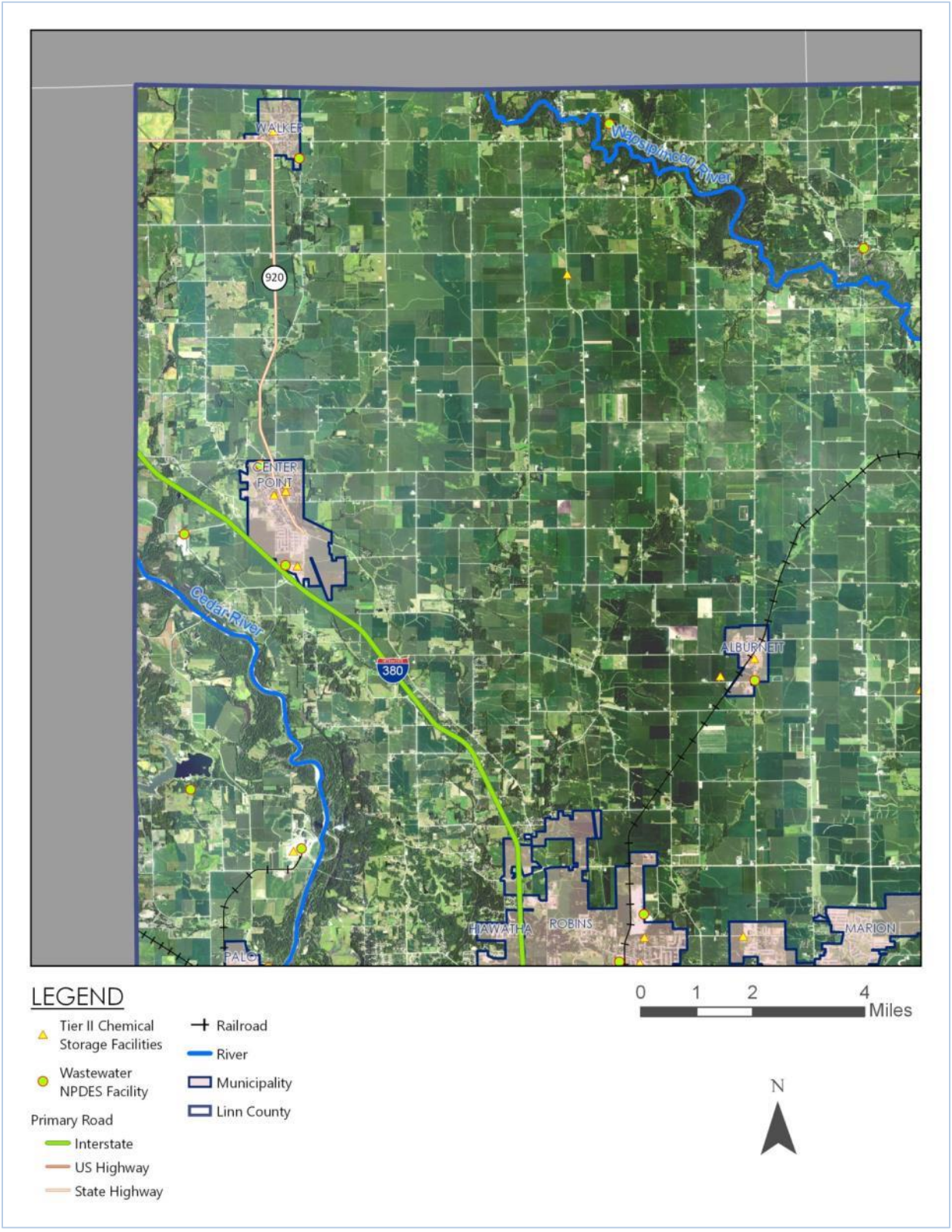
Hazardous materials incidents usually occur rapidly with minimal or no warning. Even if reported immediately, people in the area have very little time to react and/or evacuate. During some events, sheltering in-place is the best alternative to evacuation because there is no time to evacuate safely. Public address systems, television, radio, and weather radios disseminate emergency messages about incidents.

Duration

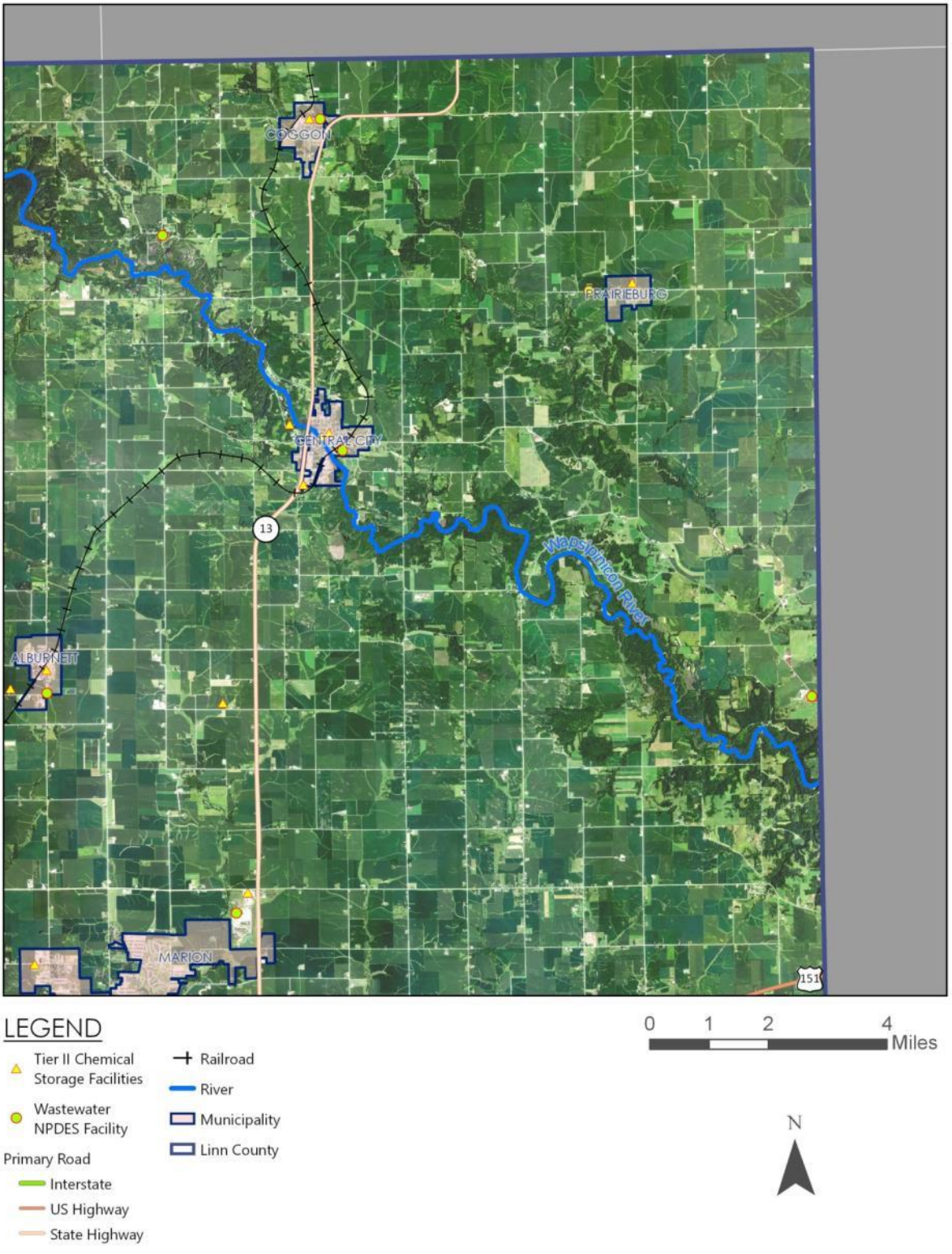
A hazardous materials incident can affect a community for a short period of time if the amount of material is relatively small and well-contained. On the other hand, a hazardous materials incident can be widespread, extremely dangerous and require long-term remediation and recovery. Response to a hazardous materials release is generally limited to the immediate effects, but response is expanded for environmental emergencies.

Risk Assessment Maps

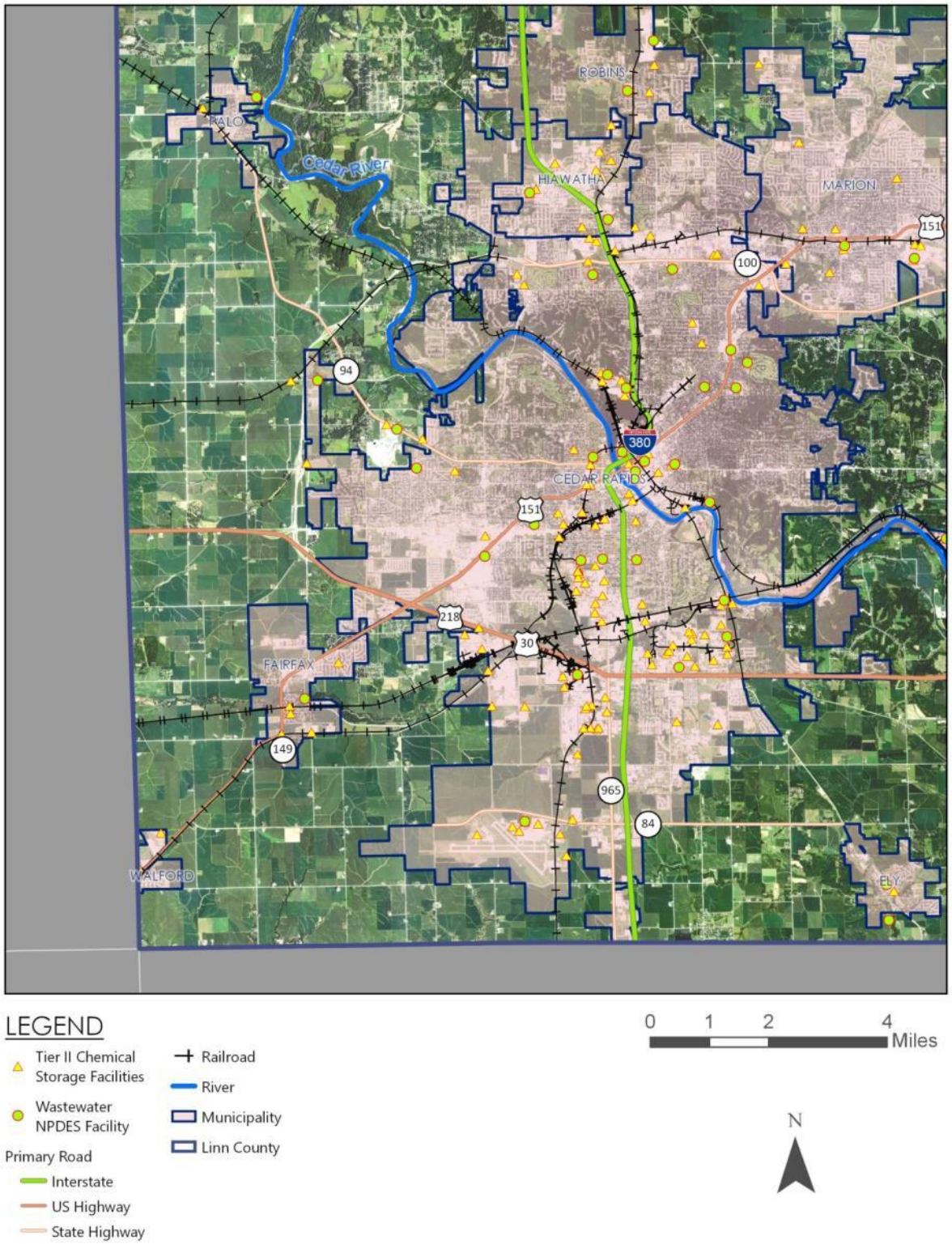
Map 20: Linn County Section 1 Tier II and Wastewater Facilities and Transportation Routes



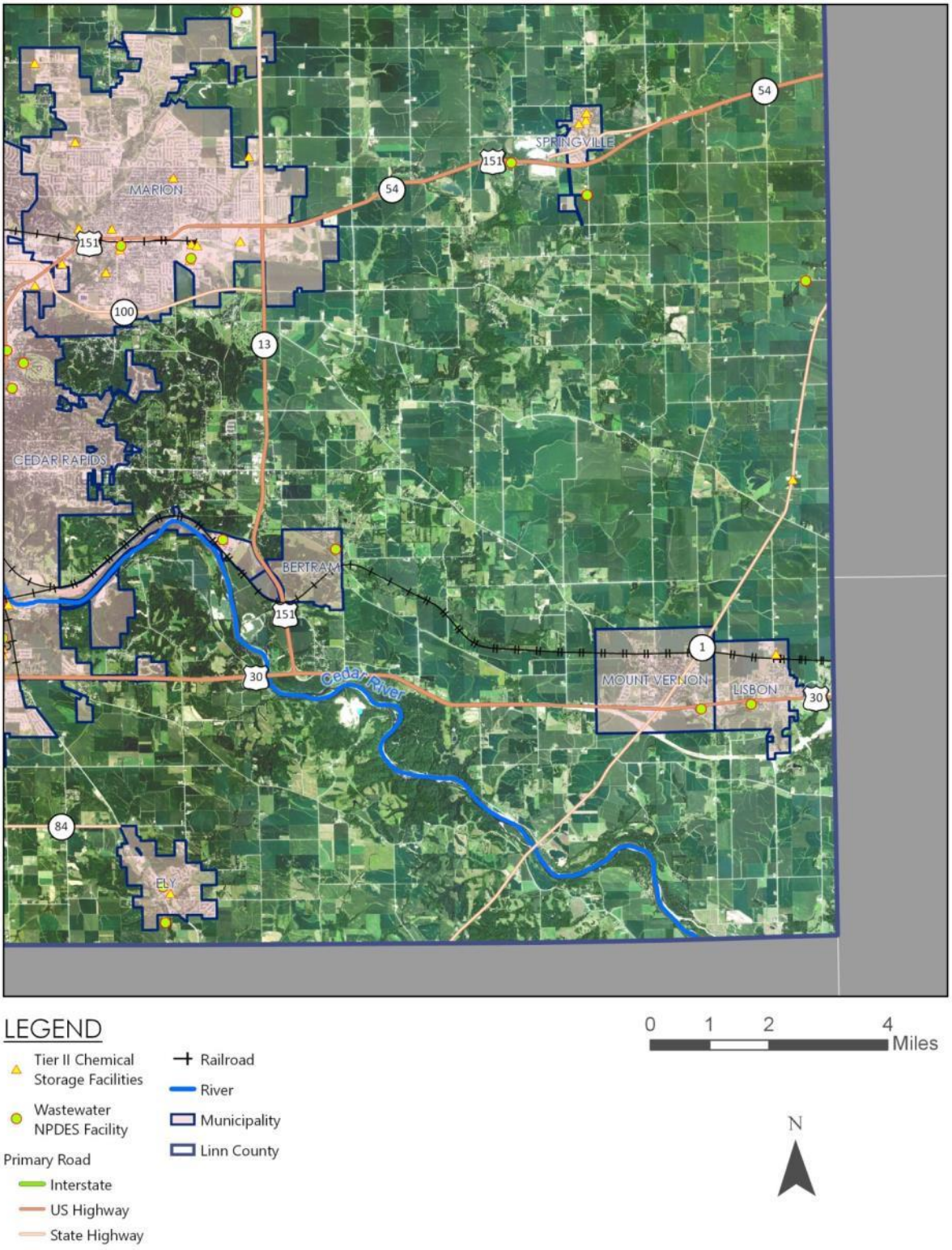
Map 21: Linn County Section 2 Tier II and Wastewater Facilities and Transportation Routes



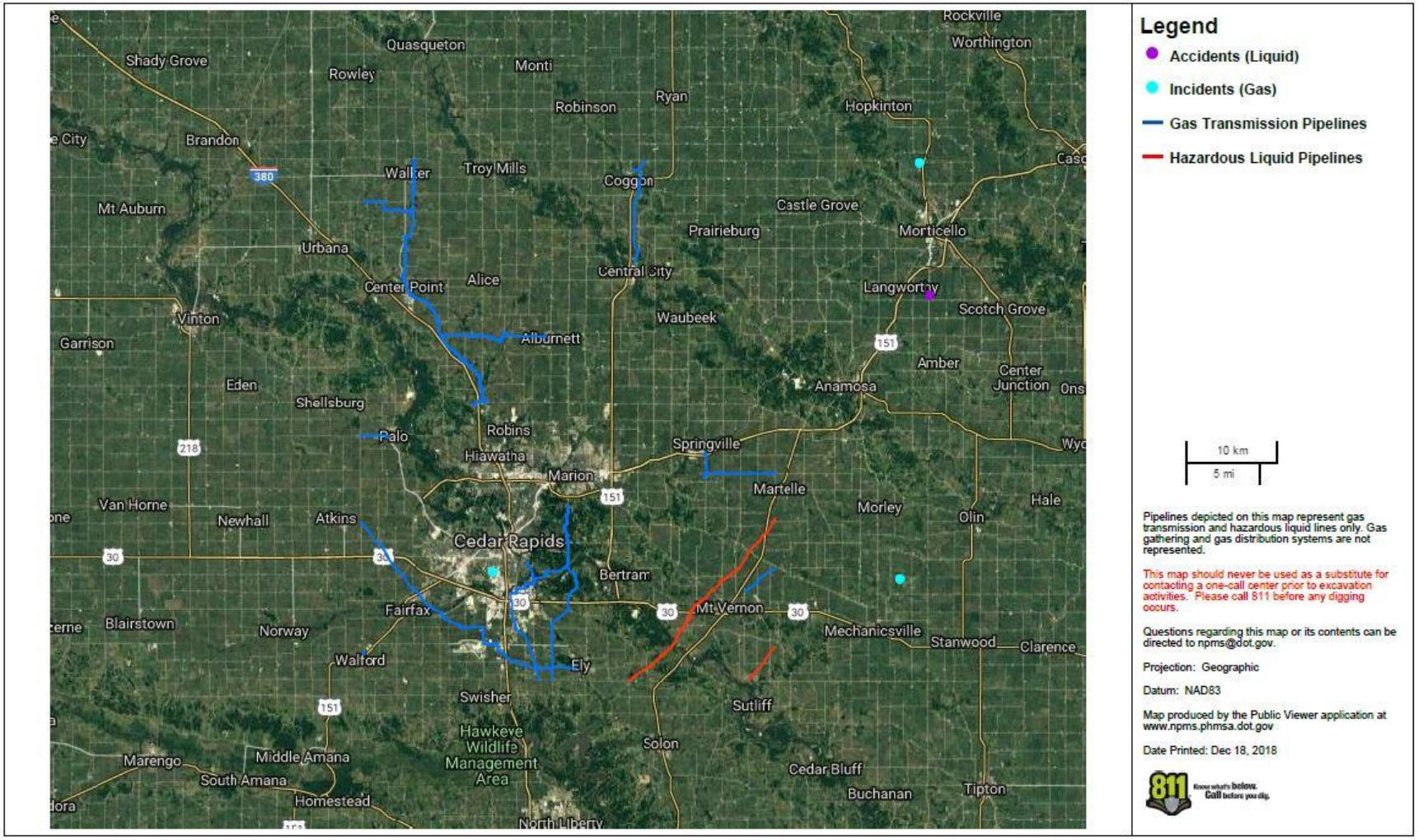
Map 22: Linn County Section 3 Tier II and Wastewater Facilities and Transportation Routes



Map 23: Linn County Section 4 Tier II and Wastewater Facilities and Transportation Routes



Map 24: Linn County Pipeline and Incidents



Infrastructure Failure

Definition of Hazard

This hazard encompasses communication failure, energy failure, structural failure, and structural fire. This includes an extended interruption, widespread breakdown, or collapse (part or all) of any public or private infrastructure that threatens life and property.

Potential Hazard Area

The potential hazard area for infrastructure failure in Linn County is countywide.

Historical Occurrences

There have been no widespread communication failures in Linn County. There are typically multiple power outages throughout Linn County each year.

The majority of major infrastructure failure, such as roads, bridges, or water infrastructure, is due to natural hazards that occur in Linn County. The persistent infrastructure failure that occurs in Linn County is backup of stormwater due to insufficient capacity during heavy rains or infiltration due to cracks in stormwater sewer lines. The most notable and recent infrastructure failure in Linn County occurred during a flash flood event in July 2014. A portion of the bridge on Highway 151 through Fairfax collapsed, and several portions of major highways were damaged. A driver was injured during the bridge collapse in Fairfax.

Structural fires occur often throughout Linn County, but typically, local capabilities are sufficient to respond and control the fire.

Probability

No widespread communications failures have occurred in Iowa or Linn County. Local incidents due to weather conditions, equipment failure, excavation incidents, and traffic accidents have been reported, but outages have usually been resolved in a timely manner. Widespread communications losses are unlikely due to backup systems and redundant system designs.

An extended interruption of electric, petroleum, or natural gas service, which by an actual or impending acute shortage of usable energy, could create a potential health problem for the population and possibly even mass panic. International events could potentially affect supplies of energy producing products while local conditions could affect distribution of electricity, petroleum, or natural gas. The magnitude and frequency of energy shortages are associated with international markets.

Local and state events such as severe winter storms can disrupt power distribution systems. If disruptions are long lasting, public shelters may need to be opened to provide shelter from

extreme cold or extreme heat. Stockpiles of energy products like power generators and fuel can eliminate short disruptions.

In Linn County, there have been structural failures, primarily structural damage, which is severe weather and flood-related. Throughout Linn County, local jurisdictions inspect and maintain structures or enforce local regulations to prevent failures that can cause injury, death, or property damage. Most often, structures are closed or decommissioned before a major failure event can occur, but there is still a likely probability of a failure occurring in Linn County.

Structural fires are a frequent occurrence in some communities, but nearly all are quickly extinguished by on-site personnel or local fire departments. In Linn County, there have been recent structural fires requiring major emergency response and recovery efforts. Despite comprehensive fire prevention and education in public, commercial, and residential structures, there is a likely probability for a major structural fire to occur in Linn County.

Magnitude and Severity

Most critical communication systems have backup and redundant designs to provide continuity of service. It should be noted that Linn County has the Joint Communications Center, located in Cedar Rapids, which coordinates emergency communications and emergency calls in Linn County. If a communications failure were to affect the communication center, the entire county would be affected and at risk, especially if the failure event occurred during a hazard event.

Energy failure, or power outages, can be widespread and last for several hours to a few days. Depending on the time of year, an extended period of time without power can be dangerous in extreme cold or heat conditions. In addition, power outages can limit the use of pumps or other necessary equipment to protect structures during other hazards, like flash food, that may affect an area during the outage.

Any structure in Linn County could become hazardous in the event of flooding, earthquake, fire, high winds, or other natural events. All structures are vulnerable due to normal deterioration and natural elements. Expected increases in traffic volume and weight will likely increase the vulnerability of transportation facilities in Iowa and Linn County.

The impacts of a failed structure would likely be contained to the immediate area and adjacent properties. The area could be as small as the house and yard of a fallen chimney, or the area could be relatively extensive if a failed structure is a multi-story building or a tall communications tower. Dam and levee failures would affect a much larger area and are discussed as separate hazards.

Occupants of older structures with outdated electrical systems not built to current fire codes are particularly vulnerable to fire. Structures with combustible materials are more vulnerable than steel or concrete structures. In addition, 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 are also at significant risk. The fire death risk for the elderly and children under 5 years of age is more than two times that of the average population.

With modern training, equipment, fire detection devices, and building regulations and inspections, most fires can be quickly contained and limited to the immediate structure involved. Certain circumstances, such as the involvement of highly combustible materials or high winds, can threaten a larger area. The density of a neighborhood can also make occupants and structures more vulnerable due to the potential of fire spreading.

Warning Time

A communications failure would likely occur with little or no warning. It is usually impossible to predict a communications failure. Some communications may be shut down for a short period of time for improvements or maintenance. These disruptions are usually made during periods of low demand and the people who rely on them are given notice that the system will be out of service.

A typical, more frequent type of energy failure, which is an electrical outage, does not have a warning. If an outage occurs because of severe weather, then warnings for severe weather events can be considered a warning, but it is difficult to predict whether or not utilities will be impacted. Overall, this type of energy failure cannot usually be predicted.

The failure of a structure would likely occur suddenly with little or no warning. Inspection and maintenance of public structures and enforcement of local regulation usually prevents failure or removes people who are vulnerable. Causal hazards can include fire, explosion, overloading of ice and snow, earthquakes, flooding, high wind, erosion, chemical corrosion, subsidence, and lack of general upkeep.

While fires usually start with little or no warning time, alert devices can allow time for responders to contain the fire and allow occupants to evacuate the area.

Duration

With the exception of structural failure and fires, which are handled by local response personnel, communication failure and energy failure are usually widespread in nature and may require outside resources to assist the county in emergency response.

Levee and Dam Failure

Definition of Hazard

Levee failure can be attributed to the loss of structural integrity of a flood wall or berm by erosion, piping, saturation, or under seepage causing water to inundate normally dry areas.

Dam failure is the uncontrolled release of impounded water resulting in downstream flooding, which can affect life and property. Dams are constructed for a variety of uses, including flood control, erosion control, water supply impoundment, hydroelectric power generation, and recreation.

Dams are classified as high, moderate, or low hazard to indicate the potential impacts of failure. The classifications, which do not signify the likelihood of failure, are:

- High Hazard—Failure may result in loss of life and extensive damage
- Moderate Hazard—Failure may damage isolated homes or cabins, industrial or commercial buildings, moderately traveled roads, interrupt major utility services; and there is no substantial risk of loss of life. Or the dam and its impoundment are of public importance, such as water supply, public recreation, or a feature in a private development complex.
- Low Hazard—Failure would be limited to loss of the dam, livestock, farm outbuildings, agricultural lands and lesser used roads, and loss of life is unlikely.

Potential Hazard Area

There are nineteen dams located throughout Linn County. The nearby upriver dams outside of the county are low-hazard dams, except one moderate hazard dam that is over 12 miles from the border. Refer to the risk assessment map, Map 25. The potential hazard area for dam failure is generally the areas surrounding and downstream of the dam. Overall, dam classification determines the potential risk if failure were to occur. Of the nineteen dams in Linn County, all are low hazard except two that are classified as moderate hazard and two that are classified as high hazard. The moderate hazard dams are private. The Gehring Dam is northwest of Hiawatha and the Lakeside Development Dam is just east of Cedar Rapids. The high hazard dams are the Pleasant Creek Lake Dam, which creates the Pleasant Creek Lake north of Palo, and the Aegon Dam in south Cedar Rapids.

Aside from the levee constructed along the Cedar River at the Quaker Oats facility in downtown Cedar Rapids, there are currently no effective levee structures in Linn County. Some levee structures had been constructed in Cedar Rapids, but according to the Army Corps of Engineers, the structures were not sufficient before the major flood in 2008. Cedar Rapids is currently in the process of designing and constructing a flood control system, which includes

levee structures.[20] Failure of these structures would result in major flooding in nearby flood prone areas.

Historical Occurrences

There have been no major failures of dams or *effective* levee structures in Linn County.

Probability

The Iowa Department of Natural Resources inspects major dams and levee structures. Major dams are all high hazard dams plus moderate hazard dams that have a permanents storage volume exceeding 100 acre-feet or a total water storage volume to the top of the dam exceeding 250 acre-fee. Low hazard dams with a product of the storage, in acre-feet, and height, in feet, exceeds 30,000 are also considered major. All of the moderate- and high-hazard dams plus one low-hazard dam are major dams. Major dams and levee structures in Linn County are regularly inspected and maintained so it is unlikely a major dam failure would occur. In addition to historical occurrences, this probability estimate is based on the *2013 Iowa Hazard Mitigation Plan* and local knowledge.

Magnitude and Severity

Most of the dams in Linn County are low risk so failure would likely result in flooding of the surrounding area and downstream flood prone areas. For the high hazard dams, Pleasant Creek Lake Dam and Aegon Dam, there is a risk of loss of life and severe property damage. The Pleasant Creek Dam has a normal storage of 9,843 acre-feet, so downstream effects in Cedar Rapids are possible; however, over eight miles separate the dam and city limits. The risks to life and property by the Aegon Dam would be more localized, as its normal storage is only 88 acre-feet. It should be noted, the 5-in-1 Dam in Cedar Rapids is classified as a low hazard dam despite its substantial presence on the Cedar River. The potential impacts of a failure would likely be widespread but not an immediate threat to safety. Refer to the risk assessment maps.

Warning Time

There is usually little to no warning in the event of a dam or levee break unless a potential failure is being monitored. Because of close monitoring, if major local dams were to fail, there would likely be several hours for people in the surrounding and vulnerable downstream areas to evacuate.

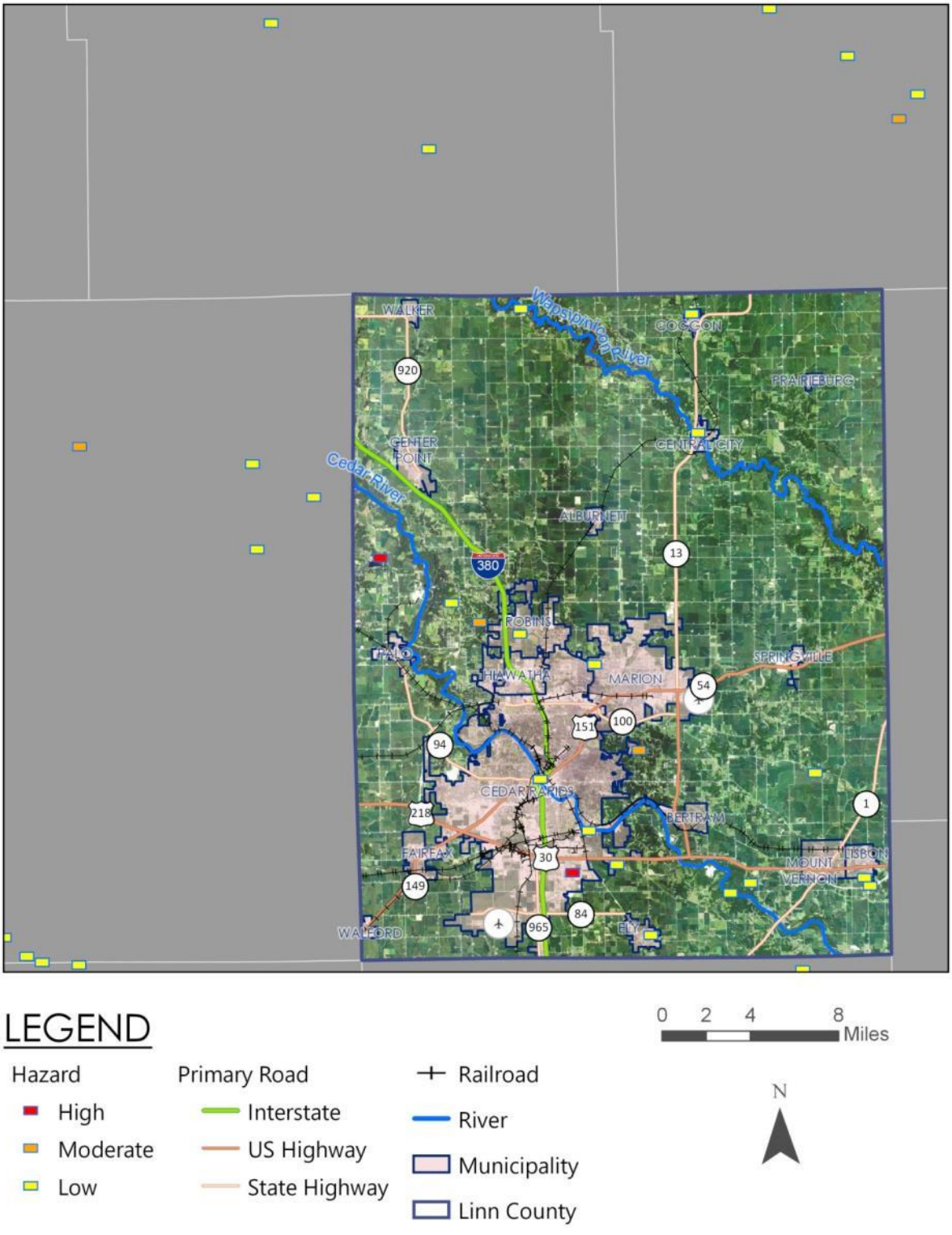
Duration

Response to a dam or levee failure would be extensive and require wide ranging recovery efforts for reconstruction of the original flood control structures and any damaged property.

Risk Assessment Maps

The surrounding and downstream areas of a dam are at risk during a dam failure event. The type of dam and severity of failure ultimately determine the geographic extent of risk. To indicate immediate and downstream areas directly at risk if a dam failure were to occur, the risk assessment maps include the location of dams in Linn County.

Map 25: Dams In and Upstream From Linn County



Radiological Incident

Definition of Hazard

This hazard encompasses fixed radiological incident and transportation radiological incident, which involve and incident resulting in a release of radiological material in transport or at a fixed facility to include power plants, hospitals, laboratories, and other facilities with radioactive material.

Potential Hazard Area

The potential hazard area for a radiological incident in Linn County is countywide. The Duane Arnold Energy Center (DAEC), which is the nuclear power plant north of Palo, maintains warning sirens in all areas within the evacuation area if an event were to occur. Refer to the risk assessment maps, Map 26 and Map 27. The DAEC is scheduled to shut down in 2020, but decommissioning of the plant will take many more years. A "gradual reduction in staffing" to fewer than 50 employees will occur over the next seven years, beyond the authorization period of this plan.[21]

Historical Occurrences

There is no history of radiological incidents in Iowa.

Probability

Historically there have been no significant releases of radiation from fixed facilities in Iowa or even the United States. Iowa does have one nuclear power plant located within its borders. Duane Arnold Energy Center is located near the city of Palo in Linn County. Three other nuclear facilities border Iowa.

There have also been no occurrences of radiological incidents in Iowa. Transportation accidents are the most common type of incident involving radioactive materials because of the high frequency of radioactive shipments. Radioactive materials are transported through the United States and Iowa regularly.

Operators of facilities with radioactive materials and transporters of radioactive waste are trained in the packaging, handling. In addition, the shipment of radioactive waste is closely regulated. The likelihood of an incident is unlikely but still possible.

Magnitude and Severity

Sources of radioactive materials include medical products, industrial products, nuclear power plant fuel, nuclear weapons, and radioactive waste from hospitals, laboratories, nuclear reactors, and military facilities.

In over 50 years of nuclear power production in the U.S., no deaths or injuries from radiation have been recorded among the general public. Each of the nuclear facilities in the country

identifies a 10-mile radius Emergency Planning Zone and a 50-mile radius Ingestion Pathway Zone. Refer to Map 26 and Map 27. The Duane Arnold Energy Center has completed construction of on-site storage facilities for spent nuclear fuel.

Depending on the level of exposure, radiation can cause loss of life and long- and short-term health effects. 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.

Specialized training is needed to respond to these types of incidents. If inadequately trained personnel attempt to respond, the impacts could be the same as those for the general public exposed to the toxic materials. Proper training and equipment greatly reduce the risk to response personnel.

If the land and facilities cannot be used for weeks, months, or even years, the loss of production would be devastating. Economic impacts would be multi-sector and long-lasting, especially in and around the affected region.

Warning Time

A radiological incident in Iowa could result from an incident in handling or transporting radioactive materials. This accident could occur with little or no warning. Ionizing radiation cannot be detected with human senses. Detection instruments are needed to indicate the existence of radiation. Distance from the incident would dictate the amount of time needed to avoid exposure from damaging radiation.

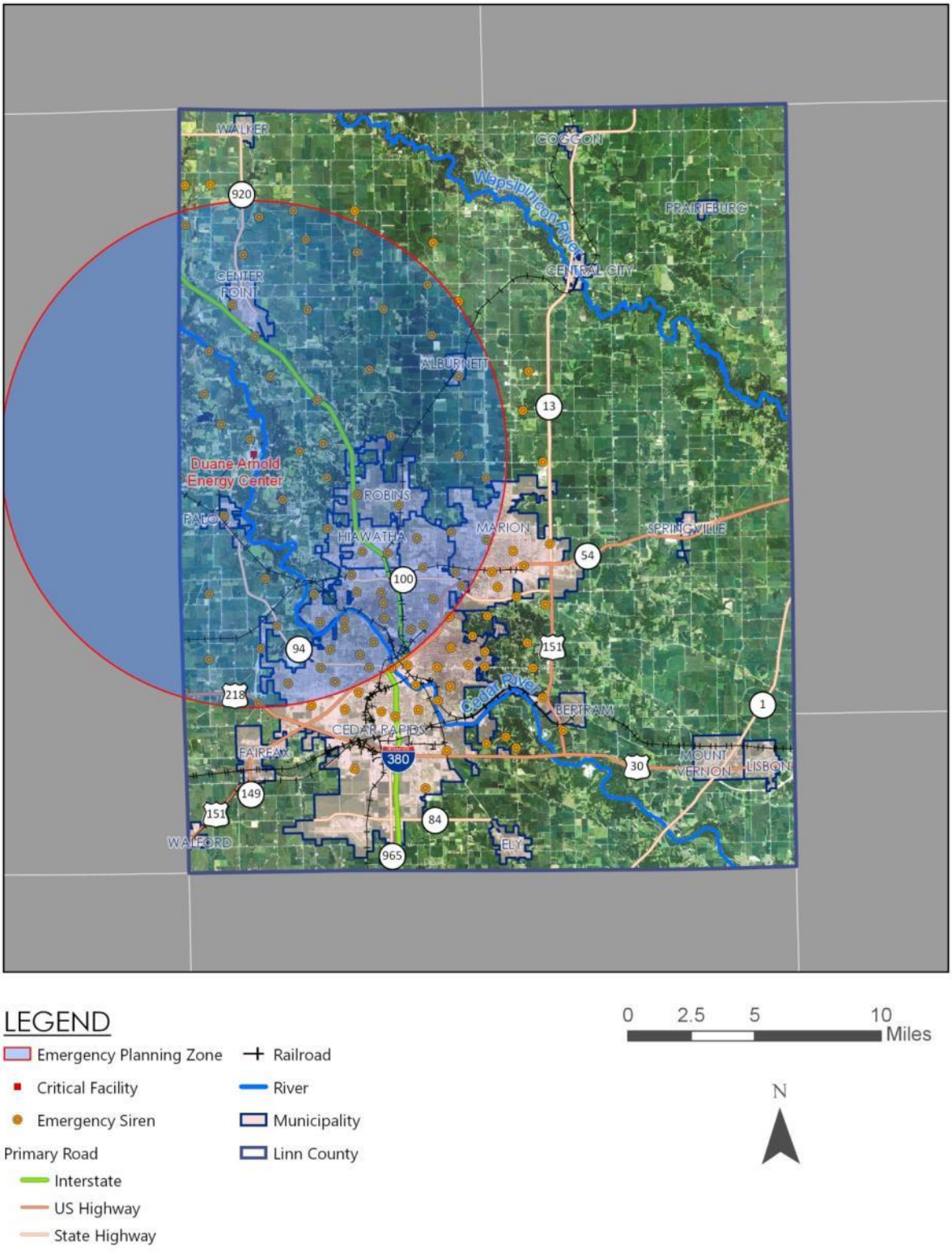
Duration

Responding to the effects of a radiological release in Iowa is extensive and will require resources and assistance from several Federal agencies to determine and evaluate the threat to life and the environment in the affected sub-areas.

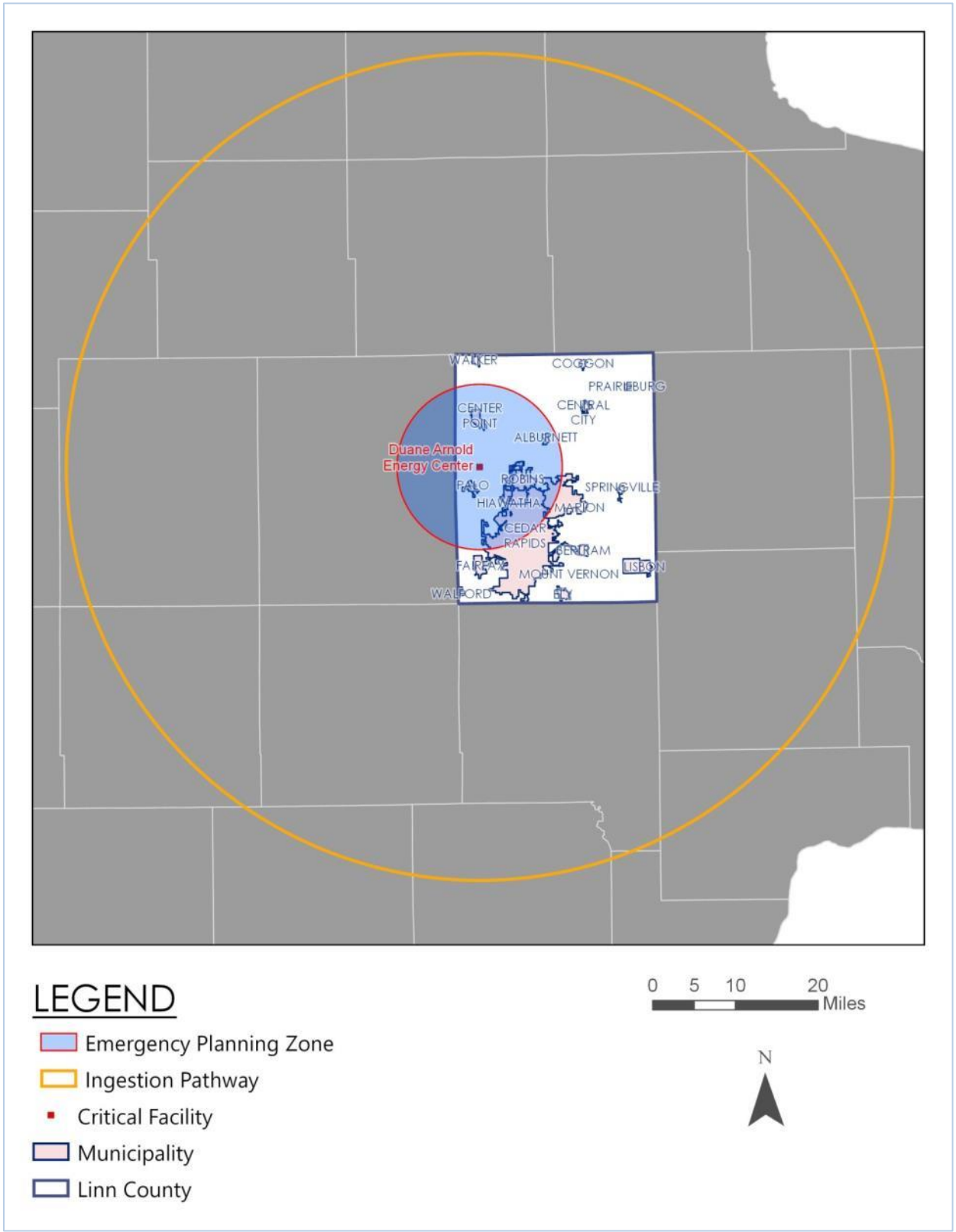
Risk Assessment Maps

A map of the location of the Duane Arnold Energy Center and warning sirens maintained by the facility in evacuation areas and a map of the Emergency Planning Zone and Ingestion Pathway are included.

Map 26: Duane Arnold Energy Center and DAEC-Controlled Warning Sirens



Map 27: DEAC Emergency Planning Zone and Ingestion Pathway



Transportation Incident

Definition of Hazard

A transportation incident is generally an accident involving any mode of transportation that directly threatens life and results in a combination of death, injury, property damage, or adverse impacts to a community's capabilities to provide emergency services.

An air transportation incident may involve a military, commercial, or private aircraft. Air transportation incidents can occur in the air or on the ground. In addition, incidents can occur at or near an airport, in remote unpopulated areas, residential areas, or dense urban areas.

A highway transportation incident can be a single or multi-vehicle incident requiring response exceeding normal daily capabilities.

A railway transportation incident may include derailment, collision, and at-grade highway crossing accidents. Train incidents can result from a variety of causes including human error, mechanical failure, faulty signal, or problems with the track. Results of an incident can range from minor "track hops" to catastrophic hazardous material incidents and even human or animal casualties.

A waterway incident involved any incident with a water vessel. In addition, waterway incidents may include events in which a person or object fall through the ice on partially frozen bodies of water.

Potential Hazard Area

The potential hazard area for a transportation incident in Linn County is countywide, but transportation infrastructure and surrounding areas are the primary potential hazard areas. Map 28 is an image of the Iowa Department of Transportation (IDOT) Highway and Transportation Map for Linn County, which presents the location of all transportation infrastructure in the county. The full PDF document can be accessed on the IDOT website.[22] For an air transportation incident, though, anywhere below a flight path in Linn County could be affected. There are two airports in Linn County. One is in Cedar Rapids, and the other is in Marion. For a road or rail incident, any area in close proximity to road or rail line, respectively, is a potential hazard area, with at-grade crossings being potential hazard for both modes. For a waterway incident, any body of water and the surrounding areas could be affected.

Historical Occurrences

Since 2000, there have been nine airway incidents in Linn County. Refer to Map 29. There were no deaths reported for any of the incidents. The majority of incidents were reported in Cedar Rapids, which is where the Eastern Iowa Airport is located. The Cedar Rapids municipal airport

is the main airport in Linn County, and one of the major regional airports in Iowa. Marion is the other city in Linn County with a municipal airport. Refer to Table 28.

Table 28: Airway Incidents 2000–2016

Event Date	Location	Injury Severity
10/3/2004	Marion	Non-Fatal
12/20/2004	Cedar Rapids	Non-Fatal
9/6/2006	Cedar Rapids	Non-Fatal
6/28/2007	Cedar Rapids	Non-Fatal
4/20/2008	Fairfax	Non-Fatal
7/28/2008	Marion	Non-Fatal
1/16/2010	Cedar Rapids	Non-Fatal
1/17/2010	Cedar Rapids	Non-Fatal
2/11/2014	Marion	Non-Fatal

Source: National Transportation Safety Board Database, November 2017

Overall, highway transportation incidents in Linn County are regularly handled by local emergency responders. Highway transportation incidents will rarely exceed local capabilities because the local emergency responders complete ongoing and interagency training for incidents that could occur along major and minor travel routes. Incidents that could exceed local capabilities would be crashes involving many vehicles or may involve large amounts of dangerous materials. According to the Iowa Department of Transportation, Linn County has averaged almost 9 crashes per day from 2008–2017. Refer to Table 29. On average, there were 12.2 crashes resulting in a fatality each year, with the fewest in 2015 and the most in 2012 and 2016, with 5 and 17, respectively. The majority of crashes each year are property-damage-only incidents, with an average of 71.6% over the ten-year period.

Table 29: Linn County Auto Crashes 2008–2017

Crash Year	Fatal	Major Injury	Minor Injury	Possible/ Unknown	Property Damage Only	Total
2008	11	94	441	586	2,601	3,733
2009	14	57	406	541	2,437	3,455
2010	11	56	305	486	2,309	3,167
2011	8	42	317	492	2,091	2,950
2012	17	64	319	514	2,159	3,073
2013	11	54	297	474	2,268	3,104
2014	13	67	339	490	2,260	3,169
2015	5	52	298	562	2,358	3,275
2016	17	47	301	524	2,440	3,329
2017	15	46	282	567	2,419	3,329
Total	122	579	3,305	5,236	23,342	32,584

Source: Iowa Department of Transportation, December 2018

A major transportation incident concern in participating jurisdictions involves vehicles at railroad crossings. In Linn County, there are four railroads: Cedar Rapids and Iowa City, Chicago

Central and Pacific, Iowa Northern, and Union Pacific. According to the Federal Railroad Administration, from 1998 to 2017, there were 72 accidents, with the majority, 49, being derailments.[23] These derailments were likely small-scale, as the average reportable damage per derailment is approximately $87,000. There are 211 at-grade crossings in Linn County: 138 are on public roads, and 72 are on private roads. From 1998 to 2017, there were two highway-rail accidents. One in 2000 resulted in $7,596 in property damage and 1 injury. The other occurred in 2012 and resulted in $19,256 in property damage and one fatality.

The remaining type of transportation incident is a waterway incident. According to the *2013 Iowa Hazard Mitigation Plan*, there have been no waterway incidents involving large water vessels in Iowa. Across the state, there have been numerous waterway incidents that involve a single person or private boats with only a few people on board. See Table 30 for information about the type of recreational boating accidents in Iowa. One fatality occurred in a kayaking accident in 2018.[24] Comprehensive accident data is not widely available at the local or county level.

Table 30: Iowa Recreational Boating Accidents 2005–2016

Accident Event	Accidents	Vessels	Injuries	Deaths
Capsizing	41	41	29	19
Collision with commercial vessel	2	4	1	1
Collision with Fixed Object	45	48	35	1
Collision with Floating Object	9	9	4	0
Collision with government vessel	1	2	0	0
Collision with Recreational Vessel	55	110	35	7
Collision with submerged object	11	11	5	2
Collision with Vessel	41	83	31	2
Departed vessel	1	1	0	1
Ejected from vessel	2	2	2	0
Fall in vessel	17	18	21	0
Fall Overboard	35	37	20	16
Fire/explosion (fuel)	11	11	8	0
Fire/explosion (non-fuel)	2	2	2	0
Flooding/swamping	36	38	14	5
Grounding	32	32	5	0
Other	8	8	10	0
Person Departed Vessel	14	15	6	6
Person ejected from vessel	22	22	21	5
Person Struck by Propeller	10	11	9	1
Person Struck by Vessel	8	11	8	0
Sinking	1	1	0	0
Skier Mishap	66	68	70	1
Total	470	585	336	67

Source: United States Coast Guard Boating Safety Resource Center Database, May 2018

Major water recreation areas in Linn County include Pleasant Creek Lake—near Center Point and Palo— and the Cedar and Wapsipinicon rivers. There are ponds and creeks located throughout Linn County that are used for recreation.

PROBABILITY

From 2000–2016, there have been nine non-fatal air transportation incidents in Linn County. Flight paths over the county, especially around the airports in Cedar Rapids and Marion, present

a risk for an air transportation incident to occur within the county. With nine events over a seventeen-year period, the probability of an air transportation incident occurring is highly likely. As part of the larger transportation incident hazard, an air transportation incident has an unlikely or occasional probability, i.e. few incidents relative to other modes of transportation. There is a greater than 50% chance for an air transportation incident based on historical data, but there have also been two four-year periods without any incidents and no fatalities.

Auto crashes occur in Linn County every year, averaging almost nine crashes per day in the last ten years. Overall, a highway transportation incident is likely. These accidents can result in property damage, injury, or death; however, over 70% are property-damage-only incidents. With a growing population in Linn and Johnson (directly to the south) counties, and the daily commuting into and out of Linn County, the number of auto accidents may increase in coming years. According to the U.S. Census Bureau Longitudinal Employer-Household Dynamic, in 2015 approximately 45,706 employees resided outside of the county. Conversely, 25,703 Linn County residents commuted outside of the county for their primary employment. The combination of large numbers of people on the road, wildlife, weather conditions, potential mechanical problems, and human error increases the probability of a transportation incident occurring in Linn County.

Train accidents have occurred every year from 1998 to 2017 except 2015, so train accidents are highly likely; however, no accident resulted in over $500,000 in damage—except in 2008, when 18 cars and the bridge they were placed on to hold it in place during historic flooding were washed away. Highway-rail accidents and fatalities are also unlikely based on historical events.

There have been few waterway incidents across Iowa and none in Linn County that have exceeded local capabilities. Statewide, there have been search and rescue events involving a single person or small boats with only a couple people on board. Small scale incidents have resulted in loss of life from pleasure craft collisions and falls from vessels, but the probability of a waterway incident is unlikely.

Magnitude and Severity

For airway incidents, people aboard airplanes are the most vulnerable. Statistics from the National Transportation Safety Board and the airline industry show that the majority (over 75%) of airplane crashes and accidents occur during the takeoff or landing phases of a flight. As a result, developed areas adjacent to the airports and in airport flight paths are particularly vulnerable to this hazard. For areas away from the airport, a smaller percentage of the population would be directly in the area of impact. Because of the infrequency of aircraft in the skies above areas away from the airport, these areas would not be considered as vulnerable.

As mentioned, most accidents occur during takeoffs and landings. Accordingly, the spatial extent of the majority of incidents would occur on airport grounds or adjacent areas. There are two airports in Linn County. Compared to many other hazards, an air transportation accident would occupy a relatively small area. For the location of airports in Linn County, refer to the risk assessment maps.

The extent to which the impacts would be felt would depend on the materials involved. For example, if a cargo plane transporting volatile or hazardous substances were involved in an accident, the area of concern would be significantly larger than the area for an accident involving a small personal aircraft carrying stable materials. The largest share of accidents would likely affect only a few city blocks.

The people who use the surface transportation system are most vulnerable in a highway transportation incident. Travelers, truck drivers, delivery personnel, and commuters are at risk at all times that they are on the road. During rush hours, holidays, and major events, the number of people on the road is significantly higher. Pedestrians and citizens of the community are less vulnerable but are still vulnerable in a highway transportation incident.

Linn County is crisscrossed by city streets, county roads, Iowa highways, a U.S. highway, and an interstate highway. Refer to the risk assessment maps for major transportation infrastructure in Linn County. Highway incidents are usually contained to areas on the roadway or directly adjacent to the roadway. Very few highway incidents affect areas outside the traveled portion of the road and the right-of-way. Extensive segments of the transportation system can be impacted during significant weather events, such as a large snowstorm, when multiple and separate accidents occur. The area of impact can extend beyond the localized area if the vehicle(s) involved are transporting hazardous materials.

Four railroads have rails that cross Linn County, including several cities. For railway locations, refer to the risk assessment maps. People and property in close proximity to railroad tracks, crossings, sidings, switching stations, and loading/unloading points are most at risk. Those away from railroad tracks and facilities are vulnerable only to large-scale incidents including those in which hazardous materials are involved.

Rail and highway incidents are usually limited to areas in and near at-grade crossing—138 public crossings and 211 total crossings. Rarely, the incident will result in widespread effects. The direct area of impact is usually quite small, but depending on the vehicle(s) and material(s) involved, the area could become extensive. Derailments can affect areas beyond at-grade crossings. If hazardous materials are involved, the effects could reach miles beyond the incident. Harmful products may contaminate streams, rivers, water distribution systems, and storm water systems. The ability of response agencies to contain the product on-scene usually limits the area affected.

Passengers of pleasure craft are most vulnerable in a waterway incident. The maximum extent of a waterway incident would be limited. Impacts would not extend beyond the immediate incident scene. The only exception would include a search and rescue event that could expand downstream.

For transportation incidents in Linn County, the potential magnitude and severity is estimated to be limited. A transportation incident could result in injuries, up to 10% to 25% of property damaged, and shutdown of facilities for a week. The property damage estimate is estimated relatively high, because if a transportation incident were to occur in a small jurisdiction, a high percentage of the community can be impacted. Overall, the magnitude and severity estimate is

based on historical occurrences, existing hazard mitigation plans, the *2013 Iowa Hazard Mitigation Plan*, and local knowledge.

Warning Time

The amount of warning time prior to an aircraft accident could vary from several minutes to a matter of seconds. Crew aboard a troubled aircraft can radio to ground crew to prepare for the incident, but little can be done to lessen the direct effects of the impact. Rarely, there is adequate time to do more than position on-site emergency response personnel.

There is usually no warning of highway incidents. During snow storms and other severe weather events that may impede travel, travelers, response agencies, and hospitals alike can be notified of hazardous travel conditions. Flash flooding is a common travel hazard in Linn County, and warnings are often issued several hours before the flooding may occur.

Like other transportation incidents, a railway incident would occur with no warning. There may be a limited amount of time to warn those in the pathway of the harmful effects.

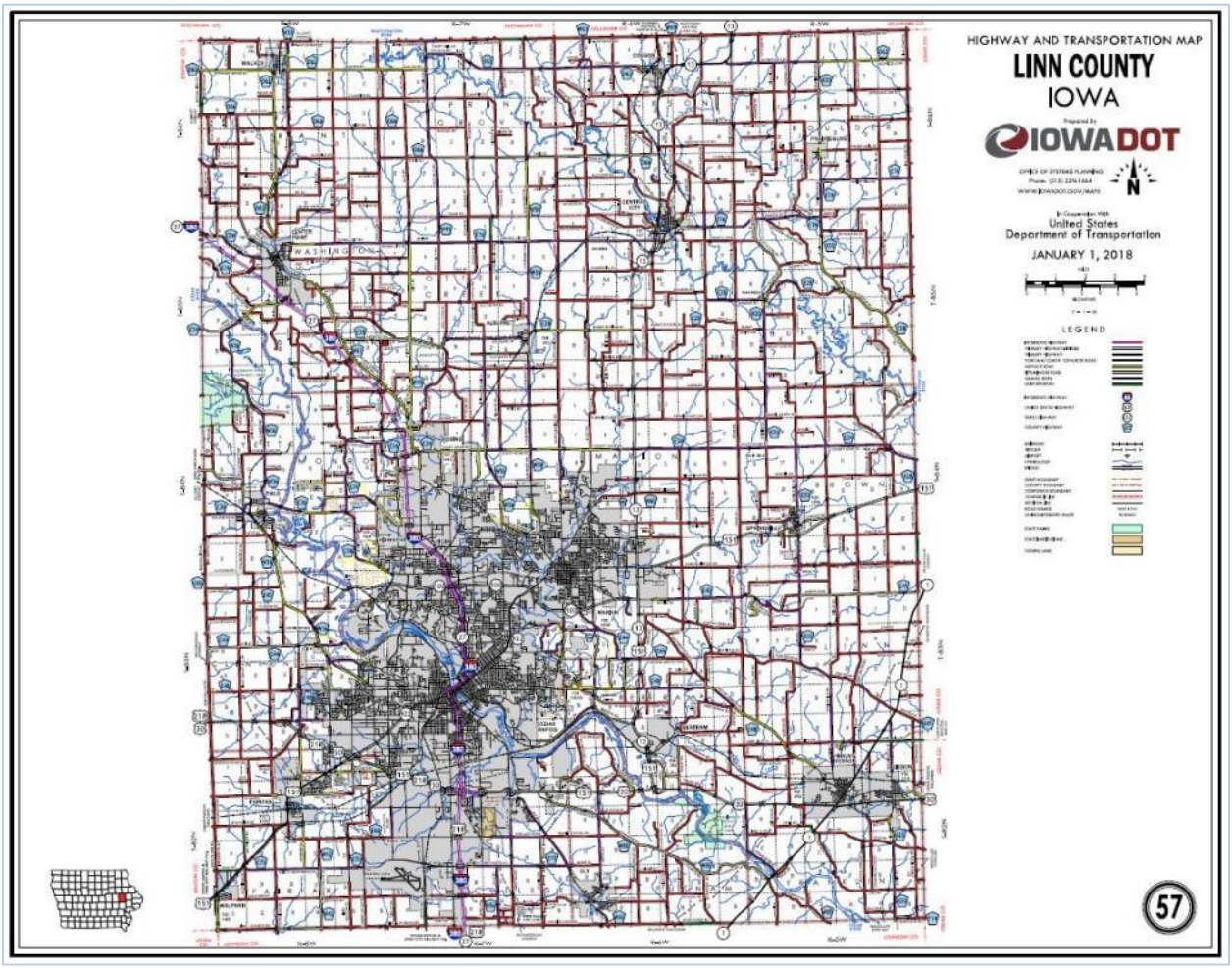
Leading causes of waterway incidents are inclement weather and operator error and incidents would occur with little or no warning. Weather forecasts are usually available days in advance and would give ample time to take shelter away from water.

Duration

Transportation incidents, particularly rail-, air-, and waterway-related hazards are likely to create more intensive response and resources to protect life and safety of those affected.

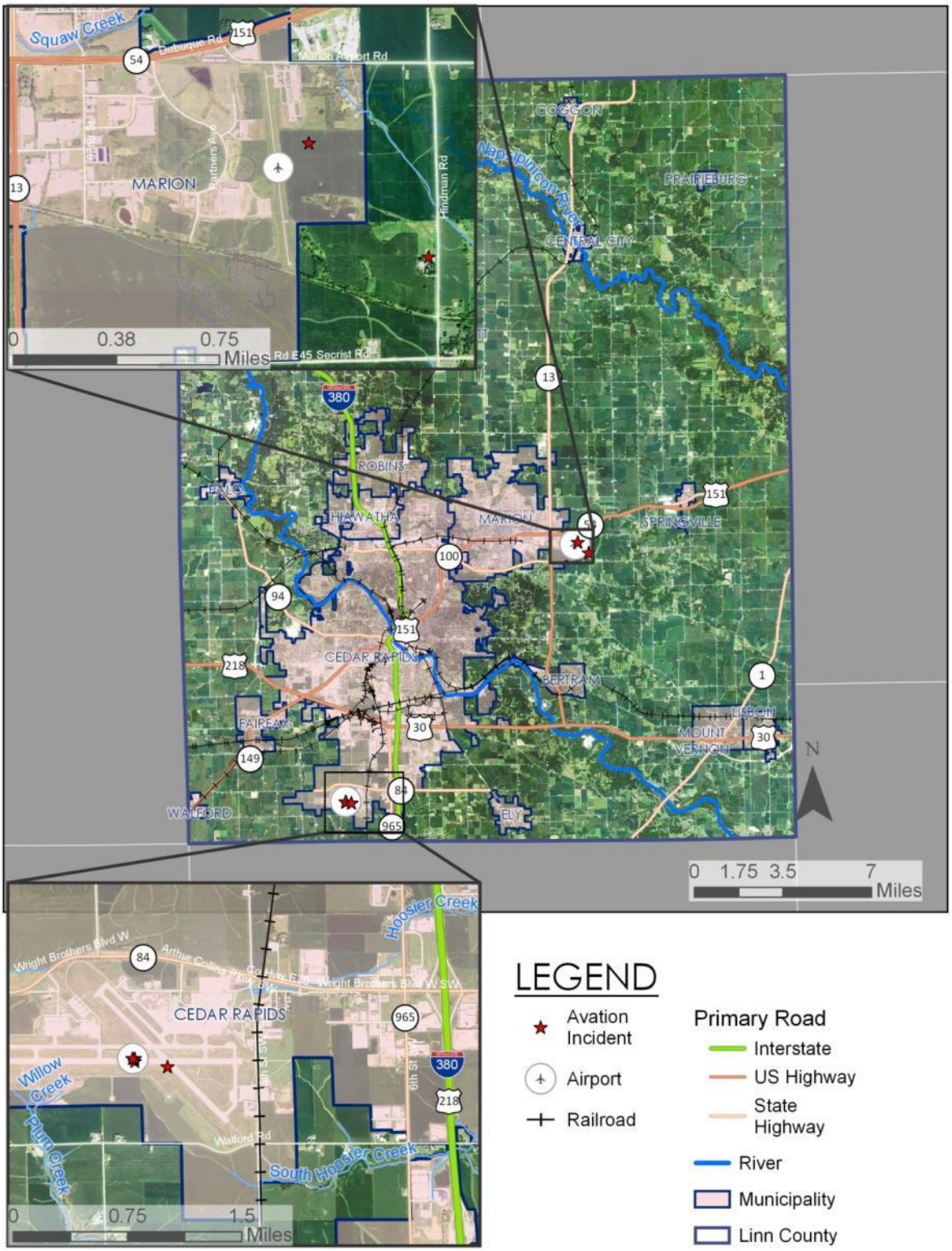
Risk Assessment Maps

Map 28: Linn County Transportation Map



Source: Iowa Department of Transportation

Map 29: Locations of Airway Incidents 2000–2016



Human-Caused Hazards

Terrorism

Definition of Hazard

This hazard encompasses the following specific hazards: enemy attack, biological terrorism, agro-terrorism, chemical terrorism, conventional terrorism, cyber terrorism, radiological terrorism, and public disorder. This includes the use of multiple outlets to demonstrate unlawful force, violence, and/or threat against persons or property causing intentional harm for purposes of intimidation, coercion or ransom in violations of the criminal laws of the United States. These actions may cause massive destruction and/or extensive casualties.

Potential Hazard Area

The potential hazard area for a terrorism event in Linn County is countywide.

Historical Occurrences

Linn County has not been the direct target of a major terrorism event. There have been threats and potential acts of terrorism, but none have resulted in injury, death, or destruction.

Probability

The federal government monitors the international political and military activities of other nations and would notify the State of Iowa of escalating military threats. There are many small military installations in Iowa; most are Iowa National Guard assets spread throughout the state comprised of various military units and functions. In Linn County, an Iowa National Guard facility is located in Cedar Rapids.

There have been no enemy attacks on or in Iowa in modern times. The only history of enemy attack dates back to early settlement and the Civil War in the 1800s. The breakup of the Soviet Union and other Soviet-Bloc nations has ended the Cold War. An enemy attack is a remote possibility due to international conflicts and the large number of weapons still in existence throughout the world. Although a fairly dense and populated metropolitan area is located in Linn County, in an all-out military attack on the United States, it is unlikely that Iowa and Linn County would be a primary target during a conventional attack.

Despite not experiencing a full terrorism event, Iowa has experienced many terrorist threats. Most incidents have been limited to reported “suspect” powders, actual threats, and hoaxes. Beginning in October 2001, following the original “Amerithrax” scares, Iowa experienced a large number of responses for suspicious powders. Following the development of a threat assessment and response protocol, the number of responses to suspicious powders has been reduced.

Incidents of agro-terrorism have occurred in Iowa. In the past ten years, Iowa has experienced incidents in which animal rights activists have vandalized or released animals in agricultural facilities. There have been cases of vandalism of agricultural facilities or incidents of disgruntled employees causing damage to animals and animal products.

Chemical terrorism has been limited in Iowa. Throughout the country, public officials have received suspicious letters, and this certainly can happen in Iowa. In 2005, a subject mailed “rat poison” to several state and local officials. One of the letters was torn open in a mail-sorting machine in Des Moines, which led to the closure of the Main Post Office and the Emergency Room of Mercy Medical Center.

There has been at least one event where subjects broke into a city’s water supply and it was suspected that chemicals may have been deposited in the water supply. There have been many releases of anhydrous ammonia by persons engaged in drug manufacturing, but terrorism is likely not the intent.

Iowa has experienced many bomb threats. During the spring of 2002, 18 pipe bombs were found in mailboxes in five states stretching from Illinois to Texas, including Iowa. Six people were injured in the bombings in Iowa and Illinois. In 2005 and 2006, pipe bombs were used in attempted murder cases in two Iowa cities.

For cyber terrorism, it is difficult to track incidents and threats, but there are definite incidents where account information has been jeopardized. Many of these notifications are concerning private companies where there could be financial concerns with data breach. In Linn County, there are large institutions and businesses that may be potential targets of cyber terrorism.

There is no history of radiological terrorism in Iowa. A nuclear power plant is located near Palo. This facility could be a potential target. Otherwise, there is international concern regarding unstable countries potential developing nuclear weapons. It is unlikely that radiological terrorism could affect the Midwest United States, but potential targets are located in Iowa and near Linn County.

As for public disorder, there have been no recent mass demonstrations, or direct conflicts among large groups of citizens, as in marches, protest rallies, riots, and non-peaceful strikes in Iowa. Although large-scale destructive civil disturbances are rare, the potential exists for an incident to occur. Alcohol is often involved in public disorder, especially related to college campuses, sporting events, and concerts.

Labor strikes and work stoppages are not considered in this hazard unless they become a threat to the community. Vandalism is usually initiated by a small number of individuals and limited to a small target group or institution. Overall, most events of this type are within the capacity of local law enforcement.

Recent national events have increased awareness of school safety. Although there has not been a major incident, schools in Linn County complete training to teach staff to response during a potential intruder event. Many schools have also installed limited access entrance systems.

Magnitude and Severity

For all types of terrorism, people who are targets, people located within targets, or people located within or near a targeted area are extremely vulnerable. The potential injuries and deaths caused by a terrorism event depends on the type of terrorism, the scale of the event, and whether or not the terrorism attempt is successful. In general, it is difficult to assume who and what structures are potential targets.

The type, scale, and success of a terrorism attempt will also determine how much of Linn County can potentially be affected by a terrorism event. Some terrorism attempts are limited in scale with specific targets while others are widespread. If a terrorism event is large scale, it is likely more than just Linn County would be affected by the event. Aside from public disorder type events, a terrorism event in Linn County has the potential to affect the entire county.

Warning Time

The United States federal government monitors worldwide political and military activity. The citizens and states of the U.S. would be put on heightened alert during periods of intense political or military conflict. With Iowa’s position in the interior of the U.S., there would likely be significant warning of an impending enemy attack.

Acts of terrorism can be immediate and often come after little or no warning. There are occasions when terrorists have warned the targeted organization beforehand, but often the attack comes without previous threat. Terrorists threaten people and facilities through "bomb threats" and other scare tactics. Even if it is a shallow threat, precautions must be taken to ensure the safety of the people and property involved.

In most incidents there would be no warning time. The only exception would be if someone called in a threat. Acts of terrorism can be immediate and often come after little or no warning. There are occasions where terrorists have warned the targeted organization beforehand, but often the attack comes without previous threat. Even if it is a shallow threat, precautions must be taken to ensure the safety of the people and property involved. Explosions are usually instantaneous; additional secondary devices may be used, lengthening the duration of the hazard until the attack site is determined to be clear.

Duration

The response to all sources of terrorism are extensive and will result in the need for outside resources and response from federal agencies in both the investigation of a crime scene and in the response to the direct threats to life and property.

Presidential Disaster Declarations

The Robert T. Stafford Disaster Relief and Emergency Assistance Act authorized the President of the United States to issue a disaster declaration when the President has determined that a disaster has caused damage of such severity that it is beyond the capabilities of state and local governments to respond. The Presidential Disaster Declaration allows the federal government to provide assistance to affected areas, such as Individual Assistance, Public Assistance, and Hazard Mitigation Assistance.

In the past 20 years, 1998-2017, Linn County has been in a Presidentially Declared Disaster nine times, which is approximately once every other year. Refer to Table 31 for the hazard events that led to those declarations and the Public Assistance and Individual Assistance approved in response. In all declarations, Linn County is one of several counties covered by the declaration. Two declarations were in response to winter weather, which would be classified as a severe winter storm hazard event within this plan. The remaining seven declarations were in response to hazards associated with spring and summer weather. Within this plan they would be classified as the flood (flash flood and river flood); thunderstorm, lightning, and hail; and tornado and windstorm hazard events.

Table 31: Linn County Presidential Disaster Declaration 1998-2017

Date	Declaration	Hazard	Public Assistance
October 31, 2017	DR-4289	Severe Storms and Flooding	$13,031,453
August 5, 2014	DR-4187	Severe Storms, Tornadoes, Straight-Line Winds, and Flooding	$14,466,320
July 2, 2013	DR-4126	Severe Storms, Tornadoes, and Flooding	$20,570,919
May 27, 2008	DR-1763	Severe Storms, Tornadoes, and Flooding	$1,155,312,887 Individual Assistance $138,749,926
January 4, 2008	DR-1737	Severe Winter Storms	$28,052,065
March 14, 2007	DR-1688	Severe Winter Storms	$65,370,067
May 25, 2004	DR-1518	Severe Storms, Tornadoes, and Flooding	$14,791,351 Individual Assistance $6,190,448
June 19, 2002	DR-1420	Severe Storms and Flooding	$5,580,290
May 21, 1999	DR-1277	Severe Storms, Flooding and Tornadoes	$8,532,427
Nine declarations			**Total PA** $1,325,707,779

In the following chapter, the hazards considered under this plan are prioritized based on the data collected for the risk assessment. The hazard events that were deemed to exceed local

response capabilities, i.e. received a Presidential Declaration, reinforce the priority levels that result from the weighted average of four criteria: probability, magnitude and severity, warning time, and duration. The winter weather and summer weather hazards that caused these events are all rated with the highest priority level and have wrought extensive loss across the planning area.

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[24] Russel, Kat. (2018, September 14). Funeral arrangements made for a man who died in kayaking accident. *The Gazette*. https://www.thegazette.com/subject/news/community/john-conley-kayaking-accident-indian-creek-died-samantha-conley-linn-county-september-3-flooding-cedar-rapids-20180914, accessed 9/14/2018.

Hazard Prioritization

As noted in the previous chapter, to determine the extent a mitigation strategy should focus on hazards, the full set of hazards that can potentially affect Linn County were prioritized using the criteria in the *2013 Iowa Hazard Mitigation Plan*. The assessment is based on hazard probability, magnitude, severity, warning time, and duration. Descriptions of the criteria are shown in Table 5–Table 8, starting on page 28. Weighted averages were calculated to determine the priority level for the multi-jurisdictional risk assessment. Refer to Table 32 for the weight of each criterion. Because of the local variability of risks, each participating jurisdiction determines the priority level that is appropriate for their community. The multi-jurisdictional assessment was used by each participating jurisdiction as a base for their specific hazard risk assessment. Each local planning committee was given an opportunity to modify the priority level of hazards to reflect local conditions and priorities. Additionally, the local planning committee for each jurisdiction that participated in the previous hazard mitigation plan was able to review the previous priority level and determine if changes were necessary to reflect current conditions and priorities. Priorities for the previous and updated plan are included to document changes. For combined hazards, the priority level for hazards previously considered separately was averaged to determine the overall priority level.

> Requirement §201.6 (d)(3): (d) Plan review… (3) A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it within 5 years in order to continue to be eligible for mitigation project grant funding.

Table 32: Weight of Hazard Prioritization Criteria

Criterion	Weight
Probability	0.45
Magnitude and Severity	0.30
Warning Time	0.15
Duration	0.10

With the weight value applied to each factor, the sum of the assessment criteria is used to determine the priority level of each hazard. The priority level determines how much focus is given to the hazard in the overall mitigation strategy. See Table 33 for the description of each priority level. The priority level determined for each hazard may not completely reflect the description of each level. The priority level that most accurately fits a hazard is applied, or due to local conditions and/or the planning committee, priority level may be adjusted.

Table 33: Hazard Priority Level

Hazard Priority		Description
1	High	Risk assessment score is high relative to other hazards; hazards may have occurred recently with severe impacts and long-term recovery; the hazard is generally a high priority in the community; the planning committee will identify potential mitigation projects
2	Medium	Risk assessment score is mid-range relative to other hazards; mitigation actions for hazards may already be complete or in progress; the hazard is generally a medium priority in the community; the planning committee will identify potential mitigation projects that may also address other hazards
3	Low	Risk assessment score is low relative to other hazards; mitigation actions for hazards may already be complete; the hazard is generally a low priority in the community; the planning committee may discuss potential mitigation projects

The multi-jurisdictional hazard risk assessment results for Linn County are included in Table 34. The assessment was used by each participating jurisdiction as a base for their specific hazard risk assessment. Each planning committee was given an opportunity to modify the priority level of hazards to reflect local conditions and priorities.

Table 34: Linn County Multi-Jurisdictional Hazard Analysis and Risk Assessment

Hazard	Type	Probability	.45	Magnitude and Severity	.30	Warning Time	.15	Duration	.10	Total	Priority Level
Animal, Plant, Crop Disease	Natural	2	.90	2	.60	4	.60	4	.40	2.50	2
Drought	Natural	3	1.35	2	.60	1	.15	4	.40	2.50	2
Earthquake	Natural	1	.45	1	.30	4	.60	1	.10	1.45	3
Expansive Soils	Natural	1	.45	1	.30	1	.15	1	.10	1.00	3
Extreme Heat	Natural	3	1.35	2	.60	1	.15	4	.40	2.50	1
Flash Flood	Natural	4	1.80	2	.60	3	.45	1	.10	2.95	1
Grass and Wild Land Fire	Natural	3	1.35	1	.30	1	.15	1	.10	1.90	2
Hazardous Materials Incident	Technological	2	.90	1	.30	4	.60	4	.40	2.20	2
Human Disease	Natural	1	.45	2	.60	2	.30	4	.40	1.75	3
Infrastructure Failure	Technological	3	1.35	2	.60	4	.60	4	.40	2.95	1
Landslide	Natural	1	.45	1	.30	2	.30	1	.10	1.15	3
Levee and Dam Failure	Technological	1	.45	1	.30	4	.60	1	.10	1.45	3
Radiological Incident	Technological	1	.45	1	.30	4	.60	4	.40	1.75	3
River Flood	Natural	4	1.80	2	.60	1	.15	4	.40	2.95	1
Severe Winter Storm	Natural	4	1.80	2	.30	1	.45	3	.30	2.85	1
Sinkholes	Natural	1	.45	1	.30	2	.30	1	.10	1.15	3
Terrorism	Human Caused	1	.45	2	.60	4	.60	2	.20	1.85	3
Thunderstorm, Lightning and Hail	Natural	4	1.80	2	.60	2	.30	2	.20	2.90	1
Tornado and Windstorm	Natural	4	1.80	2	.60	3	.45	2	.20	3.05	1
Transportation Incident	Technological	2	.90	1	.30	4	.60	2	.20	2.00	2

Linn County Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning area as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the priority levels on local conditions and priorities. Linn County participated in the existing multi-jurisdictional plan, so the priority level in the existing plan and the new priority level for a hazard are indicated to document how local conditions and priorities have changed in the jurisdiction. Refer to Table 35.

Table 35: Linn County Hazard Prioritization

Hazard	Type	Current Priority Level	Priority Level Update
Animal, Plant, Crop Disease	Natural	2	1
Drought	Natural	1	2
Earthquake	Natural	3	3
Expansive Soils	Natural	3	3
Extreme Heat	Natural	1	1
Flash Flood	Natural	1	1
Grass and Wild Land Fire	Natural	2	2
Hazardous Materials Incident	Technological	1	1
Human Disease	Natural	3	3
Infrastructure Failure	Technological	1	1
Landslide	Natural	3	3
Levee and Dam Failure	Technological	3	3
Radiological Incident	Technological	3	3
River Flood	Natural	1	1
Severe Winter Storm	Natural	1	1
Sinkholes	Natural	3	3
Terrorism	Human Caused	2	2
Thunderstorm, Lightning and Hail	Natural	1	1
Tornado and Windstorm	Natural	1	1
Transportation Incident	Technological	2	2

The Linn County planning committee changed the priority level of two hazards. The committee increased the priority level of animal, plant, and crop disease, considering the size of the agricultural industry in the county and the outbreak of the avian influenza in Iowa and the United States in 2014–2015. The committee decreased the priority level of drought, which is in line with the countywide assessment and consistent with local experience.

Alburnett Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning area as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the priority levels on local conditions and priorities. Alburnett participated in the existing multi-jurisdictional plan, so the priority level in the existing plan and the new priority level for a hazard are indicated to document how local conditions and priorities have changed in the jurisdiction. Refer to Table 36.

Table 36: Alburnett Hazard Prioritization

Hazard	Type	Current Priority Level	Priority Level Update
Animal, Plant, Crop Disease	Natural	3	3
Drought	Natural	3	3
Earthquake	Natural	3	3
Expansive Soils	Natural	Excluded	Excluded
Extreme Heat	Natural	1	1
Flash Flood	Natural	1	1
Grass or Wildland Fire	Natural	3	3
Hazardous Materials Incident	Technological	2	2
Human Disease	Natural	3	3
Infrastructure Failure	Technological	1	1
Landslide	Natural	Excluded	Excluded
Levee and Dam Failure	Technological	Excluded	Excluded
Radiological Incident	Technological	3	3
River Flood	Natural	3	3
Severe Winter Storm	Natural	1	1
Sinkholes	Natural	Excluded	Excluded
Terrorism	Human Caused	3	3
Thunderstorm, Lightning and Hail	Natural	1	1
Tornado and Windstorm	Natural	1	1
Transportation Incident	Technological	2	2

The Alburnett planning committee determined that all priority levels for Alburnett from the existing plan are still appropriate. No changes were made.

Bertram Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning area as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the priority levels on local conditions and priorities. Bertram participated in the existing multi-jurisdictional plan, so the priority level in the existing plan and the new priority level for a hazard are indicated to document how local conditions and priorities have changed in the jurisdiction. Refer to Table 37.

Table 37: Bertram Hazard Prioritization

Hazard	Type	Current Priority Level	Priority Level Update
Animal, Plant, Crop Disease	Natural	2	2
Drought	Natural	1	1
Earthquake	Natural	3	3
Expansive Soils	Natural	3	3
Extreme Heat	Natural	1	1
Flash Flood	Natural	1	1
Grass and Wild Land Fire	Natural	2	1
Hazardous Materials Incident	Technological	1	1
Human Disease	Natural	3	3
Infrastructure Failure	Technological	1	1
Landslide	Natural	3	3
Levee and Dam Failure	Technological	Excluded	Excluded
Radiological Incident	Technological	3	3
River Flood	Natural	1	1
Severe Winter Storm	Natural	1	1
Sinkholes	Natural	3	3
Terrorism	Human Caused	3	3
Thunderstorm, Lightning and Hail	Natural	1	1
Tornado and Windstorm	Natural	1	1
Transportation Incident	Technological	2	1

The Bertram planning committee increased the priority level of two hazards: Grass or wildland fire and transportation incident. The priority level for grass or wildland fire was increased because there are many wooded areas within Bertram. The priority level for transportation incident was increased due to the proximity to Highway 151 and the train tracks that run through town, right next to City Hall.

Cedar Rapids Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning area as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the priority levels on local conditions and priorities. Cedar Rapids participated in the existing multi-jurisdictional plan, so the priority level in the existing plan and the new priority level for a hazard are indicated to document how local conditions and priorities have changed in the jurisdiction. Refer to Table 38.

Table 38: Cedar Rapids Hazard Prioritization

Hazard	Type	Current Priority Level	Priority Level Update
Animal, Plant, Crop Disease	Natural	3	3
Drought	Natural	1	1
Earthquake	Natural	3	3
Expansive Soils	Natural	3	3
Extreme Heat	Natural	2	2
Flash Flood	Natural	1	1
Grass and Wild Land Fire	Natural	3	3
Hazardous Materials Incident	Technological	2	2
Human Disease	Natural	3	3
Infrastructure Failure	Technological	2	2
Landslide	Natural	3	3
Levee and Dam Failure	Technological	3	3
Radiological Incident	Technological	2	2
River Flood	Natural	1	1
Severe Winter Storm	Natural	1	1
Sinkholes	Natural	3	3
Terrorism	Human Caused	2	2
Thunderstorm, Lightning and Hail	Natural	1	1
Tornado and Windstorm	Natural	1	1
Transportation Incident	Technological	2	1

The Cedar Rapids planning committee raised the priority level of one hazard, transportation incident. The committee increased the priority level because they felt it more accurately reflected the hazards present in the community, including heavy, daily interstate and rail traffic.

Center Point Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning area as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the priority levels on local conditions and priorities. Center Point participated in the existing multi-jurisdictional plan, so the priority level in the existing plan and the new priority level for a hazard are indicated to document how local conditions and priorities have changed in the jurisdiction. Refer to Table 39.

Table 39: Center Point Hazard Prioritization

Hazard	Type	Current Priority Level	Priority Level Update
Animal, Plant, Crop Disease	Natural	3	3
Drought	Natural	3	3
Earthquake	Natural	3	3
Expansive Soils	Natural	2	3
Extreme Heat	Natural	2	2
Flash Flood	Natural	1	1
Grass or Wildland Fire	Natural	3	3
Hazardous Materials Incident	Technological	1	1
Human Disease	Natural	Excluded	2
Infrastructure Failure	Technological	1	1
Landslide	Natural	Excluded	Excluded
Levee and Dam Failure	Technological	Excluded	Excluded
Radiological Incident	Technological	1	1
River Flood	Natural	1	3
Severe Winter Storm	Natural	2	2
Sinkholes	Natural	2	3
Terrorism	Human Caused	1	1
Thunderstorm, Lightning and Hail	Natural	2	2
Tornado and Windstorm	Natural	1	1
Transportation Incident	Technological	3	3

The Center Point local planning committee changed the priority level for four hazards: expansive soils, human disease, river flood, and sinkholes. The priority level for expansive soils, river flood, and shinkholes was lowered. No committee members were aware of any issues with expansive soils. The city also experiences more severe effects from flash flooding than from river flooding. The committee was also not aware of any sinkholes, which is reflected in the hazard map. The committee increased the priority level for human disease, which remains a possibility and has the potential to cause widespread loss to human life or economic activity.

Central City Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning area as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the priority levels on local conditions and priorities. Central City participated in the existing multi-jurisdictional plan, so the priority level in the existing plan and the new priority level for a hazard are indicated to document how local conditions and priorities have changed in the jurisdiction. Refer to Table 40.

Table 40: Central City Hazard Prioritization

Hazard	Type	Current Priority Level	Priority Level Update
Animal, Plant, Crop Disease	Natural	3	3
Drought	Natural	3	3
Earthquake	Natural	3	3
Expansive Soils	Natural	Excluded	Excluded
Extreme Heat	Natural	2	2
Flash Flood	Natural	2	2
Grass or Wildland Fire	Natural	3	3
Hazardous Materials Incident	Technological	2	1
Human Disease	Natural	3	3
Infrastructure Failure	Technological	2	2
Landslide	Natural	3	3
Levee and Dam Failure	Technological	3	3
Radiological Incident	Technological	3	3
River Flood	Natural	1	1
Severe Winter Storm	Natural	1	1
Sinkholes	Natural	3	3
Terrorism	Human Caused	3	2
Thunderstorm, Lightning and Hail	Natural	2	2
Tornado and Windstorm	Natural	1	1
Transportation Incident	Technological	2	2

The Central City planning committee increased the priority level of two hazards, hazardous materials incident and terrorism. The priority level for hazardous materials incident was increased because of the presence of agricultural industry within the city, which stores anhydrous ammonia. The priority level for terrorism was increased to a level the committee felt was more appropriate.

Coggon Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning area as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the priority levels on local conditions and priorities. Coggon participated in the existing multi-jurisdictional plan, so the priority level in the existing plan and the new priority level for a hazard are indicated to document how local conditions and priorities have changed in the jurisdiction. Refer to Table 41.

Table 41: Coggon Hazard Prioritization

Hazard	Type	Current Priority Level	Priority Level Update
Animal, Plant, Crop Disease	Natural	2	3
Drought	Natural	3	3
Earthquake	Natural	1	3
Expansive Soils	Natural	2	2
Extreme Heat	Natural	2	2
Flash Flood	Natural	1	1
Grass and Wild Land Fire	Natural	1	1
Hazardous Materials Incident	Technological	1	1
Human Disease	Natural	1	1
Infrastructure Failure	Technological	1	1
Landslide	Natural	3	3
Levee and Dam Failure	Technological	3	3
Radiological Incident	Technological	1	1
River Flood	Natural	1	1
Severe Winter Storm	Natural	2	2
Sinkholes	Natural	Excluded	Excluded
Terrorism	Human Caused	1	1
Thunderstorm, Lightning and Hail	Natural	2	1
Tornado and Windstorm	Natural	1	1
Transportation Incident	Technological	1	1

The Coggon planning committee increased the priority level for thunderstorm, lightning, and hail, which is consistent with the countywide assessment and local experience. The committee decreased the priority level for two hazards: animal, plant, and crop disease and earthquake. The priority level for animal, plant, and crop disease was increased because there is less risk in an incorporated area. The priority level for earthquake was decreased to reflect the countywide assessment.

Ely Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning area as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the priority levels on local conditions and priorities. Ely participated in the existing multi-jurisdictional plan, so the priority level in the existing plan and the new priority level for a hazard are indicated to document how local conditions and priorities have changed in the jurisdiction. Refer to Table 42.

Table 42: Ely Hazard Prioritization

Hazard	Type	Current Priority Level	Priority Level Update
Animal, Plant, Crop Disease	Natural	2	2
Drought	Natural	2	1
Earthquake	Natural	3	3
Expansive Soils	Natural	Excluded	Excluded
Extreme Heat	Natural	1	2
Flash Flood	Natural	1	1
Grass or Wildland Fire	Natural	1	2
Hazardous Materials Incident	Technological	2	1
Human Disease	Natural	3	3
Infrastructure Failure	Technological	1	1
Landslide	Natural	Excluded	Excluded
Levee and Dam Failure	Technological	Excluded	Excluded
Radiological Incident	Technological	3	3
River Flood	Natural	1	1
Severe Winter Storm	Natural	1	1
Sinkholes	Natural	Excluded	Excluded
Terrorism	Human Caused	3	3
Thunderstorm, Lightning and Hail	Natural	1	1
Tornado and Windstorm	Natural	1	1
Transportation Incident	Technological	2	3

The Ely planning committee increased the priority level for drought was because of the effect a drought could have on the City's water infrastructure and the loss of water resources available for fighting fires. The priority level for hazardous materials incident was increased due to the proximity to Hoosier Creek, a tributary to the Iowa River, which flows through Iowa City and Coralville several miles downriver. The planning committee lowered the priority level for extreme heat due to the presence of community facilities with air conditioning. The priority level for grass or wildland fire was lowered due to the low quantity of grass or wildlands within city limits and mutual aid agreements in place, which would provide assistance during a hazard event. The priority level for transportation was also lowered due to the lack of any major highways or train lines in Ely.

Fairfax Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning area as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the priority levels on local conditions and priorities. Fairfax participated in the existing multi-jurisdictional plan, so the priority level in the existing plan and the new priority level for a hazard are indicated to document how local conditions and priorities have changed in the jurisdiction. Refer to Table 43.

Table 43: Fairfax Hazard Prioritization

Hazard	Type	Current Priority Level	Priority Level Update
Animal, Plant, Crop Disease	Natural	2	2
Drought	Natural	2	1
Earthquake	Natural	3	3
Expansive Soils	Natural	Excluded	Excluded
Extreme Heat	Natural	2	2
Flash Flood	Natural	1	1
Grass and Wild Land Fire	Natural	2	2
Hazardous Materials Incident	Technological	1	1
Human Disease	Natural	3	3
Infrastructure Failure	Technological	1	1
Landslide	Natural	Excluded	Excluded
Levee and Dam Failure	Technological	Excluded	2
Radiological Incident	Technological	2	2
River Flood	Natural	1	1
Severe Winter Storm	Natural	1	1
Sinkholes	Natural	Excluded	Excluded
Terrorism	Human Caused	2	2
Thunderstorm, Lightning and Hail	Natural	1	1
Tornado and Windstorm	Natural	1	1
Transportation Incident	Technological	2	2

The Fairfax planning committee raised the priority level of two hazards: drought and levee and dam failure. The priority level for drought was increased because of the impact it could have on the city's water supply. The priority level for levee and dam failure was increased because storm water management infrastructure, such as retention ponds, will be required in developments in the recent and future annexes of the city.

Hiawatha Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning area as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the priority levels on local conditions and priorities. Hiawatha participated in the existing multi-jurisdictional plan, so the priority level in the existing plan and the new priority level for a hazard are indicated to document how local conditions and priorities have changed in the jurisdiction. Refer to Table 44.

Table 44: Hiawatha Hazard Prioritization

Hazard	Type	Current Priority Level	Priority Level Update
Animal, Plant, Crop Disease	Natural	3	3
Drought	Natural	2	2
Earthquake	Natural	3	3
Expansive Soils	Natural	3	3
Extreme Heat	Natural	2	2
Flash Flood	Natural	1	1
Grass and Wild Land Fire	Natural	3	3
Hazardous Materials Incident	Technological	1	1
Human Disease	Natural	3	3
Infrastructure Failure	Technological	1	1
Landslide	Natural	3	3
Levee and Dam Failure	Technological	Excluded	Excluded
Radiological Incident	Technological	2	2
River Flood	Natural	3	3
Severe Winter Storm	Natural	1	1
Sinkholes	Natural	Excluded	Excluded
Terrorism	Human Caused	3	3
Thunderstorm, Lightning and Hail	Natural	1	1
Tornado and Windstorm	Natural	1	1
Transportation Incident	Technological	1	1

The Hiawatha planning committee determined that all priority levels for Hiawatha from the existing plan are still appropriate. No changes were made.

Lisbon Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning area as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the priority levels on local conditions and priorities. Lisbon participated in the existing multi-jurisdictional plan, so the priority level in the existing plan and the new priority level for a hazard are indicated to document how local conditions and priorities have changed in the jurisdiction. Refer to Table 45.

Table 45: Lisbon Hazard Prioritization

Hazard	Type	Current Priority Level	Priority Level Update
Animal, Plant, Crop Disease	Natural	3	2
Drought	Natural	2	2
Earthquake	Natural	Excluded	3
Expansive Soils	Natural	Excluded	Excluded
Extreme Heat	Natural	2	2
Flash Flood	Natural	1	1
Grass and Wild Land Fire	Natural	Excluded	Excluded
Hazardous Materials Incident	Technological	1	1
Human Disease	Natural	3	3
Infrastructure Failure	Technological	1	1
Landslide	Natural	Excluded	Excluded
Levee and Dam Failure	Technological	Excluded	Excluded
Radiological Incident	Technological	2	2
River Flood	Natural	Excluded	1
Severe Winter Storm	Natural	2	2
Sinkholes	Natural	Excluded	3
Terrorism	Human Caused	2	2
Thunderstorm, Lightning and Hail	Natural	1	1
Tornado and Windstorm	Natural	1	1
Transportation Incident	Technological	1	1

The Lisbon planning committee increased the priority level of animal, plant, and crop disease because of the Emerald Ash Borer infestation. The priority level of earthquake was increased because it is possible, though unlikely, in the region. The priority level for river flood was increased; Lisbon deals with some flooding issues, so this may have been addressed through the flash flood hazard in the previously approved plan. There has been some waterway flooding that affects the waste water treatment plant, so the committee decided to include this hazard as well, at the highest level. The committee was also aware of three small sinkholes off of Fairway Dr. and W. Main St. The impacts are not significant, so the committee raised the priority level.

Marion Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning area as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the priority levels on local conditions and priorities. Marion participated in the existing multi-jurisdictional plan, so the priority level in the existing plan and the new priority level for a hazard are indicated to document how local conditions and priorities have changed in the jurisdiction. Refer to Table 46.

Table 46: Marion Hazard Prioritization

Hazard	Type	Current Priority Level	Priority Level Update
Animal, Plant, Crop Disease	Natural	2	1
Drought	Natural	2	2
Earthquake	Natural	3	3
Expansive Soils	Natural	3	3
Extreme Heat	Natural	1	1
Flash Flood	Natural	1	1
Grass and Wild Land Fire	Natural	3	3
Hazardous Materials Incident	Technological	2	2
Human Disease	Natural	2	2
Infrastructure Failure	Technological	1	1
Landslide	Natural	3	3
Levee and Dam Failure	Technological	Excluded	3
Radiological Incident	Technological	2	2
River Flood	Natural	3	2
Severe Winter Storm	Natural	1	1
Sinkholes	Natural	Excluded	Excluded
Terrorism	Human Caused	3	3
Thunderstorm, Lightning and Hail	Natural	1	1
Tornado and Windstorm	Natural	1	1
Transportation Incident	Technological	2	2

The Marion planning committee increased the priority level of three hazards: animal, plant, and crop disease; levee and dam failure; and river flood. The priority level for animal, plant, and crop disease was increased because of the ongoing damage from the Emerald Ash Borer infestation. Levee and dam failure was increased because of the presence of a low-hazard dam within Marion. Finally, the river flood hazard priority level was increased because waterway flooding has forced the City to close roads on several occasions.

Mount Vernon Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning area as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the priority levels on local conditions and priorities. Mount Vernon participated in the existing multi-jurisdictional plan, so the priority level in the existing plan and the new priority level for a hazard are indicated to document how local conditions and priorities have changed in the jurisdiction. Refer to Table 47.

Table 47: Mount Vernon Hazard Prioritization

Hazard	Type	Current Priority Level	Priority Level Update
Animal, Plant, Crop Disease	Natural	3	3
Drought	Natural	2	2
Earthquake	Natural	Excluded	Excluded
Expansive Soils	Natural	Excluded	Excluded
Extreme Heat	Natural	3	3
Flash Flood	Natural	1	1
Grass and Wild Land Fire	Natural	Excluded	3
Hazardous Materials Incident	Technological	1	1
Human Disease	Natural	3	3
Infrastructure Failure	Technological	1	1
Landslide	Natural	Excluded	Excluded
Levee and Dam Failure	Technological	Excluded	Excluded
Radiological Incident	Technological	2	2
River Flood	Natural	Excluded	Excluded
Severe Winter Storm	Natural	2	1
Sinkholes	Natural	Excluded	Excluded
Terrorism	Human Caused	2	2
Thunderstorm, Lightning and Hail	Natural	1	1
Tornado and Windstorm	Natural	1	1
Transportation Incident	Technological	1	1

The Mount Vernon planning committee increased the priority level for grass or wildland fire because the hazard poses some risk, though low, to the community. The priority level for severe winter storm was increased to a level that is consistent with the countywide assessment, and the committee believed it was appropriate for Mount Vernon.

Palo Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning area as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the priority levels on local conditions and priorities. Palo participated in the existing multi-jurisdictional plan, so the priority level in the existing plan and the new priority level for a hazard are indicated to document how local conditions and priorities have changed in the jurisdiction. Refer to Table 48.

Table 48: Palo Hazard Prioritization

Hazard	Type	Current Priority Level	Priority Level Update
Animal, Plant, Crop Disease	Natural	3	3
Drought	Natural	2	2
Earthquake	Natural	3	3
Expansive Soils	Natural	Excluded	Excluded
Extreme Heat	Natural	3	3
Flash Flood	Natural	1	1
Grass and Wild Land Fire	Natural	2	2
Hazardous Materials Incident	Technological	3	3
Human Disease	Natural	3	3
Infrastructure Failure	Technological	3	3
Landslide	Natural	Excluded	Excluded
Levee and Dam Failure	Technological	3	3
Radiological Incident	Technological	2	2
River Flood	Natural	1	1
Severe Winter Storm	Natural	3	3
Sinkholes	Natural	Excluded	Excluded
Terrorism	Human Caused	3	3
Thunderstorm, Lightning and Hail	Natural	2	2
Tornado and Windstorm	Natural	2	2
Transportation Incident	Technological	2	2

The Palo planning committee determined that all priority levels for Palo from the existing plan are still appropriate. No changes were made.

Prairieburg Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning area as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the priority levels on local conditions and priorities. Prairieburg participated in the existing multi-jurisdictional plan, so the priority level in the existing plan and the new priority level for a hazard are indicated to document how local conditions and priorities have changed in the jurisdiction. Refer to Table 49.

Table 49: Prairieburg Hazard Prioritization

Hazard	Type	Current Priority Level	Priority Level Update
Animal, Plant, Crop Disease	Natural	Excluded	Excluded
Drought	Natural	3	3
Earthquake	Natural	1	3
Expansive Soils	Natural	Excluded	Excluded
Extreme Heat	Natural	2	2
Flash Flood	Natural	3	3
Grass and Wild Land Fire	Natural	3	3
Hazardous Materials Incident	Technological	1	3
Human Disease	Natural	Excluded	3
Infrastructure Failure	Technological	1	1
Landslide	Natural	Excluded	Excluded
Levee and Dam Failure	Technological	Excluded	Excluded
Radiological Incident	Technological	Excluded	Excluded
River Flood	Natural	Excluded	Excluded
Severe Winter Storm	Natural	2	2
Sinkholes	Natural	Excluded	Excluded
Terrorism	Human Caused	Excluded	Excluded
Thunderstorm, Lightning and Hail	Natural	1	1
Tornado and Windstorm	Natural	1	1
Transportation Incident	Technological	1	3

The Prairieburg planning committee decreased the priority level for earthquake to be consistent with the countywide assessment. The priority level for hazardous materials incident was decreased due to the absence of facilities in the community that produce or process large amounts of hazardous materials. The priority level for transportation incident was lowered because there are no major highways or railroad tracks within the community. The priority level for human disease was increased because the possibility of an epidemic or pandemic affecting the community exists.

Robins Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning area as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the priority levels on local conditions and priorities. Robins participated in the existing multi-jurisdictional plan, so the priority level in the existing plan and the new priority level for a hazard are indicated to document how local conditions and priorities have changed in the jurisdiction. Refer to Table 50.

Table 50: Robins Hazard Prioritization

Hazard	Type	Current Priority Level	Priority Level Update
Animal, Plant, Crop Disease	Natural	2	2
Drought	Natural	2	2
Earthquake	Natural	3	3
Expansive Soils	Natural	Excluded	Excluded
Extreme Heat	Natural	2	2
Flash Flood	Natural	1	1
Grass and Wild Land Fire	Natural	2	2
Hazardous Materials Incident	Technological	2	2
Human Disease	Natural	3	3
Infrastructure Failure	Technological	1	1
Landslide	Natural	3	3
Levee and Dam Failure	Technological	Excluded	Excluded
Radiological Incident	Technological	3	3
River Flood	Natural	1	1
Severe Winter Storm	Natural	1	1
Sinkholes	Natural	3	3
Terrorism	Human Caused	3	3
Thunderstorm, Lightning and Hail	Natural	1	1
Tornado and Windstorm	Natural	1	1
Transportation Incident	Technological	1	1

The Robins planning committee determined that all priority levels for Robins from the existing plan are still appropriate. No changes were made.

Springville Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning area as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the priority levels on local conditions and priorities. Springville participated in the existing multi-jurisdictional plan, so the priority level in the existing plan and the new priority level for a hazard are indicated to document how local conditions and priorities have changed in the jurisdiction. Refer to Table 51.

Table 51: Springville Hazard Prioritization

Hazard	Type	Current Priority Level	Priority Level Update
Animal, Plant, Crop Disease	Natural	2	3
Drought	Natural	2	2
Earthquake	Natural	3	3
Expansive Soils	Natural	Excluded	Excluded
Extreme Heat	Natural	1	1
Flash Flood	Natural	1	1
Grass or Wildland Fire	Natural	2	2
Hazardous Materials Incident	Technological	2	1
Human Disease	Natural	3	3
Infrastructure Failure	Technological	1	1
Landslide	Natural	3	3
Levee and Dam Failure	Technological	Excluded	Excluded
Radiological Incident	Technological	3	2
River Flood	Natural	1	1
Severe Winter Storm	Natural	1	1
Sinkholes	Natural	3	3
Terrorism	Human Caused	3	2
Thunderstorm, Lightning and Hail	Natural	1	1
Tornado and Windstorm	Natural	1	1
Transportation Incident	Technological	2	2

The City of Springville planning committee changed the priority level of four hazards for the update to the plan: animal, plant, and crop disease; hazardous materials incident; radiological incident; and terrorism. The priority level for animal, plant, and crop disease was decreased to reflect the limited risk within an urbanized area. The priority level for hazardous materials incident and radiological incident were increased to reflect the transportation of hazardous or radiological materials on nearby Highway 151. The priority level for terrorism was increased to reflect the possibility of a terror event, such as a shooting or cyber terrorism, that could affect the city.

Walker Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning area as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the priority levels on local conditions and priorities. Walker participated in the existing multi-jurisdictional plan, so the priority level in the existing plan and the new priority level for a hazard are indicated to document how local conditions and priorities have changed in the jurisdiction. Refer to Table 52.

Table 52: Walker Hazard Prioritization

Hazard	Type	Current Priority Level	Priority Level Update
Animal, Plant, Crop Disease	Natural	2	3
Drought	Natural	2	2
Earthquake	Natural	3	3
Expansive Soils	Natural	1	3
Extreme Heat	Natural	1	1
Flash Flood	Natural	1	1
Grass and Wild Land Fire	Natural	2	2
Hazardous Materials Incident	Technological	2	2
Human Disease	Natural	3	3
Infrastructure Failure	Technological	1	1
Landslide	Natural	Excluded	Excluded
Levee and Dam Failure	Technological	Excluded	Excluded
Radiological Incident	Technological	3	3
River Flood	Natural	1	3
Severe Winter Storm	Natural	1	1
Sinkholes	Natural	Excluded	Excluded
Terrorism	Human Caused	3	3
Thunderstorm, Lightning and Hail	Natural	1	1
Tornado and Windstorm	Natural	1	1
Transportation Incident	Technological	2	2

The Walker planning committee decreased the priority level for animal, plant, and crop disease because there is little agricultural activity in town. The priority level for expansive soils was lowered so that it was in line with the countywide assessment and consistent with local experience. The priority level for river flooding was also lowered because local experience with flooding is more strongly associated with the flash flood hazard.

Alburnett Community School District Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning area as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the priority levels on local conditions and priorities. Alburnett CSD is a new participant of the multi-jurisdictional plan, so the local planning committee completed the hazard prioritization exercise for the first time for this plan update; therefore, only one priority level is indicated. Refer to Table 53.

Table 53: Alburnett CSD Hazard Prioritization

Hazard	Type	Priority Level
Animal, Plant, Crop Disease	Natural	3
Drought	Natural	3
Earthquake	Natural	3
Expansive Soils	Natural	Excluded
Extreme Heat	Natural	3
Flash Flood	Natural	3
Grass and Wild Land Fire	Natural	2
Hazardous Materials Incident	Technological	2
Human Disease	Natural	2
Infrastructure Failure	Technological	2
Landslide	Natural	Excluded
Levee and Dam Failure	Technological	Excluded
Radiological Incident	Technological	3
River Flood	Natural	3
Severe Winter Storm	Natural	1
Sinkholes	Natural	3
Terrorism	Human Caused	1
Thunderstorm, Lightning and Hail	Natural	1
Tornado and Windstorm	Natural	1
Transportation Incident	Technological	1

The Alburnett CSD planning committee established priorities for the district that reflect conditions and concerns relevant to the District. The committee referenced the countywide hazard analysis and risk assessment in their consideration of the hazards. Many of Alburnett CSD's priorities align with rankings from the countywide assessment. Based on District-specific conditions, the committee set a lower priority level for the following hazards: animal, plant, and crop disease; drought; expansive soils; extreme heat; flash flood; infrastructure failure; landslide; levee and dam failure; and river flood. The committee set a higher priority level for human disease; terrorism; and transportation incident.

Cedar Rapids Community School District Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning area as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the priority levels on local conditions and priorities. Cedar Rapids CSD is a new participant of the multi-jurisdictional plan, so the local planning committee completed the hazard prioritization exercise for the first time for this plan update; therefore, only one priority level is indicated. Refer to Table 54.

Table 54: Cedar Rapids CSD Hazard Prioritization

Hazard	Type	Priority Level
Animal, Plant, Crop Disease	Natural	3
Drought	Natural	3
Earthquake	Natural	3
Expansive Soils	Natural	3
Extreme Heat	Natural	2
Flash Flood	Natural	1
Grass and Wild Land Fire	Natural	3
Hazardous Materials Incident	Technological	1
Human Disease	Natural	1
Infrastructure Failure	Technological	1
Landslide	Natural	3
Levee and Dam Failure	Technological	2
Radiological Incident	Technological	1
River Flood	Natural	1
Severe Winter Storm	Natural	1
Sinkholes	Natural	3
Terrorism	Human Caused	1
Thunderstorm, Lightning and Hail	Natural	1
Tornado and Windstorm	Natural	1
Transportation Incident	Technological	2

The Cedar Rapids CSD planning committee established priorities for the district that reflect conditions and concerns that are relevant to the district. The committee referenced the countywide hazard analysis and risk assessment in their consideration of the hazards. Many of Cedar Rapids CSD's priorities align with the rankings from the countywide assessment. Based on District-specific conditions, the committee set a lower priority level for the following hazards: animal, plant, and crop disease; drought; extreme heat; grass or wildland fire; and radiological incident. The committee set a higher priority level for the following hazards: hazardous materials incident, human disease, levee and dam failure, and terrorism.

Center Point-Urbana Community School District Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning area as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the priority levels on local conditions and priorities. Center Point-Urbana CSD participated in the existing multi-jurisdictional plan, so the priority level in the existing plan and the new priority level for a hazard are indicated to document how local conditions and priorities have changed in the jurisdiction. Refer to Table 55.

Table 55: Center Point-Urbana CSD Hazard Prioritization

Hazard	Type	Current Priority Level	Priority Level Update
Animal, Plant, Crop Disease	Natural	Excluded	Excluded
Drought	Natural	Excluded	Excluded
Earthquake	Natural	3	3
Expansive Soils	Natural	Excluded	Excluded
Extreme Heat	Natural	1	1
Flash Flood	Natural	1	1
Grass and Wild Land Fire	Natural	Excluded	Excluded
Hazardous Materials Incident	Technological	2	2
Human Disease	Natural	3	2
Infrastructure Failure	Technological	1	1
Landslide	Natural	Excluded	Excluded
Levee and Dam Failure	Technological	Excluded	Excluded
Radiological Incident	Technological	3	2
River Flood	Natural	Excluded	Excluded
Severe Winter Storm	Natural	1	1
Sinkholes	Natural	Excluded	Excluded
Terrorism	Human Caused	3	3
Thunderstorm, Lightning and Hail	Natural	1	1
Tornado and Windstorm	Natural	1	1
Transportation Incident	Technological	2	2

The Center Point-Urbana CSD planning committee raised the priority level for human disease due to the concentration of students hosted at District facilities on a daily basis. The priority level for radiological incident was also increased due to the close proximity of the Duane Arnold Energy Center, a nuclear power plant.

College Community School District Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning area as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the priority levels on local conditions and priorities. College CSD participated in the existing multi-jurisdictional plan, so the priority level in the existing plan and the new priority level for a hazard are indicated to document how local conditions and priorities have changed in the jurisdiction. Refer to Table 56.

Table 56: College CSD Hazard Prioritization

Hazard	Type	Current Priority Level	Priority Level Update
Animal, Plant, Crop Disease	Natural	Excluded	Excluded
Drought	Natural	Excluded	Excluded
Earthquake	Natural	3	3
Expansive Soils	Natural	Excluded	Excluded
Extreme Heat	Natural	Excluded	Excluded
Flash Flood	Natural	1	1
Grass and Wild Land Fire	Natural	2	2
Hazardous Materials Incident	Technological	2	2
Human Disease	Natural	3	2
Infrastructure Failure	Technological	1	1
Landslide	Natural	Excluded	Excluded
Levee and Dam Failure	Technological	Excluded	Excluded
Radiological Incident	Technological	3	3
River Flood	Natural	1	1
Severe Winter Storm	Natural	1	1
Sinkholes	Natural	Excluded	Excluded
Terrorism	Human Caused	2	2
Thunderstorm, Lightning and Hail	Natural	1	1
Tornado and Windstorm	Natural	1	1
Transportation Incident	Technological	2	1

The College CSD planning committee reviewed the hazard priorities for College CSD from the previously approved plan. The committee raised the priority level of human disease hazard to reflect the large student population it hosts daily during the school year. It also raised the priority level for the transportation incident because of the number of students they transport by bus on a daily basis.

Linn-Mar Community School District Hazard Prioritization

The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning area as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the priority levels on local conditions and priorities. Linn-Mar CSD is a new participant of the multi-jurisdictional plan, so the local planning committee completed the hazard prioritization exercise for the first time for this plan update; therefore, only one priority level is indicated. Refer to Table 57.

Table 57: Linn-Mar CSD Hazard Prioritization

Hazard	Type	Priority Level
Animal, Plant, Crop Disease	Natural	Excluded
Drought	Natural	Excluded
Earthquake	Natural	3
Expansive Soils	Natural	3
Extreme Heat	Natural	1
Flash Flood	Natural	1
Grass and Wild Land Fire	Natural	3
Hazardous Materials Incident	Technological	2
Human Disease	Natural	2
Infrastructure Failure	Technological	2
Landslide	Natural	Excluded
Levee and Dam Failure	Technological	Excluded
Radiological Incident	Technological	3
River Flood	Natural	1
Severe Winter Storm	Natural	1
Sinkholes	Natural	2
Terrorism	Human Caused	2
Thunderstorm, Lightning and Hail	Natural	1
Tornado and Windstorm	Natural	1
Transportation Incident	Technological	1

The Linn-Mar CSD planning committee established priorities for the district that reflect conditions and concerns that are relevant in the district. The committee referenced the countywide hazard analysis and risk assessment in their consideration of hazards. Several of the Linn-Mar CSD committee's priorities align with the rankings from the countywide assessment. Based on district-specific conditions, the committee set a lower priority level for the following hazards: grass or wildland fire and infrastructure failure. The committee set a higher priority level for the following hazards: human disease, sinkholes, terrorism, and transportation incident. Four hazards were excluded by the committee because they are impossible or extremely unlikely occur or the effects would not negatively impact the district: animal, plant, and crop disease; drought; landslide; and levee and dam failure.

Mount Vernon Community School District Hazard Prioritization

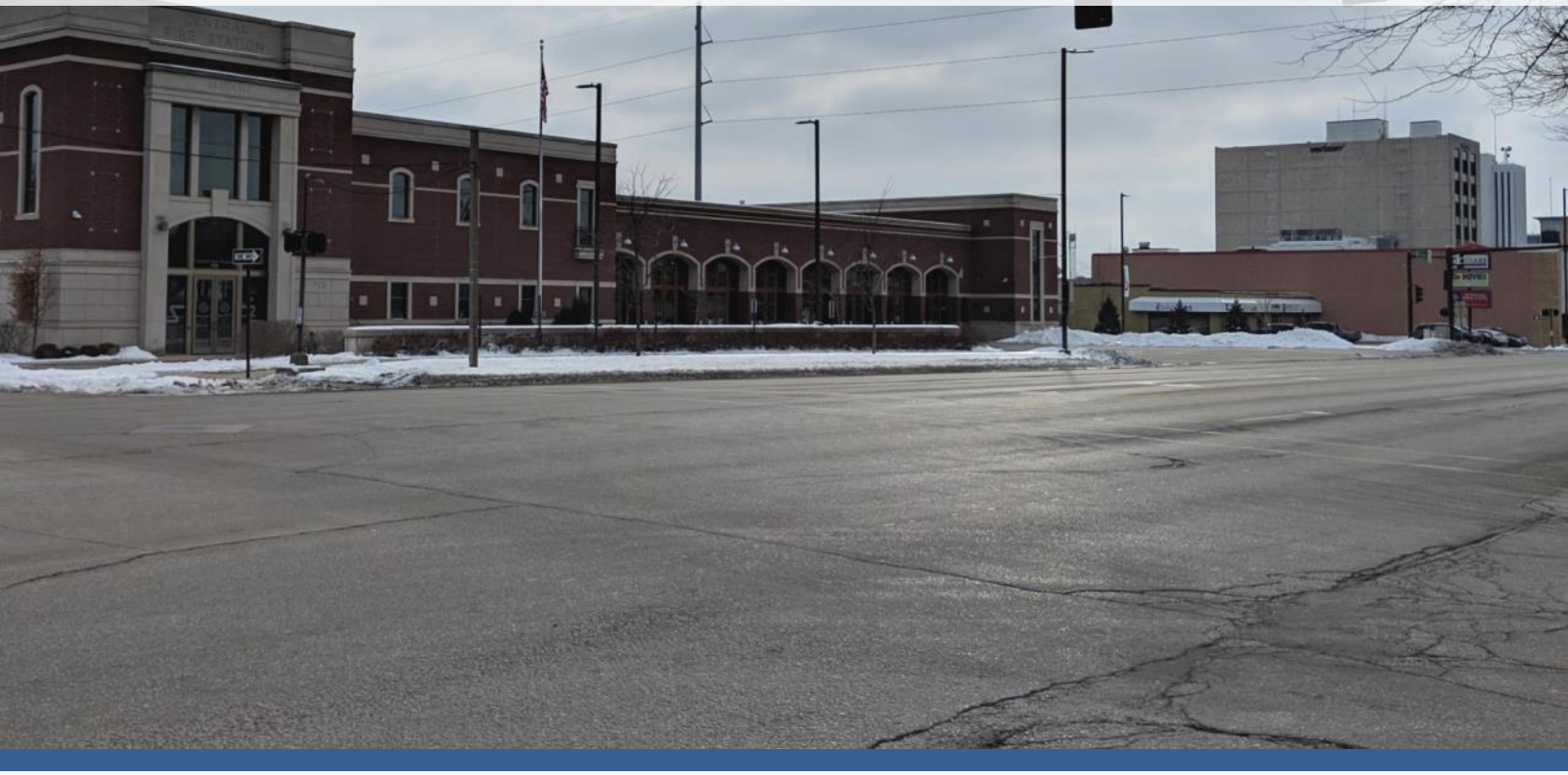
The jurisdiction's planning committee used the multi-jurisdictional risk assessment prepared for the planning area as a base for discussing the hazards that may affect the area and an appropriate priority level. Ultimately, the planning committee based the priority levels on local conditions and priorities. Mount Vernon CSD is a new participant of the multi-jurisdictional plan, so the local planning committee completed the hazard prioritization exercise for the first time for this plan update; therefore, only one priority level is indicated. Refer to Table 58.

Table 58: Mount Vernon CSD Hazard Prioritization

Hazard	Type	Priority Level
Animal, Plant, Crop Disease	Natural	3
Drought	Natural	3
Earthquake	Natural	3
Expansive Soils	Natural	3
Extreme Heat	Natural	2
Flash Flood	Natural	3
Grass o Wildland Fire	Natural	3
Hazardous Materials Incident	Technological	1
Human Disease	Natural	1
Infrastructure Failure	Technological	2
Landslide	Natural	3
Levee and Dam Failure	Technological	3
Radiological Incident	Technological	2
River Flood	Natural	2
Severe Winter Storm	Natural	2
Sinkholes	Natural	3
Terrorism	Human Caused	1
Thunderstorm, Lightning and Hail	Natural	2
Tornado and Windstorm	Natural	2
Transportation Incident	Technological	2

The Mount Vernon CSD planning committee established priorities for the district that reflect conditions and concerns that are relevant in the district. The committee referenced the countywide hazard analysis and risk assessment in their consideration of hazards. Several of the Mount Vernon CSD committee's priorities align with the rankings from the countywide assessment. Based on district-specific conditions, the committee set a lower priority level for the following hazards: animal, plant, and crop disease; drought; extreme heat; flash flood; grass or wildland fire; infrastructure failure; river flood; severe winter storm; thunderstorm, lightning, and hail; and tornado and windstorm. The committee set a higher priority level for the following hazards: hazardous materials incident, human disease, radiological incident, and terrorism.

Community Attributes



In a multi-jurisdictional plan, it is important to identify local conditions and priorities that differ among participating jurisdictions. These differences are important to consider before identifying a jurisdiction's final mitigation strategy. Despite a relatively small planning area based on county boundaries, variation in topography, hydrology, population, and etc. result in different risks for each jurisdiction. These variations and other attributes such as critical facilities, vulnerable populations, community resources, and overall hazard mitigation progress factor into how a jurisdiction should approach each hazard. This chapter will document these attributes.

Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in a community. In each jurisdiction, the planning committee identified the primary critical facilities in their community. Generally, all jurisdiction property and infrastructure are considered critical facilities, but additional facilities may be included. This section displays the critical facilities identified by each jurisdiction. The critical facilities maps include the flood zone layer because it is the only mapped hazard that scored a priority level 1 in the countywide risk assessment.

Schools were considered critical facilities in many jurisdictions; however, many of the school districts in the county participated in the plan, so their facilities are considered for the respective districts. Because schools were referenced regularly, locations of public schools in non-participating districts are included in this section. Locations of private schools are included as reference for vulnerable populations, which are considered in the next section for participating jurisdictions.

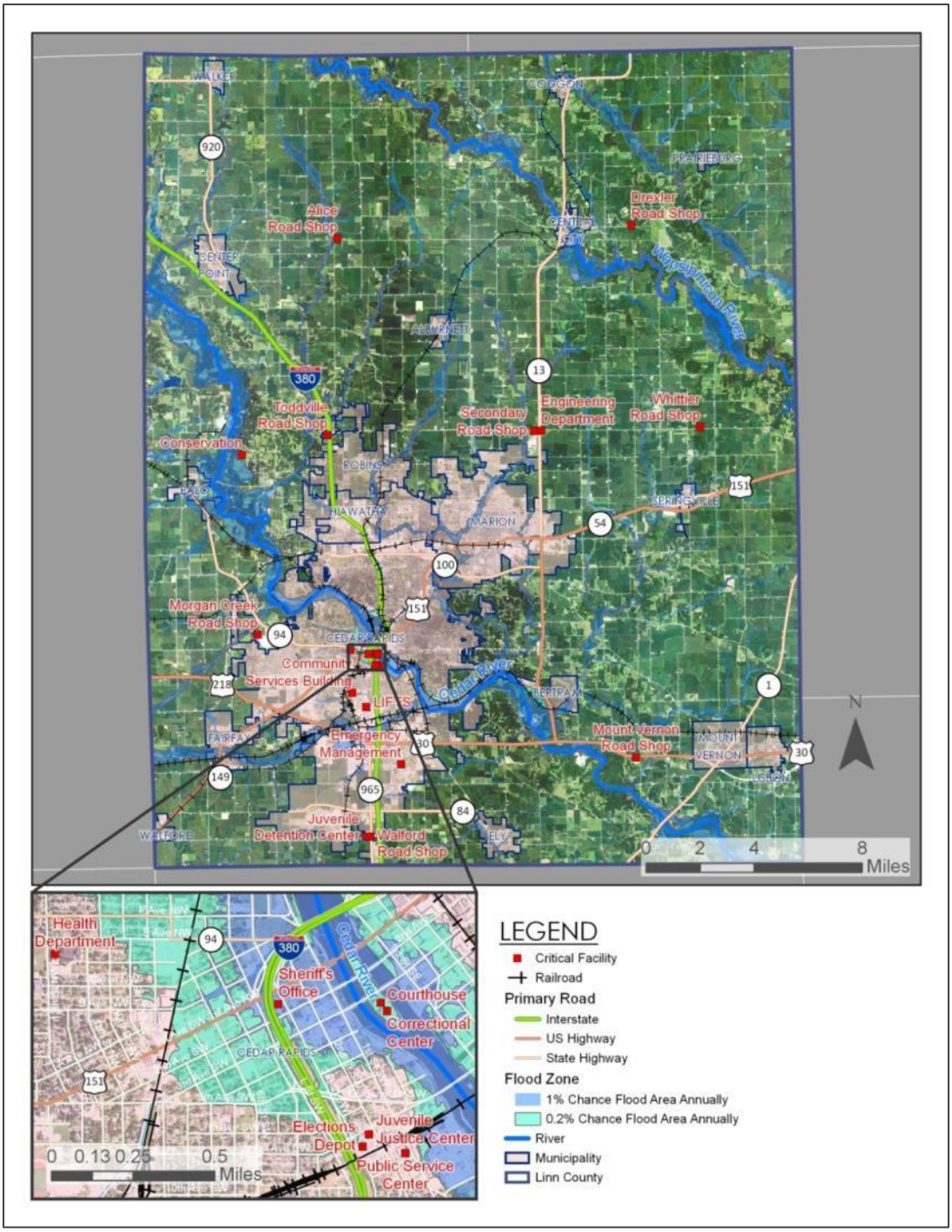
Because of the extent and variety of city-owned property for the cities of Cedar Rapids and Marion, a tiered system of categorizing critical facilities was created to distinguishing different characteristics of those properties. The three tiers that categorize critical facilities for those communities are the following:

1. Facilities that provide essential services during or following a hazard event or possess engineered features that mitigate against hazard events.
2. Facilities that may facilitate hazard response or recovery efforts.
3. Other city-owned facilities.

Linn County Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Linn County, all county property and infrastructure are considered critical facilities. For specific critical facilities, refer to Map 30.

Map 30: Linn County Critical Facilities



Alburnett Critical Facilities

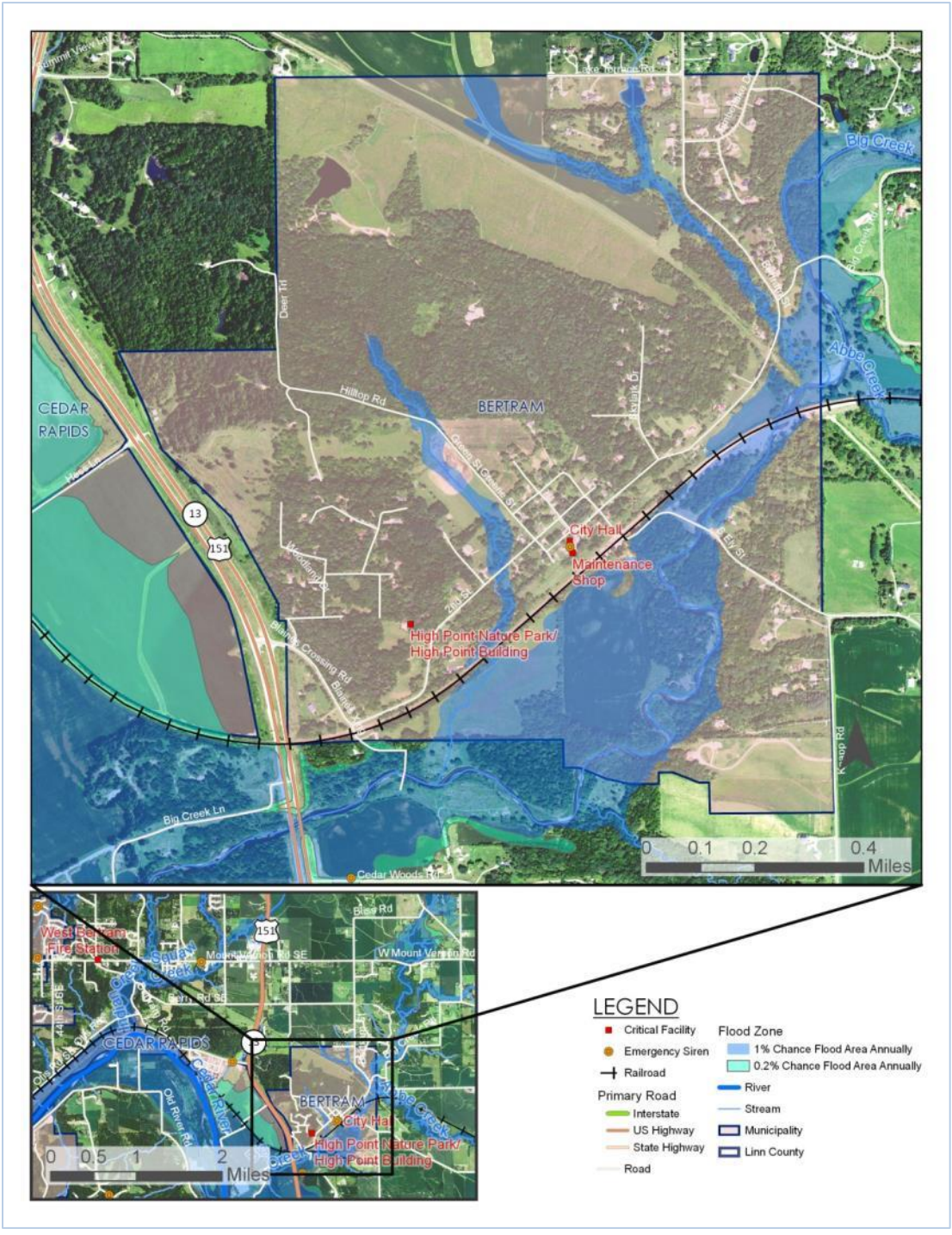
Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Alburnett, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Map 31.

Map 31: Alburnett Critical Facilities

Bertram Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Bertram, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Map 32.

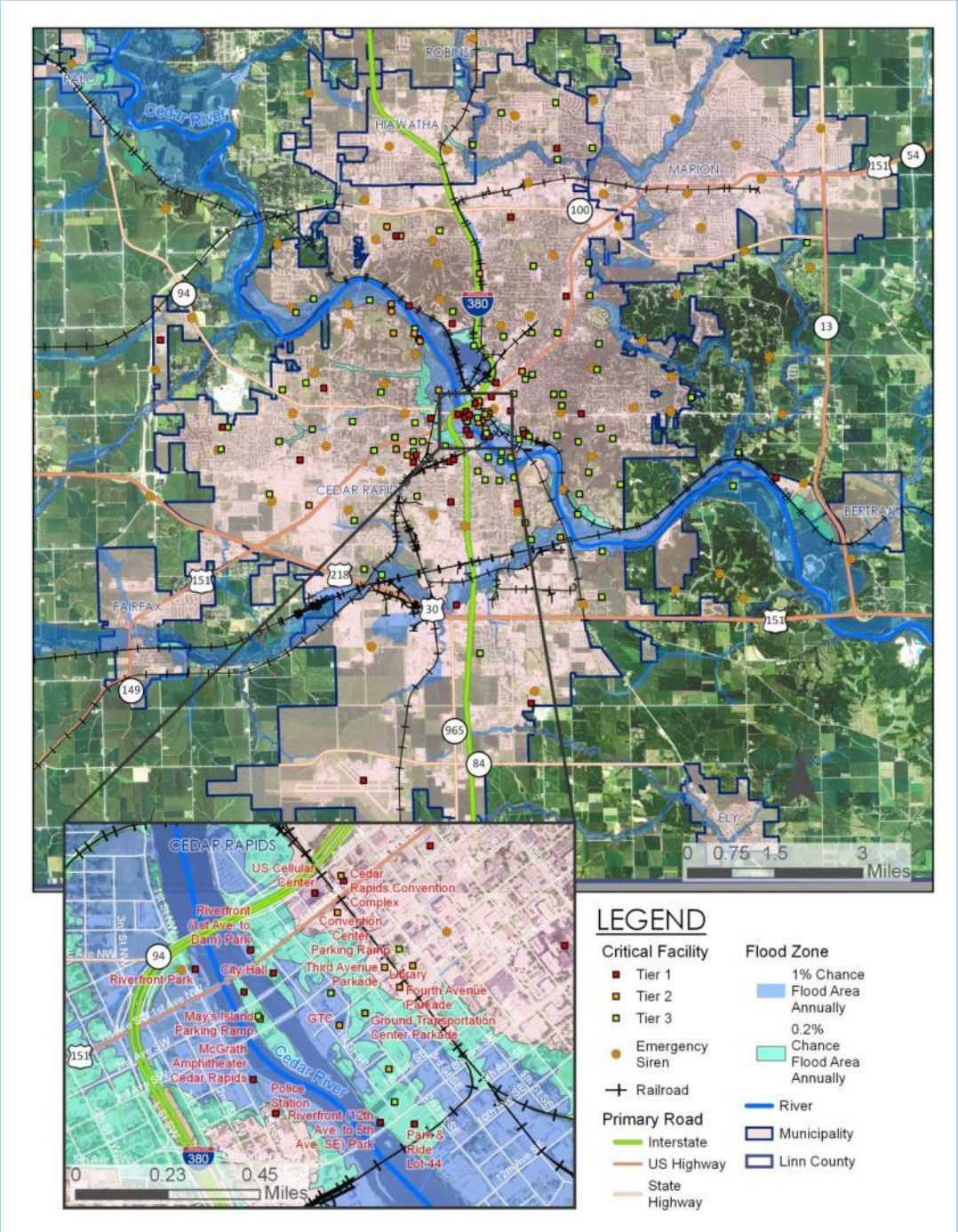
Map 32: Bertram Critical Facilities



Cedar Rapids Critical Facilities

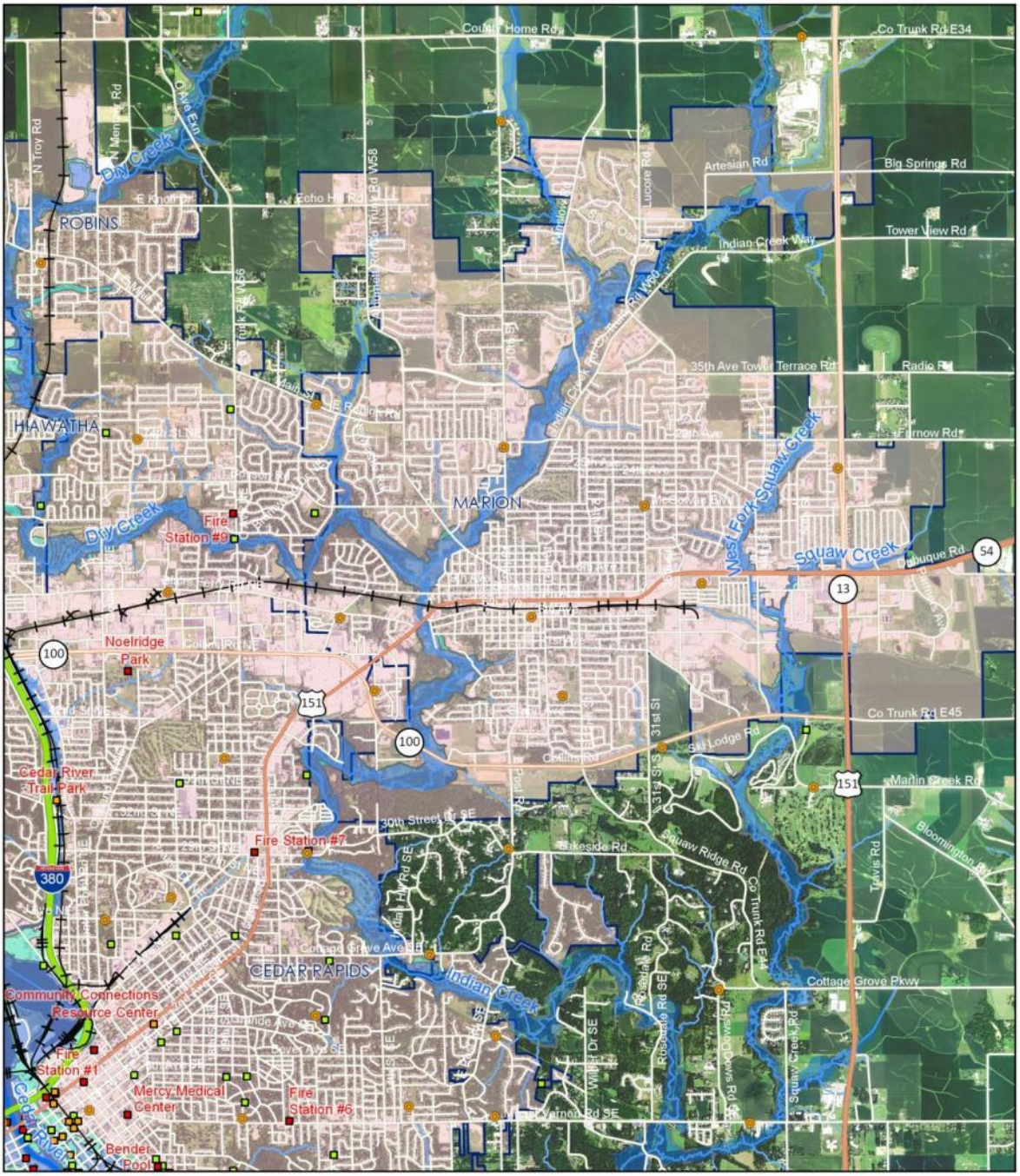
Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Cedar Rapids, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Map 33–Map 42.

Map 33: Cedar Rapids Downtown Tier 1 and 2 Critical Facilities

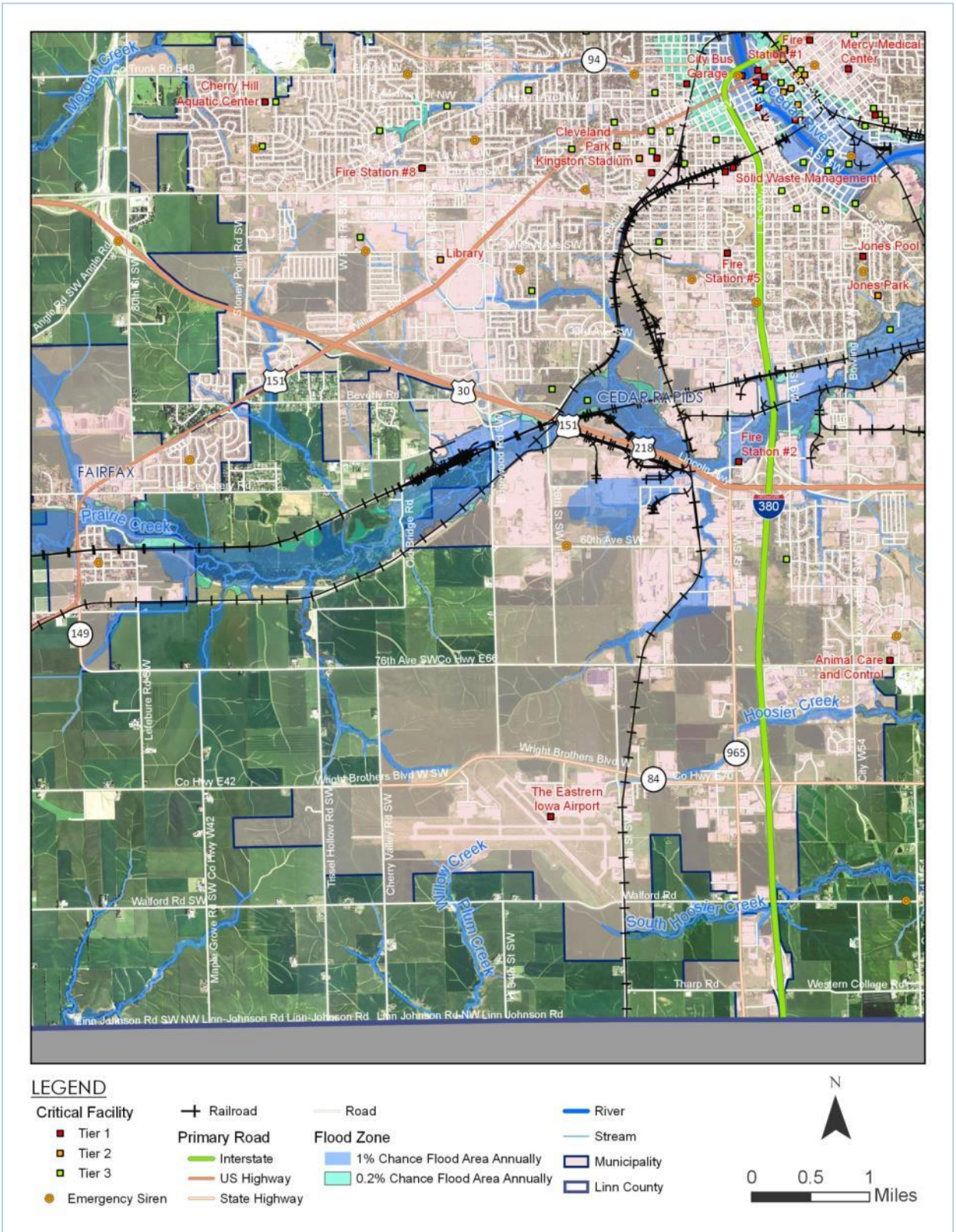


Map 34: Cedar Rapids Section 1 Tier 1 and 2 Critical Facilities

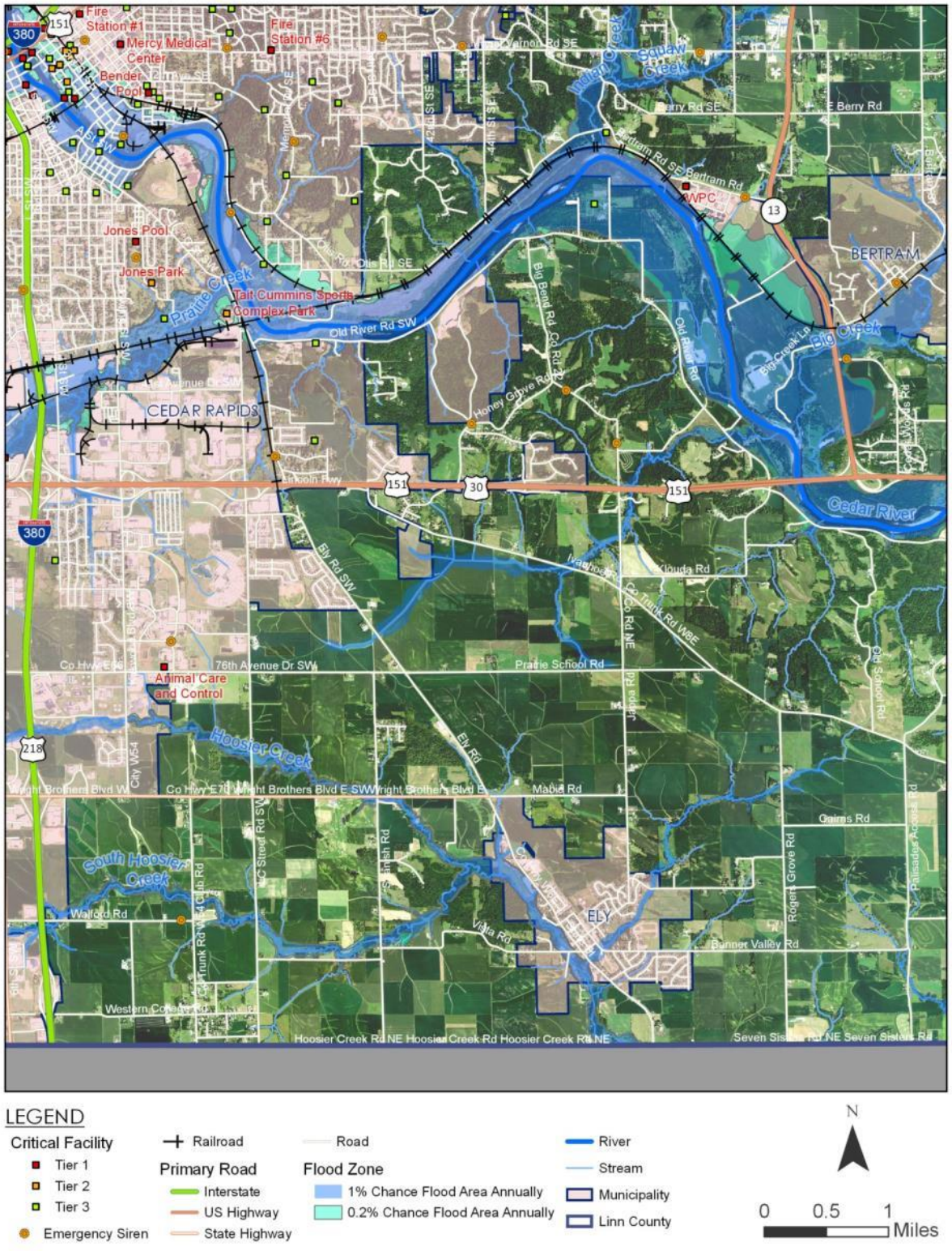
Map 35: Cedar Rapids Section 2 Tier 1 and 2 Critical Facilities



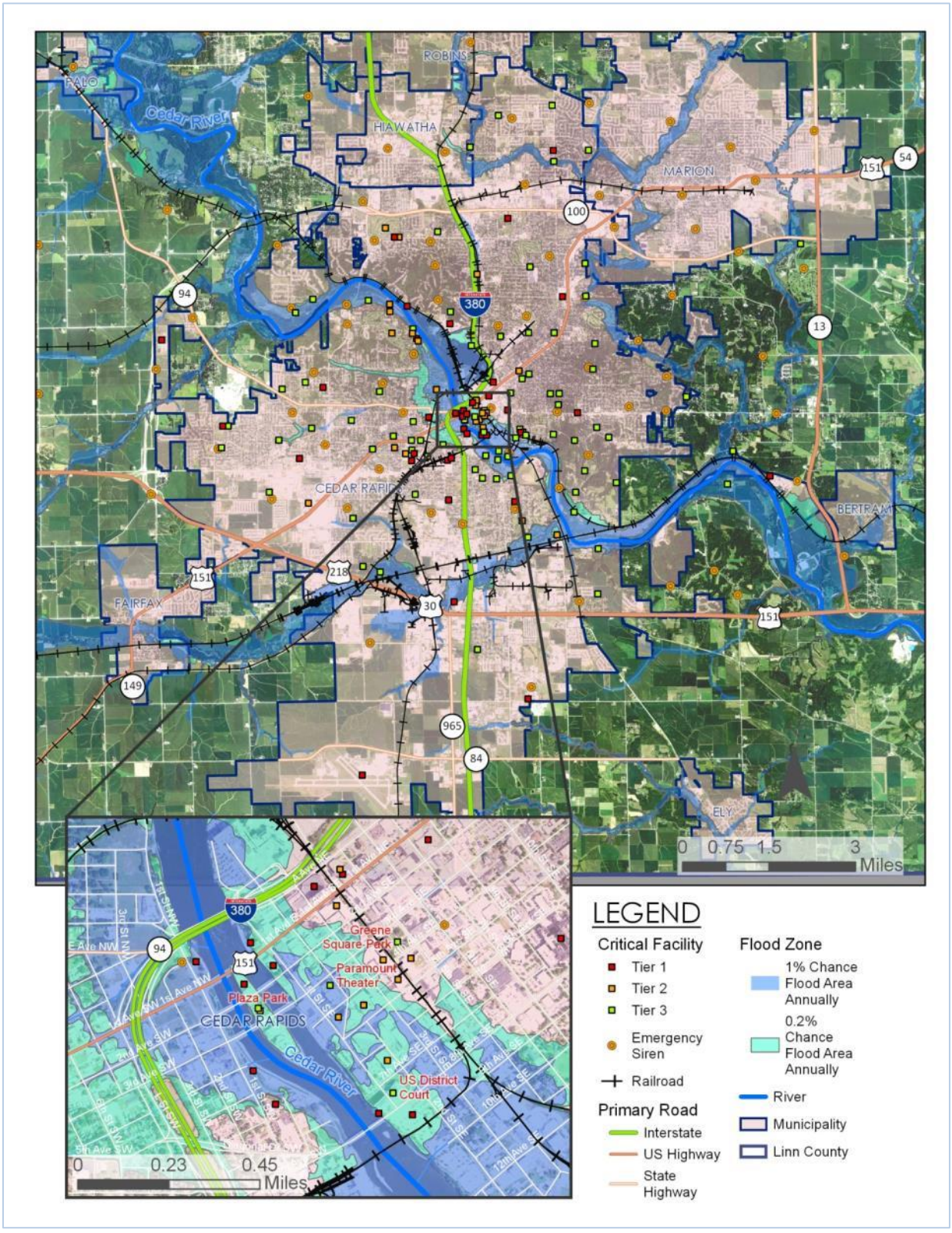
Map 36: Cedar Rapids Section 3 Tier 1 and 2 Critical Facilities



Map 37: Cedar Rapids Section 4 Tier 1 and 2 Critical Facilities

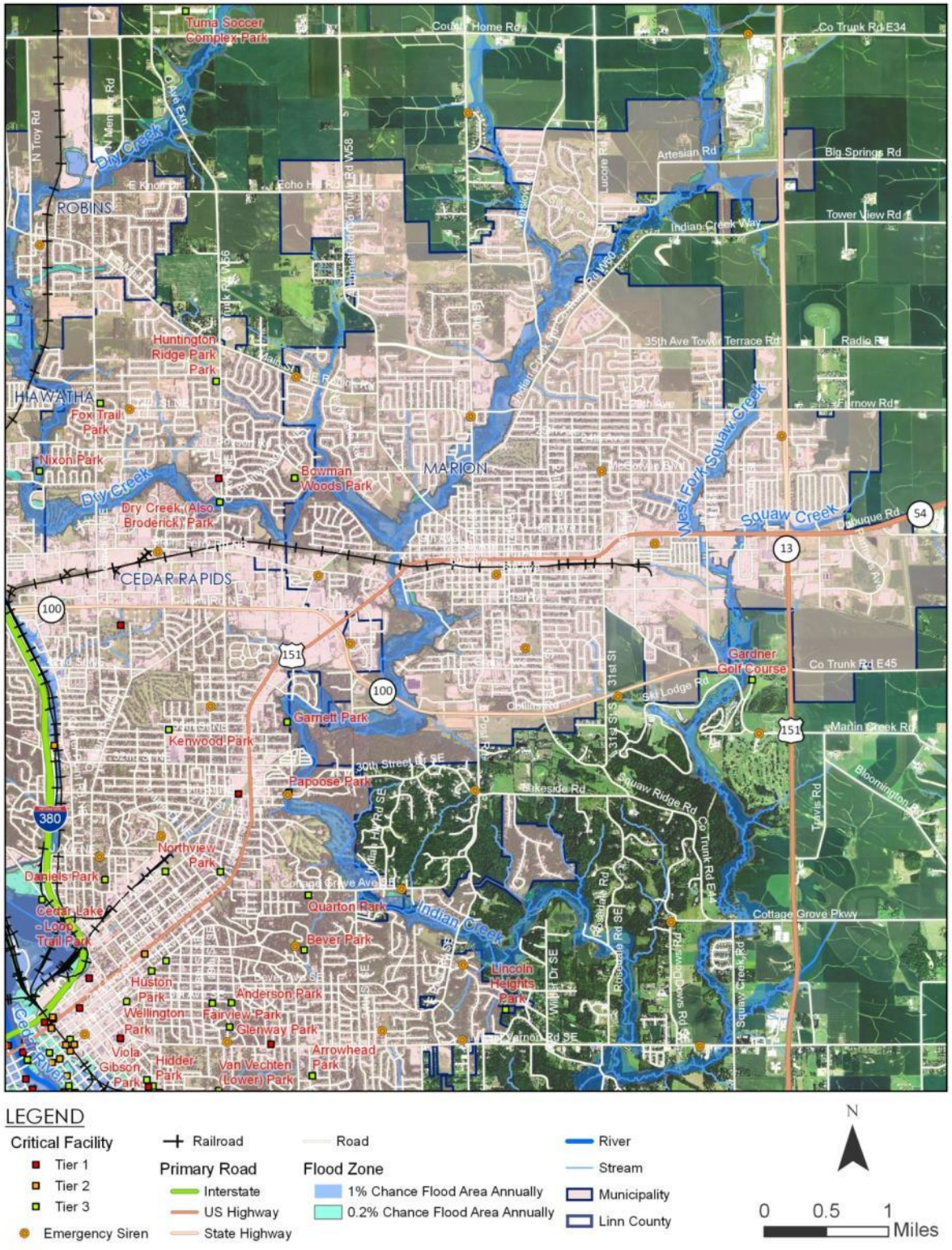


Map 38: Cedar Rapids Downtown Tier 3 Critical Facilities

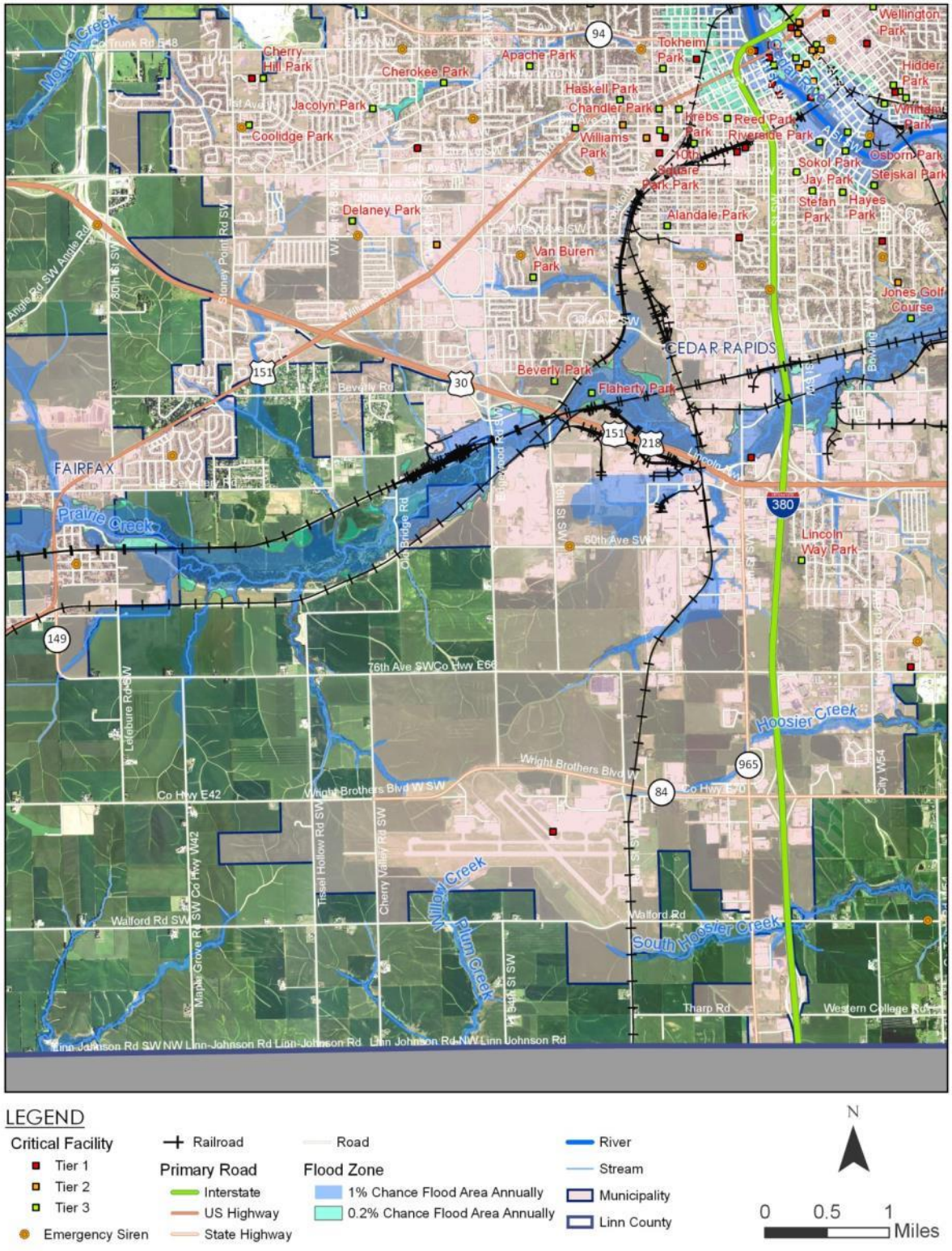


Map 39: Cedar Rapids Section 1 Tier 3 Critical Facilities

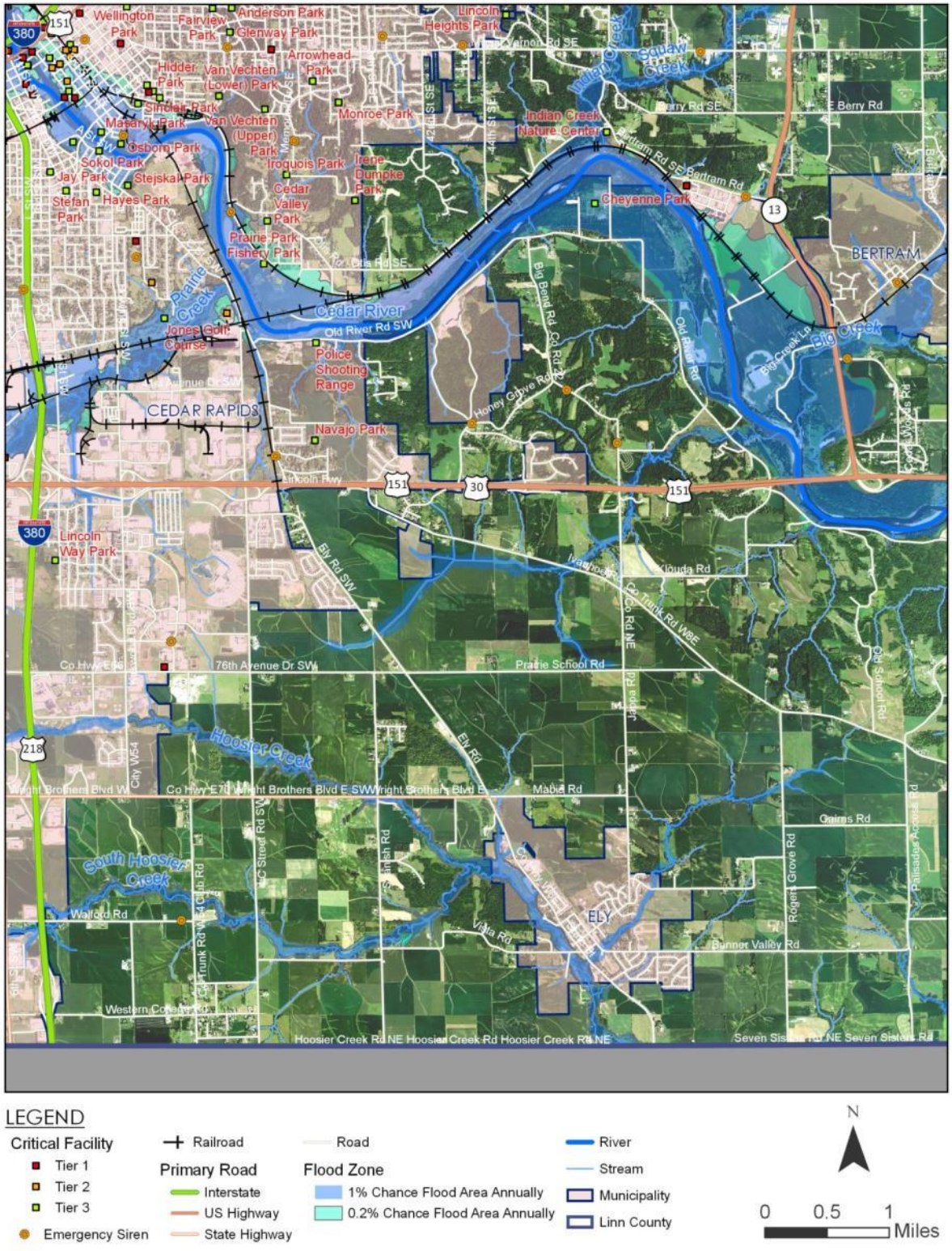
Map 40: Cedar Rapids Section 2 Tier 3 Critical Facilities



Map 41: Cedar Rapids Section 3 Tier 3 Critical Facilities



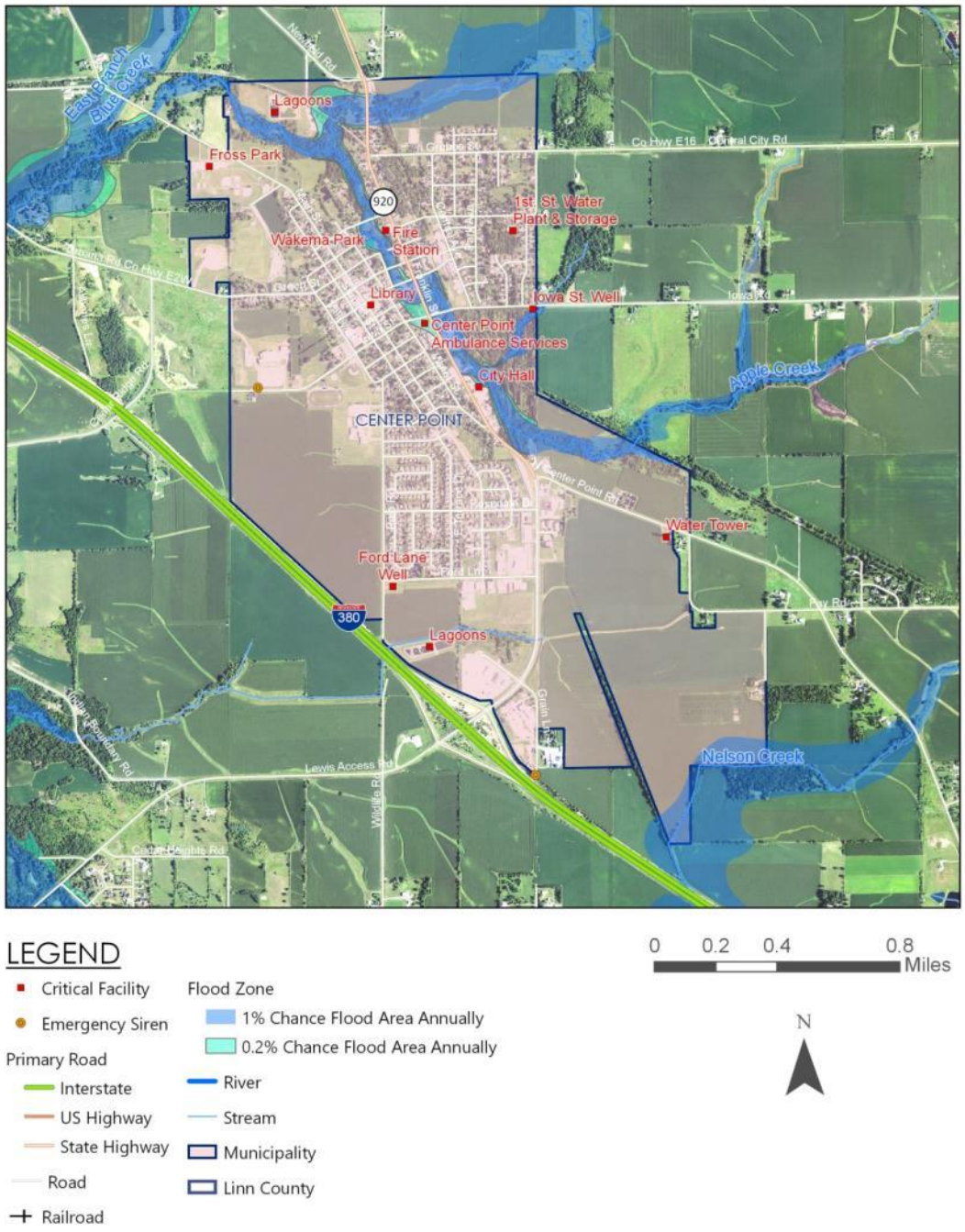
Map 42: Cedar Rapids Section 4 Tier 3 Critical Facilities



Center Point Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Center Point, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Map 43.

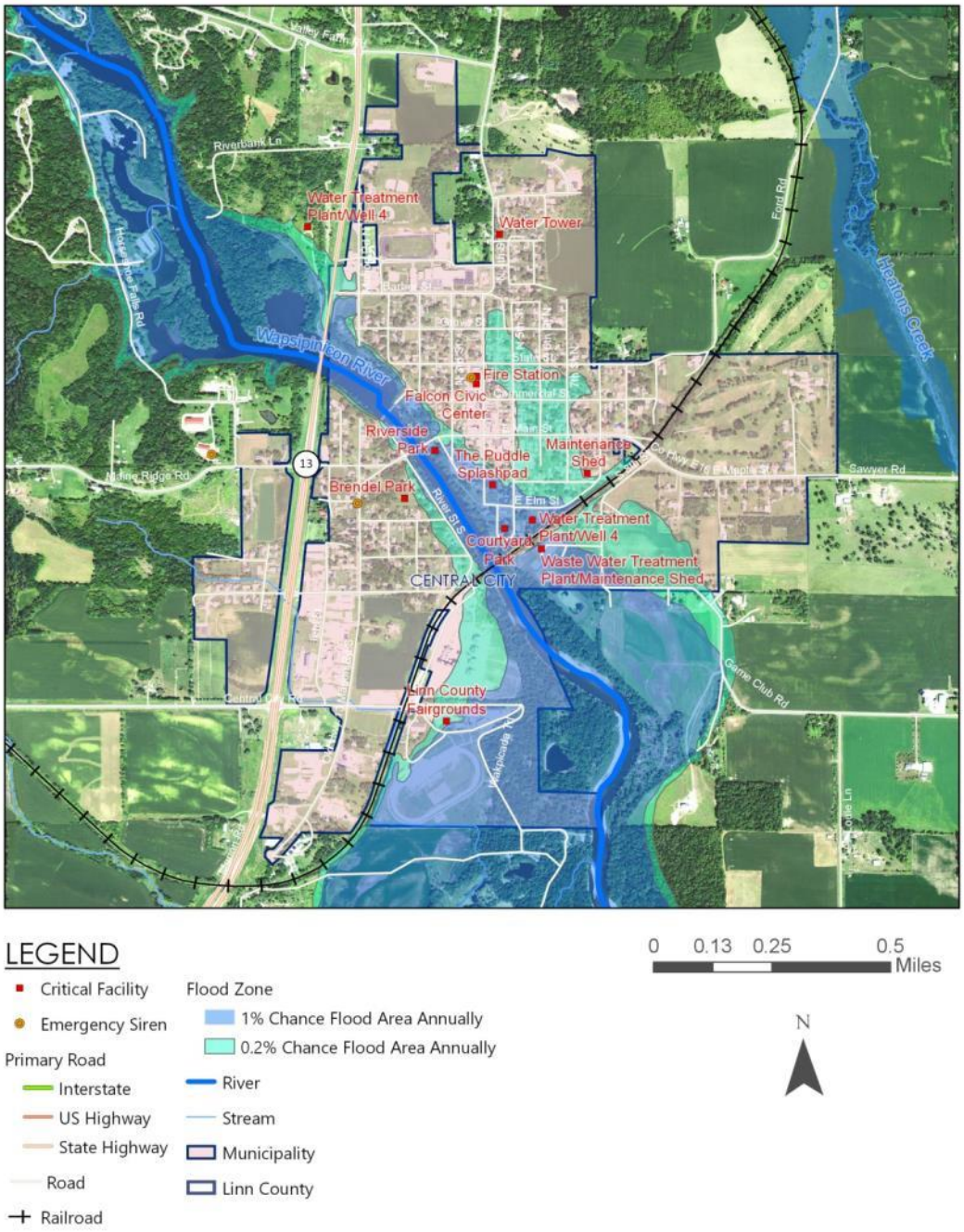
Map 43: Center Point Critical Facilities



Central City Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Central City, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Map 44.

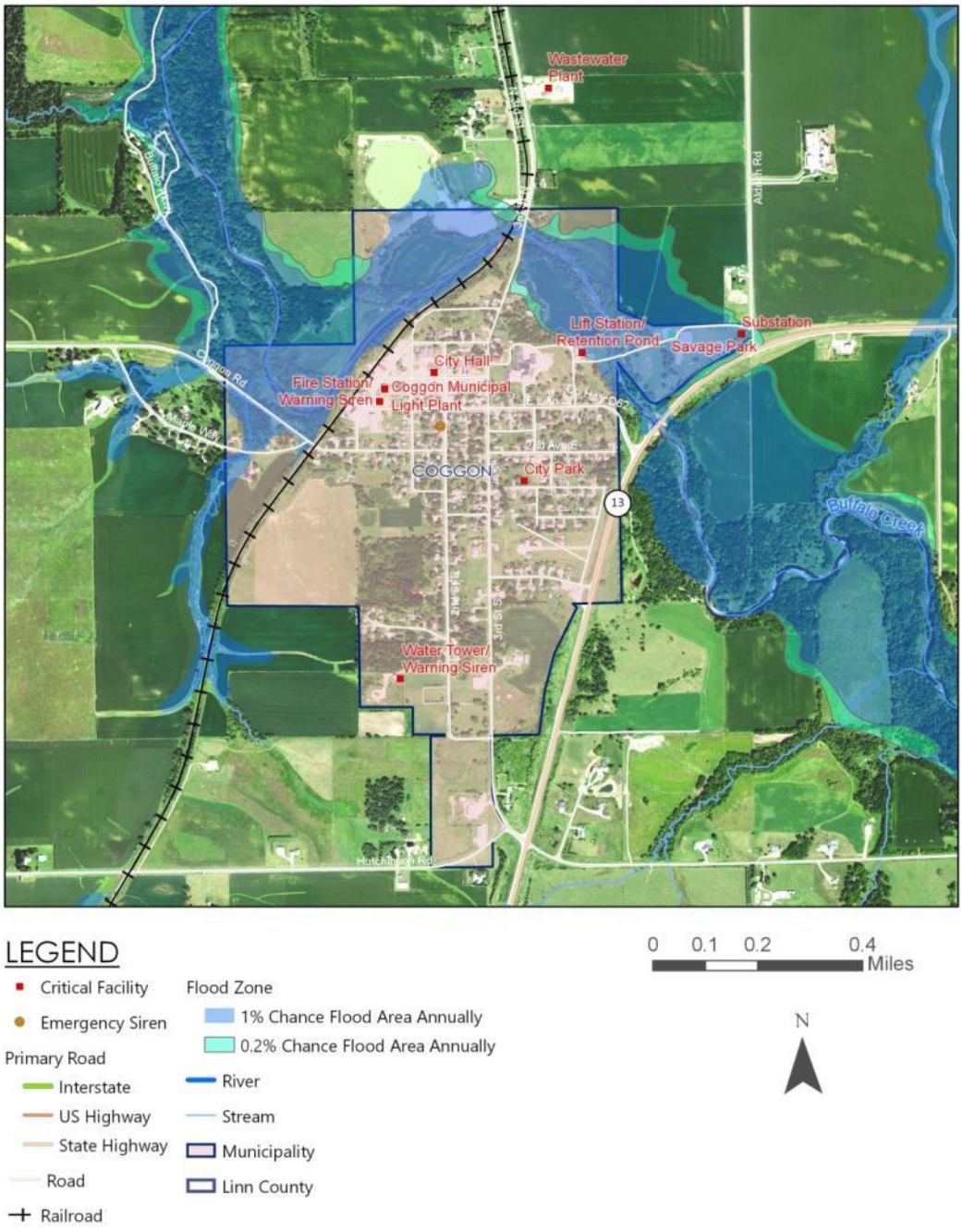
Map 44: Central City Critical Facilities



Coggon Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Coggon, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Map 45.

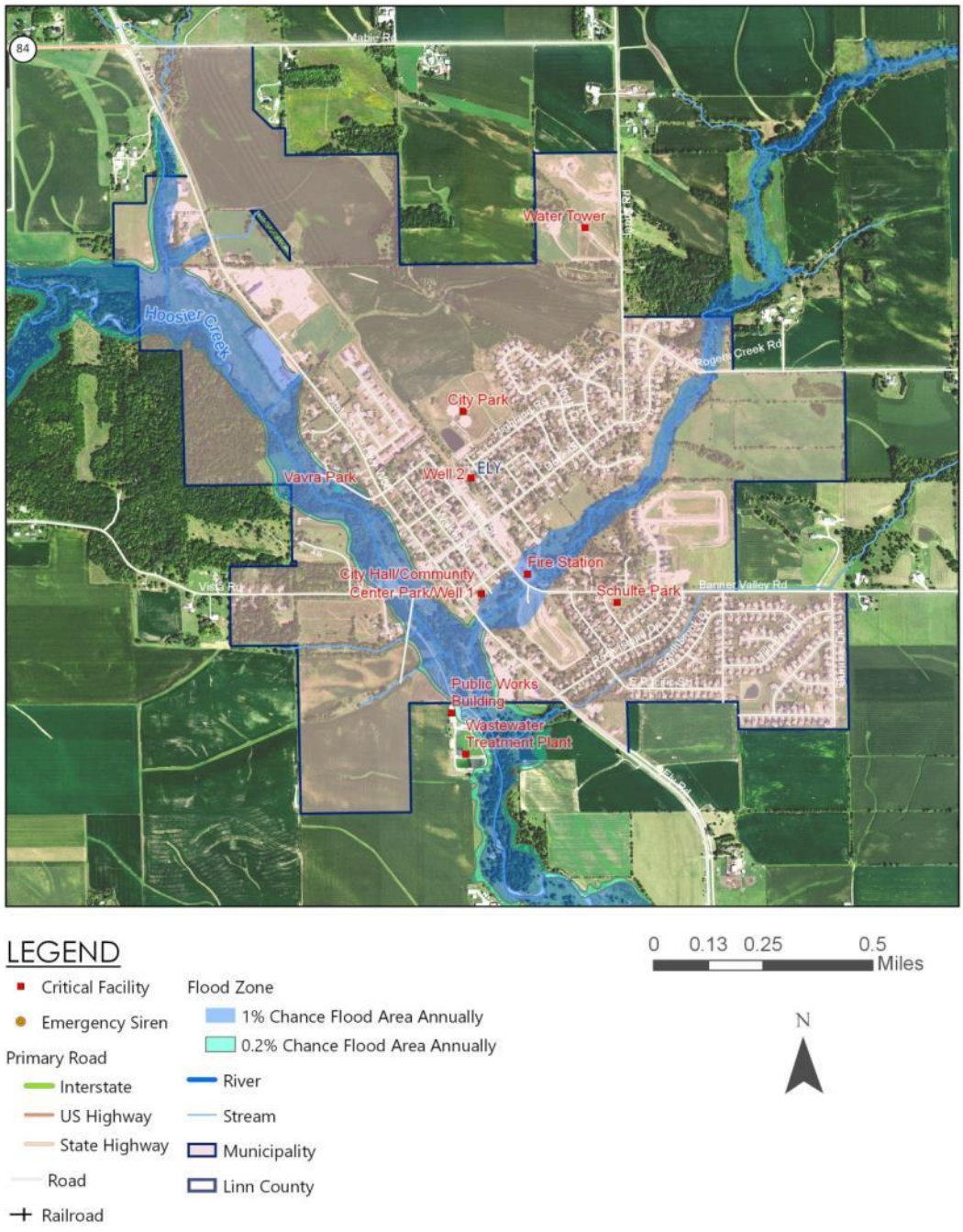
Map 45: Coggon Critical Facilities



Ely Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Ely, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Map 46.

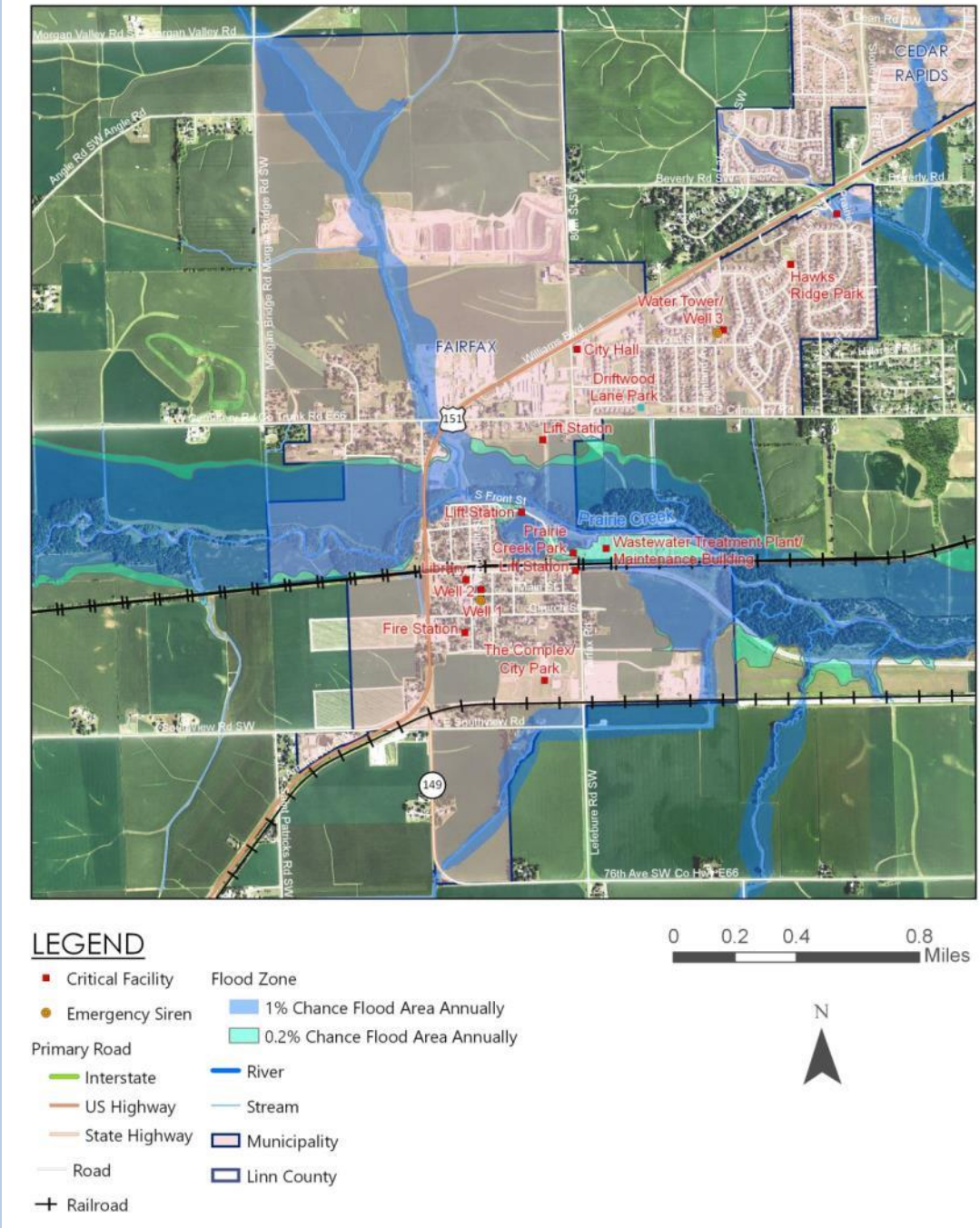
Map 46: Ely Critical Facilities



Fairfax Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Fairfax, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Map 47.

Map 47: Fairfax Critical Facilities



Hiawatha Critical Facilities

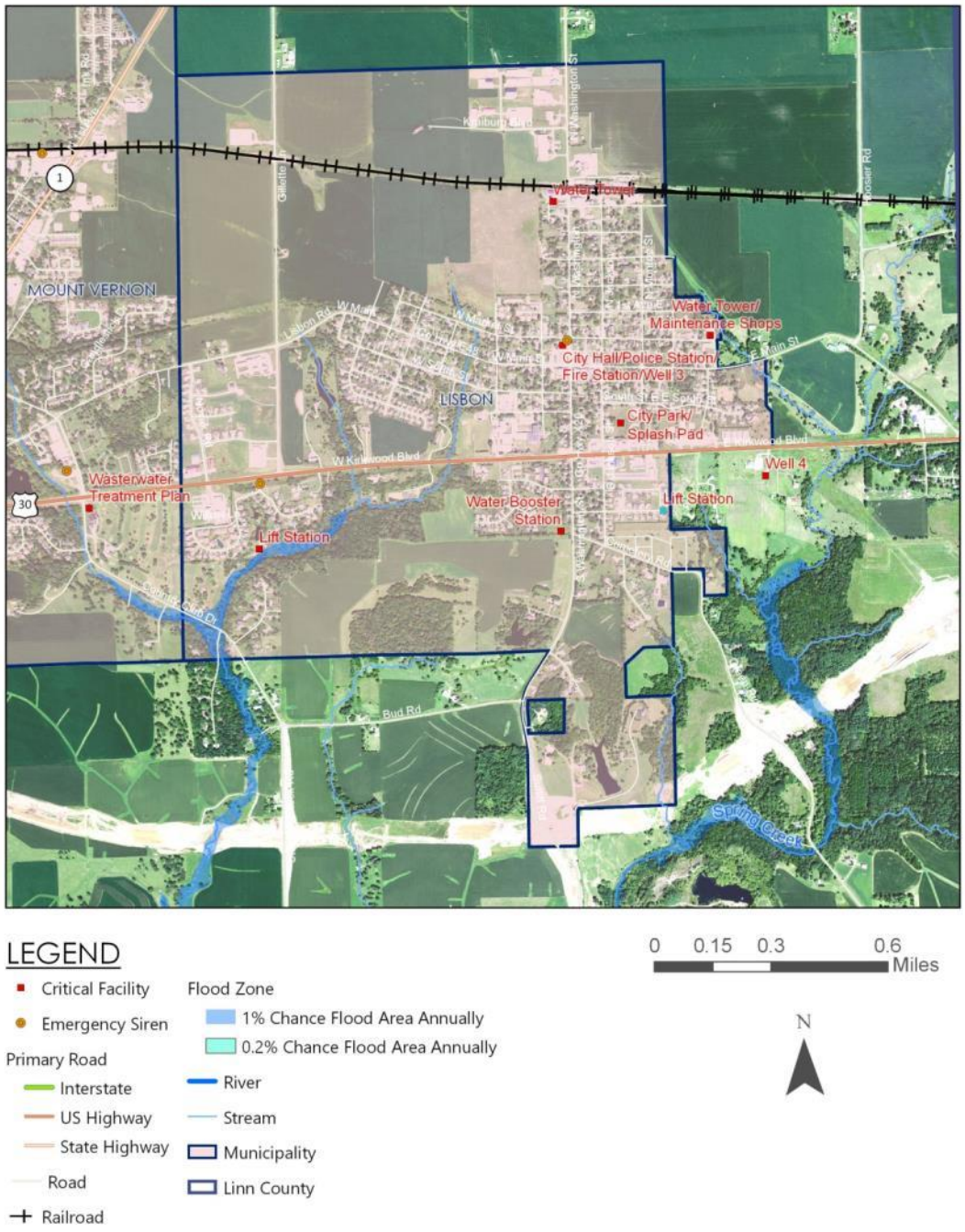
Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Hiawatha, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Map 48.

Map 48: Hiawatha Critical Facilities

Lisbon Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Lisbon, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Map 49.

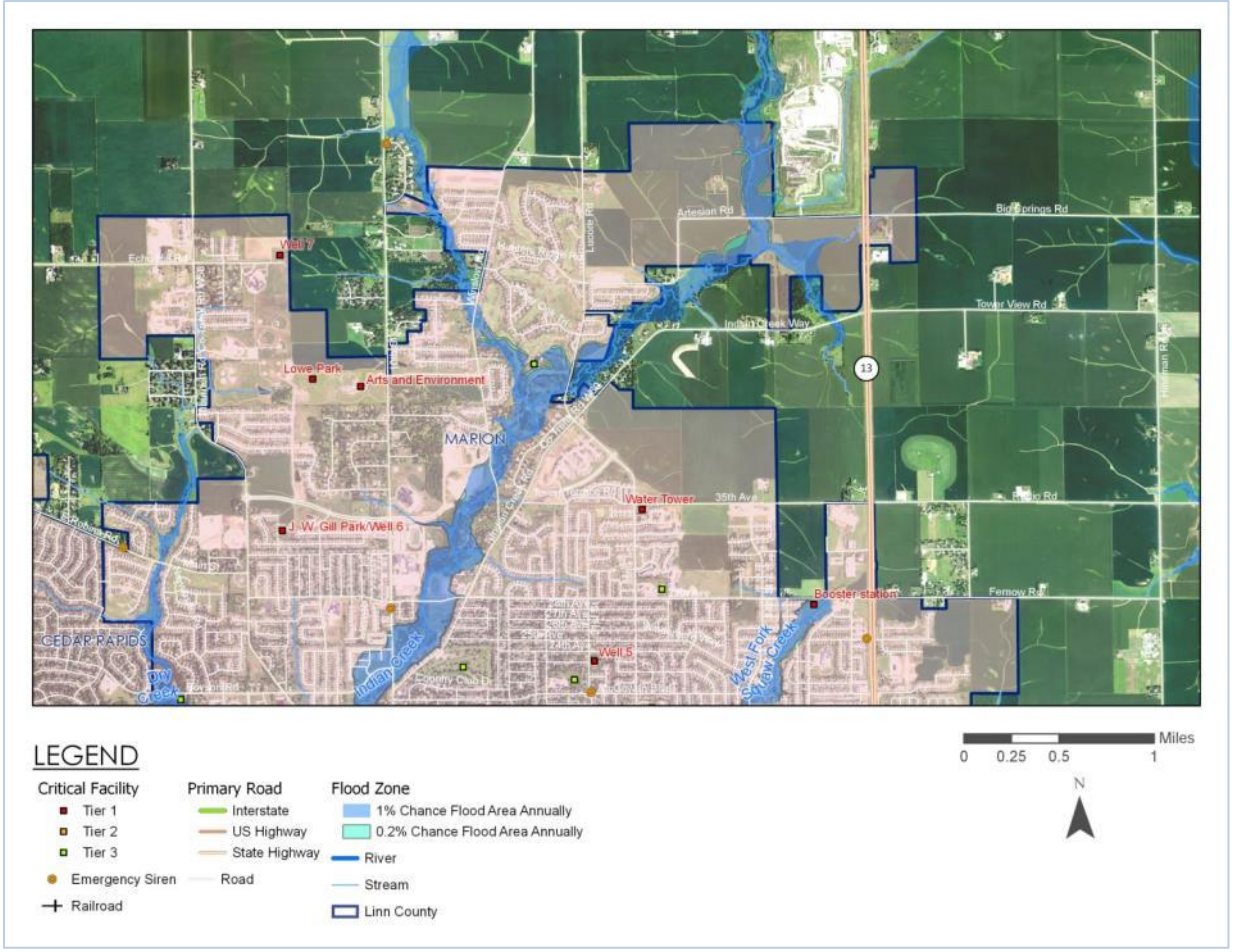
Map 49: Lisbon Critical Facilities



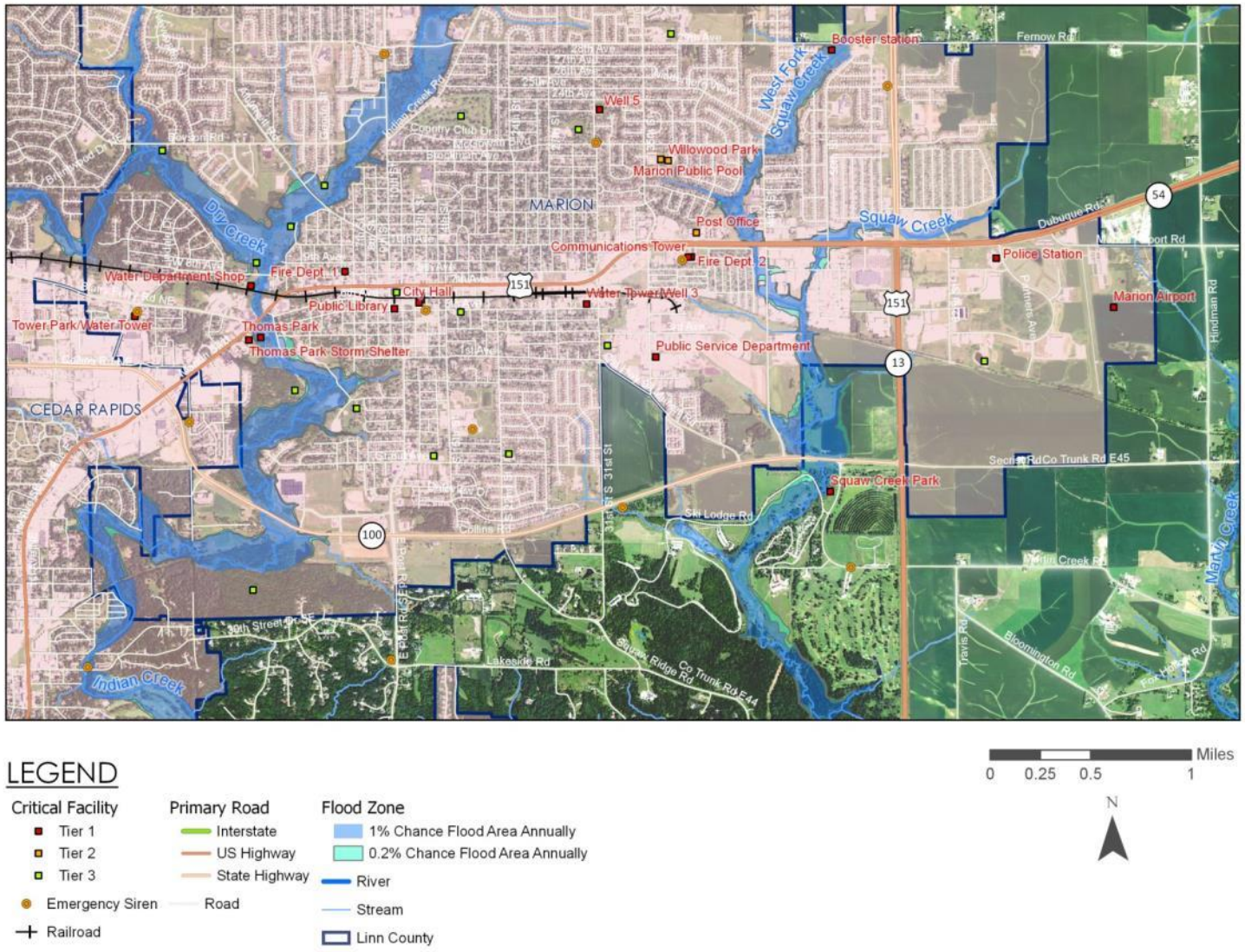
Marion Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Marion, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Map 50–Map 53.

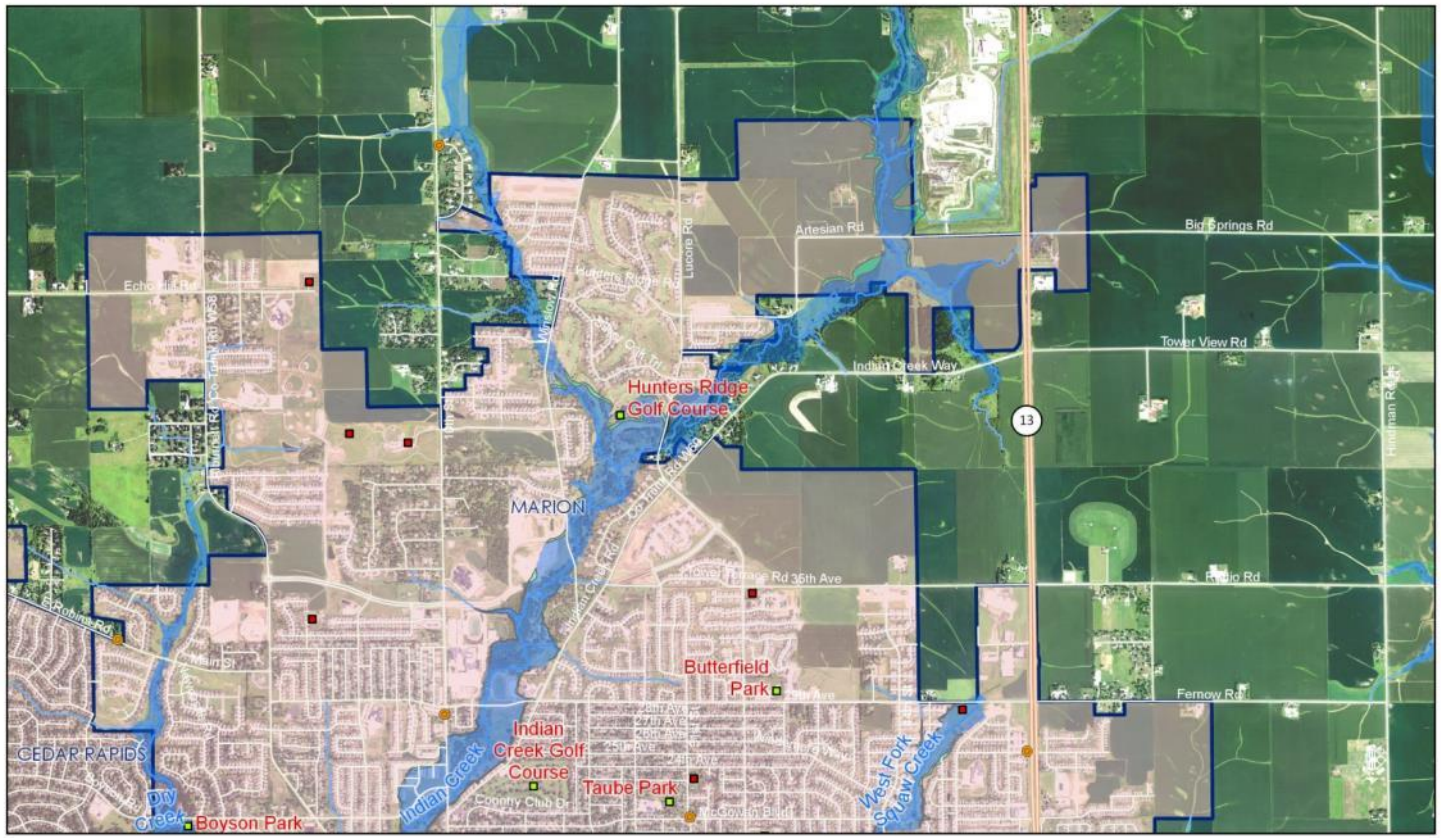
Map 50: Marion Section 1 Tier 1 and 2 Critical Facilities



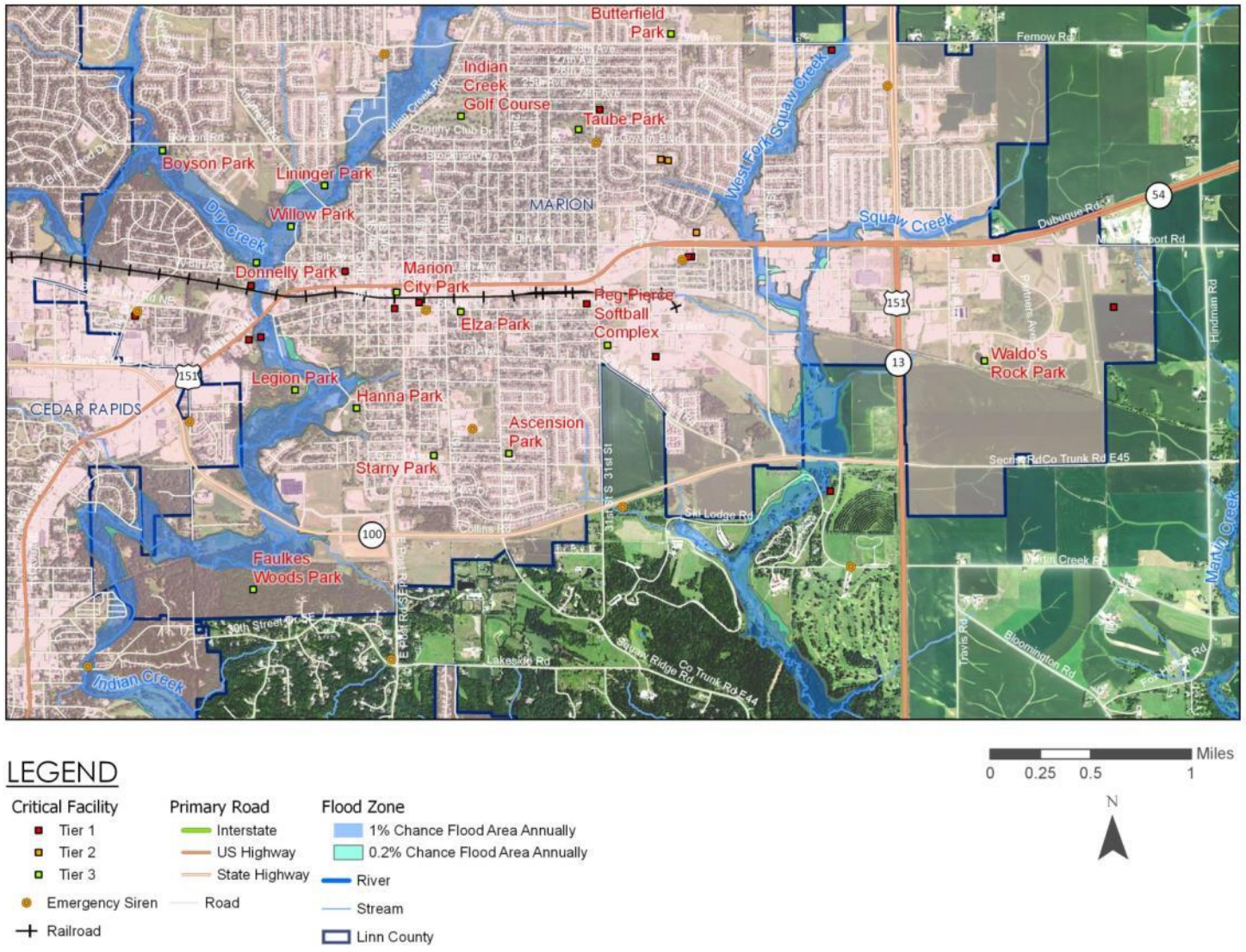
Map 51: Marion Section 2 Tier 1 and 2 Critical Facilities



Map 52: Marion Section 1 Tier 3 Critical Facilities



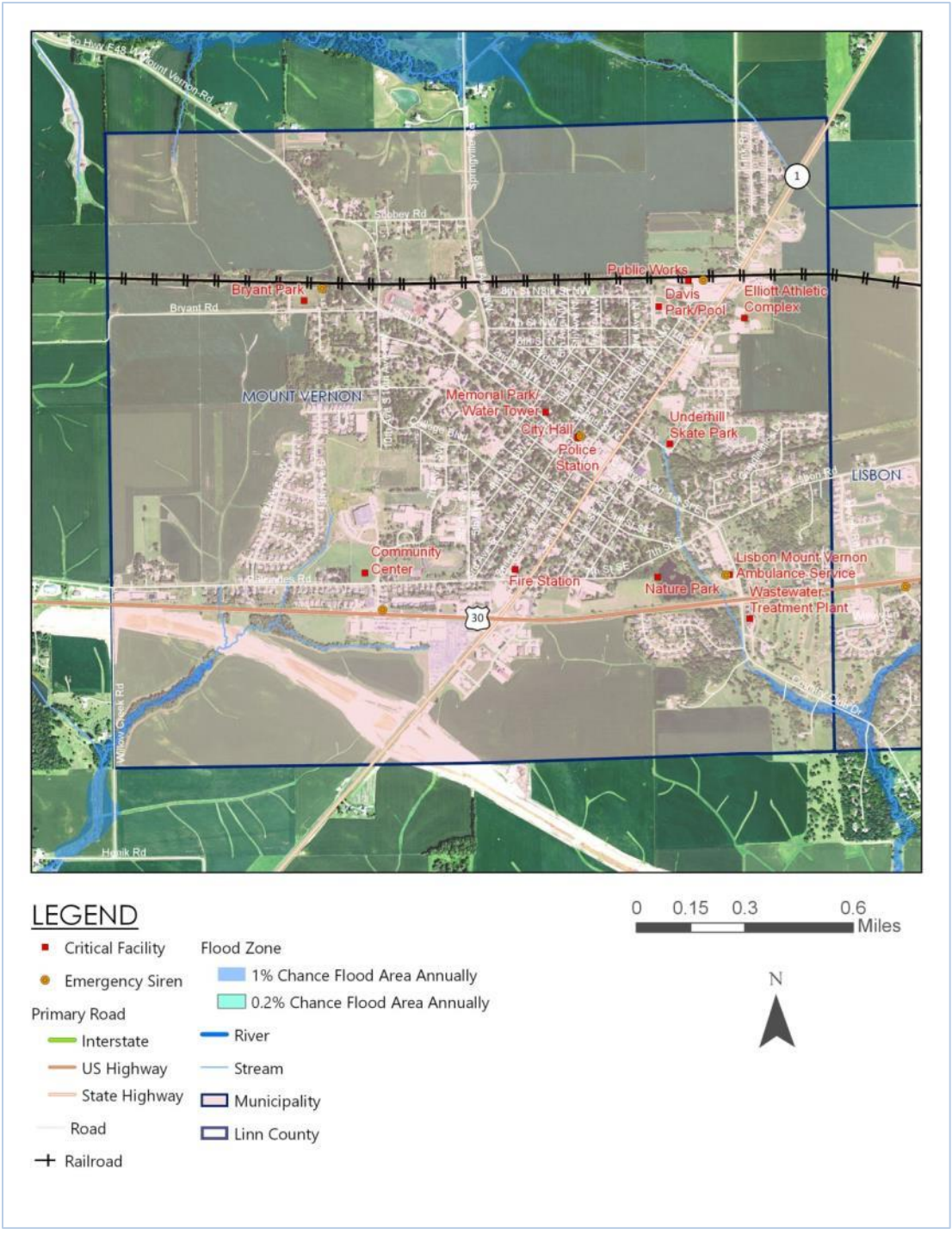
Map 53: Marion Section 2 Tier 3 Critical Facilities



Mount Vernon Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Mount Vernon, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Map 54.

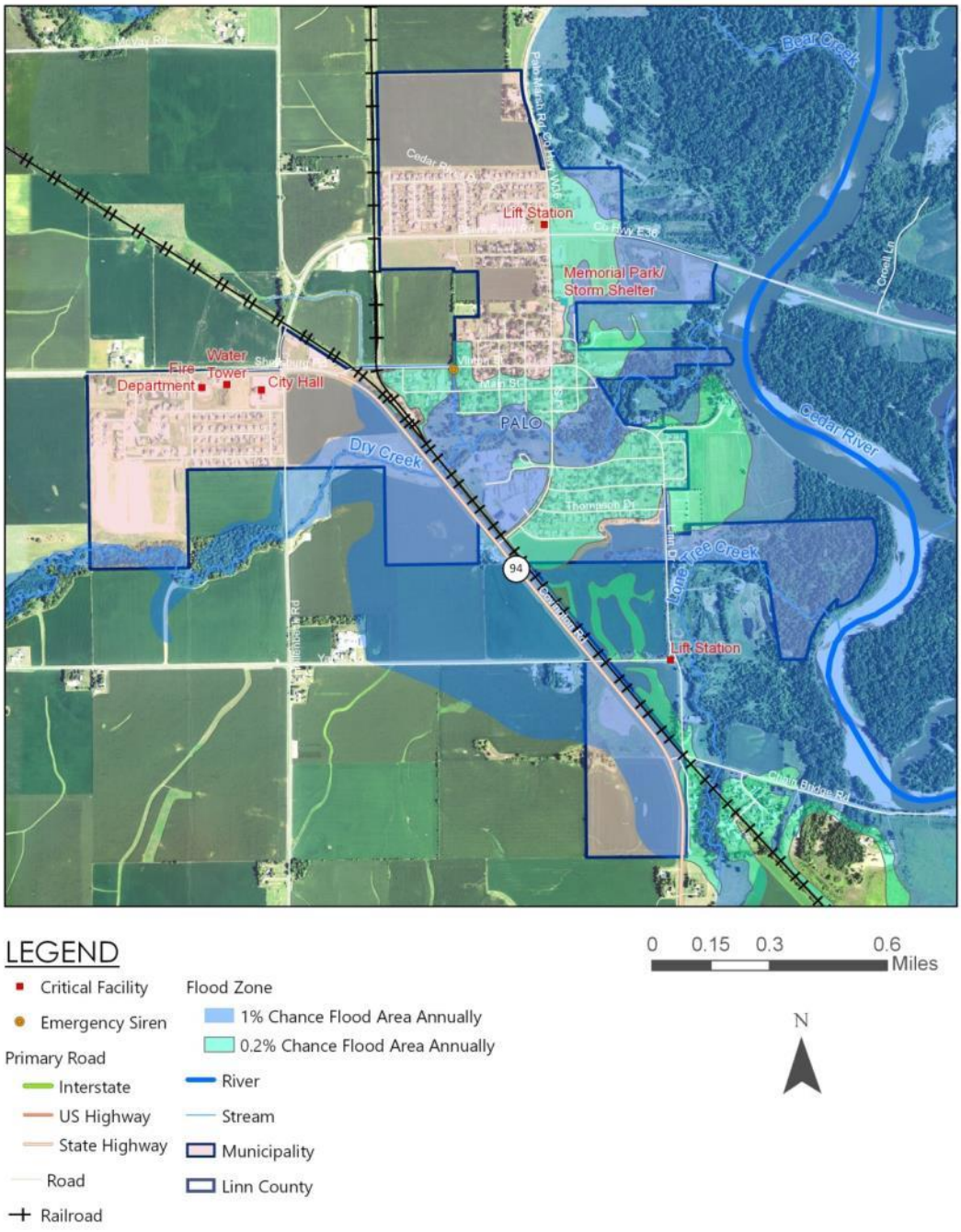
Map 54: Mount Vernon Critical Facilities



Palo Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Palo, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Map 55.

Map 55: Palo Critical Facilities



Prairieburg Critical Facilities

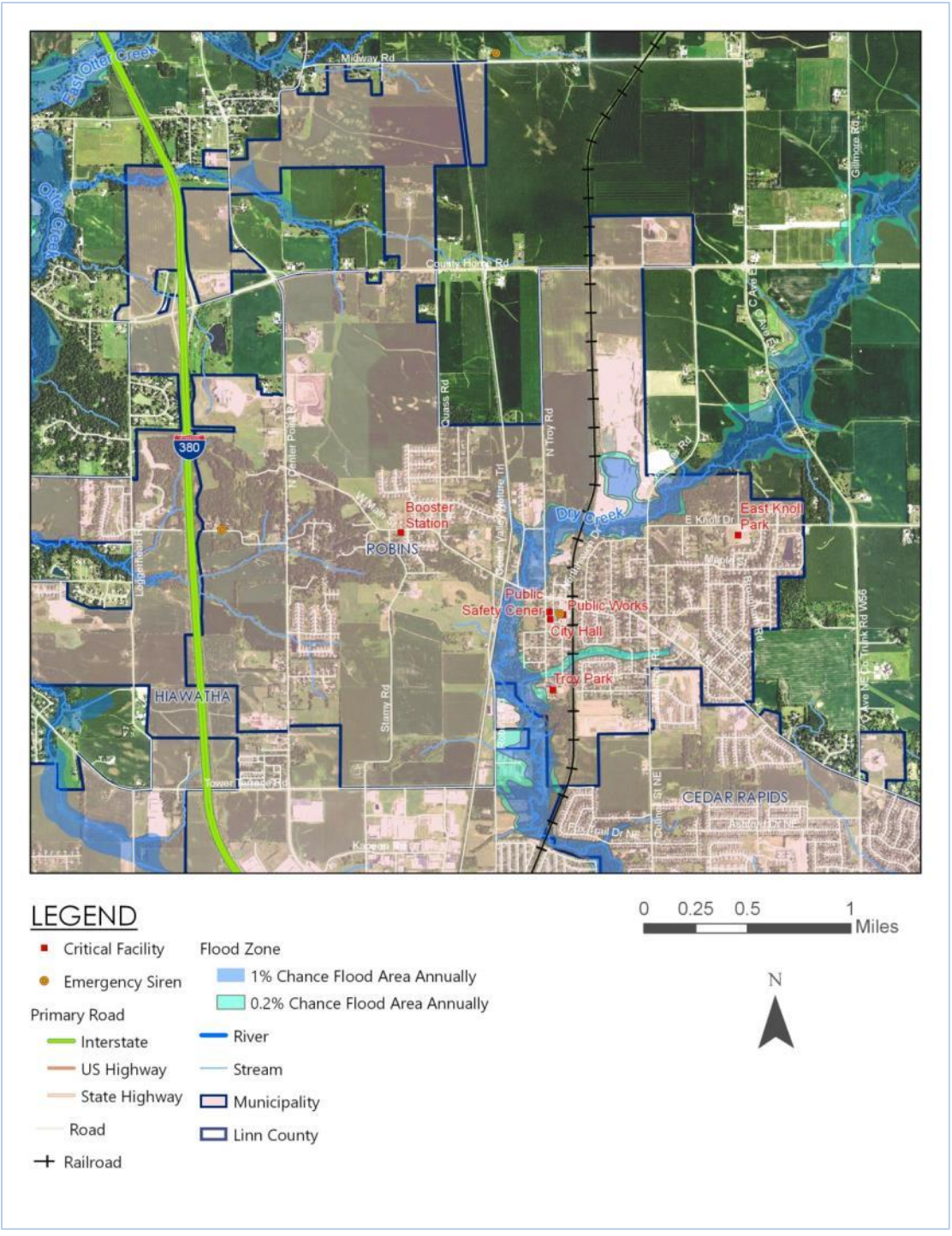
Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Prairieburg, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Map 56.

Map 56: Prairieburg Critical Facilities

Robins Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Robins, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Map 57.

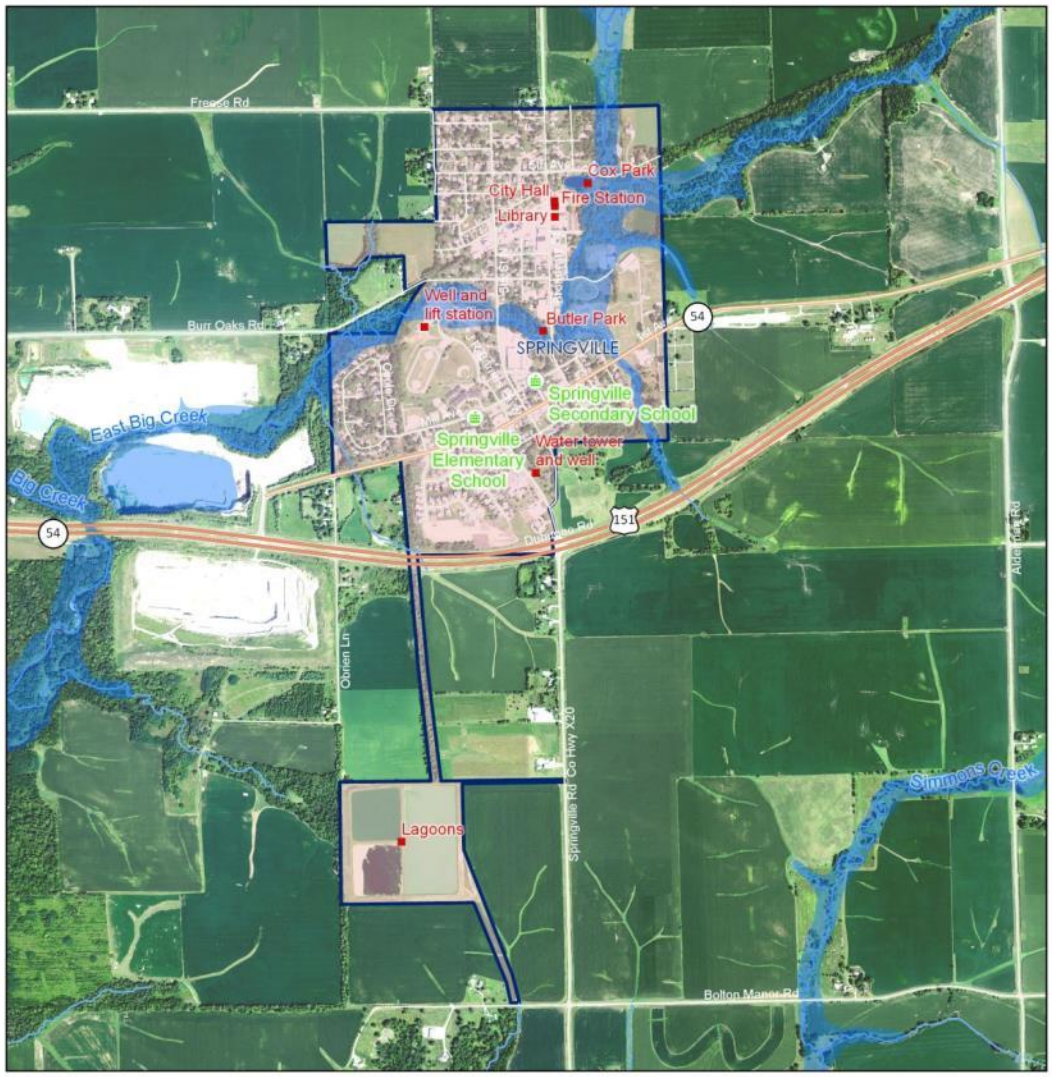
Map 57: Robins Critical Facilities



Springville Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Springville, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Map 58.

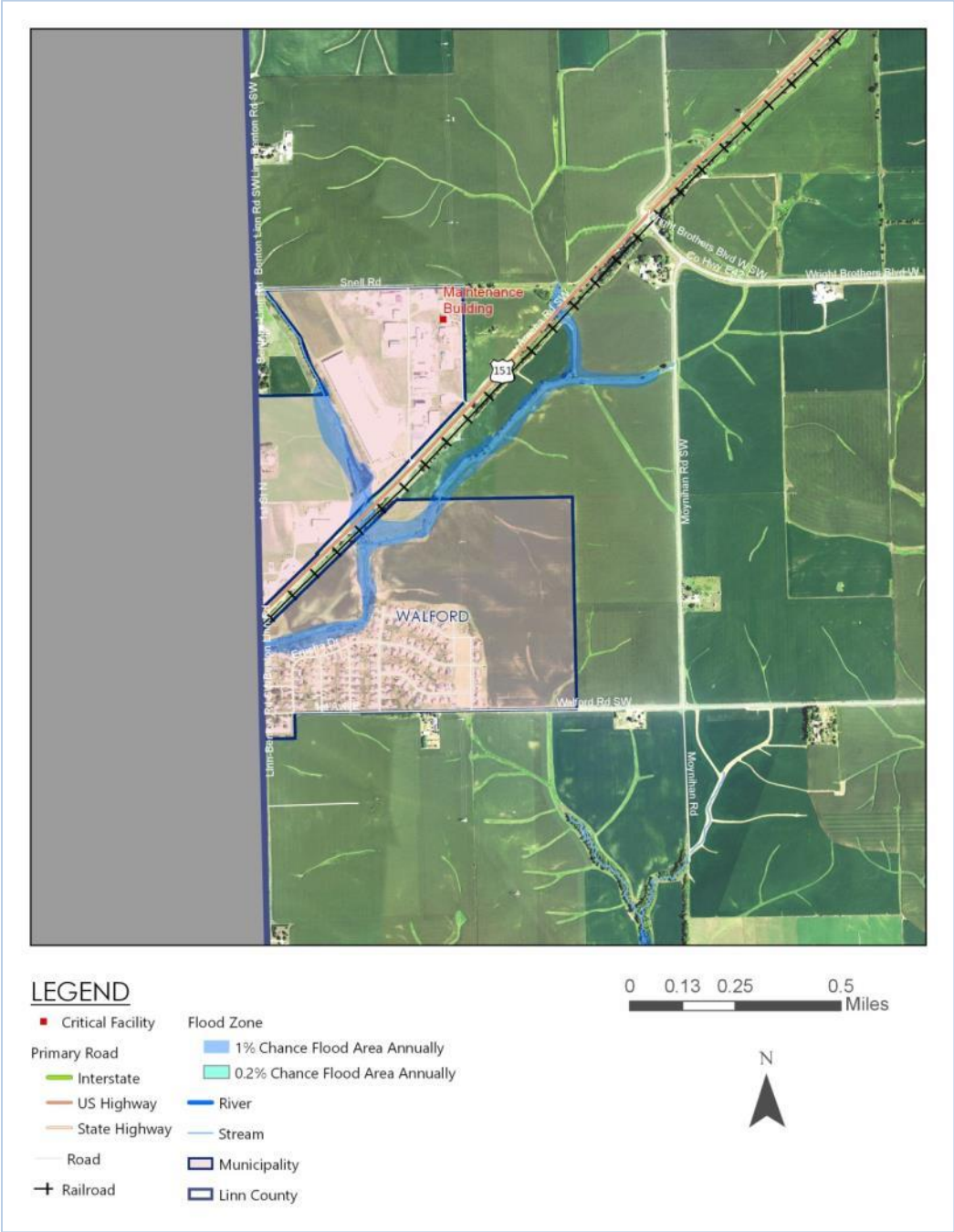
Map 58: Springville Critical Facilities



Walford Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Walford, all city property and infrastructure are considered critical facilities. Because Walford participated in an approved hazard mitigation plan through Benton County, only their critical facilities with Linn County are mapped. For specific critical facilities, refer to Map 59.

Map 59: Walford Critical Facilities



Walker Critical Facilities

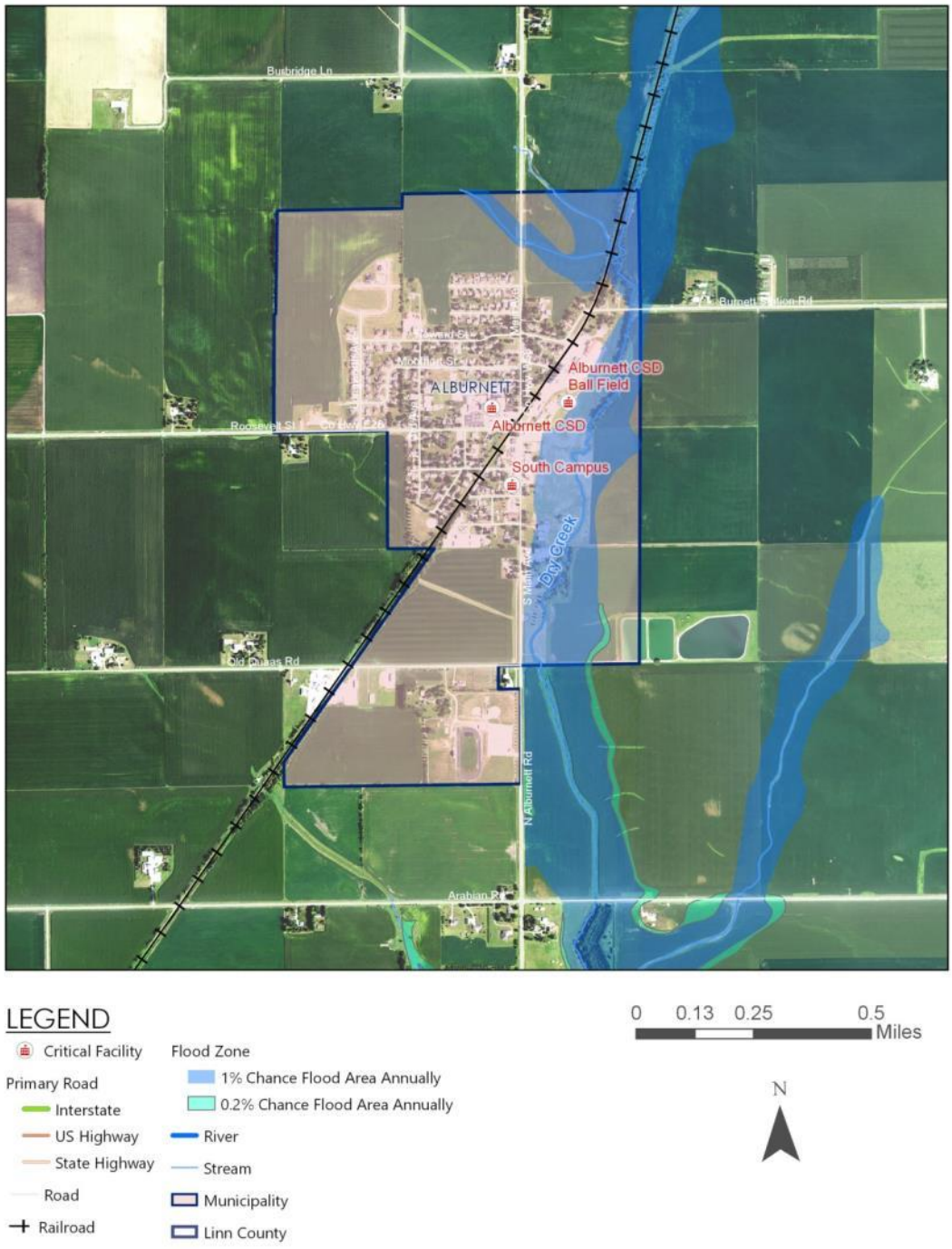
Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In Walker, all city property and infrastructure are considered critical facilities. For specific critical facilities, refer to Map 60.

Map 60: Walker Critical Facilities

Alburnett Community School District Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In the Alburnett CSD, all district property and infrastructure are considered critical facilities. For specific critical facilities, refer to Map 61.

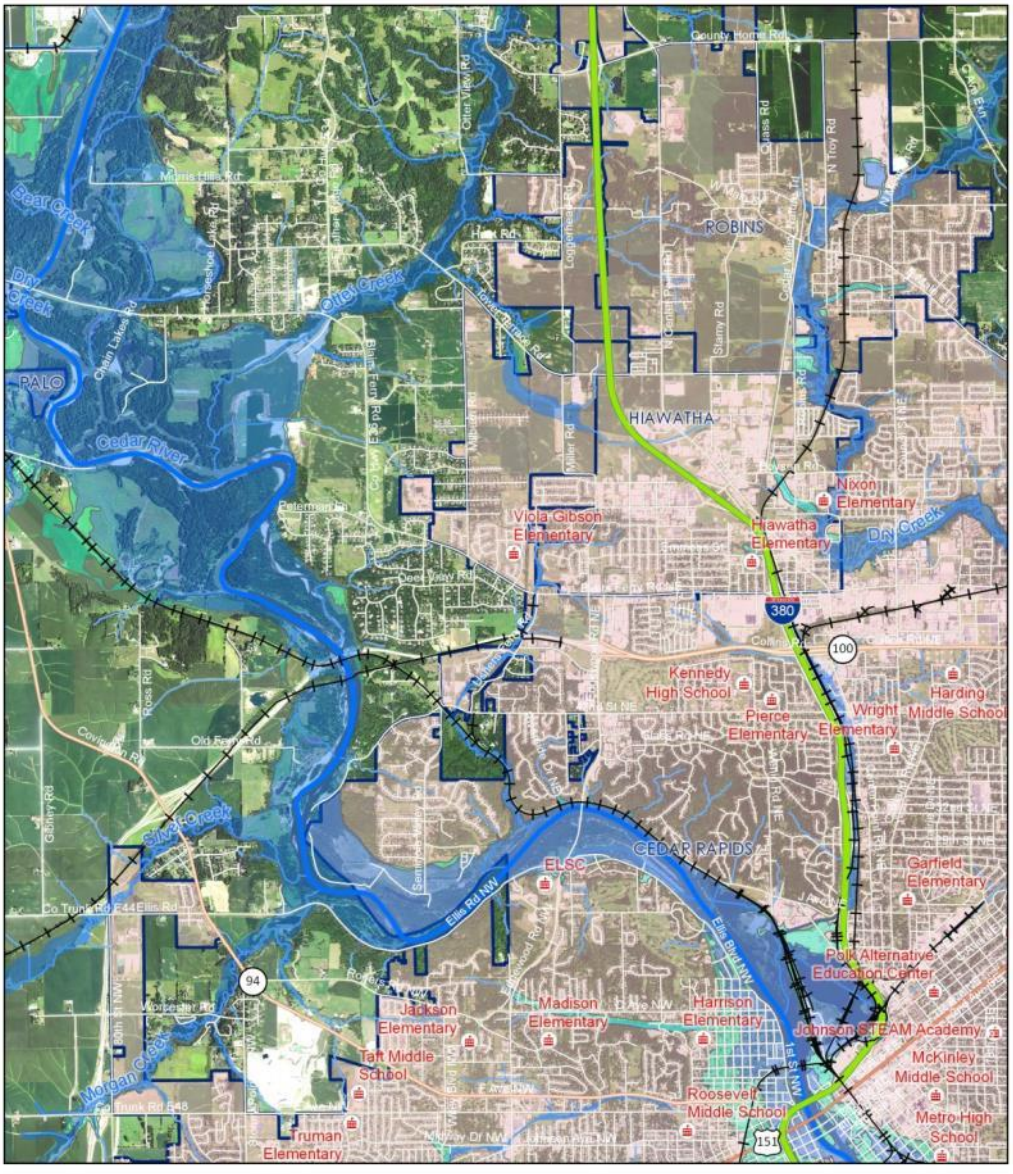
Map 61: Alburnett CSD Critical Facilities



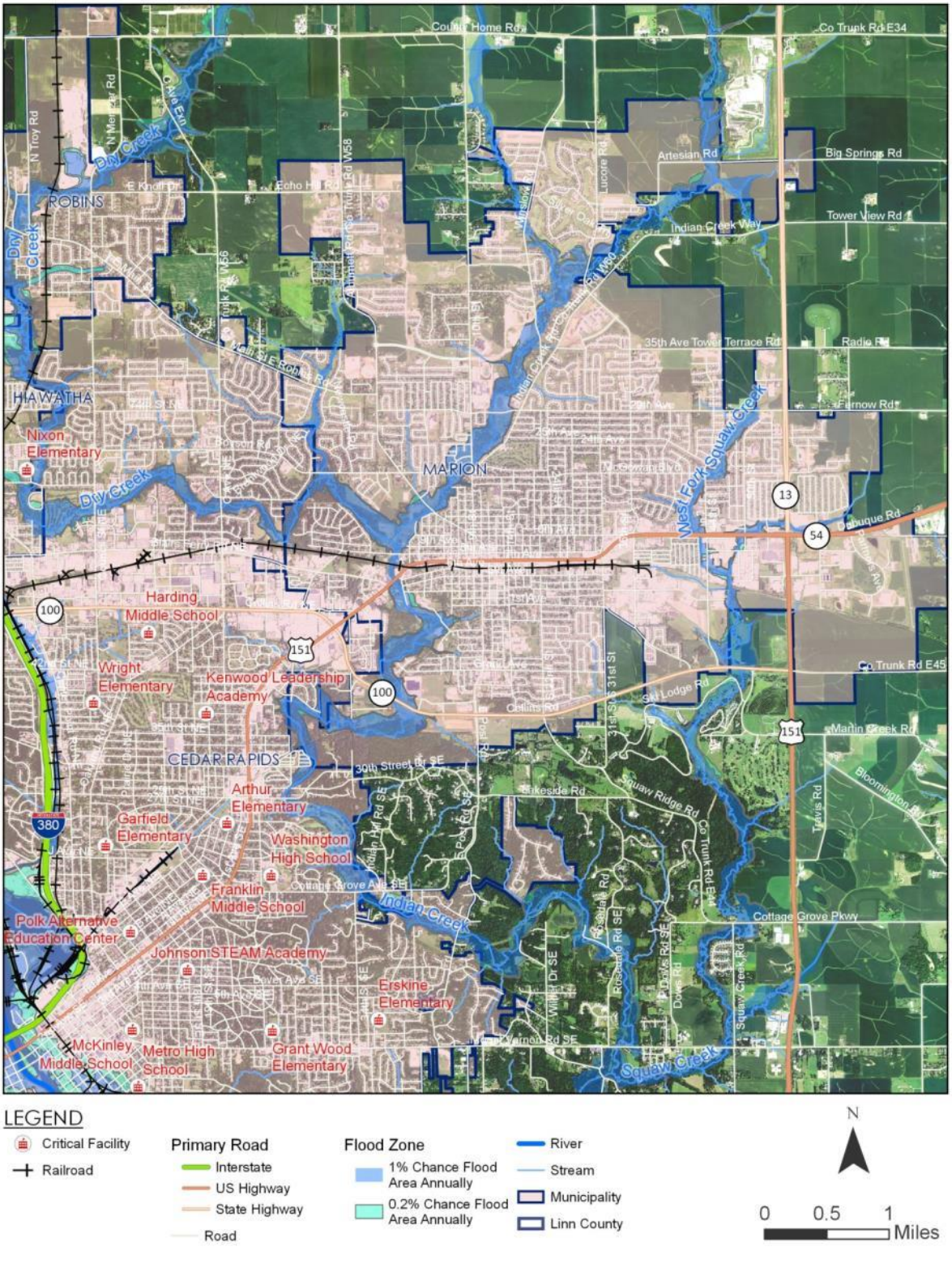
Cedar Rapids Community School District Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In the Cedar Rapids CSD, all district property and infrastructure are considered critical facilities. For specific critical facilities, refer to Map 62–Map 65.

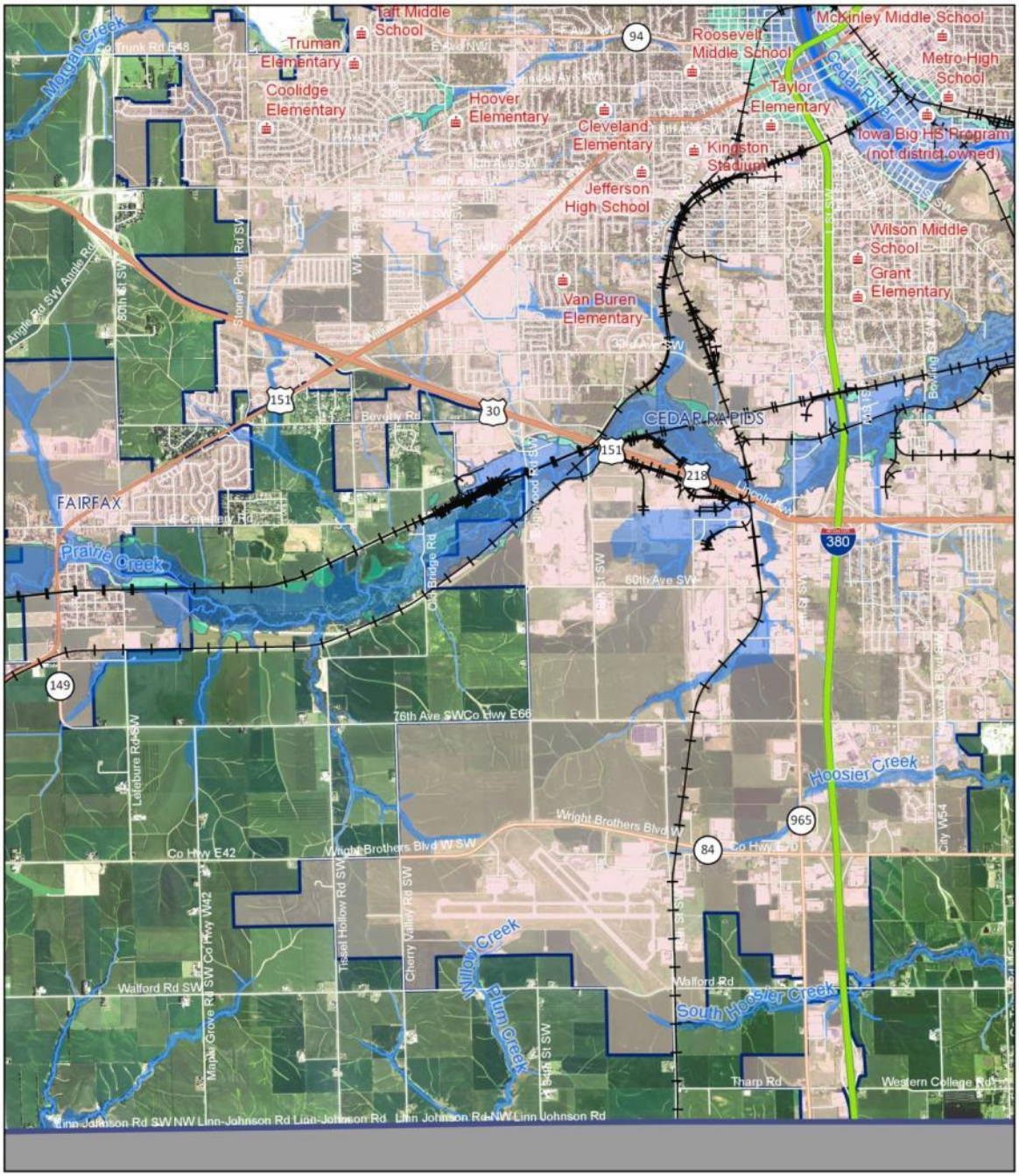
Map 62: Cedar Rapids CSD Section 1 Critical Facilities



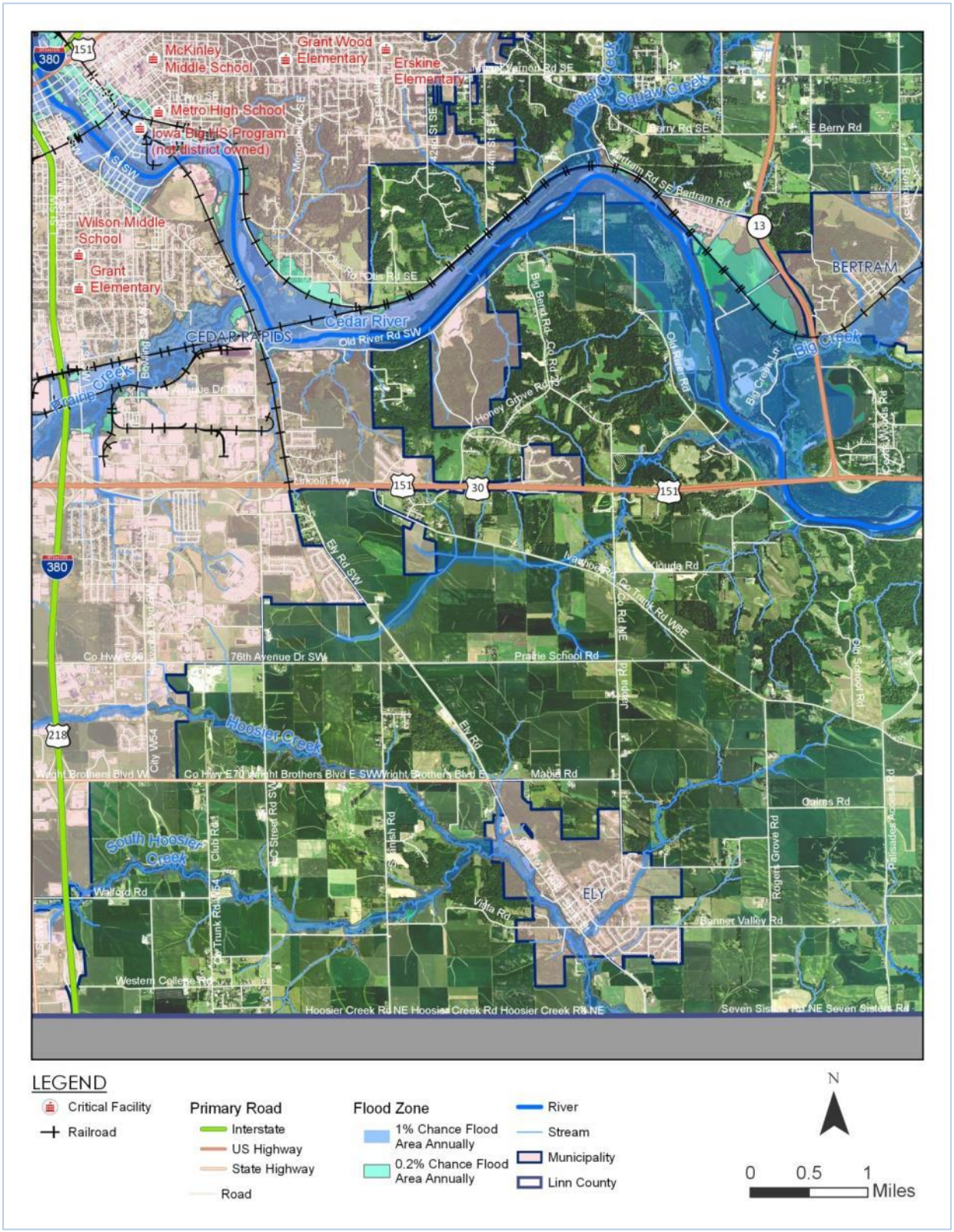
Map 63: Cedar Rapids CSD Section 2 Critical Facilities



Map 64: Cedar Rapids CSD Section 3 Critical Facilities



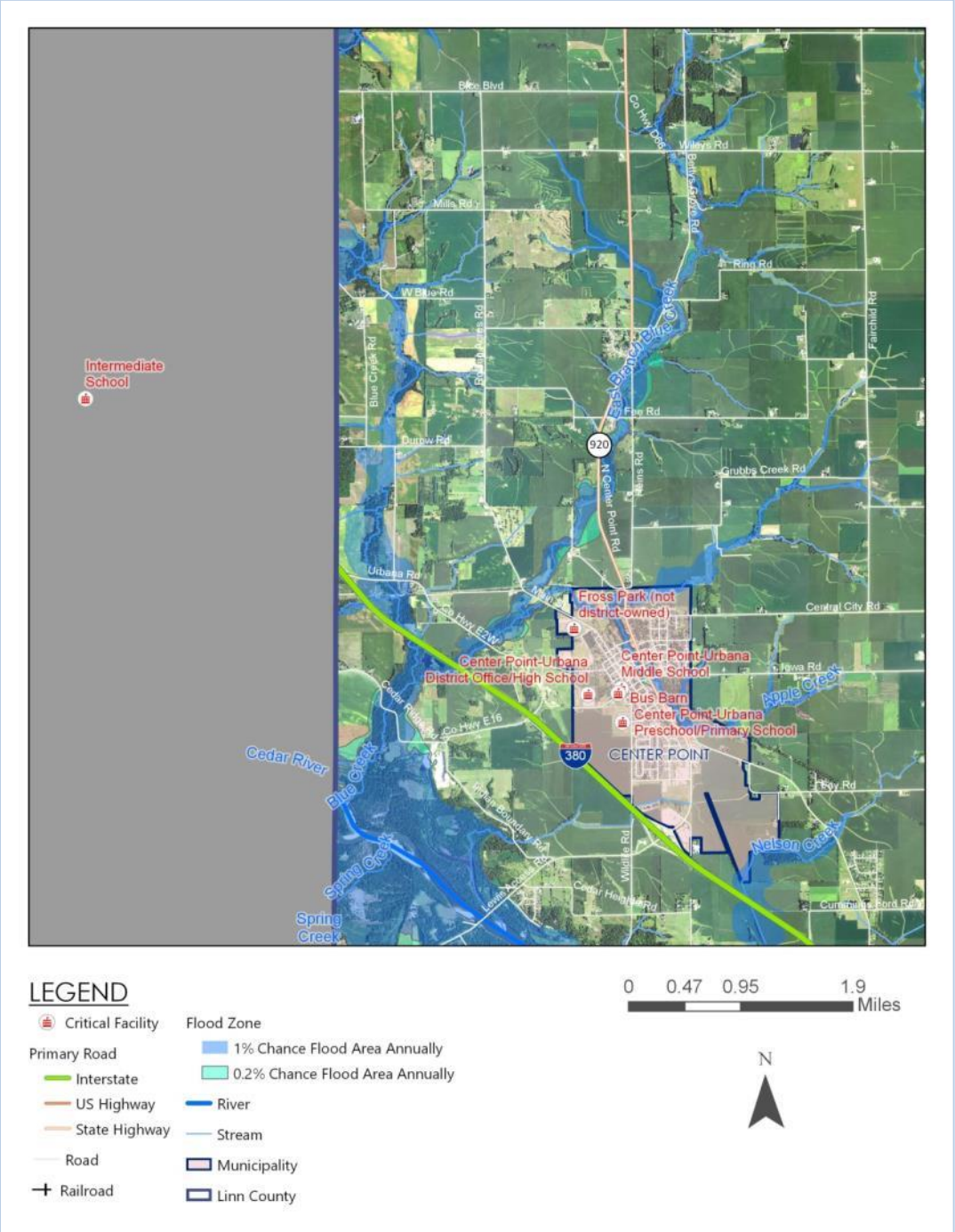
Map 65: Cedar Rapids CSD Section 4 Critical Facilities



Center Point-Urbana Community School District Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In the Center Point-Urbana CSD, all district property and infrastructure are considered critical facilities. For specific critical facilities, refer to Map 66.

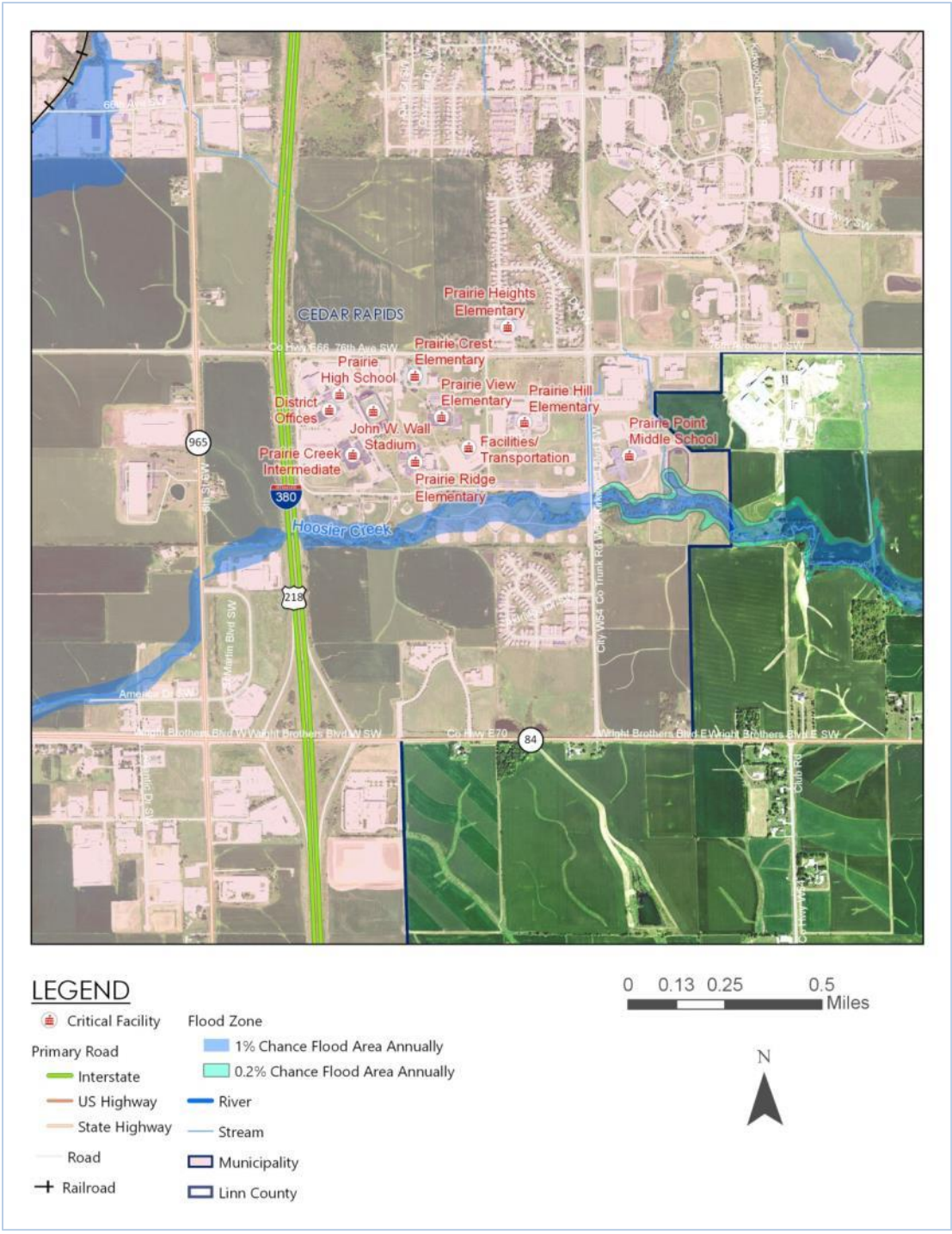
Map 66: Center Point-Urbana CSD Critical Facilities



College Community School District Critical Facilities

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In the College CSD, all district property and infrastructure are considered critical facilities. For specific critical facilities, refer to Map 67.

Map 67: College CSD Critical Facilities



Linn-Mar Community School District

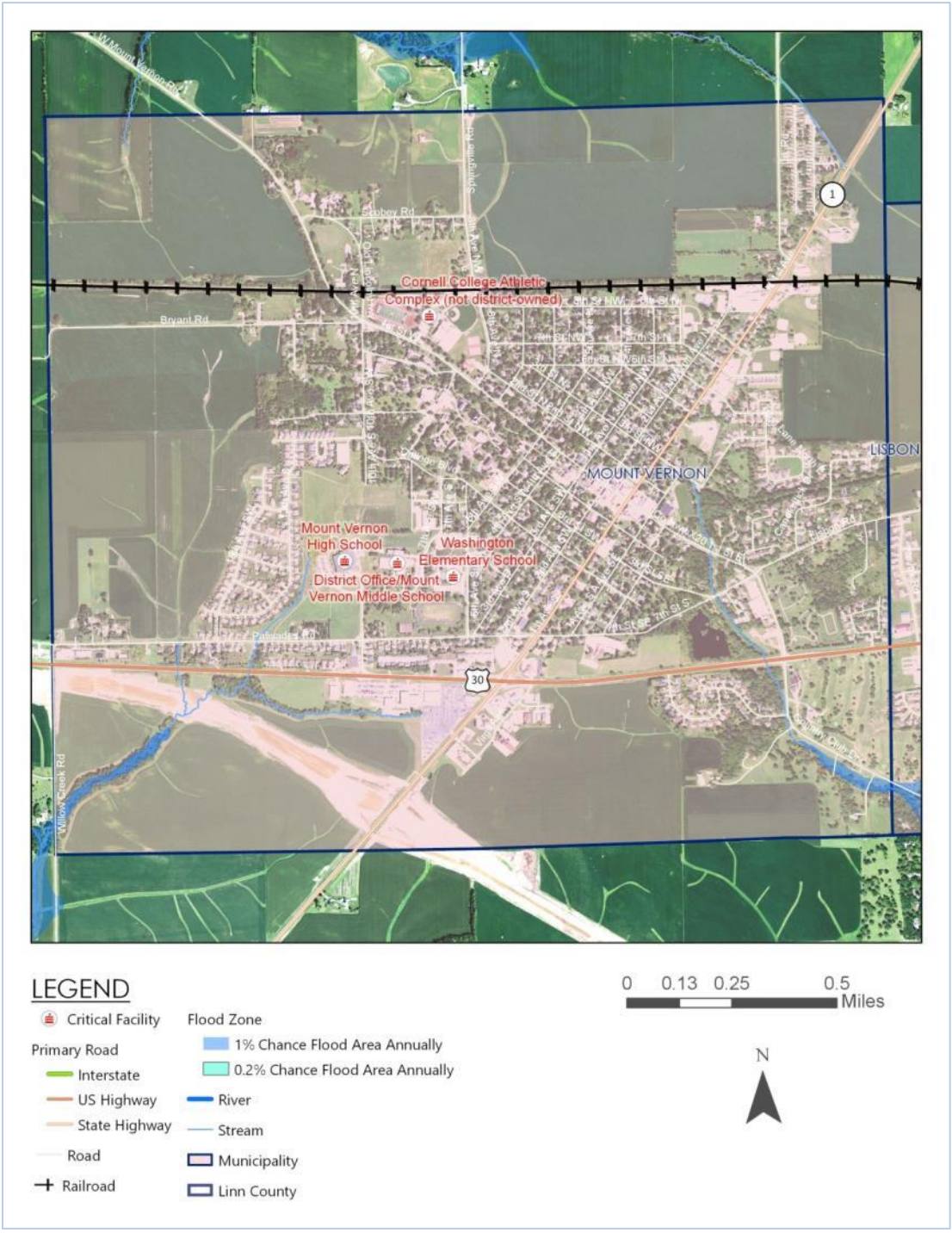
Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In the Linn-Mar CSD, all district property and infrastructure are considered critical facilities. For specific critical facilities, refer to Map 68.

Map 68: Linn-Mar CSD Critical Facilities

Mount Vernon Community School District

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. In the Mount Vernon CSD, all district property and infrastructure are considered critical facilities. For specific critical facilities, refer to Map 69.

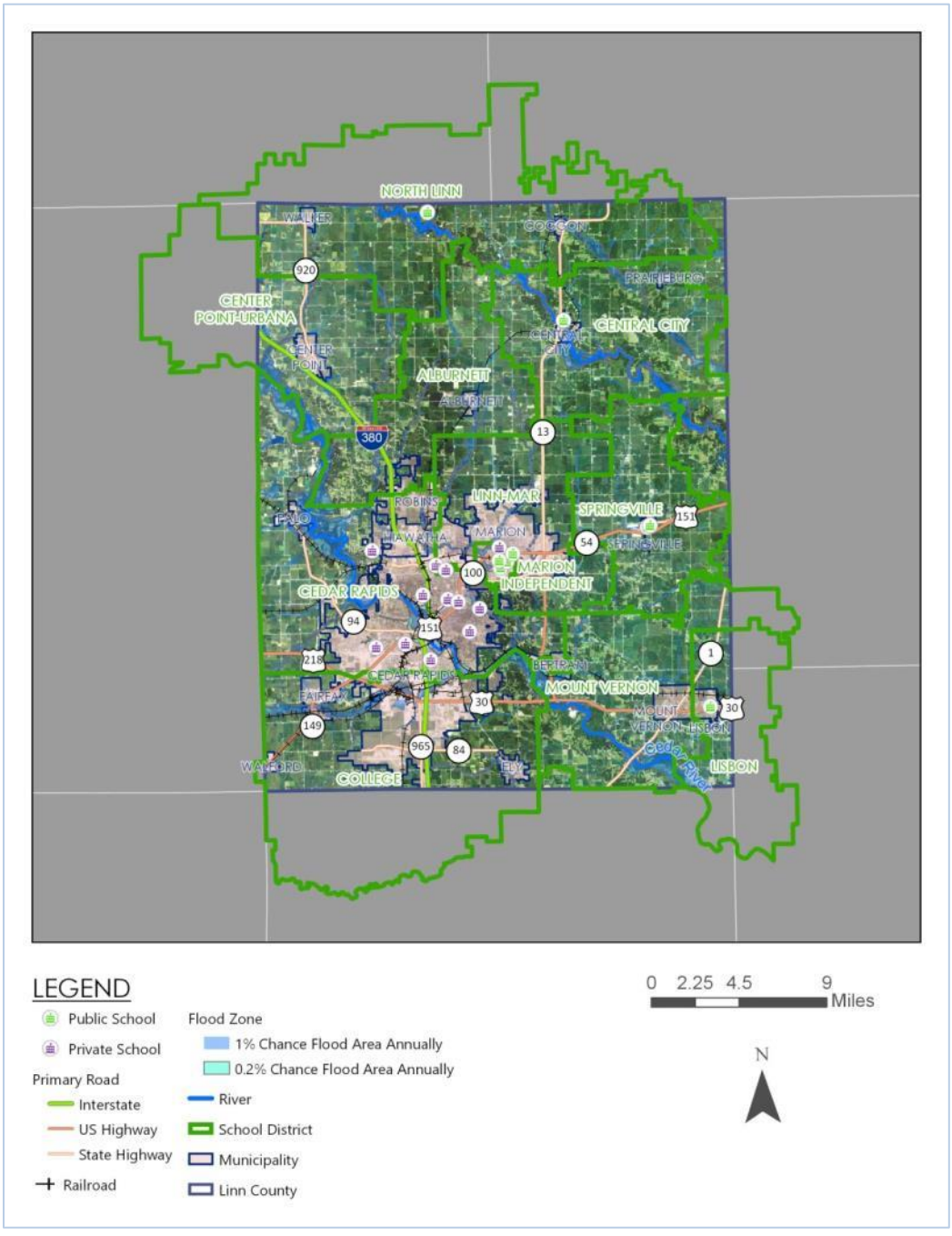
Map 69: Mount Vernon CSD Critical Facilities



Public Schools in Non-Participating Jurisdictions and Private Schools

Critical facilities are the buildings, facilities, and infrastructure that provide essential services to the residents and businesses in the community. Many jurisdictions included the public schools as critical facilities. These are the public schools for school districts that did not participate in the planning process. Private schools are included as reference for vulnerable populations, considered in the next section.

Map 70: Public Schools in Non-Participating Jurisdictions and Private Schools



Vulnerable Populations

A major focus in hazard mitigation planning is vulnerable populations, which are groups of people who may be vulnerable during a hazard event due to lack of mobility or extended exposure. In all communities, elderly, ill, or disabled living in their home, retirement facilities, or long-term care facilities may be vulnerable due to mobility issues or dependence on medical devices. Daycare and school facilities may also be vulnerable due to a high ratio of children to adults.

To assist individuals, the Linn County Emergency Management Agency maintains a registry of people who have a disability or medical condition and may potentially require assistance evacuating their home in an emergency. The registry is voluntary, and there are currently 877 people registered in Linn County.

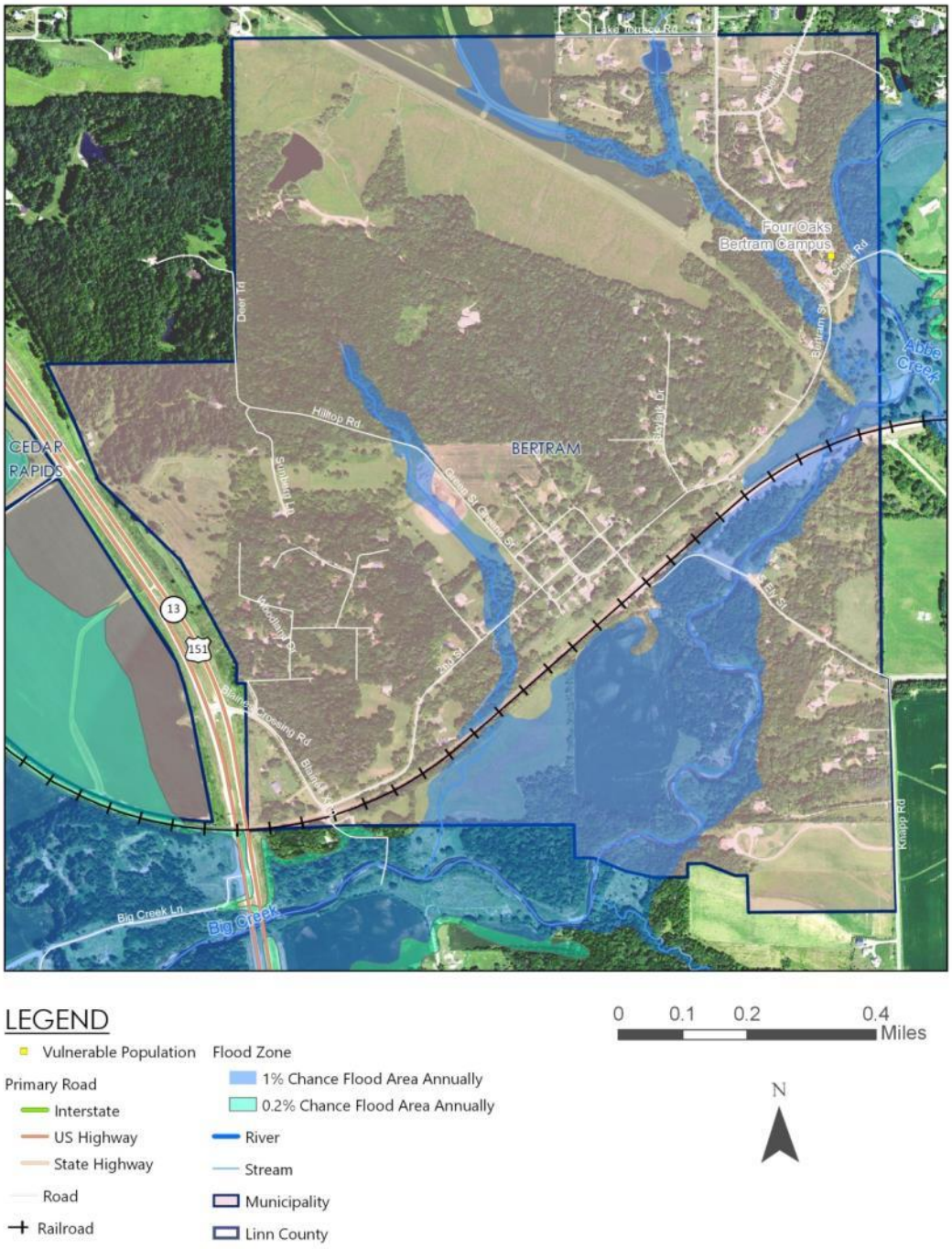
Regarding exposure, people who work outdoors or use outdoor recreation facilities are vulnerable during severe weather events. There are recreation areas, large and small, throughout Linn County and trails that stretch for miles. Shelters are provided in most areas, but the existing shelters may not be sufficient for severe weather events.

In several jurisdictions, the planning committee identified vulnerable populations within their community, which are displayed in this section. The size of the jurisdiction is a factor in including specific vulnerable populations, as a list of vulnerable populations for the cities of Cedar Rapids and Marion may be extensive and non-comprehensive. All schools host vulnerable populations regularly and are shown in the Critical Facilities section starting on page 196. The vulnerable populations maps include the flood zone layer because it is the only mapped hazard that scored a priority level 1 in the countywide risk assessment.

Bertam Vulnerable Populations

The Bertram planning committee identified the facilities that regularly host vulnerable populations, i.e. locations where there may be several individuals who may require assistance during or following a hazard event. For specific vulnerable populations, refer to Map 71.

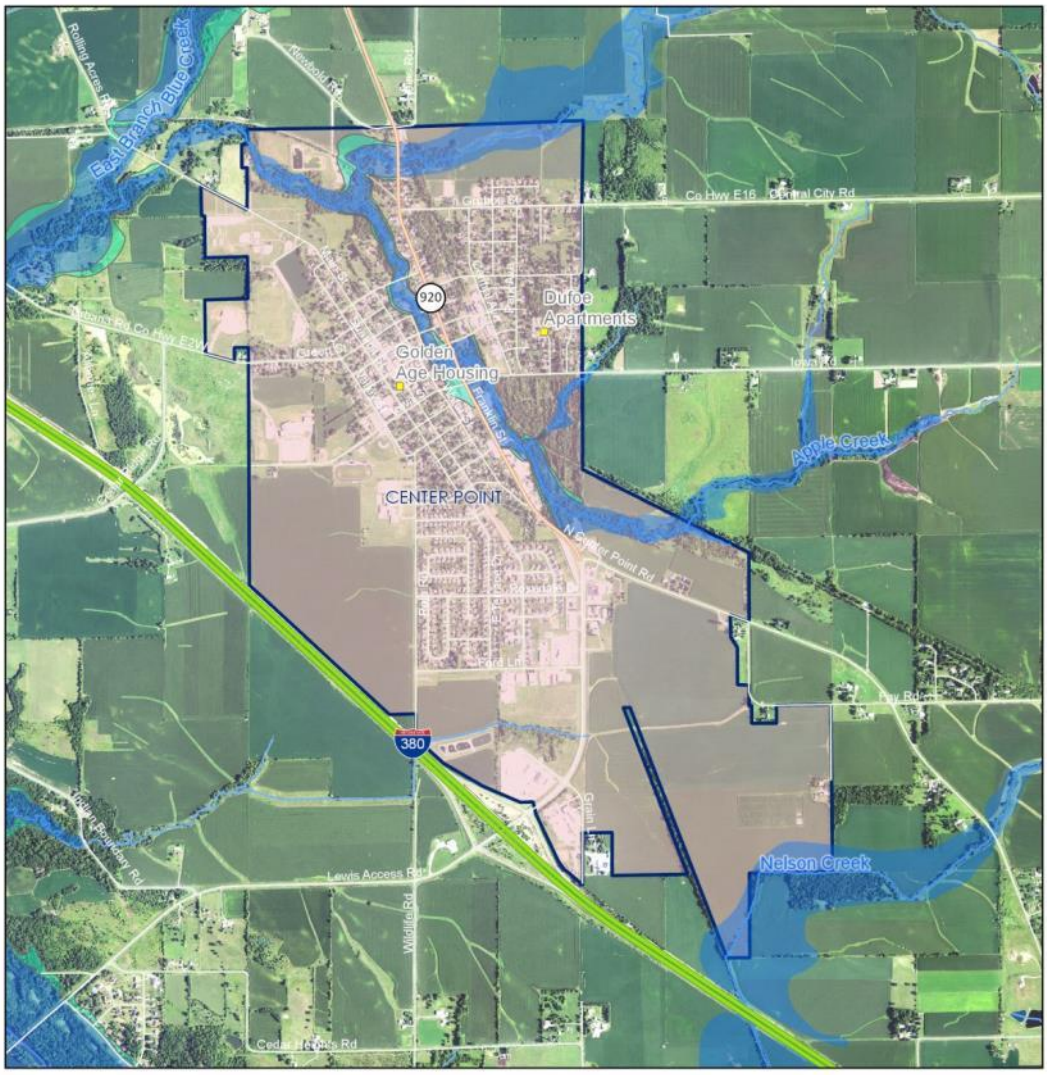
Map 71: Bertram Vulnerable Populations



Center Point Vulnerable Populations

The Center Point planning committee identified the facilities that regularly host vulnerable populations, i.e. locations where there may be several individuals who may require assistance during or following a hazard event. For specific vulnerable populations, refer to Map 72.

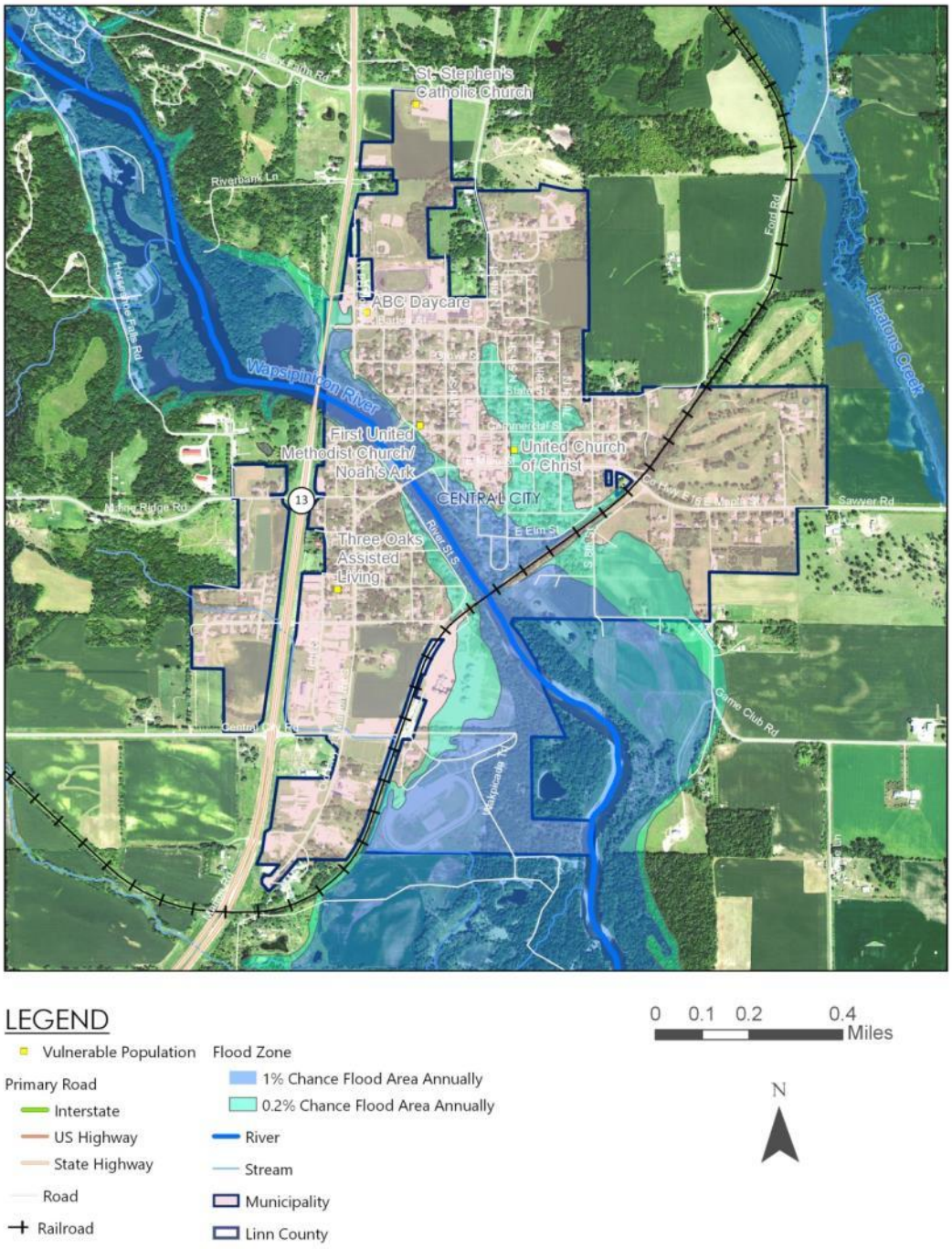
Map 72: Center Point Vulnerable Populations



Central City Vulnerable Populations

The Central City planning committee identified the facilities that regularly host vulnerable populations, i.e. locations where there may be several individuals who may require assistance during or following a hazard event. For specific vulnerable populations, refer to Map 73.

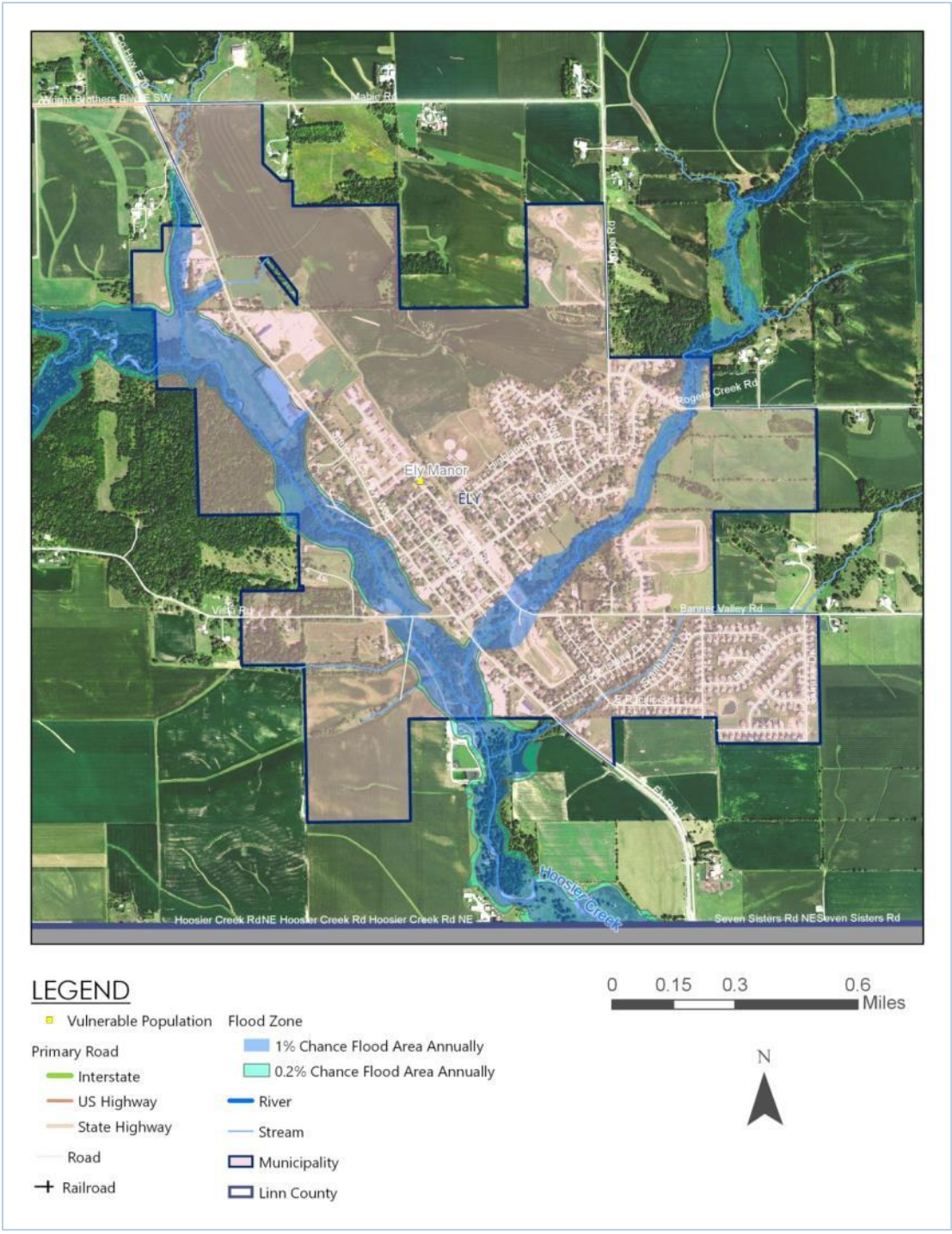
Map 73: Central City Vulnerable Populations



Ely Vulnerable Populations

The Ely planning committee identified the facilities that regularly host vulnerable populations, i.e. locations where there may be several individuals who may require assistance during or following a hazard event. For specific vulnerable populations, refer to Map 74.

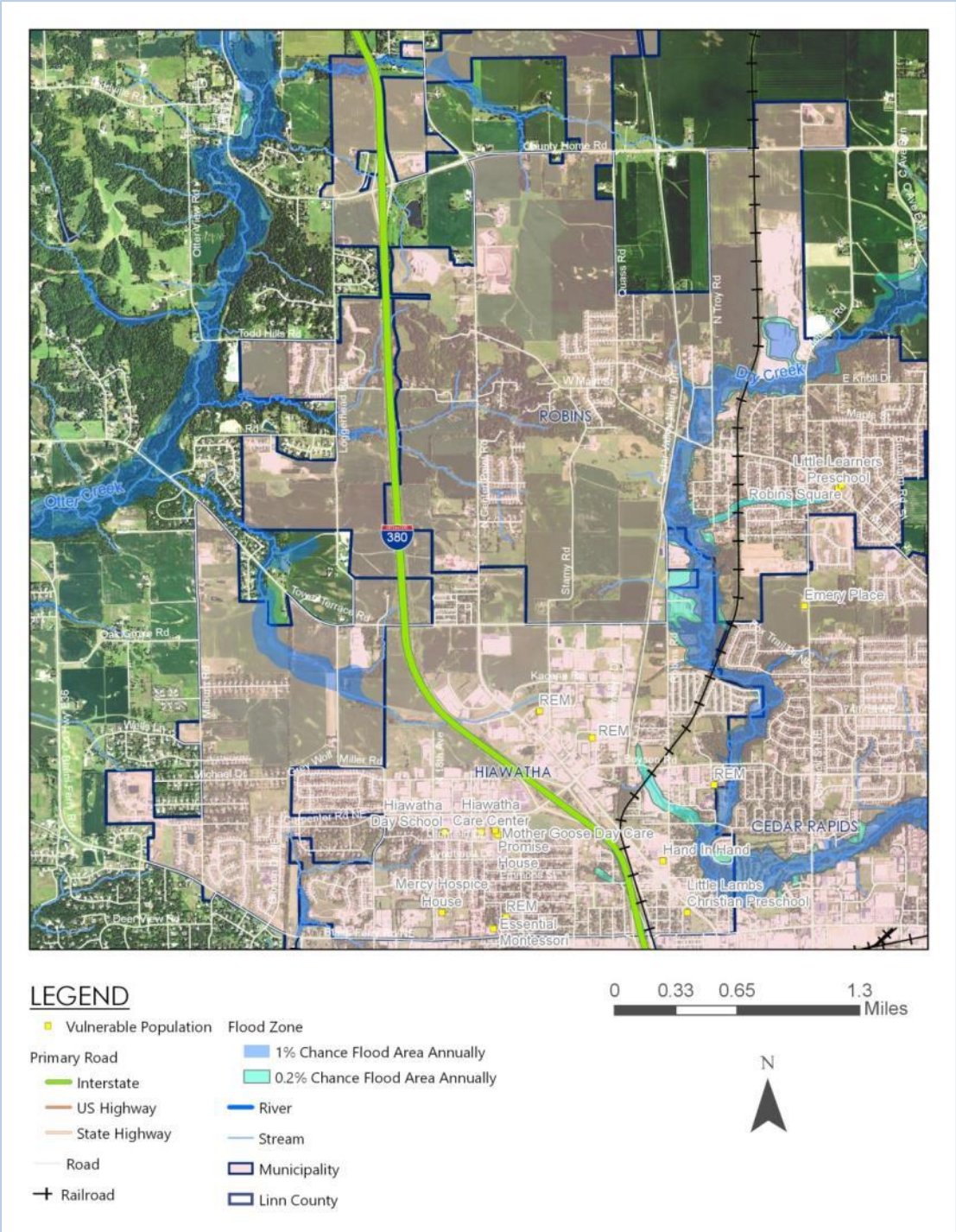
Map 74: Ely Vulnerable Populations



Hiawatha Vulnerable Populations

The Hiawatha planning committee identified the facilities that regularly host vulnerable populations, i.e. locations where there may be several individuals who may require assistance during or following a hazard event. For specific vulnerable populations, refer to Map 75.

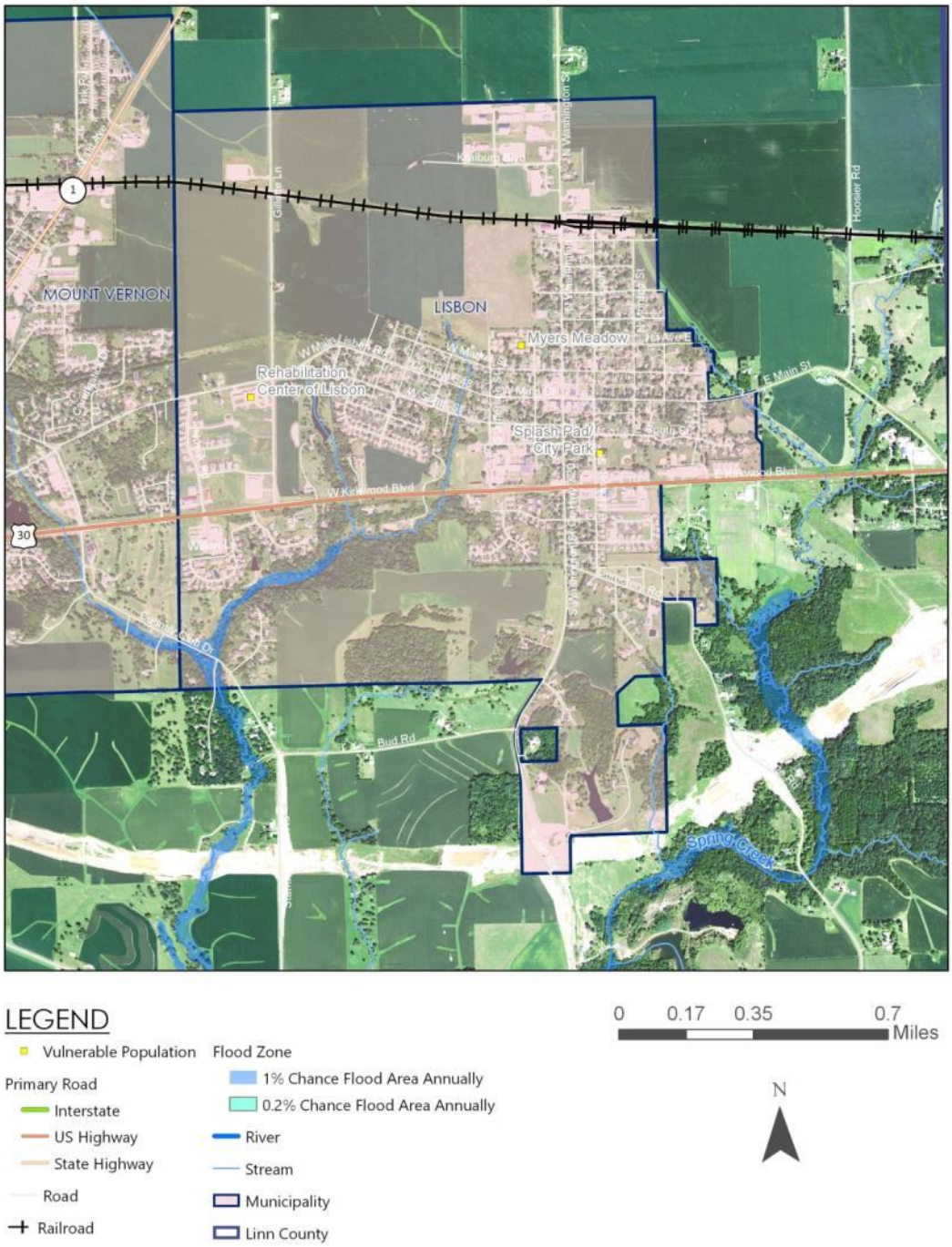
Map 75: Hiawatha Vulnerable Populations



Lisbon Vulnerable Populations

The Lisbon planning committee identified the facilities that regularly host vulnerable populations, i.e. locations where there may be several individuals who may require assistance during or following a hazard event. For specific vulnerable populations, refer to Map 76.

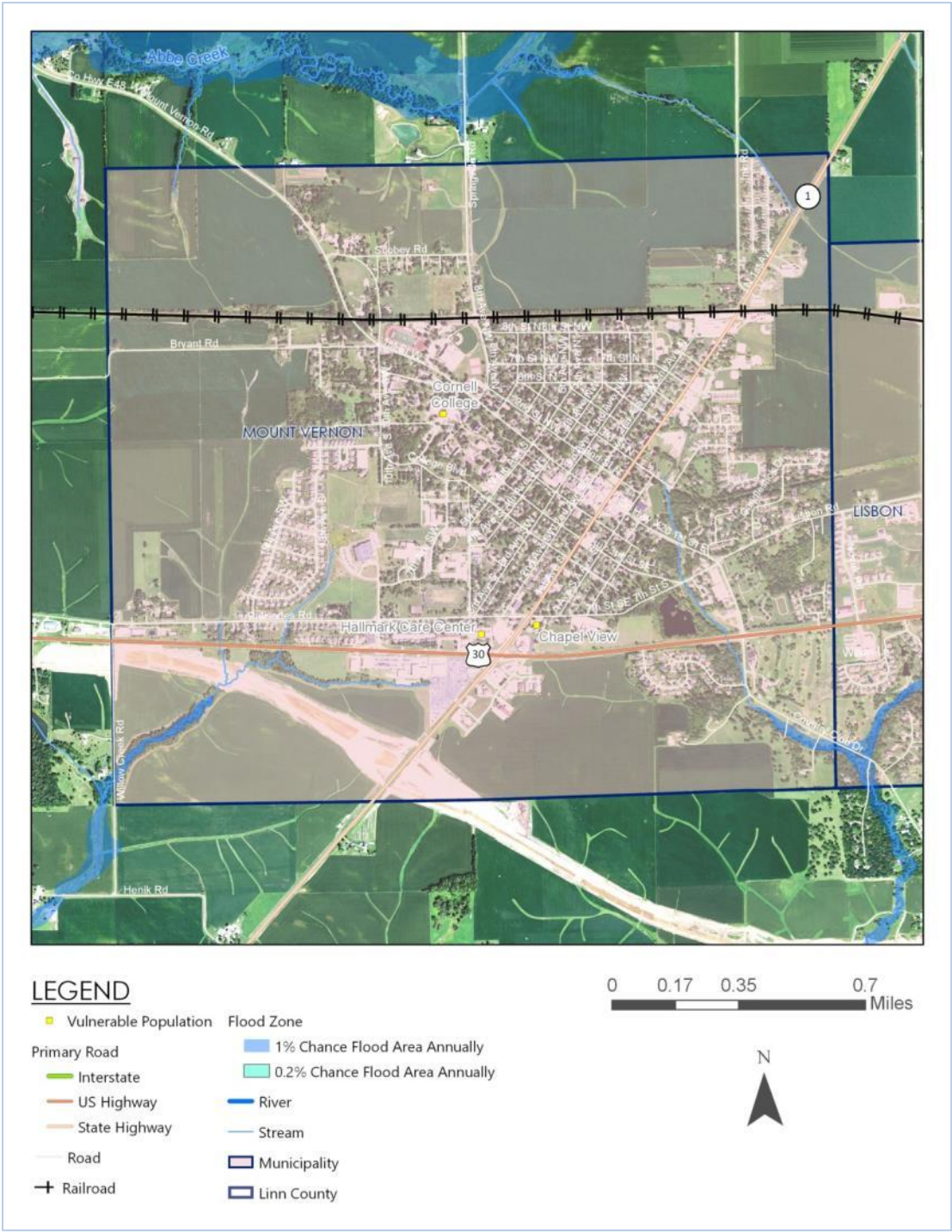
Map 76: Lisbon Vulnerable Populations



Mount Vernon Vulnerable Populations

The Mount Vernon planning committee identified the facilities that regularly host vulnerable populations, i.e. locations where there may be several individuals who may require assistance during or following a hazard event. For specific vulnerable populations, refer to Map 77.

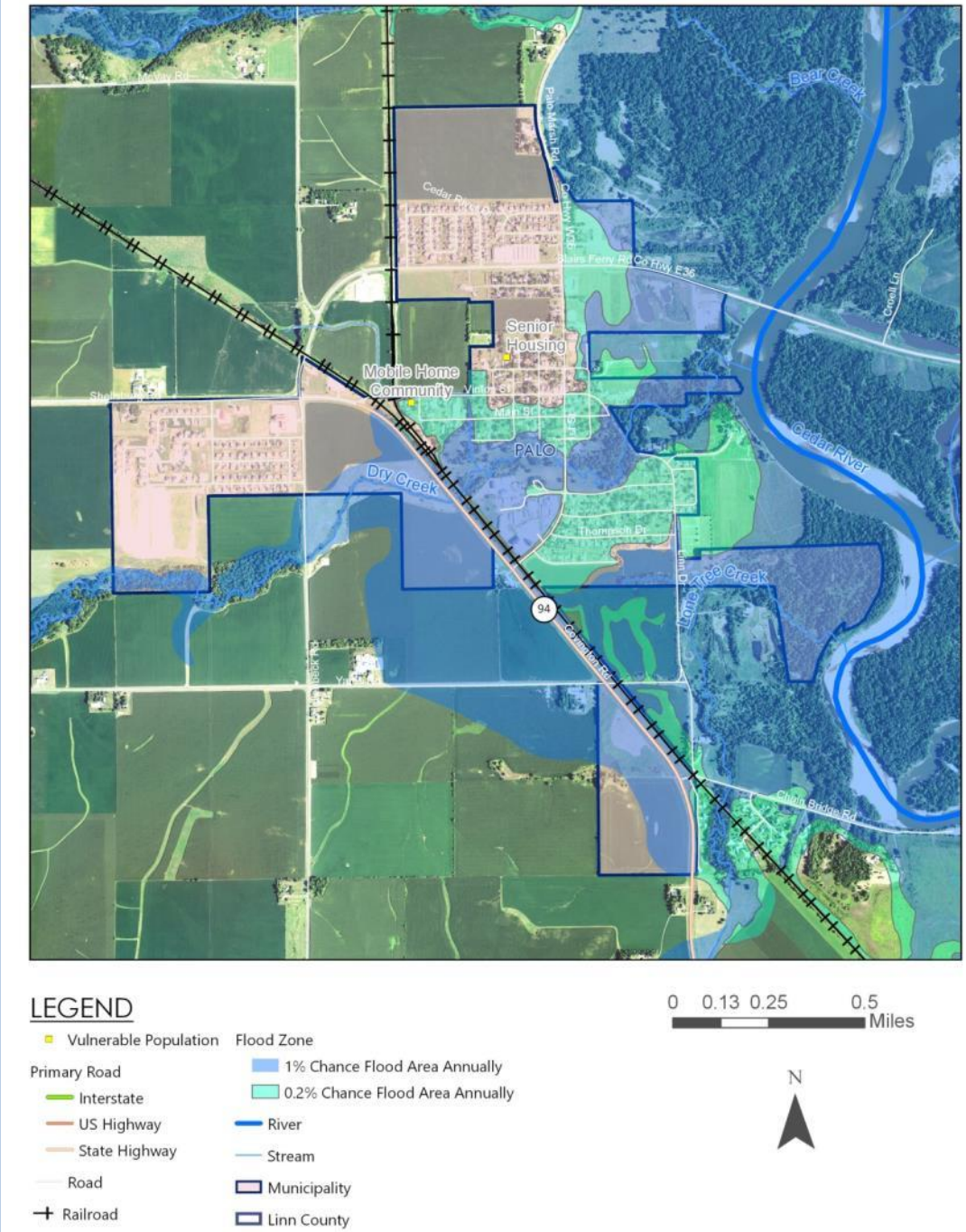
Map 77: Mount Vernon Vulnerable Populations



Palo Vulnerable Populations

The Palo planning committee identified the facilities that regularly host vulnerable populations, i.e. locations where there may be several individuals who may require assistance during or following a hazard event. For specific vulnerable populations, refer to Map 78.

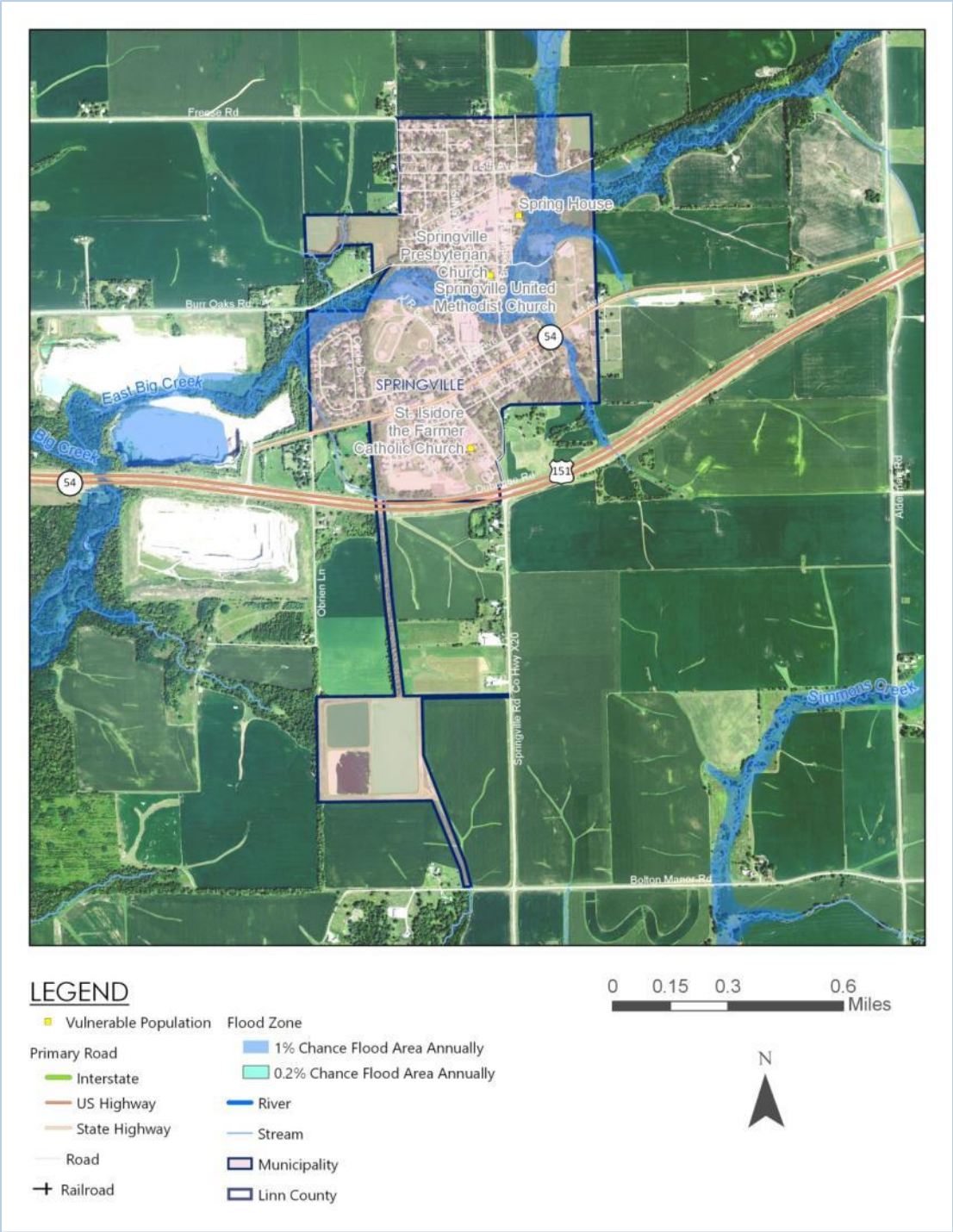
Map 78: Palo Vulnerable Populations



Springville Vulnerable Populations

The Springville planning committee identified the facilities that regularly host vulnerable populations, i.e. locations where there may be several individuals who may require assistance during or following a hazard event. For specific vulnerable populations, refer to Map 79.

Map 79: Springville Vulnerable Populations



Walker Vulnerable Populations

The Walker planning committee identified the facilities that regularly host vulnerable populations, i.e. locations where there may be several individuals who may require assistance during or following a hazard event. For specific vulnerable populations, refer to Map 80.

Map 80: Walker Vulnerable Populations

Operations and Resources

Local governments in Iowa are subject to Iowa Code, which grants the authority to protect the health, safety, and welfare of its residents and levy taxes to provide services. Participating jurisdictions have similar authority, but each jurisdiction varies in terms of size and governmental priorities. When developing a mitigation strategy in a multi-jurisdictional planning area, it is important to distinguish the variation in operations and resources among jurisdictions to ensure the mitigation strategy is feasible. In other words, it is important to consider whether or not each community has the expertise or access to the resources needed to complete a project. In the following pages, the operations and resources for each participating jurisdiction are included.

Requirement §201.6 (c)(3): A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.

Linn County Operations and Resources

Linn County has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All County operations and resources were considered throughout the plan development process to ensure the county's final mitigation strategy is feasible. See Table 59.

Table 59: Linn County Operations and Resources

Officials, Commissions, and Committees	• Board of Supervisors* • Planning and Zoning Commission/Board of Adjustment • Conservation Board • Board of Health • Food Systems Council* • Linn Soil & Water Conservation District* • Linn County Emergency Management Commission • Cedar Rapids/Linn County Solid Waste Commission • Historic Preservation Commission • Local Emergency Planning Committee
Staff and Departments	• GIS/Mapping • Planning and Development* • Purchasing Division • Community Services • Linn County Conservation* • Historic Preservation • Human Resources • Information Technology • Risk Management • Attorney • Assessor • Auditor • Finance and Budget • Recorder • Treasurer • Public Health* • Sheriff's Office* • Engineering and Secondary Roads* • Veteran Affairs
County Services	• Law enforcement and response* • Well and septic system permits • Development/building permits* • Stormwater system maintenance and improvements* • Maintain generators in critical facilities* • Road maintenance and improvements and snow removal* • Vegetation and tree management in public areas * • Maintain outdoor warning siren system and regular tests* • Mapping services • Purchasing • Recorder and Treasurer Services • County website

Table 59: Linn County Operations and Resources, continued

Contracted or Agreement Services	• Linn County Emergency Management Agency* • LinnAlerts* • Police and fire protection mutual aid agreements* • Linn County HAZMAT Response Team* • Linn Area Partners Active in Disaster (LAP-AID)* • Ambulance services* • Linn County LIFTS • Linn County Soil Conservation Department* • Corridor MPO • East Central Iowa Council of Governments* • Indian Creek Watershed Management Authority* • Lower Cedar Watershed Management Authority* • Maquoketa River Watershed Management Authority* • Middle Cedar Watershed Management Authority* • Upper Wapsipinicon Watershed Management Authority*
Policies, Programs, and Plans	• Capital Improvement Program* • Linn County Code of Ordinances includes Building, Zoning, and Subdivision Ordinance* • Linn County Comprehensive Plan 2013* • Linn County Hazard Mitigation Plan 2010* • Comprehensive Emergency Management Plan* • Community Rating System participation (Current Class 8)* • Floodplain Management Program (floodplain manager, current effective map 4/5/2010, Floodplain Ordinance)* • Coordinate with Indian Creek Watershed Management Authority • Coordinate with Iowa Department of Natural Resources • National Incident Management System training for necessary staff and officials
Financial and Other Resources	• County budget* • Bonds • Grants • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the county's mitigation strategy.

Alburnett Operations and Resources

Alburnett has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All City operations and resources were considered throughout the plan development process to ensure the county's final mitigation strategy is feasible. See Table 60.

Table 60: Alburnett Operations and Resources

Officials, Commissions, and Committees	• Mayor • City Council* • Planning and Zoning Commission/Board of Adjustment • Linn County Emergency Management Commission
Staff and Departments	• City Clerk* • Public Works* • Fire Department
City Services	• Clean and secure water supply* • Wastewater treatment* • Street, sanitary, and storm sewer maintenance and improvements* • Snow removal* • Fire protection and education* • Vegetation and tree management in public areas* • Maintain outdoor warning siren system and regular tests* • City website*
Contracted or Agreement Services	• Linn County Sheriff's Office* • Linn County Emergency Management Agency* • Maintain County outdoor warning siren system and regular tests* • Fire protection mutual aid agreements* • Linn County HAZMAT Response Team* • East Central Iowa Council of Governments* • Cedar Rapids/Linn County Solid Waste Agency
Policies, Programs, and Plans	• Alburnett Code of Ordinances includes Building Code, Zoning Ordinance, Subdivision Code, and Disaster Recovery and Reconstruction Ordinance* • National Flood Insurance Program participation* • Floodplain Management Program (floodplain manager, current effective map 4/5/2010, and Floodplain Ordinance)* • 2013 Alburnett Comprehensive Plan* • Linn County Multi-Jurisdictional Hazard Mitigation Plan 2019–2024* • Coordinate with the Indian Creek Watershed Management Authority* • Coordinate with the Duane Arnold Energy Center* • Coordinate with Linn County Public Health* • Coordinate with Iowa Department of Natural Resources • Coordinate with Alburnett Community School District (includes a tornado safe room) • Event permits require emergency plan* • National Incident Management System (NIMS) training*
Financial and Other Resources	• City budget* • Bonds* • Grants* • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the county's mitigation strategy.

Bertram Operations and Reources

Bertram has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All City operations and resources were considered throughout the plan development process to ensure the county's final mitigation strategy is feasible. See Table 61.

Table 61: Bertram Operations and Resources

Officials, Commissions, and Committees	• Mayor* • City Council* • Linn County Emergency Management Commission
Staff and Departments	• City Clerk* • Public Works*
City Services	• Clean and secure water supply* • Street maintenance and improvements* • Snow removal* • Vegetation and tree management in public areas*
Contracted or Agreement Services	• Linn County Sheriff's Office* • Linn County Emergency Management Agency* • Maintain outdoor warning siren system and regular test* • West Bertram and Mount Vernon Fire Departments* • Fire protection mutual aid agreements* • Linn County Public Health approves septic permits • Linn County HAZMAT Response Team* • East Central Iowa Council of Governments* • Cedar Rapids/Linn County Solid Waste Agency
Policies, Programs, and Plans	• Bertram Code of Ordinances includes Building, Zoning, and Subdivision Ordinance* • National Flood Insurance Program participation* • Floodplain Management Program (floodplain manager, current effective map 4/5/2010, and Floodplain Ordinance)* • Coordinate with Linn County Public Health • Coordinate with Iowa Department of Natural Resources • National Incident Management System training for necessary staff and officials
Financial and Other Resources	• City budget* • Bonds • Grants • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the county's mitigation strategy.

Cedar Rapids Operations and Resources

Cedar Rapids has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All City operations and resources were considered throughout the plan development process to ensure the county's final mitigation strategy is feasible. See Table 62.

Table 62: Cedar Rapids Operations and Resources

Officials, Commissions, and Committees	• Mayor • City Council • City Planning Commission • Long Term Planning Commission • Airport Zoning Commission • Board of Adjustment (Zoning and Airport)* • Municipal Improvement District Commissions • Stormwater Commission • Parks and Recreation Commission • Historic Preservation Commission
Staff and Departments	• Animal Care and Control • Building Services • City Assessor's Office • City Attorney's Office • City Clerk's Office • Community Development* • Development Services Department • Eastern Iowa Airport • Finance • Fire Department* • Finance • Human Resources • Information Technology • Library • Parks and Recreation* • Police Department* • Public Works* • Purchasing Services • Transit • Utilities*
City Services	• Clean and secure water supply* • Wastewater treatment* • Street and storm sewer maintenance and improvements* • Snow removal* • Fire protection and education* • Hazardous materials response* • Police protection and education* • Vegetation management and coordinate with Iowa Department of Natural Resources • Outdoor recreation facilities • Maintain outdoor warning siren system and regular tests* • Maintain generators in critical facilities* • Solid waste and recycling removal • Public transit • Maintain city website and "Our CR" publication

Table 62: Cedar Rapids Operations and Resources, continued

Contracted or Agreement Services	• Linn County Emergency Management Agency* • Fire protection mutual aid agreements* • Police protection mutual aid agreements* • Linn County Regional HAZMAT Response Team* • Corridor Metropolitan Planning Organization • East Central Iowa Council of Governments* • Cedar Rapids/Linn County Solid Waste Agency
Policies, Programs, and Plans	• Cedar Rapids Code of Ordinances includes Building, Zoning and Subdivision Ordinance* • FEMA NFIP Community Rating System participation* • Floodplain Management Program (floodplain manager, current effective map 4/5/2010, updated Floodplain Management Ordinance, flood protection system construction, 5 in 1 Dam management)* • Flood Control System Masterplan • Flood Response Plan* • Envision CR* • Drought Mitigation Plan* • Stormwater Master Plan* • Sanitary Sewer Master Plan* • Urban Reforestation Program • Indian Creek, Middle Cedar, and Lower Cedar Watershed Management Authorities* • NIMS Training for necessary staff and officials* • Coordinate with the Iowa DNR regarding the 5-in-1 dam* • Coordinate with the Duane Arnold Energy Center as a standby for evacuation* • Coordinate with Linn County Public Health* • Coordinate with local school districts
Financial and Other Resources	• City budget* • Local Option Sales Tax • Stormwater Utility Enterprise Fund • Grants and federal appropriations* • Bonds • Grants • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the county's mitigation strategy.

Center Point Operations and Resources

Center Point has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All City operations and resources were considered throughout the plan development process to ensure the county's final mitigation strategy is feasible. See Table 63.

Table 63: Center Point Operations and Resources

Officials, Commissions, and Committees	• Mayor* • City Council* • Planning and Zoning Commission/Board of Adjustment • Linn County Emergency Management Commission
Staff and Departments	• Administration* • Public Works • Fire Department* • Ambulance Service* • Parks and Recreation • Center Point Public Library
City Services	• Clean and secure water supply* • Wastewater treatment* • Street, sanitary, and storm sewer maintenance and improvements* • Snow removal* • Fire protection and education* • Vegetation and tree management in public areas* • Maintain outdoor warning siren system and regular test* • City website and Nixle messaging to provide information
Contracted or Agreement Services	• Linn County Sheriff's Office • Linn County Emergency Management Agency* • Fire protection mutual aid agreements • Linn County HAZMAT Response Team • Linn County Building Inspector* • East Central Iowa Council of Governments* • Center Point Regional Ambulance Service* • Cedar Rapids/Linn County Solid Waste Agency
Policies, Programs, and Plans	• Center Point Code of Ordinances includes Building, Zoning, and Subdivision Ordinance* • Linn County Multi-Jurisdictional Hazard Mitigation Plan 2019–2019* • National Flood Insurance Program participation* • Floodplain Management Program (floodplain manager, current effective map 4/5/2010, and Floodplain Ordinance)* • 2010 Center Point Comprehensive Plan* • Coordinate with Duane Arnold Energy Center • Coordinate with Linn County Public Health • Coordinate with Iowa Department of Natural Resources • Coordinate with Center Point – Urbana Community School District • National Incident Management System training for necessary staff and officials
Financial and Other Resources	• City budget* • Bonds • Grants • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the county's mitigation strategy.

Central City Operations and Resources

Central City has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All City operations and resources were considered throughout the plan development process to ensure the county's final mitigation strategy is feasible. See Table 64.

Table 64: Central City Operations and Resources

Officials, Commissions, and Committees	• Mayor* • City Council* • Planning and Zoning Commission/Board of Adjustment • Linn County Emergency Management Commission
Staff and Departments	• Administration* • City Engineer* • Public Works and Building Department* • Fire Department* • J.C. Clegg Public Library • Senior Dining*
City Services	• Clean and secure water supply* • Wastewater treatment* • Street, sanitary, and storm sewer maintenance and improvements* • Snow removal* • Fire protection and education/fire station* • Vegetation and tree management in public areas* • Maintain outdoor warning siren system and regular tests* • Senior dining service • Falcon Community Center is designated shelter facility* • City website
Contracted or Agreement Services	• Linn County Sheriff's Office* • Linn County Emergency Management Agency* • Fire protection mutual aid agreements* • Linn County Regional HAZMAT Response Team* • East Central Iowa Council of Governments*
Policies, Programs, and Plans	• Central City Code of Ordinances includes Building, Zoning, and Subdivision Ordinance* • National Flood Insurance Program participation* • Floodplain Management Program (floodplain manager, current effective map 4/5/2010, and Floodplain Ordinance)* • Central City Comprehensive Plan* • Coordinate with Army Corp of Engineers regarding the dam • Coordinate with Duane Arnold Energy Center as a standby for evacuation • Coordinate with Linn County Public Health and offer flu shots • Coordinate with Iowa Department of Natural Resources • Coordinate with Central City Community School District • National Incident Management System training for necessary staff and officials
Financial and Other Resources	• City budget* • Bonds* • Grants* • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the county's mitigation strategy.

Coggon Operations and Resources

Coggon has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All City operations and resources were considered throughout the plan development process to ensure the county's final mitigation strategy is feasible. See Table 65.

Table 65: Coggon Operations and Resources

Officials, Commissions, and Committees	• Mayor* • City Council* • Planning and Zoning Commission/Board of Adjustment • Coggon Area Betterment Association (CABA) • Linn County Emergency Management Commission
Staff and Departments	• City Clerk* • Public Works* • Fire Department* • Library
City Services	• Clean and secure water supply* • Wastewater treatment* • Street, sanitary, and storm sewer maintenance and improvements* • Snow removal* • Fire protection and education* • Vegetation and tree management in public areas* • Maintain outdoor warning siren system and regular tests* • Coggon Public Library • City website
Contracted or Agreement Services	• Linn County Sheriff's Office* • Linn County Emergency Management Agency* • Fire protection mutual aid agreements* • Linn County Regional HAZMAT Response Team* • East Central Iowa Council of Governments* • Cedar Rapids/Linn County Solid Waste Agency
Policies, Programs, and Plans	• Coggon Code of Ordinances includes Building, Zoning, and Subdivision Ordinance* • National Flood Insurance Program participation* • Floodplain Management Program (floodplain manager, current effective map 4/5/2010, and Floodplain Ordinance)* • Linn County Multi-Jurisdictional Hazard Mitigation Plan 2014–2019* • Coordinate with Duane Arnold Energy Center* • Coordinate with Linn County Public Health* • Coordinate with Iowa Department of Natural Resources • National Incident Management System training for necessary staff and officials
Financial and Other Resources	• City budget* • Bonds* • Grants* • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the county's mitigation strategy.

Ely Operations and Resources

Ely has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All City operations and resources were considered throughout the plan development process to ensure the county's final mitigation strategy is feasible. See Table 66.

Table 66: Ely Operations and Resources

Officials, Commissions, and Committees	• Mayor* • City Council* • Planning and Zoning Commission/Board of Adjustment • Parks and Recreation Commission • Participate in Local Emergency Planning Commission
Staff and Departments	• Administration* • Public Works* • Parks and Recreation • Fire Department* • Library
City Services	• Clean and secure water supply* • Wastewater treatment* • Street, sanitary, and storm sewer maintenance and improvements* • Fire protection and education* • Emergency Medical Technician (EMT)* • Vegetation and tree management in public areas * • Maintain outdoor warning siren system and regular tests* • Maintain portable backup power generators* • Snow removal* • Maintain city website/social media outlets*
Contracted or Agreement Services	• Linn County Sheriff's Office* • Linn County Emergency Management Agency* • Fire protection mutual aid agreements* • Linn County HAZMAT Response Team* • Corridor MPO and East Central Iowa Council of Governments* • Solid waste and recycling
Policies, Programs, and Plans	• Ely Code of Ordinances includes Building, Zoning, and Subdivision Code* • National Flood Insurance Program participation* • Floodplain Management Program (floodplain manager, current effective map 4/5/2010, and Floodplain Ordinance)* • 2015 Ely Comprehensive Plan* • 2013 Linn County Multi-Jurisdictional Hazard Mitigation Plan* • Coordinate with Linn County Public Health* • Coordinate with Iowa Department of Natural Resources* • National Incident Management System training for necessary staff and officials
Financial and Other Resources	• City budget* • Bonds • Grants* • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the county's mitigation strategy.

Fairfax Operations and Resources

Farifax has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All City operations and resources were considered throughout the plan development process to ensure the county's final mitigation strategy is feasible. See Table 67.

Table 67: Fairfax Operations and Resources

Officials, Commissions, and Committees	• Mayor* • City Council • Planning and Zoning Commission/Board of Adjustment • Parks and Beautification Committee • Library Board of Trustees • Participate in Local Emergency Planning Committee
Staff and Departments	• City Clerk's Office* • Public Works and Parks Department* • Fire and Rescue Department* • Library
City Services	• Clean and secure water supply* • Wastewater treatment* • Street, sanitary, and storm sewer maintenance and improvements* • Snow removal* • Fire protection and education* • Vegetation management and coordinate with Iowa Department of Natural Resources* • Maintain outdoor warning siren system and regular tests* • Maintain generators in critical facilities* • Maintain city website and monthly newsletter
Contracted or Agreement Services	• Linn County Sheriff's Office and Signal 88 Security* • Linn County Emergency Management Agency* • Fire protection mutual aid agreements* • Linn County HAZMAT Response Team* • Corridor MPO and East Central Iowa Council of Governments* • Solid waste and recycling
Policies, Programs, and Plans	• Fairfax Code of Ordinances includes Building, Zoning, and Subdivision Ordinance* • National Flood Insurance Program participation • Floodplain Management Program (floodplain manager, current effective map 4/5/2010, and Floodplain Ordinance)* • Fairfax Comprehensive Plan 2016* • Coordinate with the Duane Arnold Energy Center • Coordinate with Linn County Public Health • National Incident Management System training for necessary staff and officials
Financial and Other Resources	• City budget* • Grants* • Bonds • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the county's mitigation strategy.

Hiawatha Operations and Resources

Hiawatha has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All City operations and resources were considered throughout the plan development process to ensure the county's final mitigation strategy is feasible. See Table 68.

Table 68: Hiawatha Operations and Resources

Officials, Commissions, and Committees	• Mayor • City Council* • Planning and Zoning/Board of Adjustment • Parks and Recreation • Water Board • Participate in Local Emergency Planning Committee
Staff and Departments	• Community Development* • Economic Development • Fire and Ambulance Department* • Library • Parks and Recreation • Police Department* • Policy and Administration* • Public Works* • Water*
City Services	• Community Center • Clean and secure water supply* • Street, sanitary, and storm sewer maintenance and improvements* • Snow removal* • Fire protection and education* • Police protection and education* • Medical Emergency Services* • Vegetation management and coordinate with Iowa Department of Natural Resources • Maintain generators in critical facilities* • Maintain city website
Contracted or Agreement Services	• Linn County Emergency Management Agency* • Fire protection mutual aid agreements • Police protection mutual aid agreements • Linn County Regional HAZMAT Response Team • Maintain outdoor warning siren system and regular tests—DAEC and Linn County EMA* • Corridor MPO and East Central Iowa Council of Governments* • Wastewater treatment • Solid waste and recycling removal • Cedar Rapids/Linn County Solid Waste Agency
Policies, Programs, and Plans	• Hiawatha Code of Ordinances includes Building, Zoning, and Subdivision Ordinance* • National Flood Insurance Program participation* • Floodplain Management Program (floodplain manager, current effective map 4/5/2010, Floodplain Ordinance)* • Hiawatha Comprehensive Plan, adopted 2016* • Participate in Indian Creek Watershed Management Authority* • National Incident Management System Training for necessary staff and officials* • Coordinate with the Duane Arnold Energy Center* • Coordinate with Linn County Public Health • Coordinate with local school districts

Table 68: Hiawatha Operations and Resources, continued

Financial and Other Resources	• City budget* • Bonds • Grants* • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the county's mitigation strategy.

Lisbon Operations and Resources

Lisbon has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All City operations and resources were considered throughout the plan development process to ensure the county's final mitigation strategy is feasible. See Table 69.

Table 69: Lisbon Operations and Resources

Officials, Commissions, and Committees	• Mayor • City Council* • Mayor Pro-Tem • Police Chief • Board of Adjustment • Cemetery Commission • Library Board of Trustees • Historic Preservation Commission • Parks and Recreation Board • Planning and Zoning • History Center Board • Tree Board • Linn County Emergency Management Commission
Staff and Departments	• Animal Control • City Hall* • Fire Department* • History Center • Library • Parks and Recreation • Police Department/K9 Unit* • Public Works
City Services	• Clean and secure water supply* • Wastewater treatment* • Street, sanitary, and storm sewer maintenance and improvements* • Snow removal* • Fire protection and education* • Vegetation and tree management in public areas* • Maintain outdoor warning siren system and regular tests* • City website
Contracted or Agreement Services	• IWORN Equipment Sharing Program • Linn County Emergency Management Agency* • Fire protection mutual aid agreements • Police protection mutual aid agreements • Linn County Regional HAZMAT Response Team • East Central Iowa Council of Governments* • Cedar Rapids/Linn County Solid Waste Agency • Coordinate with the Duane Arnold Energy Center* • Coordinate with Linn County Public Health • Coordinate with Iowa Department of Natural Resources
Policies, Programs, and Plans	• Lisbon Code of Ordinances includes Building Code, Zoning Ordinance, and Subdivision Code* • Lisbon Comprehensive Plan • National Flood Insurance Program participation* • Floodplain Management Program (floodplain manager, current effective map on 4/5/2010, and Floodplain Ordinance)* • Linn County Multi-Jurisdictional Hazard Mitigation Plan 2014–2019 • SE Linn Community Center (supported by City) • National Incident Management System training for necessary staff and officials

Table 69: Lisbon Operations and Resources, continued

Financial and Other Resources	• City budget* • Bonds • Grants • Donations • Township funds for Fire Department*

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the county's mitigation strategy.

Marion Operations and Resources

Marion has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All City operations and resources were considered throughout the plan development process to ensure the county's final mitigation strategy is feasible. See Table 70.

Table 70: Marion Operations and Resources

Officials, Commissions, and Committees	• Mayor • City Council* • Planning and Zoning Commission • Board of Adjustment • Historic Preservation Commission • Airport Commission • Construction Code Review Board • Stormwater Advisory Committee • Park Board • Public Service Board • Water Board • Local Option Sales Tax Oversight Committee • Traffic Advisory Board • Bicycle and Pedestrian Advisory Committee • Tree Board • Linn County Emergency Management Commission
Staff and Departments	• City Manager* • Building Services* • City Clerk • Communication Director • Engineering* • Finance • Fire Department* • Information Technology • Parks and Recreation • Planning and Development* • Police Department* • Public Service • Water*
City Services	• Clean and secure water supply • Street, sanitary, and storm sewer maintenance and improvements* • Snow removal* • Fire protection and education* • Police protection and education* • Vegetation and tree management in public areas* • Maintain outdoor warning siren system and regular tests* • Maintain generators in critical facilities* • Solid waste and recycling removal • Maintain city website
Contracted or Agreement Services	• Wastewater treatment (City of Cedar Rapids) • Linn County Emergency Management Agency* • Police and fire protection mutual aid agreements • Linn County Regional HAZMAT Response Team • Corridor MPO and East Central Iowa Council of Governments* • Cedar Rapids/Linn County Solid Waste Agency

Table 70: Marion Operations and Resources, continued

Policies, Programs, and Plans	• Marion Code of Ordinances includes Building, Zoning, and Subdivision Ordinance* • National Flood Insurance Program participation* • Floodplain Management Program (floodplain manager, current effective map 4/5/2010, Floodplain Ordinance)* • Requirement for storm shelters in new or expanded manufactured home developments* • 2010 Marion Comprehensive Plan* • 2014–2019 Linn County Multi-Jurisdictional Hazard Mitigation Plan* • Emerald Ash Borer Response Plan* • Participate in Indian Creek Watershed Management Authority* • NIMS Training for necessary staff and officials • Coordinate with Duane Arnold Energy Center* • Coordinate with Linn County Public Health • Coordinate with Iowa Department of Natural Resources • Coordinate with local school districts • National Incident Management System training for necessary staff and officials
Financial and Other Resources	• City budget* • Bonds • Grants* • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the county's mitigation strategy.

Mount Vernon Operations and Resources

Mount Vernon has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All City operations and resources were considered throughout the plan development process to ensure the county's final mitigation strategy is feasible. See Table 71.

Table 71: Mount Vernon Operations and Resources

Officials, Commissions, and Committees	• Mayor • City Council • Planning and Zoning Commission/Board of Adjustment • Parks and Recreation Commission • Linn County Emergency Management Commission
Staff and Departments	• Administration* • City Engineer* • Zoning Administrator* • Public Works* • Parks and Recreation • Police Department* • Fire Department* • Emergency Management Coordinator* • Library
City Services	• Clean and secure water supply* • Wastewater treatment* • Street, sanitary sewer, and storm sewer maintenance and improvements* • Fire protection and education* • Vegetation and tree management in public areas* • Maintain outdoor warning siren system and regular tests* • Snow removal* • Maintain city website
Contracted or Agreement Services	• Linn County Sheriff's Office* • Linn County Emergency Management Agency* • Fire protection mutual aid agreements* • Lisbon-Mount Vernon Ambulance Service • Linn County HAZMAT Response Team* • East Central Iowa Council of Governments* • Solid waste and recycling • Leaf collection • Library/Cornell College
Policies, Programs, and Plans	• Mount Vernon Code of Ordinances includes Building, Zoning, and Subdivision Code* • National Flood Insurance Program participation* • Floodplain Management Program (floodplain manager, current effective map 4/5/2010, and Floodplain Ordinance)* • Mount Vernon Comprehensive Plan 2016 • Coordinate with Duane Arnold Energy Center* • Coordinate with Linn County Public Health • Preventive Emerald Ash Borer Treatment Plan • National Incident Management System training for necessary staff and officials

Table 71: Mount Vernon Operations and Resources, continued

Financial and Other Resources	• City budget* • Bonds • Grants* • Donations • Local Option Sales Tax • Franchise fees • Hotel/motel tax

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the county's mitigation strategy.

Palo Operations and Resources

Palo has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All City operations and resources were considered throughout the plan development process to ensure the county's final mitigation strategy is feasible. See Table 72.

Table 72: Palo Operations and Resources

Officials, Commissions, and Committees	• Mayor • City Council • Planning and Zoning Commission/Board of Adjustment* • Stormwater Management Committee* • Participate in Local Emergency Planning Committee • Parks and Recreation Board
Staff and Departments	• City Clerk's Office* • Public Works • Fire Department*
City Services	• Clean and secure water supply • Wastewater treatment • Street, sanitary, and storm sewer maintenance and improvements • Snow removal • Fire protection and education • Vegetation and tree management in public areas • City website and newsletter
Contracted or Agreement Services	• Linn County Sheriff's Office • Linn County Emergency Management Agency* • Fire protection mutual aid agreements • Maintain outdoor warning siren system and regular tests • Linn County Regional HAZMAT Response Team • East Central Iowa Council of Governments* • Cedar Rapids/Linn County Solid Waste Agency
Policies, Programs, and Plans	• Palo Code of Ordinances includes Building Code, Zoning Ordinance, and Subdivision Code* • National Flood Insurance Program participation • Floodplain Management Program (floodplain manager, current effective map on 4/5/2010, and Floodplain Ordinance)* • 2009 Palo Hazard Mitigation Plan* • 2014-2019 Linn County Multi-Jurisdictional Hazard Mitigation Plan* • Coordinate with the Duane Arnold Energy Center* • Coordinate with Linn County Public Health • Coordinate with Iowa Department of Natural Resources • National Incident Management System training for necessary staff and officials
Financial and Other Resources	• City budget* • Bonds • Grants • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the county's mitigation strategy.

Prairieburg Operations and Resources

Prairieburg has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All City operations and resources were considered throughout the plan development process to ensure the county's final mitigation strategy is feasible. See Table 73.

Table 73: Prairieburg Operations and Resources

Officials, Commissions, and Committees	• Mayor* • City Council*
Staff and Departments	• City Clerk* • Public Works* • Fire Department
City Services	• Clean and secure water supply* • Wastewater treatment* • Street maintenance and improvements* • Snow removal* • Fire protection and education* • Maintain backup power generators in the Fire Station* • Vegetation and tree management in public areas* • Maintain manual outdoor warning siren and regular tests*
Contracted or Agreement Services	• Linn County Sheriff's Office • Linn County Emergency Management Agency* • Fire protection mutual aid agreements • Linn County HAZMAT Response Team • East Central Iowa Council of Governments* • Solid waste and recycling
Policies, Programs, and Plans	• Prairieburg Code of Ordinances* • Linn County Multi-Jurisdictional Hazard Mitigation Plan 2014–2019* • Coordinate with the Duane Arnold Energy Center • Coordinate with Linn County Public Health • Coordinate with Iowa Department of Natural Resources
Financial and Other Resources	• City budget* • Bonds • Grants • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the county's mitigation strategy.

Robins Operations and Resources

Robins has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All City operations and resources were considered throughout the plan development process to ensure the county's final mitigation strategy is feasible. See Table 74.

Table 74: Robins Operations and Resources

Officials, Commissions, and Committees	• Mayor* • City Council* • Planning and Zoning Commission/Board of Adjustment • Linn County Emergency Management Agency Commission*
Staff and Departments	• City Clerk's Office* • Public Works* • Fire Department* • Police Department*
City Services	• Street, sanitary, and storm sewer maintenance and improvements* • Snow removal* • Fire protection and education* • Vegetation and tree management in public areas* • Maintain outdoor warning siren system and regular tests* • City website*
Contracted or Agreement Services	• Water and wastewater services maintained by Cedar Rapids • Linn County Emergency Management Agency* • Fire protection mutual aid agreements* • Police protection mutual aid agreements* • Linn County Regional HAZMAT Response Team • East Central Iowa Council of Governments* • Cedar Rapids/Linn County Solid Waste Agency • Ruud Hauling
Policies, Programs, and Plans	• Robins Code of Ordinances includes Building Code, Zoning Ordinance, and Subdivision Code* • National Flood Insurance Program participation* • Floodplain Management Program (floodplain manager, current effective map on 4/5/2010, and Floodplain Ordinance)* • 2013 Robins Comprehensive Plan • Coordinate with the Duane Arnold Energy Center* • Coordinate with Linn County Public Health* • Coordinate with Iowa Department of Natural Resources • National Incident Management System training for necessary staff and officials
Financial and Other Resources	• City budget* • Bonds • Grants • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the county's mitigation strategy.

Springville Operations and Resources

Springville has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All City operations and resources were considered throughout the plan development process to ensure the county's final mitigation strategy is feasible. See Table 75.

Table 75: Springville Operations and Resources

Officials, Commissions, and Committees	• Mayor* • City Council* • Planning and Zoning Commission/Board of Adjustment • Parks Board • Library Board • Linn County Emergency Management Commission
Staff and Departments	• City Clerk* • Public Works* • Fire Department*
City Services	• Clean and secure water supply* • Wastewater treatment* • Street maintenance and improvements* • Snow removal* • Fire protection and education* • Vegetation and tree management in public areas* • Maintain outdoor warning siren system and regular tests* • Springville Memorial Library • City website
Contracted or Agreement Services	• Linn County Sheriff's Office* • Linn County Emergency Management Agency* • Fire protection mutual aid agreements* • Linn County HAZMAT Response Team* • East Central Iowa Council of Governments* • Solid waste and recycling*
Policies, Programs, and Plans	• Springville Code of Ordinances includes Building, Zoning, and Subdivision Ordinance* • National Flood Insurance Program participation • Floodplain Management Program (floodplain manager, current effective map 4/5/2010, and Floodplain Ordinance)* • 2004 Springville Comprehensive Plan* • Capital Improvement Program* • Coordinate with Duane Arnold Energy Center* • Coordinate with Linn County Public Health* • Coordinate with Iowa Department of Natural Resources* • Coordinate with Springville Community School District • National Incident Management System training for necessary staff and officials*
Financial and Other Resources	• City budget* • Bonds • Grants* • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the county's mitigation strategy.

Walker Operations and Resources

Walker has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All City operations and resources were considered throughout the plan development process to ensure the county's final mitigation strategy is feasible. See Table 76.

Table 76: Walker Operations and Resources

Officials, Commissions, and Committees	• Mayor* • City Council • Planning and Zoning Commission/Board of Adjustment • Linn County Emergency Management Commission
Staff and Departments	• City Clerk* • Public Works* • Fire Department/Emergency Medical Service*
City Services	• Clean and secure water supply* • Wastewater treatment* • Street, sanitary, and storm sewer maintenance and improvements* • Fire protection and education* • Emergency medical services* • Maintain backup power generators in critical facilities* • Vegetation and tree management in public areas* • Maintain outdoor warning siren system and regular tests* • Snow removal* • City website and new resident newsletter*
Contracted or Agreement Services	• Linn County Sheriff's Office* • Linn County Emergency Management Agency* • Fire protection mutual aid agreements* • Linn County HAZMAT Response Team* • East Central Iowa Council of Governments* • Solid waste and recycling* • Library services in Center Point
Policies, Programs, and Plans	• Walker Code of Ordinances includes Building, Zoning, and Subdivision Ordinance* • National Flood Insurance Program participation • Floodplain Management Program (floodplain manager, current effective map 4/5/2010, and Floodplain Ordinance)* • Coordinate with Duane Arnold Energy Center* • Coordinate with Linn County Public Health* • Coordinate with Iowa Department of Natural Resources* • National Incident Management System training for necessary staff and officials*
Financial and Other Resources	• City budget* • Bonds • Grants* • Donations • Walker Betterment Club, Lions Club, Knights of Columbus, American Legion, and Fire Department Mutual Aid Society

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the county's mitigation strategy.

Alburnett Community School District Operations and Resources

Alburnett CSD has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All District operations and resources were considered throughout the plan development process to ensure the district's final mitigation strategy is feasible. See Table 77.

Table 77: Alburnett CSD Operations and Resources

Officials, Commissions, and Committees	• School Board* • School Improvement Advisory Committee
Staff and Departments	• Superintendent* • Secondary Principal* • Elementary Principal • Building and Grounds Supervisor*
District Services	• Instruction • Preschool • Special Eduction • English Language Learner (ELL) Instruction • Building maintenance and improvements* • Grounds maintenance* • Transportation* • Food Service • Facilities made available for community use
Contracted or Agreement Services	• Linn Count Emergency Management Agency* • Fire Protection* • Solid was and recycling • School Resource Officer*
Policies, Programs, and Plans	• School District Policies*
Financial and Other Resources	• District budget* • Bonds • Grants • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the county's mitigation strategy.

Cedar Rapids Community School District Operations and Resources

Cedar Rapids CSD has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All District operations and resources were considered throughout the plan development process to ensure the district's final mitigation strategy is feasible. See Table 78.

Table 78: Cedar Rapids CSD Operations and Resources

Officials, Commissions, and Committees	• Board of Education* • Teacher Quality Committee
Staff and Departments	• Superintendent • Associate Superintendent • Executive Administrator & Board Secretary* • Deputy Superintendent • Executive Director of Business Services & CFO • Executive Director of Elementary Education • Executive Director of Equity • Executive Director of Instructional Services • Executive Director of Secondary Educations • Executive Director of Special Services • Executive Director of Talent Management • Director of Communications
District Services	• Instruction • Gifted Education • Special Services • English Language • Health Services • Homeless Services • Nutrition Services
Contracted or Agreement Services	• Cedar Rapids Police Department* • Cedar Rapids Fire Department* • Linn County Emergency Management Agency* • Solid waste and recycling
Policies, Programs, and Plans	• 2017–2022 Strategic Plan* • School Improvement Plans* • Cedar Rapids CSD Policies, Regulations, and Procedures* • Coordinate with the Duane Arnold Energy Center* • Coordinate with Linn County Public Health*
Financial and Other Resources	• District budget • Bonds • Grants • Donations • Cedar Rapids Community School District Foundation

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the county's mitigation strategy.

Center Point-Urbana Community School District Operations and Resources

Center Point-Urbana CSD has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All District operations and resources were considered throughout the plan development process to ensure the district's final mitigation strategy is feasible. See Table 79.

Table 79: Center Point-Urbana CSD Operations and Resources

Officials, Commissions, and Committees	• Board of Education
Staff and Departments	• District Office • Athletic and Transportation Department • Food Service Department • Instructional Services Department • Superintendent* • Director of Technology and Instruction* • School Principals* • Director of Facilities and Grounds*
District Services	• Instruction • Special Education • English Language Learner (ELL) Instruction • Building maintenance and improvements* • Grounds maintenance* • Snow removal* • Transportation*
Contracted or Agreement Services	• Linn County Sheriff's Office* • Local fire departments* • Linn County Emergency Management Agency* • Fire protection mutual aid agreements* • Solid waste and recycling
Policies, Programs, and Plans	• Emergency plans and drills* • Coordinate with Duane Arnold Energy Center* • Coordinate with Linn County Public Health*
Financial and Other Resources	• District budget* • Bonds • Grants* • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the county's mitigation strategy.

College Community School District Operations and Resources

College CSD has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All District operations and resources were considered throughout the plan development process to ensure the district's final mitigation strategy is feasible. See Table 80.

Table 80: College CSD Operations and Resources

Officials, Commissions, and Committees	• Board of Education
Staff and Departments	• District and Business Office* • Superintendent* • Operations Department*
City Services	• Instruction • Building maintenance and improvements* • Grounds maintenance* • Snow removal* • Transportation* • Food Service (daily capacity of 6,500 meals)
Contracted or Agreement Services	• Cedar Rapids Police Department* • Cedar Rapids Fire Department* • Linn County Emergency Management Agency* • Solid waste and recycling
Policies, Programs, and Plans	• Emergency plans and drills* • Coordinate with the Duane Arnold Energy Center* • Coordinate with Linn County Public Health*
Financial and Other Resources	• District budget* • Bonds • Grants • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the county's mitigation strategy.

Linn-Mar Community School District Operations and Resources

Linn-Mar CSD has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All district operations and resources were considered throughout the plan development process to ensure the district's final mitigation strategy is feasible. See Table 81.

Table 81: Linn-Mar CSD Operations and Resources

Officials, Commissions, and Committees	• Board of Education
Staff and Departments	• Superintendent • Executive Director of Student Services • Associate Superintendent & Chief Academic Officer • Executive Director of Technology • Chief Human Resources Office & Executive Director of Public Relations • CFO, COO & Board Treasurer
District Services	• Instruction • Building maintenance and improvements • Nutrition services • Grounds maintenance • Health services • Snow removal • Student support services • Transportation
Contracted or Agreement Services	• Cedar Rapids and Marion Police Departments • Cedar Rapids and Marion Fire Departments • Linn County Emergency Management Agency • Solid waste and recycling
Policies, Programs, and Plans	• Emergency plans and drills • Coordinate with the Duane Arnold Energy Center • Coordinate with Linn County Public Health
Financial and Other Resources	• District budget • Bonds • Grants • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the county's mitigation strategy.

Mount Vernon Community School District Operations and Resources

Mount Vernon CSD has a wide range of operations and resources to implement a well-rounded hazard mitigation strategy. All district operations and resources were considered throughout the plan development process to ensure the district's final mitigation strategy is feasible. See Table 82.

Table 82: Mount Vernon CSD Operations and Resources

Officials, Commissions, and Committees	• Board of Education* • Superintendent* • Building Administrators*
Staff and Departments	• Administration* • Teaching Staff • Support Staff • Technology Department* • Business Department • Facilities and Maintenance Department* • Transportation Department
District Services	• PK-12 Public School District • Instruction • Special Education • English Language Learner (ELL) Instruction • Building maintenance and improvements* • Grounds maintenance* • Snow removal* • Transportation* • Food service
Contracted or Agreement Services	• Mount Vernon Police Department* • Mount Vernon Fire Department* • Linn County Emergency Management Agency* • Solid waste and recycling • Lisbon/Mount Vernon Ambulance* • Cornell College
Policies, Programs, and Plans	• Mount Vernon Community School District Board Policies and Procedures* • School Improvement Plan* • Coordinate with the Duane Arnold Energy Center* • Coordinate with Linn County Public Health*
Financial and Other Resources	• Property and Sales Tax Revenues* • State education aid • Federal education aid • Donations

*The asterisk indicates officials or staff that participated in the plan development process or policies, programs, and plans that were discussed or reviewed for relevancy in the county's mitigation strategy.

Progress Update

For jurisdictions with existing hazard mitigation plans, it is important to document the mitigation actions that have been completed since the plan was adopted. The jurisdictions that participated in the previously approved plan completed mitigation actions that significantly reduce the risk of high priority hazards in the community.

> Requirement §201.6 (d)(3): (d) Plan review… (3) A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it within 5 years in order to continue to be eligible for mitigation project grant funding.

The following section provides an update on the completed mitigation actions. A table is included that displays information about the action, hazard(s) addressed, goal(s) addressed, whether the action was included in the previous plan, and notes on the work completed. Actions that were included in the previous plan are indicated with an "X" in the corresponding column. The absence of "X" indicates a mitigation action that was undertaken but not specifically referenced in the previous hazard mitigation plan. Generally, in a jurisdiction's progress update, the mitigation actions that were included in the previous hazard mitigation plan show a commitment to and documented progress toward completing mitigation actions.

It should be noted that although a mitigation action may be included in a jurisdiction's progress update as a completed mitigation action, the mitigation action may not necessarily be excluded from the jurisdiction's updated mitigation strategy in this plan. The majority of hazard mitigation actions are ongoing in nature, as risk and vulnerability change throughout a jurisdiction. In addition, the majority of mitigation actions require multiple projects over a span of time that extends beyond the five-year life of a hazard mitigation plan, which is often due to the cost of completing large or multi-stage mitigation actions.

Linn County Progress Update

Linn County has an existing hazard mitigation strategy, so it is important to document mitigation actions that have been completed since the plan was adopted. Completed mitigation actions demonstrate Linn County's general commitment and progress toward mitigating or reducing the risk of hazards in the county. Refer to Table 83.

Table 83: Linn County Complete Mitigation Actions

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Participate in the Community Resilience Roundtable Program and implement supporting projects	All hazards	1, 2, 3, 4, 5	X	Pilot program of the National Research Council and National Academy of Sciences Resilient America Roundtable. The County is participating.
Expand outdoor and indoor notification systems	Tornado and Windstorm, Thunderstorm, Lightning and Hail	1, 4, 5	X	Six new sirens have been installed recently.
Identify and complete flood mitigation projects to protect identified critical facilities and infrastructure	Flood	1, 2, 3, 5	X	Some flood mitigation projects have been completed around county bridges.
Acquire, relocate, elevate, and/or demolish structures in the floodplain	Flood	1, 2, 3, 4, 5	X	Some properties have been elevated.
Strengthen the Floodplain Ordinance to reduce development in the floodplain	Flood	1, 2, 5	X	New ordinance language is pending.
Improve the county's rating in the Community Rating System	Flood	1, 2, 4, 5	X	The county entered the Community Rating System in 2008 and plans to continuously improve its rating.

Table 83: Linn County Complete Mitigation Actions, complete

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Participate in the development and implementation of the Indian Creek Watershed Management Plan to improve stormwater management, which may include regulatory or structural projects	Flood	1, 2, 3, 4, 5	X	The Indian Creek Watershed Management Authority has developed a watershed plan. Linn County is participating in the WMA, with representation on the WMA Board of Directors.
Continue continuity planning in all county departments Previously: *Initiate continuity planning in all county departments*	All hazards	1, 2, 3, 5	X	Continuity planning has occurred, but this is an ongoing process.
Participate actively in the watershed management authorities (WMA) that Linn County is a member of and support the WMA plans.	Flash Flood, River Flood	1, 2, 4, 5		Linn County has staff participating on the Boards of Directors for five WMA's: Indian Creek, Lower Cedar, Maquoketa River, Middle Cedar, and Upper Wapsipinicon. Indian Creek

Alburnett Progress Update

Alburnett has an existing hazard mitigation strategy, so it is important to document mitigation actions that have been completed since the plan was adopted. Completed mitigation actions demonstrate Alburnett's general commitment and progress toward mitigating or reducing the risk of hazards in the city. Refer to Table 84.

Table 84: Alburnett Complete Mitigation Actions

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Public education project	All hazards	1, 4, 5	X	This project includes adding hazard-related information to the city website and sponsoring presentations for local organizations e.g. Lions Club and the Alburnett Historical Society
Construct a new fire station	Infrastructure Failure	1, 3, 5	X	Progress has been made on this project, and building is targeted to start in spring 2019.

Bertram Progress Update

Bertram has an existing hazard mitigation strategy, so it is important to document mitigation actions that have been completed since the plan was adopted. Completed mitigation actions demonstrate Bertram's general commitment and progress toward mitigating or reducing the risk of hazards in the city. Refer to Figure 5.

Figure 5: Bertram Complete Mitigation Actions

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Replace and repair bridges damaged by flash flooding	Flash Flood, Infrastructure Failure	1, 2, 3, 5	X	The bridges will be elevated and/or extended to prevent future flood damage. One bridge has washed out and has been replaced since the previous plan. One needs to be mitigated against future flooding
Establish plan to address Oak Wilt in public areas	Animal, Plant, Crop Disease	2, 3, 4, 5	X	Ongoing work is taking place to address problem trees but no plan has been created.
Identify and complete stormwater management improvements to reduce flood damage risk	Flood, Infrastructure Failure	1, 2, 3, 5	X	The City of Bertram has purchased a property with the intention of using it to address stormwater.
Participate in the Lower Cedar Watershed Management Authority and its watershed planning process.	Flash Flood, River Flood	1, 2, 5		The City of Bertram holds a position on the Lower Cedar WMA Board of Directors.
Determine appropriate generator testing schedule and reporting procedure	Tornado and Windstorm, Thunderstorm, Lightning, and Hail, Infrastructure Failure, Severe Winter Storm	1, 2, 3, 5	X	Regular maintenance is performed on the well pump generator.

Cedar Rapids Progress Update

Cedar Rapids has an existing hazard mitigation strategy, so it is important to document mitigation actions that have been completed since the plan was adopted. Completed mitigation actions demonstrate Cedar Rapids' general commitment and progress toward mitigating or reducing the risk of hazards in the city. Refer to Table 85.

Table 85: Cedar Rapids Complete Mitigation Actions

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Participate in the Community Resilience Roundtable Program and implement supporting projects	All hazards	1, 2, 3, 4, 5	X	Pilot program of the National Research Council and National Academy of Sciences Resilient America Roundtable. Community meetings have been ongoing, and some projects are in development.
Install flood warning system on Indian Creek	Flood	1, 2, 4, 5	X	Coordinating with the Army Corps of Engineers, adjacent cities, and the East Central Iowa Council of Governments was in the "Current Mitigation Activities" category in the previous plan. The Indian Creek Watershed Management Authority was created. The multi-jurisdictional and multi-disciplinary group is developing a watershed management plan and coordinating with the Silver Jackets to develop a warning system. This project is still needed as the USGS shut down the river gage in Marion.
Complete stormwater outfall backflow protection project	Flood	1, 2, 5	X	This project is underway and partially completed. Stormwater pipe outlets have been added at the Cedar River.
Install backup power sources for traffic lights	Flood	1, 3, 5	X	This project is underway. 70 of the City's 185 traffic lights have had backup power installed, and the City has funding for 30 more.

Table 85: Cedar Rapids Complete Mitigation Actions, continued

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Complete Vinton Ditch improvements	Flood	1, 2, 5	X	This project is in progress and involves bank stabilization.
Acquire, relocate, elevate, and/or demolish structures in flood hazard areas or structures subject to repetitive damage	Flood	1, 2, 3, 5	X	This project ongoing and actions are taken as funding is available.
Add additional shallow water wells to the city's water supply	Drought	1, 3, 5	X	Well #5 is under construction. Other wells are planned.
Complete the city's Permanent Flood Control System (FCS) which includes the following phases: • Ellis Ln. NW to I-380 • I-380 to 8th Ave. SW • 8th Ave. SW to 12th Ave. SW (Ingredion) • 12th Ave. SW to Cedar Rapids/Linn County Solid Waste Agency Site 1 • I-380 at 7th St. NE to Cargill (Bean) and around Quaker Oats to A Ave. NE • A Ave. NE to 8th Ave. SE • 8th Ave. SE to Alliant Substation • Alliant Substation to Cargill (Corn) • 30 gate closures and 11 pump stations • 8th Ave. Bridge replacement and raising *Previously this mitigation strategy had alternate boundaries for some of the phases.*	Flood	1, 2, 3, 5	X	This is a long term project currently under design and construction, with completion expected in the 2030's subject to funding availability. This project is being implemented into smaller subsegments for construction. Each completed subsegment mitigates against flooding. There is currently an initiative to evaluate the possibility and benefit of extending the east side system concept upstream to McCloud Run and J Avenue NE to protect additional properties. The City recently secured funding from the Federal government and passed a property tax increase to provide additional funding for the FCS.[25]

Table 85: Cedar Rapids Complete Mitigation Actions, continued

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Develop and implement a City response plan for Indian Creek flooding *Previously: Develop and implement a response plan for Indian Creed flooding*	Flood	1, 2, 3, 4, 5	X	Previously this action related to participating in the Indian Creek Watershed Management Authority planning process. This City is on the WMA's Board of Directors. The WMA has completed their masterplan, which the city participated in. Separately, the city could develop a flood response plan for the Indian Creek.
Add detention basins and other stormwater infrastructure to increase stormwater management capability and reduce flood risk *Previously: Add detention basins to increase stormwater management capability*	Flood	1, 2, 3, 5	X	These activities will be guided by the City's developing Stormwater Masterplan. This project may complement the Indian Creek Watershed Management Plan and the Middle Cedar Wastershed Management Plan.
Update Stormwater Master Plan and prioritized Capital Improvement Project list *Previously: Add detention basins to increase stormwater management capability.*	Flood	1, 2, 3, 5	X	The City is in year 3 of 5 of the update cycle for the Stormwater Master Plan. The committee wanted to expand the strategy from the previously approved plan to include their planning framework.
Participate actively in Watershed Management Authorities (WMA) that Cedar Rapids is a member of and support the WMA's plans.	Flood	1, 2, 3, 5		The City is on the boards of directors for the Middle Cedar WMA, Indian Creek WMA, and Lower Cedar WMA.
Improve two major water detention basins	Flood	1, 2, 5	X	This and other flood risk reduction projects will be addressed in the Stormwater Master Plan.
Add additional signage for emergency routes and evacuation routes	Transportation Incident, Flood, Radiological Incident	1, 4, 5	X	The City has the capability to change traffic patterns and facilitate evacuation through the Traffic Operations Center
Construct berm at Ellis Boulevard	Flood	1, 2, 3, 5	X	This mitigation action has been completed.

Table 85: Cedar Rapids Complete Mitigation Actions, continued

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Reconstruct Public Works facility above the 2008 flood level	Flood	1, 2, 3, 5	X	This mitigation action has been completed.
Add additional sump pits and epoxy flooring at City Hall	Flood	1, 2, 5	X	This mitigation action has been completed.
Construct ring levee at the Water Pollution Control facility	Flood	1, 3, 5	X	This mitigation action has been completed.
Install berm at Q Avenue and 8th Street NW for interim flood protection	Flood	1, 2, 3, 5	X	This mitigation action has been completed.
Reroute sewer in the Sun Valley Neighborhood	Flood	1, 2, 5	X	This mitigation action has been completed.
Construct berm in the Sun Valley Neighborhood along Cottage Grove Parkway	Flood	1, 2, 3, 5	X	This mitigation action has been completed.
Install new pump and return sewer to protect wastewater infrastructure	Flood	1, 2, 3, 5	X	This mitigation action has been completed.
Complete Cedar River Siphon Project	Flood	1, 2, 3, 5	X	This mitigation action has been completed.
Replace damaged sections of the sanitary sewer with flood resilient materials	Flood	1, 2, 5	X	This mitigation action has been completed.
Mitigate Valley Brook Drive erosion	Flood	1, 2, 3, 5	X	This mitigation action has been completed.
Relocate the Sac and Fox Trail	Flood	1, 2, 5	X	This mitigation action has been completed.

Center Point Progress Update

Center Point has an existing hazard mitigation strategy, so it is important to document mitigation actions that have been completed since the plan was adopted. Completed mitigation actions demonstrate Center Point's general commitment and progress toward mitigating or reducing the risk of hazards in the city. Refer to Table 86.

Table 86: Center Point Complete Mitigation Action

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Retrofit existing City Hall or construct a new City Hall to withstand natural hazards including a dedicated generator	Tornado and Windstorm, Thunderstorm, Lightning, and Hail, Flood, Infrastructure Failure	1, 2, 3, 5	X	The City is currently in the planning process for this project.
Construct a new Fire Station with a dedicated generator	Tornado and Windstorm, Infrastructure Failure, Thunderstorm, Lightning, and Hail, Flood, Severe Winter Storm	1, 2, 3, 5	X	The City is currently in the planning process for this project.
Digitize city and public records	Tornado and Windstorm, Infrastructure Failure, Thunderstorm, Lightning, and Hail, Flood	3, 5	X	This project is complete.
Education residents about the importance of disconnecting their sump pumps from the sanitary sewer	Infrastructure Failure, Food	2, 3, 4, 5	X	This project is in process. Community outreach has been conducted, and tile installation has been completed to mitigate local flash flooding.

Central City Progress Update

Central City has an existing hazard mitigation strategy, so it is important to document mitigation actions that have been completed since the plan was adopted. Completed mitigation actions demonstrate Central City's general commitment and progress toward mitigating or reducing the risk of hazards in the city. Refer to Table 87.

Table 87: Central City Complete Mitigation Actions

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Identify and complete flood protection for the wastewater treatment facility	River Flood	1, 2, 3, 5	X	The lagoons are no longer in the floodplain. Additional flood mitigation efforts are underway, including a floodwall.
Identify and/or construct a storage facility for maintenance equipment and flood protection supplies	River Flood and Flash Flood	1, 3, 5	X	Flood protection supplies are accessible, but additional mitigation efforts could be completed.
Complete bank stabilization along the river and bridges	River Flood, Flash Flood, and Landslide	1, 2, 5	X	Riprap and armament work has been completed, and the area behind the wastewater plant has been addressed. Additional work could be completed in the future.
Expand outdoor warning system coverage	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 4, 5	X	One siren was installed by the City and one by the County.
Replace the Fire Department's personal protective equipment	Infrastructure Failure and Grass and Wildland Fire	1, 3, 5	X	This is an ongoing process.
Develop a plan for the imminent emerald ash borer infestation	Animal, Plant, Crop Disease	2, 4, 5	X	No plan has been developed, but the City addresses problems as they arise.
Complete bank stabilization near the water tower	Landslide	1, 2, 3, 5	X	The City has performed some bank stabilization. Additional efforts could be needed if a new road to the water tower was constructed.

Table 87: Central City Complete Mitigation Actions, continued

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Purchase portable or fixed generators for critical facilities. Previously: *Purchase portable generators for critical facilities.*	Severe Winter Storm, Tornado and Windstorm, and Infrastructure Failure	1, 2, 3, 5	X	City maintains a generator at City Hall, the wastewater treatment facility, and a portable generator for one well.
Relocate water source(s) from the 100 year floodplain	River Flood	1, 3, 5	X	The well was relocated in 2013.
Add a new well to increase water supply	Infrastructure Failure and Drought	1, 3, 5	X	This project has been completed.

Coggon Progress Update

Coggon has an existing hazard mitigation strategy, so it is important to document mitigation actions that have been completed since the plan was adopted. Completed mitigation actions demonstrate Coggon's general commitment and progress toward mitigating or reducing the risk of hazards in the city. Refer to Table 88.

Table 88: Coggon Complete Mitigation Actions

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Acquire, relocate, elevate, and/or demolish structures in flood hazard areas	Flood	1, 2, 3, 4, 5	X	The old wastewater plant in a flood hazard area will be demolished.
Improve, structurally protect, or relocate water and wastewater facilities to maintain service	Flood	1, 2, 3, 5	X	A new wastewater facility is being constructed.
Purchase power generators for critical facilities, including water and sanitary sewer facilities	Infrastructure failure; tornado and windstorm; thunderstorm, lightning, and hail; severe winter storm	1, 3, 5	X	The water treatment facility, water tower, and Fire Department have backup power.
Designate shelter for park and campground users, if needed, and/or consider other facilities for a tornado safe room and construct the room. Previously: *Designate shelter for park and campground users, if needed, construct a tornado safe room*	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 2, 4, 5	X	There is no significant progress to document.

Ely Progress Update

Ely has an existing hazard mitigation strategy, so it is important to document mitigation actions that have been completed since the plan was adopted. Completed mitigation actions demonstrate Ely's general commitment and progress toward mitigating or reducing the risk of hazards in the city. Refer to Table 89.

Table 89: Ely Complete Mitigation Actions

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Add hazard-related information to the city website	All hazards	1, 3, 4, 5	X	This is an ongoing project.
Add water retention capacity for Banner Valley Creek	Flood	1, 2, 3, 5	X	Work has been completed to address nearby flooding. The City ultimately used a solution that did not involve water retention.

Fairfax Progress Update

Fairfax has an existing hazard mitigation strategy, so it is important to document mitigation actions that have been completed since the plan was adopted. Completed mitigation actions demonstrate Fairfax's general commitment and progress toward mitigating or reducing the risk of hazards in the city. Refer to Table 90.

Table 90: Fairfax Complete Mitigation Actions

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Add additional well and water storage facility	Infrastructure Failure, Drought	1, 3, 5	X	The city has upgraded the capacity of their wells and is planning further upgrades for additional capacity.
Expand warning siren coverage	Tornado and Windstorm	1, 3, 4, 5	X	Fairfax has recently installed two warning sirens and may install more as needed.
Purchase and install backup power generators for outdoor warning sirens	Tornado and Windstorm	1, 3, 5	X	Backup power sources have been installed for existing sirens.
Purchase weather radios for city buildings	Tornado and Windstorm, Thunderstorm, Lightning, and Hail, Severe Winter Storm	1, 3, 4, 5	X	City Hall has a weather radio.
Improve and expand the city's stormwater management system	Flood	1, 2, 3, 5	X	New retention ponds have been installed.
Purchase appropriate size water pumps	Flood	1, 2, 3, 5	X	Two large pumps have been purchased, but future needs may require more.
Purchase and install backup power generators at critical facilities *Previously: Purchase and install backup power generators for two wells*	Infrastructure Failure, Tornado and Windstorm, Thunderstorm, Lightning, and Hail, Severe Winter Storm	1, 2, 3, 5	X	Fairfax has installed generators at their wells. They may consider installing them at other critical facilities.
Water main replacement project	Infrastructure Failure	1, 3, 5	X	Fairfax has completed two phases of replacements. The replacements included upgrading the water mains to 8" size and new hydrants in developed areas.

Hiwatha Progress Update

Hiawatha has an existing hazard mitigation strategy, so it is important to document mitigation actions that have been completed since the plan was adopted. Completed mitigation actions demonstrate Hiawatha's general commitment and progress toward mitigating or reducing the risk of hazards in the city. Refer to Table 91.

Table 91: Hiawatha Complete Mitigation Actions

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Construct new fire station	Infrastructure Failure	1, 2, 3, 5	X	The new fire station will improve response as the city's population increases and development expands. There is no progress to report, but it is still being considered.
Purchase and install backup power generators in critical facilities	Infrastructure Failure, Tornado and Windstorm, Thunderstorm, Lightning, and Hail, Severe Winter Storm	1, 2, 3, 5	X	The library and well #10 do not currently have a generator. Other facilities have backup power.
Participate in the Indian Creek Watershed Management Authority planning process and implement the plan	Flood	1, 2, 3, 4, 5	X	Hiawatha has been participating in the Indian Creek WMA and will continue to be involved.
Continue water, sewer, and stormwater infrastructure improvements to reduce infiltration	Flood	1, 2, 3, 5	X	This is an ongoing project.
Determine feasibility of strengthening the city's floodplain ordinance	Flood	1, 2, 3, 5	X	The City's floodplain ordinance has been updated since the previous hazard mitigation plan was approved and updates will be ongoing.

Lisbon Progress Update

Lisbon has an existing hazard mitigation strategy, so it is important to document mitigation actions that have been completed since the plan was adopted. Completed mitigation actions demonstrate Lisbon's general commitment and progress toward mitigating or reducing the risk of hazards in the city. Refer to Table 92.

Table 92: Lisbon Complete Mitigation Actions

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Improve stormwater management system	Flood	1, 3		Ongoing. Lisbon has installed a new outlet, cleaned stormwater lines, and installed a Gabian basket.
Purchase and install generators in critical facilities	Tornado and Windstorm, Thunderstorm, Lightning, and Hail, Infrastructure Failure, Severe Winter Storm	1, 2, 3, 5		This need is currently met.

Marion Progress Update

Marion has an existing hazard mitigation strategy, so it is important to document mitigation actions that have been completed since the plan was adopted. Completed mitigation actions demonstrate Marion's general commitment and progress toward mitigating or reducing the risk of hazards in the city. Refer to Table 93.

Table 93: Marion Complete Mitigation Actions

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Construct tornado safe rooms in public facilities	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 4, 5	X	There is a safe room at Thomas Park, and the City may consider other locations in the future.
Assess outdoor warning siren coverage and expand coverage, if needed	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 3, 4, 5	X	Expansion of coverage will be needed as the city grows east of Highway 13. The EMA and Duane Arnold Energy Center is currently doing a study.
Participate in the Indian Creek Watershed Management Authority planning process and implement the plan	Flood	1, 2, 3, 4, 5	X	Marion holds a position on the Indian Creek Watershed Management Authority Board of Directors
Develop alternative source of drinking water	Drought	1, 3, 5	X	This is an ongoing project.
Perform an annual inspection of existing storm shelters in mobile home communities to ensure continued compliance with access and safety requirements.	Thunderstorm, lightning, and hail; tornado and windstorm	1, 5		This is an ongoing project, which has commenced.
Develop and implement an information technology disaster recovery site at the police station	Infrastructure Failure, Terrorism	3, 5	X	Complete storage array network backup

Mount Vernon Progress Update

Mount Vernon has an existing hazard mitigation strategy, so it is important to document mitigation actions that have been completed since the plan was adopted. Completed mitigation actions demonstrate Mount Vernon's general commitment and progress toward mitigating or reducing the risk of hazards in the city. Refer to Table 94.

Table 94: Mount Vernon Complete Mitigation Actions

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Develop public awareness campaign for local hazards	All hazards	1, 4, 5	X	City staff utilizes social media to provide hazard-related information
Develop process to notify special needs population	All hazards	1, 4, 5	X	Mount Vernon police provide information for resources as appropriate
Develop program to educate the public about the need to expand emergency services as the community grows	All hazards	1, 4, 5	X	This is an ongoing project
Purchase and install backup power generators in critical facilities	Thunderstorm, Lightning, and Hail, Flood, Tornado and Windstorm, Infrastructure Failure	1, 2, 3, 5	X	A generator was last installed at the fire station around 2011. City hall has a power generator.
Adopt restrictive permit process for large events	Thunderstorm, Lighting, and Hail, Flood, Tornado and Windstorm, Hazardous Materials Incident, Sever Winter Storm, Radiological Incident, Terrorism, Extreme Heat	1, 3, 5	X	Some procedures are in place and additional procedures are in development.
Encourage the construction of storm shelters and structural hardening against high wind hazards in schools, daycares, adult care, and other facilities with vulnerable populations	Thunderstorm, Lightning, and Hail, Tornado and Windstorm	1, 2, 4, 5	X	These efforts are ongoing
Participate in a watershed planning process, if available, and implement the plan	Flood	1, 2, 4, 5	X	Since the previous hazard mitigation plan was adopted, Mount Vernon has joined the newly formed Lower Cedar Watershed Management Authority.

Table 94: Mount Vernon Complete Mitigation Actions, continued

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Educate owners about check valves	Flood	1, 3, 4, 5	X	This is an ongoing project.
Educate local businesses about hazardous material incident mitigation strategies	Hazardous Materials Incident	1, 3, 5	X	This is an ongoing project, with coordination with the Fire Department and Cornell College
Improve snow emergency route and evacuation plan	Severe Winter Storm	1, 3, 5	X	This is an ongoing project
Require storm shelter space in new manufactured home developments and/or lobby the state legislature to revise Iowa Code to require storm shelter space in manufactured home developments	Thunderstorm, Lightning, and Hail, Tornado and Windstorm	1, 5	X	Requirements related to this strategy have been added to the zoning code.

Palo Progress Update

Palo has an existing hazard mitigation strategy, so it is important to document mitigation actions that have been completed since the plan was adopted. Completed mitigation actions demonstrate Palo's general commitment and progress toward mitigating or reducing the risk of hazards in the city. Refer to Table 95.

Table 95: Palo Complete Mitigation Actions

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Construct a tornado safe room in new public facilities	Thunderstorm, Lightning, and Hail, Tornado and Windstorm	1, 2, 3, 5	X	One in City Hall and Memorial Park concession stand
Purchase and install backup power generators in critical facilities	Thunderstorm, Lightning, and Hail, Tornado and Windstorm, Severe Winter Storm, Infrastructure Failure	1, 2, 3, 5	X	Backup generators are installed at the fire station, wells, and lift stations
Determine potential benefits of petitioning Linn and Benton County to make Dry Creek a designated waterway	Flood	3, 5	X	A large portion of the creek has been designated as a waterway.
Complete water, sewer, and stormwater system improvements	Flood, Infrastructure Failure	1, 2, 3, 5	X	Repairs have been made on damage from 2016 flooding. Repairs have been completed on manholes, and some water line/lining projects have been completed.
Participate in a watershed planning process, if available, and implement the plan	Flood	1, 2, 3, 4, 5	X	Palo is a participant in the Middle Cedar Watershed Management Authority.
Recruit volunteers for the Fire Department	All hazards	1, 2, 3, 5	X	This is an ongoing project.
Add hazard related information to the city website	All hazards	1, 2, 3, 4, 5	X	This is an ongoing project.
Purchase weather radios for City Hall and the city's ball diamond	Thunderstorm, Lightning, and Hail, Tornado and Windstorm	1, 4, 5		Completed

Prairieburg Progress Update

Prairieburg has an existing hazard mitigation strategy, so it is important to document mitigation actions that have been completed since the plan was adopted. Completed mitigation actions demonstrate Prairieburg's general commitment and progress toward mitigating or reducing the risk of hazards in the city. Refer to Table 96.

Table 96: Prairieburg Complete Mitigation Actions

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Upgrade outdoor warning siren to increase coverage area, include remote activation capability, and backup power source	Tornado and Windstorm, Thunderstorm, Lightning, and Hail, Infrastructure Failure	1, 3, 5	X	The existing warning siren is manually controlled. It has a generator, which is on a maintenance plan.
Modify the Fire Station backup power generator to be portable	Tornado and Windstorm, Thunderstorm, Lightning, and Hail, Infrastructure Failure, Severe Winter Storm	3, 5	X	Fire trucks have generators.
Purchase fire swatters	Infrastructure Failure, Grass and Wildland Fire	1, 2, 5	X	Fire swatters have been purchased.
Purchase chainsaw for each fire truck	Infrastructure Failure, Grass and Wildland Fire	1, 2, 5	X	Chainsaws have been purchased.
Purchase a leaf blower	Grass and Wildland Fire	1, 2, 5	X	A leaf blower has been purchased.
Periodically borrow an electronic speed sign and place on major city routes	Transportation Incident	1, 4, 5	X	This is an ongoing project.
Develop an emergency assistance program	All hazards	1, 4, 5	X	An emergency response plan has been developed. Maintenance is an ongoing project.

Robins Progress Update

Robins has an existing hazard mitigation strategy, so it is important to document mitigation actions that have been completed since the plan was adopted. Completed mitigation actions demonstrate Robins' general commitment and progress toward mitigating or reducing the risk of hazards in the city. Refer to Table 97.

Table 97: Robins Complete Mitigation Actions

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Purchase and install stationary generators at lift stations and replace obsolete generators	Tornado and Windstorm, Thunderstorm, Lightning, and Hail, Severe Winter Storm, Infrastructure Failure	1, 2, 3, 5	X	Robins has five generators, including at City Hall, the fire station, and a lift station. The City needs backup power for the Maple St. and Wildflower lift stations. Most of the generators were installed within the past 3–10 years.
Participate in the Indian Creek Watershed Management Authority planning process and implement the plan	Flood	1, 2, 3, 4, 5	X	Robins is an active participant in the Indian Creek Watershed Management Authority.
Improve stormwater management system	Flood	1, 2, 3, 4, 5	X	The city's focus is the northwest quadrant. Detention basins are required in new developments.
Expand warning siren coverage, as development expands	Tornado and Windstorm, Thunderstorm, Lightning, and Hail	1, 4, 5	X	Current coverage is adequate, but the City is expanding.
Purchase brush truck for the Fire Department	Grass and Wildland Fire	1, 2, 3, 5	X	Robins has a brush truck, which may need replaced within 5 years.
Establish proper computer network security	Infrastructure Failure, Terrorism	1, 3, 5	X	Upgrades have been implemented. Ongoing project.

Springville Progress Update

Springville has an existing hazard mitigation strategy, so it is important to document mitigation actions that have been completed since the plan was adopted. Completed mitigation actions demonstrate Springville's general commitment and progress toward mitigating or reducing the risk of hazards in the city. Refer to Table 98.

Table 98: Springville Complete Mitigation Actions

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Purchase and install backup power generator in critical facilities	Thunderstorm, Lightning, and Hail, Infrastructure Failure, Tornado and Windstorm, Severe Winter Storm	1, 3, 5	X	The city well, treatment plan, and fire department have backup power.
Assess warning siren coverage and expand or replace existing sirens, if needed	Tornado and Windstorm, Lightning, and hail	1, 3, 4, 5	X	The City has ordered two new sirens with solar battery backup.
Complete water and sewer infrastructure improvements	Infrastructure Failure, Flood	1, 2, 3, 5	X	The city does not have stormwater infrastructure. The water and sewer rate were increased to fund future system improvements.
Add hazard related information the city's website	All hazards	1, 2, 3, 4, 5	X	Alerts, for issues like snow emergencies and water main breaks, are on the website.

Walker Progress Update

Walker has an existing hazard mitigation strategy, so it is important to document mitigation actions that have been completed since the plan was adopted. Completed mitigation actions demonstrate Walker's general commitment and progress toward mitigating or reducing the risk of hazards in the city. Refer to Table 99.

Table 99: Walker Complete Mitigation Actions

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Purchase and install backup power generators in critical facilities	Thunderstorm, Lightning, and Hail, Infrastructure Failure, Severe Winter Storm, Tornado and Windstorm	1, 2, 3, 5	X	Facilities with generators include the Fire Station, well, and wastewater treatment plant
Remove debris from creeks	Flood	1, 2, 5	X	Creek cleanup has occurred. This is an ongoing project.
Add hazard-related information to the city's website	All hazards	1, 2, 4, 5	X	Information has been posted online and in the newsletter for new citizens.
Purchase weather radios for the City Shop Previously: *Purchase weather radios for the City Shop and ball diamond*	Thunderstorm, Lightning, and Hail, Tornado and Windstorm	1, 3, 5	X	The ball diamond has a weather radio.
Continue water, sewer, and stormwater infrastructure improvements Previously: *Complete water, sewer, and stormwater infrastructure improvements*	Infrastructure Failure, Flood	1, 2, 3, 5	X	3500 feet of water main was replaced in a project that ended in 2015. Other improvements are ongoing.
Identify and implement flood mitigation solutions on Karens Court road	Flood	1, 2, 3, 5	X	Ditches and culverts were installed to reduce flood risk
Improve drainage along transportation infrastructure to prevent frost boils	Infrastructure Failure, Expansive Soils	2, 3, 5	X	Improvements were completed.
Add a new well	Drought	1, 2, 3, 5	X	An existing well was rehabilitated.

Center Point-Urbana Community School District Progress Update

Center Point-Urbana CSD has an existing hazard mitigation strategy, so it is important to document mitigation actions that have been completed since the plan was adopted. Completed mitigation actions demonstrate Center Point-Urbana CSD's general commitment and progress toward mitigating or reducing the risk of hazards in the district. Refer to Table 100.

Table 100: Center Point-Urbana CSD Complete Mitigation Actions

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Purchase and install generators in critical facilities	Thunderstorm, Lighting, and Hail, Infrastructure Failure, Tornado and Windstorm, Severe Winter Storm	1, 2, 3, 5	X	A generator is installed at the primary school, and conduit is installed for hook up at the high school
Add air conditioning to all district facilities	Extreme Heat	1, 3, 5	X	Air conditioning has been installed at most district facilities

College Community School District Progress Update

College CSD has an existing hazard mitigation strategy, so it is important to document mitigation actions that have been completed since the plan was adopted. Completed mitigation actions demonstrate College CSD's general commitment and progress toward mitigating or reducing the risk of hazards in the district. Refer to Table 101.

Table 101: College CSD Complete Mitigation Actions

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Purchase and install generators for critical facilities	Thunderstorm, Lightning, and Hail, Infrastructure Failure, Tornado and Windstorm, Severe Winter Storm	1, 3, 5	X	A generator was installed at the District Office. The District is considering a generator for the Transportation & Operations Office.
Install cameras and intruder locks in all school facilities	Terrorism	1, 5	X	Cameras have been installed, and the District is considering upgrades to the system.

[25] http://www.cedar-rapids.org/local_government/departments_g_-_v/public_works/cedar_river_flood_control_system.php, accessed 12/26/2018.

Mitigation Strategy

A mitigation strategy is a set of mitigation actions meant to prevent or reduce the potential impacts of hazards. There are several types of mitigation actions with a different method of reducing vulnerability. Types of mitigation actions include prevention, property protection, public education and awareness, natural resource protection, emergency services, and structural projects.

> Requirement §201.6 (c)(3)(ii): (c) The plan shall include the following:… (3) A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools. This section shall include:... (ii) A section that identifies and analyzed 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.

The planning committee in each participating jurisdiction identified proposed mitigation actions, which are actions beyond current operations and resources, for each hazard that may affect the jurisdiction. The planning committee in each jurisdiction considered each type of mitigation action before identifying final mitigation actions. To be included in the final mitigation strategy, a mitigation action must be within the jurisdiction's authority, technically feasible, and fulfill at least one goal.

In jurisdictions that have developed mitigation strategies for past hazard mitigation plans, the existing mitigation strategy was used as a base for this plan. Mitigation actions that were included in the existing plan and continue to be a priority are noted with an "X." The absence of an "X" indicates the mitigation action was not specifically referenced in the existing hazard plan. In the adjacent "Notes" column, the jurisdiction's progress is referenced.

As determined by the planning committee in each jurisdiction, there are mitigation actions in the existing plan not included in the updated mitigation strategy because the proposed mitigation actions are technically ongoing operations, the jurisdiction is not financially or legally responsible for the action, or the project does not reflect current conditions and priorities in the community. In addition to these reasons, notes may be included for many of the mitigation strategies that were removed for the plan update.

Watershed Management Authorities in Linn County

In 2010, Iowa lawmakers passed legislation that allows cities, counties, soil and water conservation districts, and other stakeholders to create watershed management authorities (WMA), cooperative organizations that can engage in watershed planning and management. Because of the history of devastating flooding in the State of Iowa, including Linn County, planning and management practices are primarily related to flood risk reduction; however, many of Iowa's waterways are impaired, so significant efforts are made to improve water quality, as well.

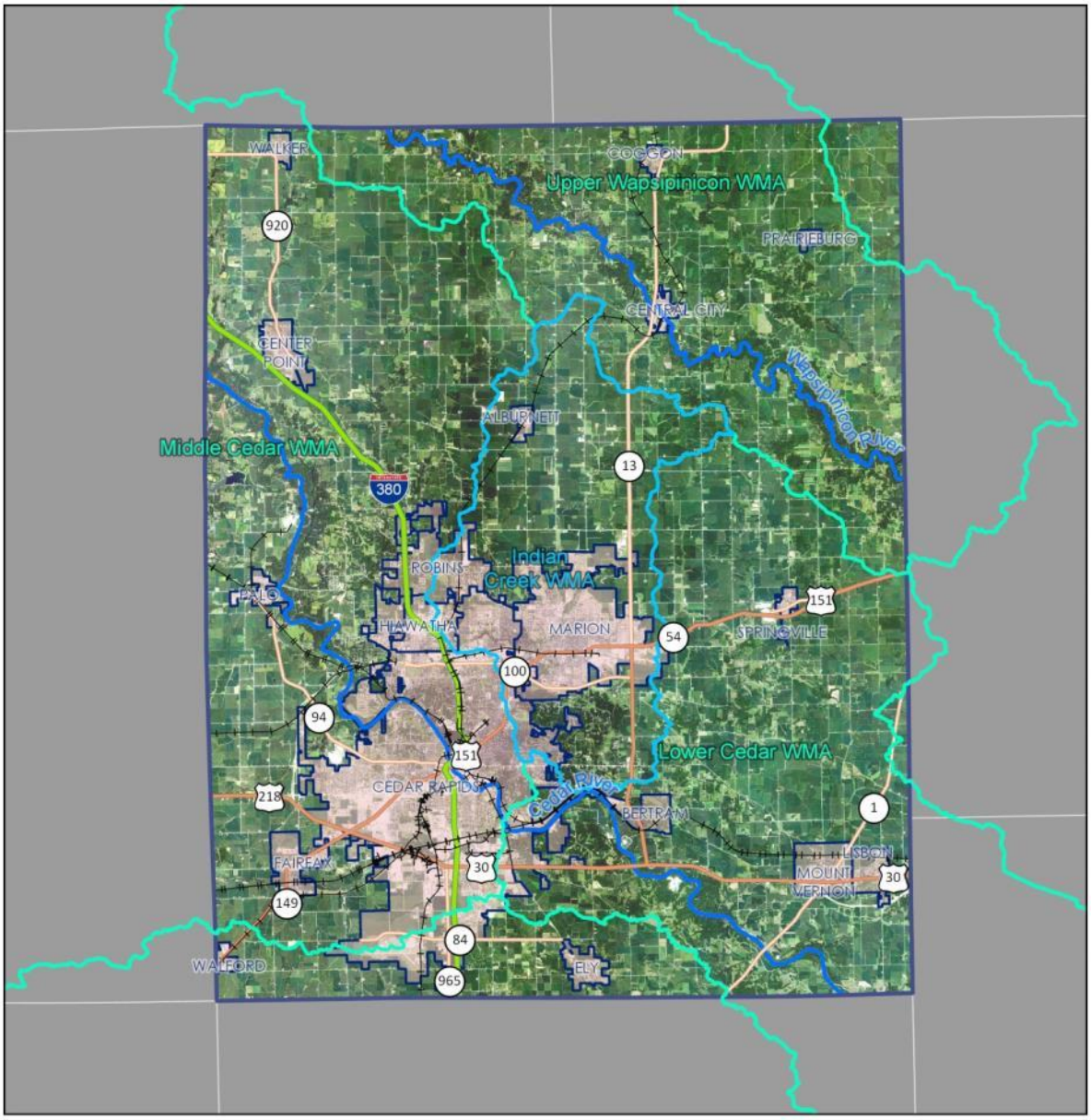
There are four WMAs in Linn County that overlap the county and several cities. Refer to Map 81. Three are based on the U.S. Geological Survey's (USGS) hydrologic unit code (HUC) 8 watersheds: Middle Cedar, Lower Cedar, and Upper Wapsipinicon. One, Indian Creek, is based on a HUC 10 watershed. A HUC 10 can be a sub-region of a HUC 8, and in the case of Indian Creek, it is a sub-region of the Lower Cedar Watershed.

Linn County is on the Board of Directors of all four WMAs in the county. Many cities within the county hold board positions on one or more watersheds. Currently, Indian Creek WMA is the only WMA with a completed watershed management plan. The jurisdictions that hold board positions within that organization—Linn County, Cedar Rapids, Hiawatha, Marion, and Robins—have included mitigation strategies that reinforce the recommendations of the watershed management plan. Several jurisdictions that participate in other watershed management authorities have included their participation and/or support of a future watershed management plan as a mitigation strategy/strategies.

Middle Cedar WMA and Upper Wapsipinicon WMA are two of nine Iowa WMAs participating in the Iowa Watershed Approach (IWA) project that was funded through a Department of Housing and Urban Development National Disaster Resilience Competition grant. Through the IWA, dozens of public and private organizations have partnered with the goal of reducing flood hazards and improving water quality in the State of Iowa. The watersheds eligible for IWA funding will construct water management features, or best practices, at dozens of project sites to address this goal—practices such as farm ponds, wetlands, stormwater detention basins, oxbow restoration, buffer strips, etc.[26]

The best practices will be implemented in areas outside of Linn County; however, they may have some effect on the areas in the county that are along the Cedar and Wapsipinicon rivers because the practices will be constructed upstream. Furthermore, IWA planning and construction projects are intended to be replicable[27]. The goals and activities of WMAs provide an opportunity to integrate hazard mitigation plans and strategies into other planning mechanisms, and vice versa. WMAs are relatively new cooperative organizations in Iowa, and their plans and implemented practices will continue to develop and mature in the coming years.

Map 81: Watershed Management Authorities in Linn County



Linn County Mitigation Strategy

All identified hazards are addressed by at least one mitigation action in Linn County's final mitigation strategy. Several mitigation actions address multiple hazards due to the similar impacts. Mitigations actions for flood or severe weather hazards are often similar. Refer to Table 102 for the county's mitigation strategy. Linn County did not remove any mitigation actions.

Table 102: Linn County Mitigation Strategy

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
1	Participate in the Community Resilience Roundtable Program and implement supporting projects	All hazards	1, 2, 3, 4, 5	X	Pilot program of the National Research Council and National Academy of Sciences Resilient America Roundtable. The County is participating.
2	Expand outdoor and indoor notification systems	Tornado and windstorm, thunderstorm, lightning and hail	1, 4, 5	X	Six new sirens have been installed recently.
3	Construct multi-purpose tornado safe rooms in critical facilities and determine areas in the county that would benefit from the addition of a multi-purpose tornado safe room	Tornado and windstorm, thunderstorm, lightning, and hail	1, 2, 4, 5	X	No significant progress to document.
4	Determine options and feasibility of stronger regulations to protect electricity distribution infrastructure from wind and ice damage	Tornado and windstorm, thunderstorm, lightning and hail, severe winter storm	1, 3, 5	X	Protecting electricity distribution infrastructure was included in the existing hazard mitigation plan, but the related mitigation actions were combined and modified to consider common building practices. There is no significant progress to document.
5	Purchase and install generators in critical facilities	Tornado and windstorm, thunderstorm, lightning and hail, severe winter storm, infrastructure failure	1, 2, 3, 5	X	Although the county maintains generators, there is not significant plan-related progress to document.

Table 102: Linn County Mitigation Strategy, continued

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
6	Provide residential home rehabilitation and/or emergency repair program to prevent major damage to homes during hazard events	Tornado and windstorm, thunderstorm, lightning and hail, severe winter storm	1, 2, 4, 5	X	A housing assistance program was included in the existing plan as a low priority mitigation action. There is not significant progress to document.
7	Identify and complete flood mitigation projects to protect identified critical facilities and infrastructure	Flood	1, 2, 3, 5	X	Some flood mitigation projects have been completed around county bridges.
8	Acquire, relocate, elevate, and/or demolish structures in the floodplain	Flood	1, 2, 3, 4, 5	X	Some properties have been elevated.
9	Strengthen the Floodplain Ordinance to reduce development in the floodplain	Flood	1, 2, 5	X	New ordinance language is pending.
10	Strengthen development-related ordinances to improve stormwater management in new development	Flood	1, 2, 5	X	This mitigation action is high priority in the existing plan. This mitigation action in conjunction with the Indian Creek Watershed Management Plan participation addresses improving stormwater management. There is no significant progress to document.
11	Improve the county's rating in the Community Rating System	Flood	1, 2, 4, 5	X	The county entered the Community Rating System in 2008 and plans to continuously improve its rating.
12	Establish the use of the HAZUS and Iowa Flood Center flood modeling systems with the Linn County Emergency Management Agency	Flood	1, 2, 5	X	From the existing plan, this mitigation action was modified to include the Iowa Flood Center in order to reflect all resources currently available. There is no significant progress to document.
13	Participate in the development and implementation of the Indian Creek Watershed Management Plan to improve stormwater management, which may include regulatory or structural projects	Flood	1, 2, 3, 4, 5	X	The Indian Creek Watershed Management Authority has developed a watershed plan. Linn County is participating in the WMA, with representation on the WMA Board of Directors.

Table 102: Linn County Mitigation Strategy, continued

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
14	Provide hazard-related educational materials on the county website	All natural hazards	1, 4, 5	X	
15	Encourage the Linn County Food Systems Council to identify the scope and potential necessity for a food security plan addressing access to food during and after hazard events	All natural hazards	1, 3, 4, 5	X	
16	Continue continuity planning in all county departments Previously: *Initiate continuity planning in all county departments*	All hazards	1, 2, 3, 5	X	Continuity planning has occurred, but this is an ongoing process.
17	Participate actively in the watershed management authorities (WMA) that Linn County is a member of and support the WMA plans.	Flash flood, river flood	1, 2, 4, 5		Linn County has staff participating on the Boards of Directors for five WMA's: Indian Creek, Lower Cedar, Maquoketa River, Middle Cedar, and Upper Wapsipinicon. Indian Creek
18	Complete and maintain a debris management plan and all related contracts.	All hazards	1, 2, 3, 4, 5		

Alburnett Mitigation Strategy

All identified hazards are addressed by at least one mitigation action in Alburnett's final mitigation strategy. Several mitigation actions address multiple hazards due to the similar impacts. Mitigations actions for flood or severe weather hazards are often similar. Refer to Table 103 and Table 104 for the city's mitigation strategy and removed mitigation actions, respectively.

Table 103: Alburnett Mitigation Strategy

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
1	Public education project	All hazards	1, 4, 5	X	This project includes adding hazard-related information to the city website and spon11`1soring presentations for local organizations e.g. Lions Club and the Alburnett Historical Society
2	Construct a new fire station	Infrastructure failure	1, 3, 5	X	Progress has been made on this project, and building is targeted to start in spring 2019.
3	Complete stormwater/culvert improvement project for Roosevelt St.	Flash flood	1, 2, 3, 5		The Roosevelt St. culvert is sometimes a bottleneck for flash flooding.
4	Install backup generators at critical facilities.	Tornado and windstorm, thunderstorm, lightning, and hail, severe winter storm, infrastructure failure	1, 2, 3, 5		
5	Complete and maintain a debris management plan and all related contracts	Earthquake; flash flood; hazardous materials incident; infrastructure failure; river flood; severe winter storm; terrorism; thunderstorm, lightning, and hail; tornado and windstorm	1, 2, 3, 4, 5		

Table 104: Alburnett Removed Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Determine emergency plans for the sports complex	Thunderstorm, lightning, hail, tornado and windstorm, and other hazards to be determined	1, 4, 5	X	The school now owns the sports complex.
Construct a multi-purpose safe room in public facilities	Thunderstorm, lightning, and hail, tornado and windstorm	1, 2, 3, 5	X	The school is located in the center of the community, and a large portion of the school is a safe shelter.
Acquire, relocate, elevate, and/or demolish structures in flood hazard areas	Flood	1, 2, 5	X	The City is not aware of buildings that have been flooded by water rising over the creek banks.

Bertram Mitigation Strategy

All identified hazards are addressed by at least one mitigation action in Bertram's final mitigation strategy. Several mitigation actions address multiple hazards due to the similar impacts. Mitigations actions for flood or severe weather hazards are often similar. Refer to Table 105 and Table 106 for the city's mitigation strategy and removed mitigation actions, respectively.

Table 105: Bertram Mitigation Strategy

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
1	Construct a multi-purpose safe room	Tornado and windstorm, thunderstorm, lightning, and hail	1, 2, 4, 5	X	The safe room will likely be a park restroom. There is no progress to report.
2	Replace and repair bridges damaged by flash flooding	Flash flood, infrastructure failure	1, 2, 3, 5	X	The bridges will be elevated and/or extended to prevent future flood damage. One bridge has washed out and has been replaced since the previous plan. One needs to be mitigated against future flooding
3	Acquire, relocate, elevate, and/or demolish structures in flood hazard areas	Flood	1, 2, 3, 4, 5	X	No progress to report
4	Establish public cooling center policy	Extreme heat	1, 4, 5	X	No progress to report
5	Establish communication procedure for hazard events	All hazards	1, 3, 4, 5	X	Will coordinate with Linn County EMA
6	Establish plan to address Oak Wilt in public areas	Animal, plant, crop disease	2, 3, 4, 5	X	Ongoing work is taking place to address problem trees but no plan has been created.
7	Identify and complete stormwater management improvements to reduce flood damage risk	Flood, infrastructure failure	1, 2, 3, 5	X	The City of Bertram has purchased a property with the intention of using it to address stormwater.
8	Establish evacuation routes/policies for hazardous materials incidents Previously: *Establish evacuation routes for hazardous materials incidents*	Hazardous materials incident	1, 4, 5	X	Will coordinate with Linn County EMA

Table 105: Bertram Mitigation Strategy, continued

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
9	Participate in the Lower Cedar Watershed Management Authority and its watershed planning process.	Flash flood, river flood	1, 2, 5		
10	Complete and maintain a debris management plan and all related contracts.	All hazards	1, 2, 3, 4, 5		

Table 106: Bertram Removed Mitigation Strategy

Removed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Determine appropriate generator testing schedule and reporting procedure	Tornado and windstorm, thunderstorm, lightning, and hail, infrastructure failure, severe winter storm	1, 2, 3, 5	X	Regular maintenance is performed on the well pump generator.

Cedar Rapids Mitigation Strategy

All identified hazards are addressed by at least one mitigation action in Cedar Rapids' final mitigation strategy. Several mitigation actions address multiple hazards due to the similar impacts. Mitigations actions for flood or severe weather hazards are often similar. Refer to Table 107 and Table 108 for the city's mitigation strategy and removed mitigation actions, respectively.

Table 107: Cedar Rapids Mitigation Strategy

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
1	Participate in the Community Resilience Roundtable Program and implement supporting projects	All hazards	1, 2, 3, 4, 5	X	Pilot program of the National Research Council and National Academy of Sciences Resilient America Roundtable. Community meetings have been ongoing, and some projects are in development.
2	Install flood warning system on Indian Creek	Flood	1, 2, 4, 5	X	Coordinating with the Army Corps of Engineers, adjacent cities, and the East Central Iowa Council of Governments was in the "Current Mitigation Activities" category in the previous plan. The Indian Creek Watershed Management Authority was created. The multi-jurisdictional and multi-disciplinary group is developing a watershed management plan and coordinating with the Silver Jackets to develop a warning system. This project is still needed as the USGS shut down the river gage in Marion.
3	Complete stormwater outfall backflow protection project	Flood	1, 2, 5	X	This project is underway and partially completed. Stormwater pipe outlets have been added at the Cedar River.
4	Install backup power sources for traffic lights	Flood	1, 3, 5	X	This project is underway. 70 of the City's 185 traffic lights have had backup power installed, and the City has funding for 30 more.

Table 107: Cedar Rapids Mitigation Strategy, continued

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
5	Complete Vinton Ditch improvements	Flood	1, 2, 5	X	This project is in progress and involves bank stabilization.
6	Acquire, relocate, elevate, and/or demolish structures in flood hazard areas or structures subject to repetitive damage	Flood	1, 2, 3, 5	X	This project ongoing and actions are taken as funding is available.
7	Expand the city's outdoor warning siren system	Tornado and windstorm, thunderstorm, lightning, and hail	1, 4, 5	X	Possible areas for expansion include the Tuma Soccer Complex or the area around County Home Rd. and C Ave.
8	Construct safe rooms in public facilities and recreation areas	Tornado and windstorm, thunderstorm, lightning, and hail	1, 5	X	
9	Harden public facilities to withstand wind and other severe weather damage	Tornado and windstorm, thunderstorm, lightning, and hail	1, 2, 5	X	
10	Add additional shallow water wells to the city's water supply	Drought	1, 3, 5	X	Well #5 is under construction. Other wells are planned.

Table 107: Cedar Rapids Mitigation Strategy, continued

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
11	Complete the city's Permanent Flood Control System (FCS) which includes the following phases: • Ellis Ln. NW to I-380 • I-380 to 8th Ave. SW • 8th Ave. SW to 12th Ave. SW (Ingredion) • 12th Ave. SW to Cedar Rapids/Linn County Solid Waste Agency Site 1 • I-380 at 7th St. NE to Cargill (Bean) and around Quaker Oats to A Ave. NE • A Ave. NE to 8th Ave. SE • 8th Ave. SE to Alliant Substation • Alliant Substation to Cargill (Corn) • 30 gate closures and 11 pump stations • 8th Ave. Bridge replacement and raising *Previously this mitigation strategy had alternate boundaries for some of the phases.*	Flood	1, 2, 3, 5	X	This is a long term project currently under design and construction, with completion expected in the 2030's subject to funding availability. This project is being implemented into smaller subsegments for construction. Each completed subsegment mitigates against flooding. There is currently an initiative to evaluate the possibility and benefit of extending the east side system concept upstream to McCloud Run and J Avenue NE to protect additional properties.
12	Complete the City's FCS Edgewood Bridge and approach improvements *Previously: This was part of the mitigation strategy directly above*	Flood	1, 2, 3, 5	X	

Table 107: Cedar Rapids Mitigation Strategy, continued

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
13	Develop and implement a City response plan for Indian Creek flooding *Previously: Develop and implement a response plan for Indian Creed flooding*	Flood	1, 2, 3, 4, 5	X	Previously this action related to participating in the Indian Creek Watershed Management Authority planning process. The WMA has completed their masterplan, which the city participated in. Separately, the city could develop a flood response plan for the Indian Creek.
14	Add detention basins and other stormwater infrastructure to increase stormwater management capability and reduce flood risk *Previously: Add detention basins to increase stormwater management capability*	Flood	1, 2, 3, 5	X	These activities will be guided by the City's developing Stormwater Masterplan. This project may complement the Indian Creek Watershed Management Plan and the Middle Cedar Wastershed Management Plan.
15	Update Stormwater Master Plan and prioritized Capital Improvement Project list *Previously: Add detention basins to increase stormwater management capability.*	Flood	1, 2, 3, 5	X	The City is in year 3 of 5 of the update cycle for the Stormwater Master Plan. The committee wanted to expand the strategy from the previously approved plan to include their planning framework.
16	Complete and maintain a debris management plan and any related contracts	All hazards	1, 2, 3, 4, 5		
17	Participate actively in Watershed Management Authorities (WMA) that Cedar Rapids is a member of and support the WMA's plans.	Flood	1, 2, 3, 5		
18	Where possible, identify and implement projects that complement the Flood Risk Management goal and objectives of the Indian Creek Watershed Management Plan	Flood	1, 2, 3, 4, 5		
19	Install backup generators at critical facilities/pumping stations	Flood	1, 2, 3, 5		

Table 107: Cedar Rapids Mitigation Strategy, continued

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
20	Complete vulnerability assessment of Join Communications Network and address and vulnerabilities	All	3, 4, 5		
21	Continue development of Cedar River Flood Response Plan	Flood	1, 2, 3, 5		
22	Update Sanitary Sewer Master Plan and prioritized Capital Improvement Project list	Flood	1, 2, 5		
23	Implement mitigation projects outlined in Repetitive Loss Area Analysis	Flood	1, 2, 4, 5		Refer to Appendix E

Table 108: Cedar Rapids Removed Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Improve two major water detention basins	Flood	1, 2, 5	X	This and other flood risk reduction projects will be addressed in the Stormwater Master Plan.
Develop and implement a residential wellness check program	Extreme heat and severe winter storm	1, 4, 5	X	There is a program in place that is operated by the Linn County EMA.
Develop and implement a residential fan program	Extreme heat	1, 5	X	
Install lightning rods on large critical facilities	Thunderstorm, lightning, and hail	1, 2, 5	X	
Add additional signage for emergency routes and evacuation routes	Transportation incident, flood, radiological incident	1, 4, 5	X	The City has the capability to change traffic patterns and facilitate evacuation through the Traffic Operations Center
Construct berm at Ellis Boulevard	Flood	1, 2, 3, 5	X	This mitigation action has been completed.
Reconstruct Public Works facility above the 2008 flood level	Flood	1, 2, 3, 5	X	This mitigation action has been completed.
Add additional sump pits and epoxy flooring at City Hall	Flood	1, 2, 5	X	This mitigation action has been completed.
Construct ring levee at the Water Pollution Control facility	Flood	1, 3, 5	X	This mitigation action has been completed.
Install berm at Q Avenue and 8th Street NW for interim flood protection	Flood	1, 2, 3, 5	X	This mitigation action has been completed.

Table 108: Cedar Rapids Removed Mitigation Strategy, continued

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Reroute sewer in the Sun Valley Neighborhood	Flood	1, 2, 5	X	This mitigation action has been completed.
Construct berm in the Sun Valley Neighborhood along Cottage Grove Parkway	Flood	1, 2, 3, 5	X	This mitigation action has been completed.
Install new pump and return sewer to protect wastewater infrastructure	Flood	1, 2, 3, 5	X	This mitigation action has been completed.
Complete Cedar River Siphon Project	Flood	1, 2, 3, 5	X	This mitigation action has been completed.
Replace damaged sections of the sanitary sewer with flood resilient materials	Flood	1, 2, 5	X	This mitigation action has been completed.
Mitigate Valley Brook Drive erosion	Flood	1, 2, 3, 5	X	This mitigation action has been completed.
Relocate the Sac and Fox Trail	Flood	1, 2, 5	X	This mitigation action has been completed.

Center Point Mitigation Strategy

All identified hazards are addressed by at least one mitigation action in Center Point's final mitigation strategy. Several mitigation actions address multiple hazards due to the similar impacts. Mitigations actions for flood or severe weather hazards are often similar. Refer to Table 109 for the city's mitigation strategy. Center Point did not remove any mitigation actions.

Table 109: Center Point Mitigation Strategy

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
1	Improve communication capabilities with equipment update and developing a communication plan with local agencies	Infrastructure failure, hazardous materials incident, terrorism, radiological incident, transportation incident	1, 3, 4, 5	X	
2	Construct a multi-purpose safe room in conjunction with new public facilities	Tornado and windstorm, thunderstorm, lightning, and hail	1, 3, 4, 5	X	
3	Retrofit existing City Hall or construct a new City Hall to withstand natural hazards including a dedicated generator	Tornado and windstorm, thunderstorm, lightning, and hail, flood, infrastructure failure	1, 2, 3, 5	X	The City is currently in the planning process for this project.
4	Construct a new Fire Station with a dedicated generator	Tornado and windstorm, infrastructure failure, thunderstorm, lightning, and hail, flood, severe winter storm	1, 2, 3, 5	X	The City is currently in the planning process for this project.
5	Digitize city and public records	Tornado and windstorm, infrastructure failure, thunderstorm, lightning, and hail, flood	3, 5	X	This project is complete.
6	Upgrade waster infrastructure with 6" lines to provide system access for fire protection	Infrastructure failure	1, 2, 3, 5	X	

Table 109: Center Point Mitigation Strategy, continued

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
7	Complete the high priority phases of the city's comprehensive stormwater improvement plan	Infrastructure failure, flood	1, 2, 3, 5	X	
8	Education residents about the importance of disconnecting their sump pumps from the sanitary sewer	Infrastructure failure, food	2, 3, 4, 5	X	This project is in process. Community outreach has been conducted, and tile installation has been completed to mitigate local flash flooding.
9	Develop a stream debris cleaning program	Flood	2, 3, 4, 5	X	
10	Acquire, relocate, elevate, and/or remove structures in flood hazard areas	Flood	1, 2, 3, 4, 5	X	
11	Complete and maintain a debris management plan and all related contracts	All	1, 2, 3, 4, 5		
12	Post disaster/hazard information to city website	All	1, 4, 5		
13	Install generators at critical facilities	Infrastructure failure; tornado and windstorm; thunderstorm, lightning, and hail; severe winter storm	1, 3, 5		

Central City Mitigation Strategy

All identified hazards are addressed by at least one mitigation action in Central City's final mitigation strategy. Several mitigation actions address multiple hazards due to the similar impacts. Mitigations actions for flood or severe weather hazards are often similar. Refer to Table 110 and Table 111 for the city's mitigation strategy and removed mitigation actions, respectively.

Table 110: Central City Mitigation Strategy

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
1	Acquire, elevate, relocate, or demolish structures in flood hazard areas	River flood	1, 2, 3, 4, 5	X	The city acquired and demolished 15 houses in the floodplain in 2000–2005 and approximately 20 structures are currently located in the floodplain.
2	Sanitary and storm sewer system improvements to prevent system backup in structures	River flood and flash flood	1, 2, 5	X	The city replaced manholes in 2012 and storm sewer projects in 2011–2012. There are plans for future improvements.
3	Identify and complete flood protection for the wastewater treatment facility	River flood	1, 2, 3, 5	X	The lagoons are no longer in the floodplain. Additional flood mitigation efforts are underway, including a floodwall.
4	Identify and/or construct a storage facility for maintenance equipment and flood protection supplies	River flood and flash flood	1, 3, 5	X	Flood protection supplies are accessible, but additional mitigation efforts could be completed.
5	Complete bank stabilization along the river and bridges	River flood, flash flood, and landslide	1, 2, 5	X	Riprap and armament work has been completed, and the area behind the wastewater plant has been addressed. Additional work could be completed in the future.
6	Expand outdoor warning system coverage	Tornado and windstorm, thunderstorm, lightning, and hail	1, 4, 5	X	One siren was installed by the City and one by the County.
7	Construct a multi-purpose community safe room	Tornado and windstorm and thunderstorm, lightning, and hail	1, 2, 4, 5	X	

Table 110: Central City Mitigation Strategy, continued

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
8	Replace the Fire Department's personal protective equipment	Infrastructure failure and grass and wildland fire	1, 3, 5	X	This is an ongoing process.
9	Develop a plan for the imminent emerald ash borer infestation	Animal, plant, crop disease	2, 4, 5	X	No plan has been developed, but the City addresses problems as they arise.
10	Complete bank stabilization near the water tower	Landslide	1, 2, 3, 5	X	The City has performed some bank stabilization. Additional efforts could be needed if a new road to the water tower was constructed.
11	Expand the storm sewer system to increase capacity	Flash flood	1, 2, 5	X	
12	Purchase portable or fixed generators for critical facilities. Previously: *Purchase portable generators for critical facilities.*	Severe winter storm, tornado and windstorm, and infrastructure failure	1, 2, 3, 5	X	City maintains a generator at City Hall, the wastewater treatment facility, and a portable generator for one well.
13	Share hazard risk information on the City's website	All	1, 2, 3, 4, 5		
14	Participate actively in the Upper Wapsipinicon Watershed Management Authority and support its watershed plan.	Flash flood, river flood	1, 2, 4, 5		
15	Complete and maintain a debris management plan and all related contracts.	All	1, 2, 3, 4, 5		

Table 111: Central City Removed Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Relocate water source(s) from the 100 year floodplain	River flood	1, 3, 5	X	The well was relocated in 2013.
Add a new well to increase water supply	Infrastructure failure and drought	1, 3, 5	X	This project has been completed.

Coggon Mitigation Strategy

All identified hazards are addressed by at least one mitigation action in Coggon's final mitigation strategy. Several mitigation actions address multiple hazards due to the similar impacts. Mitigations actions for flood or severe weather hazards are often similar. Refer to Table 112 and Table 113 for the city's mitigation strategy and removed mitigation actions, respectively.

Table 112: Coggon Mitigation Strategy

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
1	Update the emergency response plan	All hazards	1, 2, 3, 4, 5	X	Coggon relies on the Linn County EMA plan. There is no significant progress to document.
2	Acquire, relocate, elevate, and/or demolish structures in flood hazard areas	Flood	1, 2, 3, 4, 5	X	There is no significant progress to document. The old wastewater plant in a flood hazard area will be demolished.
3	Improve, structurally protect, or relocate water and wastewater facilities to maintain service	Flood	1, 2, 3, 5	X	A new wastewater facility is being constructed.
4	Purchase power generators for critical facilities, including water and sanitary sewer facilities	Infrastructure failure; tornado and windstorm; thunderstorm, lightning, and hail; severe winter storm	1, 3, 5	X	There is no significant progress to document. The water treatment facility, water tower, and Fire Department have backup power.
5	Establish a communication plan for city officials, staff, and emergency response teams, and if needed, purchase communication equipment	Infrastructure failure	1, 3, 4, 5	X	There is no significant progress to document. The City will coordinate with Linn County EMA.
6	Create a wellness check program for residents who want to be checked on during or after certain hazard events	All hazards	1, 3, 4, 5	X	The City will coordinate with Linn County EMA.

Table 112: Coggon Mitigation Strategy, continued

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
7	Purchase or secure access to an all-terrain vehicle for off-road emergencies	Infrastructure failure, transportation incident, terrorism	1, 3, 5	X	There is no significant progress to document. The Fire Department has an ATV; however, it only has room for the driver. The City could benefit from an ATV, as well.
8	Designate shelter for park and campground users, if needed, and/or consider other facilities for a tornado safe room and construct the room. Previously: *Designate shelter for park and campground users, if needed, construct a tornado safe room*	Tornado and windstorm, thunderstorm, lightning, and hail	1, 2, 4, 5	X	There is no significant progress to document.
9	Complete a flood risk reduction project around Savage Park	Flash flood, river flood	1, 3, 5		
10	Complete and maintain a debris management plan and all related contracts	Earthquake; flash flood; hazardous materials incident; infrastructure failure; river flood; severe winter storm; terrorism; thunderstorm, lightning, and hail; tornado and windstorm	1, 3, 4, 5		
11	Participate actively in the Upper Wapsipinicon Watershed Management Authority and support the watershed plan	Flash flood, river flood	1, 2, 3, 4, 5		

Table 113: Coggon Removed Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Maintain a supply of sand for immediate containment of hazardous materials spills to reduce potential contamination	Hazardous materials incident	1, 3, 5	X	Coggon maintains a supply of sand.

Ely Mitigation Strategy

All identified hazards are addressed by at least one mitigation action in Ely's final mitigation strategy. Several mitigation actions address multiple hazards due to the similar impacts. Mitigations actions for flood or severe weather hazards are often similar. Refer to Table 114 and Table 115 for the city's mitigation strategy and removed mitigation actions, respectively.

Table 114: Ely Mitigation Strategy

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
1	Construct a multi-purpose safe room in public facilities	Tornado and windstorm, thunderstorm, lightning, and hail	1, 4, 5	X	There is no significant progress to document.
2	Complete Fuhrmeister Street stormwater improvements	Flood	1, 2, 3, 5	X	
3	Add hazard-related information to the city website	All hazards	1, 3, 4, 5	X	This is an ongoing project.
4	Purchase/replace backup power generators for critical facilities Previously: *Purchase backup power generators for critical facilities*	Tornado and windstorm, thunderstorm, lightning, and hail, severe winter storm, infrastructure failure	1, 2, 3, 5	X	There is no significant progress to document.
5	Evaluate and mitigate risk from Rogers Creek	River flood	1, 2, 3, 5		
6	Evaluate and mitigate Rowley St. flash flooding	Flash flood	1, 2, 3, 5		
7	Evaluate and create hazardous materials response plan	Hazardous materials incident	1, 2, 5		
8	Complete and maintain a debris management plan and all related contracts	All hazards	3, 4, 5		

Table 115: Ely Removed Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Add water retention capacity for Banner Valley Creek	Flood	1, 2, 3, 5	X	Work has been completed to address nearby flooding. The City ultimately used a solution that did not involve water retention.
Purchase space heaters for a public wellness program	Severe winter storm, infrastructure failure	1, 4, 5	X	
Acquire, relocate, elevate, and/or demolish structures located in the floodplain	Flood	1, 2, 3, 4, 5	X	There have not been recent discussions held by the City for flood buyouts. Recent revisions of the Flood Insurance Rate Map have moved many properties out of the flood zone.
Dredge and stabilize Hoosier Creek	Flood	1, 3, 5	X	There have not been recent discussions held by the City for this work.

Fairfax Mitigation Strategy

All identified hazards are addressed by at least one mitigation action in Fairfax's final mitigation strategy. Several mitigation actions address multiple hazards due to the similar impacts. Mitigations actions for flood or severe weather hazards are often similar. Refer to Table 116 and Table 117 for the city's mitigation strategy and removed mitigation actions, respectively.

Table 116: Fairfax Mitigation Strategy

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
1	Add additional well and water storage facility	Infrastructure failure, drought	1, 3, 5	X	The city has upgraded the capacity of their wells and is planning further upgrades for additional capacity.
2	Expand warning siren coverage	Tornado and windstorm	1, 3, 4, 5	X	Fairfax has recently installed two warning sirens and may install more as needed.
3	Purchase and install backup power generators for outdoor warning sirens	Tornado and windstorm	1, 3, 5	X	Backup power sources have been installed for existing sirens.
4	Purchase weather radios for city buildings	Tornado and windstorm, thunderstorm, lightning, and hail, severe winter storm	1, 3, 4, 5	X	City Hall has a weather radio.
5	Construct a multi-purpose safe room	Tornado and windstorm, thunderstorm, lightning, and hail	1, 4, 5	X	
6	Determine the feasibility of a lightning warning system for outdoor recreation areas and purchase, if feasible	Thunderstorm, lightning, and hail	1, 4, 5	X	Fairfax is still considering a lightning detection system.
7	Improve and expand the city's stormwater management system	Flood	1, 2, 3, 5	X	New retention ponds have been installed.
8	Purchase appropriate size water pumps	Flood	1, 2, 3, 5	X	Two large pumps have been purchased, but future needs may require more.
9	Coordinate with railroad operator and improve signals at crossings near the city's recreational facilities	Transportation incident	1, 4, 5	X	The City would like to see improved signals near the Complex.
10	Develop a drought plan	Drought	1, 3, 5	X	

Table 116: Fairfax Mitigation Strategy, continued

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
11	Purchase and install backup power generators at critical facilities *Previously: Purchase and install backup power generators for two wells*	Infrastructure failure, tornado and windstorm, thunderstorm, lightning, and hail, severe winter storm	1, 2, 3, 5	X	Fairfax has installed generators at their wells. They may consider installing them at other critical facilities.
12	Replace W. Cemetery Rd. bridge around 2021, following IDOT work *Previously: Structurally improve bridges on Highway 151*	Transportation incident	1, 2, 3, 5	X	IDOT will replace the bridge over Highway 151 in 2019. The W. Cemetery Rd. bridge will be addressed following that project.
13	Install additional security at infrastructure facilities	Terrorism	1, 2, 3, 5		
14	Complete source water and wellhead protection plan for the Iowa Department of Natural Resources	Infrastructure failure, terrorism	1, 3, 5		
15	Share hazard and risk information on the City's website	All hazards	1, 2, 3, 4, 5		
16	Complete and maintain a debris management plan	Animal, plant, and crop disease; earthquake; flash flood; grass and wildland fire; hazardous materials incident; river flood; terrorism; thunderstorm, lightning, and hail; tornado and windstorm	1, 3, 4, 5		

Table 117: Fairfax Removed Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Water main replacement project	Infrastructure failure	1, 3, 5	X	Fairfax has completed two phases of replacements. The replacements included upgrading the water mains to 8" size and new hydrants in developed areas.
Acquire, relocate, elevate, and or demolish structures in flood hazard areas, if needed	Flood	1, 2, 5	X	Fairfax does not have any current plans to conduct these activities.
Purchase and grass and wildland fire gear	Grass and wildland fire	1, 2, 3, 5	X	Fairfax feels that structural gear is adequate for these types of fires.

Hiawatha Mitigation Strategy

All identified hazards are addressed by at least one mitigation action in Hiawatha's final mitigation strategy. Several mitigation actions address multiple hazards due to the similar impacts. Mitigations actions for flood or severe weather hazards are often similar. Refer to Table 118 for the city's mitigation strategy. Hiawatha did not remove any mitigation actions.

Table 118: Hiawatha Mitigation Strategy

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
1	Construct new fire station	Infrastructure failure	1, 2, 3, 5	X	The new fire station will improve response as the city's population increases and development expands. There is no progress to report, but it is still being considered.
2	Purchase and install backup power generators in critical facilities	Infrastructure failure, tornado and windstorm, thunderstorm, lightning, and hail, severe winter storm	1, 2, 3, 5	X	The library and well #10 do not currently have a generator.
3	Identify gaps in outdoor warning siren coverage and expand, if needed	Tornado and windstorm, thunderstorm, lightning, and hail	1, 4, 5	X	
4	Construct tornado safe rooms in public facilities	Tornado and windstorm, thunderstorm, lightning, and hail	1, 4, 5	X	
5	Determine feasibility of requiring storm shelters in manufactured home or multi-family housing developments	Tornado and windstorm, thunderstorm, lightning, and hail	1, 5	X	
6	Participate in the Indian Creek Watershed Management Authority planning process and implement the plan	Flood	1, 2, 3, 4, 5	X	Hiawatha has been participating in the Indian Creek WMA and will continue to be involved.
7	Continue water, sewer, and stormwater infrastructure improvements to reduce infiltration	Flood	1, 2, 3, 5	X	

Table 118: Hiawatha Mitigation Strategy, continued

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
8	Acquire, relocate, elevate, and/or demolish structures in flood hazard areas	Flood	1, 2, 3, 5	X	The City may consider this action again in the future.
9	Determine feasibility of strengthening the city's floodplain ordinance	Flood	1, 2, 3, 5	X	The City's floodplain ordinance has been updated since the previous hazard mitigation plan was approved and updates will be ongoing.
10	Identify potential urban wildland interface improvements	Grass and wildland fire	1, 2, 3, 5	X	
11	Provide hazard-related information on the city website	All hazards	1, 2, 4, 5	X	
12	Where possible, identify and implement projects that complement the Flood Risk Management goal and objectives of the Indian Creek Watershed Plan	Flood	1, 2, 3, 4, 5		This goal expands on the goal to participate in the Indian Creek Watershed Authority. It specifically points to a section of the plan, which was completed since the previously approved hazard mitigation plan was completed.
13	Complete and maintain a debris management plan and all related contracts.	Earthquake; flash flood; hazardous materials incident; infrastructure failure; river flood; severe winter storm; terrorism; thunderstorm, lightning, and hail; tornado and windstorm	1, 3, 4, 5		The debris management plan is intended to ensure the City is able to remove debris from a hazard event in a prompt and cost-effective manner.

Lisbon Mitigation Strategy

All identified hazards are addressed by at least one mitigation action in Lisbon's final mitigation strategy. Several mitigation actions address multiple hazards due to the similar impacts. Mitigations actions for flood or severe weather hazards are often similar. Refer to Table 119 and Table 120 for the city's mitigation strategy and removed mitigation actions, respectively.

Table 119: Lisbon Mitigation Strategy

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
1	Educate residents about weather radios	Thunderstorm, lightning, and hail, flood, severe winter storm, hazardous materials incident, infrastructure failure, extreme heat, terrorism	1, 3, 5	X	Lisbon will coordinate with Linn County EMA on this action.
2	Expand warning siren coverage	Tornado and windstorm, thunderstorm, lightning, and hail	1, 3, 5	X	Lisbon is considering an annex on the SE side of town so may need to expand their coverage area in the future.
3	Develop education program for community safe rooms	Tornado and windstorm, thunderstorm, lightning, and hail	1, 3	X	No progress to report.
4	Develop and implement watershed protection plan	Flood	1, 2, 3, 5	X	This is an ongoing project for Lisbon.
5	Develop map of past hazardous materials incidents	Hazardous materials incident	1, 3	X	Lisbon will coordinate with Linn County EMA on this action.
6	Improve stormwater management system	Flood	1, 3		Ongoing. Lisbon has installed a new outlet, cleaned stormwater lines, and installed a Gabian basket.
7	Educate residents about hazards *Previously: Educate residents about flood, renters, and homeowners insurance*	All	1, 4, 5	X	
8	Install a community safe room at a critical facility or sports facility	Tornado and windstorm	1, 2, 4, 5		
9	Complete a flood mitigation project around the wastewater treatment facility	Flash flood, river flood	1, 2, 3, 5		

Table 120: Lisbon Removed Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Purchase and install generators in critical facilities	Tornado and windstorm, thunderstorm, lightning, and hail, infrastructure failure, severe winter storm	1, 2, 3, 5		This need is currently met.
Enter the Community Rating System	Flood	1, 2, 3, 4, 5	X	The committee was unaware of any previous considerations of participating in the CRS program. They do not believe many properties in Lisbon are eligible for flood insurance.

Marion Mitigation Strategy

All identified hazards are addressed by at least one mitigation action in Marion's final mitigation strategy. Several mitigation actions address multiple hazards due to the similar impacts. Mitigations actions for flood or severe weather hazards are often similar. Refer to Table 121 and Table 122 for the city's mitigation strategy and removed mitigation actions, respectively.

Table 121: Marion Mitigation Strategy

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
1	Construct tornado safe rooms in public facilities	Tornado and windstorm, thunderstorm, lightning, and hail	1, 4, 5	X	There is no significant progress to document. There is a safe room at Thomas Park, and the City may consider other locations in the future.
2	Determine feasibility of requiring storm shelter or tornado safe rooms in new structures	Tornado and windstorm, thunderstorm, lightning, and hail	1, 2, 3, 5	X	There is no significant progress to document.
3	Purchase and install backup power generators in critical facilities and/or replace obsolete generators	Severe winter storm, infrastructure failure, tornado and windstorm, thunderstorm, lightning, and hail	1, 2, 3, 5	X	There is no significant progress to document.
4	Assess outdoor warning siren coverage and expand coverage, if needed	Tornado and windstorm, thunderstorm, lightning, and hail	1, 3, 4, 5	X	Expansion of coverage will be needed as the city grows east of Highway 13. The EMA and Duane Arnold Energy Center is currently doing a study.
5	Participate in the Indian Creek Watershed Management Authority planning process and implement the plan	Flood	1, 2, 3, 4, 5	X	Marion holds a position on the Indian Creek Watershed Management Authority Board of Directors
6	Acquire, relocate, elevate, and/or demolish structures in flood hazard areas	Flood	1, 2, 3, 4, 5	X	There is no significant progress to document.
7	Develop alternative source of drinking water	Drought	1, 3, 5	X	This is an ongoing project.

Table 121: Marion Mitigation Strategy, continued

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
8	Construct two new fire stations with a tornado safe room Previously: *Construct new fire station with a tornado safe room*	Infrastructure failure, tornado and windstorm, thunderstorm, lightning, and hail	1, 2, 3, 5	X	Previously "Assessment of new locations for fire stations in growth areas." There is no significant progress to document.
9	Where possible, identify and implement projects that complement the Flood Risk Management goal and objectives of the Indian Creek Watershed Management Plan	Flood	1, 2, 3, 4, 5		
10	Complete and maintain a debris management plan and all related contracts.	All hazards	3, 4, 5		
11	Include hazard or disaster preparedness information in the Marion Messenger (City newsletter).	All hazards	1, 2, 3, 4, 5		
12	Perform an annual inspection of existing storm shelters in mobile home communities to ensure continued compliance with access and safety requirements.	Thunderstorm, lightning, and hail; tornado and windstorm	1, 5		

Table 122: Marion Removed Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Develop and implement an information technology disaster recovery site at the police station	Infrastructure failure, terrorism	3, 5	X	Complete storage array network backup

Mount Vernon Mitigation Strategy

All identified hazards are addressed by at least one mitigation action in Mount Vernon's final mitigation strategy. Several mitigation actions address multiple hazards due to the similar impacts. Mitigations actions for flood or severe weather hazards are often similar. Refer to Table 123 and Table 124 for the city's mitigation strategy and removed mitigation actions, respectively.

Table 123: Mount Vernon Mitigation Strategy

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
1	Develop public awareness campaign for local hazards	All hazards	1, 4, 5	X	City staff utilizes social media to provide hazard-related information
2	Develop process to notify special needs population	All hazards	1, 4, 5	X	Mount Vernon police provide information for resources as appropriate
3	Develop program to educate the public about the need to expand emergency services as the community grows	All hazards	1, 4, 5	X	This is an ongoing project
4	Purchase and install backup power generators in critical facilities	Thunderstorm, lightning, and hail, flood, tornado and windstorm, infrastructure failure	1, 2, 3, 5	X	A generator was last installed at the fire station around 2011. City hall has a power generator.
5	Adopt restrictive permit process for large events	Thunderstorm, lighting, and hail, flood, tornado and windstorm, hazardous materials incident, sever winter storm, radiological incident, terrorism, extreme heat	1, 3, 5	X	Some procedures are in place and additional procedures are in development.
6	Expand outdoor warning siren coverage	Thunderstorm, lightning, and hail; tornado and windstorm; radiological incident	1, 5	X	
7	Develop an education program about tornado safe rooms to encourage developers and homeowners to incorporate storm shelters or tornado safe rooms into homes	Thunderstorm, lightning, and hail, tornado and windstorm	1, 4, 5	X	
8	Educate residents about the importance of flood, renters, and homeowners insurance	Thunderstorm, lighting, and hail, flood, tornado and windstorm, infrastructure failure	1, 4, 5	X	

Table 123: Mount Vernon Mitigation Strategy, continued

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
9	Construct a multi-purpose tornado safe room in public facilities and recreation areas	Thunderstorm, lightning, and hail, tornado and windstorm	1, 5	X	
10	Encourage the construction of storm shelters and structural hardening against high wind hazards in schools, daycares, adult care, and other facilities with vulnerable populations	Thunderstorm, lightning, and hail, tornado and windstorm	1, 2, 4, 5	X	These efforts are ongoing
11	Encourage developers and contractors to offer and market wind resistant building materials	Thunderstorm, lightning, and hail, tornado and windstorm	1, 2, 4, 5	X	
12	Participate in the Community Rating System	Flood	1, 2, 3, 4, 5	X	Enhances the city's floodplain management program
13	Participate in a watershed planning process, if available, and implement the plan	Flood	1, 2, 4, 5	X	Since the previous hazard mitigation plan was adopted, Mount Vernon has joined the newly formed Lower Cedar Watershed Management Authority.
14	Educate owners about check valves	Flood	1, 3, 4, 5	X	This is an ongoing project.
15	Acquire, relocate, elevate, and/or demolish structures in flood hazard areas	Flood	1, 2, 3, 4, 5	X	
16	Educate local businesses about hazardous material incident mitigation strategies	Hazardous materials incident	1, 3, 5	X	This is an ongoing project, with coordination with the Fire Department and Cornell College
17	Develop map of historic hazardous material incidents	Hazardous materials incident	1, 2, 5	X	
18	Improve snow emergency route and evacuation plan	Severe winter storm	1, 3, 5	X	This is an ongoing project

Table 123: Mount Vernon Mitigation Strategy, continued

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
19	Develop inflow and infiltration strategies to mitigate against overflow at wastewater facilities Previously: *Develop bypass and absorption field*	Flood	1, 2, 3, 5	X	
20	Study the benefits of sprinkler systems for residents, businesses, and developers Previously: *Educate residents, businesses, and develops about the benefits of sprinkler systems and coordinate an incentive program for inclusion in new development*	Infrastructure failure	1, 2, 4, 5	X	Mount Vernon decided to change the scope of this project for now.
21	Where possible, implement floodplain management and other hazard mitigation strategies in development projects, and ensure strategies remain consistent with the Comprehensive Plan. Previously: *Incorporate floodplain management and other hazard mitigation strategies into comprehensive planning*	All hazards	1, 2, 3, 4, 5	X	
22	Complete and maintain a debris management plan and all related contracts	All hazards	1, 2, 3, 4, 5		

Table 124: Mount Vernon Removed Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Require storm shelter space in new manufactured home developments and/or lobby the state legislature to revise Iowa Code to require storm shelter space in manufactured home developments	Thunderstorm, lightning, and hail, tornado and windstorm	1, 5	X	Requirements related to this strategy have been added to the zoning code.
Educate residents about weather radios	All hazards	1, 4, 5	X	
Lobby the state legislature to revise Iowa Code to allow local government to regulate agricultural fertilizer facilities in urban and residential areas	Hazardous materials incident	1, 2, 3, 5	X	This strategy is less important as Mount Vernon does not have any fertilizer facilities in their city limits.
Lobby the state legislature to revise Iowa Code to allow the assessment of fees from chemical facilities for hazardous materials programs	Hazardous materials incident	1, 2, 3, 5	X	

Palo Mitigation Strategy

All identified hazards are addressed by at least one mitigation action in Palo's final mitigation strategy. Several mitigation actions address multiple hazards due to the similar impacts. Mitigations actions for flood or severe weather hazards are often similar. Refer to Table 125 and Table 126 for the city's mitigation strategy and removed mitigation actions, respectively.

Table 125: Palo Mitigation Strategy

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
1	Construct a tornado safe room in new public facilities	Thunderstorm, lightning, and hail, tornado and windstorm	1, 2, 3, 5	X	One in City Hall and Memorial Park concession stand
2	Purchase and install backup power generators in critical facilities	Thunderstorm, lightning, and hail, tornado and windstorm, severe winter storm, infrastructure failure	1, 2, 3, 5	X	Backup generators are installed at the fire station, wells, and lift stations
3	Require storm shelters in new manufacturing home developments	Thunderstorm, lightning, and hail, tornado and windstorm	1, 2, 5	X	There are no new manufactured homes.
4	Determine potential benefits of petitioning Linn and Benton County to make Dry Creek a designated waterway	Flood	3, 5	X	A large portion of the creek has been designated as a waterway.
5	Complete water, sewer, and stormwater system improvements	Flood, infrastructure failure	1, 2, 3, 5	X	Repairs have been made on damage from 2016 flooding. Repairs have been completed on manholes, and some water line/lining projects have been completed.
6	Participate in a watershed planning process, if available, and implement the plan	Flood	1, 2, 3, 4, 5	X	Palo is a participant in the Middle Cedar Watershed Management Authority.
7	Participate in the Community Rating System	Flood	1, 2, 4, 5	X	Enhances current floodplain management program. There is no significant progress to document. Many properties have been certified outside of the floodplain through LOMA's.
8	Acquire, relocate, elevate, and or demolish structures in flood hazard areas	Flood	1, 2, 4, 5	X	There is no significant progress to document.

Table 125: Palo Mitigation Strategy, continued

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
9	Recruit volunteers for the Fire Department	All hazards	1, 2, 3, 5	X	This is an ongoing project.
10	Add hazard related information to the city website	All hazards	1, 2, 3, 4, 5	X	This is an ongoing project.
11	Complete creek bed stabilization projects	River flood	1, 2, 3, 5		
12	Conduct EMT training	All hazards	1, 5		
13	Create a disaster response plan for Palo	All hazards	1, 2, 3, 4, 5		
14	Develop a debris management plan and maintain all related contracts	All hazards	1, 2, 3, 4, 5		

Table 126: Palo Removed Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Purchase weather radios for City Hall and the city's ball diamond	Thunderstorm, lightning, and hail, tornado and windstorm	1, 4, 5	X	Completed

Prairieburg Mitigation Strategy

All identified hazards are addressed by at least one mitigation action in Prairieburg's final mitigation strategy. Several mitigation actions address multiple hazards due to the similar impacts. Mitigations actions for flood or severe weather hazards are often similar. Refer to Table 127 for the city's mitigation strategy. Prairieburg did not remove any mitigation actions.

Table 127: Prairieburg Mitigation Strategy

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
1	Upgrade outdoor warning siren to increase coverage area, include remote activation capability, and backup power source	Tornado and windstorm, thunderstorm, lightning, and hail, infrastructure failure	1, 3, 5	X	The existing warning siren is manually controlled. It has a generator, which is on a maintenance plan.
2	Modify the Fire Station backup power generator to be portable	Tornado and windstorm, thunderstorm, lightning, and hail, infrastructure failure, severe winter storm	3, 5	X	Fire trucks have generators.
3	Develop and implement a fire safety campaign	Infrastructure failure	1, 2, 4, 5	X	The focus of the program is changing smoke detector batteries and other topics. This project has been conducted but not recently.
4	Purchase new CPAP devices	Infrastructure failure	1, 5	X	
5	Purchase hazardous materials containment boom	Hazardous materials incident	1, 2, 5	X	
6	Purchase fire swatters	Infrastructure failure, grass and wildland fire	1, 2, 5	X	Fire swatters have been purchased.
7	Purchase chainsaw for each fire truck	Infrastructure failure, grass and wildland fire	1, 2, 5	X	Chainsaws have been purchased.
8	Purchase a leaf blower	Grass and wildland fire	1, 2, 5	X	A leaf blower has been purchased.
9	Periodically borrow an electronic speed sign and place on major city routes	Transportation iIncident	1, 4, 5	X	This is an ongoing project.
10	Develop an emergency assistance program	All hazards	1, 4, 5	X	An emergency response plan has been developed. Maintenance is an ongoing project.

Table 127: Prairieburg Mitigation Strategy, continued

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
11	Develop an emergency operations plan for the city and conduct a practice drill	All hazards	1, 2, 3, 5	X	
12	Complete and maintain a debris management plan and all related contracts.	All hazards	1, 2, 3, 4, 5		

Robins Mitigation Strategy

All identified hazards are addressed by at least one mitigation action in Robins' final mitigation strategy. Several mitigation actions address multiple hazards due to the similar impacts. Mitigations actions for flood or severe weather hazards are often similar. Refer to Table 128 for the city's mitigation strategy. Robins did not remove any mitigation actions.

Table 128: Robins Mitigation Strategy

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
1	Construct a multi-purpose safe room	Tornado and windstorm, thunderstorm, lightning, and hail	1, 2, 3, 4, 5	X	No progress to report
2	Purchase and install stationary generators at lift stations and replace obsolete generators	Tornado and windstorm, thunderstorm, lightning, and hail, severe winter storm, infrastructure failure	1, 2, 3, 5	X	Robins has five generators, including at City Hall, the fire station, and a lift station. The City needs backup power for the Maple St. and Wildflower lift stations. Most of the generators were installed within the past 3–10 years.
3	Participate in the Indian Creek Watershed Management Authority planning process and implement the plan	Flood	1, 2, 3, 4, 5	X	Robins is an active participant in the Indian Creek Watershed Management Authority.
4	Acquire, relocate, elevate, and or demolish structures in flood hazard areas	Flood	1, 2, 5	X	
5	Improve stormwater management system	Flood	1, 2, 3, 4, 5	X	The city's focus is the northwest quadrant. Detention basins are required in new developments.
6	Expand warning siren coverage, as development expands	Tornado and windstorm, thunderstorm, lightning, and hail	1, 4, 5	X	Current coverage is adequate, but the City is expanding.
7	Establish ideal emergency travel routes when major travel routes are blocked	Transportation incident, infrastructure failure	1, 2, 3, 4, 5	X	The city's focus is primarily routes for emergency responders
8	Purchase brush truck for the Fire Department	Grass and wildland fire	1, 2, 3, 5	X	Robins has a brush truck, which may need replaced within 5 years.

Table 128: Robins Mitigation Strategy, continued

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
9	Establish proper computer network security	Infrastructure failure, terrorism	1, 3, 5	X	Upgrades have been implemented. Ongoing project.
10	Construct a regional retention basin	Flash flood, river flood	1, 2, 3, 5		
11	Complete and maintain a debris management plan and all related contracts	Earthquake; flash flood; hazardous materials incident; infrastructure failure; river flood; severe winter storm; terrorism; thunderstorm, lightning, and hail; tornado and windstorm	1, 2, 3, 4, 5		

Springville Mitigation Strategy

All identified hazards are addressed by at least one mitigation action in Springville's final mitigation strategy. Several mitigation actions address multiple hazards due to the similar impacts. Mitigations actions for flood or severe weather hazards are often similar. Refer to Table 129 for the city's mitigation strategy. Springville did not remove any mitigation actions.

Table 129: Springville Mitigation Strategy

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
1	Purchase and install backup power generator in critical facilities	Thunderstorm, lightning, and hail, infrastructure failure, tornado and windstorm, severe winter storm	1, 3, 5	X	The city well, treatment plan, and fire department have backup power.
2	Assess warning siren coverage and expand or replace existing sirens, if needed	Tornado and windstorm, lightning, and hail	1, 3, 4, 5	X	The City has ordered two new sirens with solar battery backup.
3	Complete water and sewer infrastructure improvements	Infrastructure failure, flood	1, 2, 3, 5	X	The city does not have stormwater infrastructure. The water and sewer rate were increased to fund future system improvements.
4	Acquire, relocate, elevate, and/or demolish structures in the floodplain	Flood	1, 2, 3, 5	X	There are not many structures within the floodplain, but there are a couple bridges that can flood.
5	Add hazard related information the city's website	All hazards	1, 2, 3, 4, 5	X	Alerts, for issues like snow emergencies and water main breaks, are on the website.
6	Update the city's all-hazard emergency response plan	All hazards	1, 2, 3, 4, 5	X	
7	Install safe room at a critical facility	Tornado and windstorm; thunderstorm, lightning, and hail	1, 4, 5		
8	Update Duane Arnold Energy Center Preparedness Plan	Infrastructure failure	1, 3, 4, 5		There is a plan in place which could be reviewed and updated.
9	Complete and maintain a debris management plan and all related contracts	All hazards	1, 2, 3, 4, 5		

Walker Mitigation Strategy

All identified hazards are addressed by at least one mitigation action in Walker's final mitigation strategy. Several mitigation actions address multiple hazards due to the similar impacts. Mitigations actions for flood or severe weather hazards are often similar. Refer to Table 130 and Table 131 for the city's mitigation strategy and removed mitigation actions, respectively.

Table 130: Walker Mitigation Strategy

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
1	Purchase and install backup power generators in critical facilities	Thunderstorm, lightning, and hail, infrastructure failure, severe winter storm, tornado and windstorm	1, 2, 3, 5	X	Facilities with generators include the Fire Station, well, and wastewater treatment plant
2	Construct tornado safe rooms in public facilities and recreation areas	Thunderstorm, lightning, and hail, tornado and windstorm	1, 2, 4, 5	X	
3	Remove debris from creeks	Flood	1, 2, 5	X	Creek cleanup has occurred. This is an ongoing project.
4	Add hazard-related information to the city's website	All hazards	1, 2, 4, 5	X	Information has been posted online and in the newsletter for new citizens.
5	Purchase weather radios for the City Shop Previously: *Purchase weather radios for the City Shop and ball diamond*	Thunderstorm, lightning, and hail, tornado and windstorm	1, 3, 5	X	The ball diamond has a weather radio.
6	Continue water, sewer, and stormwater infrastructure improvements Previously: *Complete water, sewer, and stormwater infrastructure improvements*	Infrastructure failure, flood	1, 2, 3, 5	X	3500 feet of water main was replaced in a project that ended in 2015. Other improvements are ongoing.
7	Add battery backup/generator hookups to sirens	Thunderstorm, lightning, and hail; tornado and windstorm	1, 5		
8	Complete and maintain a debris management plan and all related contracts.	All hazards	1, 2, 3, 4, 5		
9	Evaluate and complete flood risk reduction projects	Flash flood, river flood	1, 2, 3, 5		
10	Engage with the Middle Cedar Watershed Management Authority	Flash flood, river flood	1, 2, 5		
11	Purchase radios for city staff communication	All hazards	1, 2, 3, 5		

Table 131: Walker Removed Mitigation Strategy

Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
Identify and implement flood mitigation solutions on Karens Court road	Flood	1, 2, 3, 5	X	Ditches and culverts were installed to reduce flood risk
Improve drainage along transportation infrastructure to prevent frost boils	Infrastructure failure, expansive soils	2, 3, 5	X	Improvements were completed.
Add a new well	Drought	1, 2, 3, 5	X	An existing well was rehabilitated.
Acquire, relocate, elevate, and/or demolish structures in the floodplain	Flood	1, 2, 3, 4, 5	X	According to the committee, most of the property in the flood zone has been removed/mitigated.
Develop plan to deal with an emerald ash borer infestation	Animal, plant, crop disease	2, 4, 5	X	The committee stated that not many ash trees were in the area.

Walford Mitigation Strategy

This is an excerpt of the *Benton County 2016 Multi-Jurisdictional Hazard Mitigation Plan*, the plan Walford participated in to maintain Hazard Mitigation Assistance eligibility. It is included as reference. Refer to Table 132.

Table 132: Walford Mitigation Strategy

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed[28]
1	Maintain well-equipped & well-trained fire department capable of appropriate & effective response to all potential fir & emergency incidents	Structural fire, grass and wildland fire, hazardous materials incident, transportation incident, terrorism	1, 2, 4
2	Maintain well-trained and viable law enforcement agencies in order to identify and respond to potential threats and events	All hazards	1, 2, 3, 4
3	Maintain first response organizations capable of responding to an managing air transportation incident	Transportation incident	1, 2, 3, 4
4	Main and enhance storm spotter training	Tornado/windstorm, thunderstorm/lightning/hail	1
5	Maintain and publicize a list of sites that could be used as cooling shelters for public retreats during extreme heat events	Extreme heat	1
6	Encourage citizen purchase/use of smoke detectors	Structural fires	1, 2
7	Purchase new ambulances & first responder units	Transportation incident, tornado/windstorm, extreme heat, severe winter storm, human disease, terrorism	1
8	Rescue/extrication equipment and training for fire departments	Transportation incident, tornado/windstorm, terrorism	1, 2, 4
9	Develop and enhance local emergency operations plan	All hazards	1, 2, 4
10	EMS training	All hazards	1, 2, 4
11	PPE for first responders	Transportation incident, tornado/windstorm, extreme heat, severe winter storm, human disease, terrorism, hazardous materials incident, structural fire, grass or wildland fire	1, 2, 4
12	Ensure the first responders are properly trained to recognize and respond to any potential HAZMAT event	Hazardous materials incident, terrorism	1, 2, 4
13	Maintain electronic resource directory of local resources	All hazards	1, 2, 4
14	Develop/publicize city evacuation plans	Terrorism, hazardous materials incident	1, 2
15	Encourage residents to have Disaster Supply Kits on hand to be used in the event of a disaster event	All hazards	1, 2, 5
15	Work with Benton County EMA to ensure that local Tier II Reports are being filed	Hazardous materials incident	1, 2, 4

Alburnett Community School District Mitigation Strategy

All identified hazards are addressed by at least one mitigation action in Alburnett CSD's final mitigation strategy. Several mitigation actions address multiple hazards due to the similar impacts. Mitigations actions for flood or severe weather hazards are often similar. Refer to Table 133 for the district's mitigation strategy.

Table 133: Alburnett CSD Mitigation Strategy

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Update/Notes
1	Purchase and install generators for critical facilities	Thunderstorm, lightning, and hail, infrastructure failure, tornado and windstorm, severe winter storm	1, 2, 3, 5	
2	Update secure entrances	Terrorism	1, 2, 5	
3	Construct tornado safe room at sports complex	Tornado and windstorm	1, 5	
4	Provide hazard information through District website or newsletter	All hazards	1, 4, 5	
5	Create evacuation/response plan for rail incident/amend crisis plan	Transportation/all hazards	1, 2, 3, 4, 5	

Cedar Rapids Community School District Mitigation Strategy

All identified hazards are addressed by at least one mitigation action in Cedar Rapids CSD's final mitigation strategy. Several mitigation actions address multiple hazards due to the similar impacts. Mitigations actions for flood or severe weather hazards are often similar. Refer to Table 134 for the district's mitigation strategy.

Table 134: Cedar Rapids CSD Mitigation Strategy

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Update/Notes
1	Purchase and install generators for critical facilities	Infrastructure failure; severe winter storm; thunderstorm, lightning, and hail; tornado and windstorm	1, 3, 5	
2	Construct a tornado safe room in new district facilities	Thunderstorm, lightning, and hail; tornado and windstorm	1, 2, 3, 5	
3	Install cameras and intruder locks in all school facilities	Terrorism	1, 5	
4	Continuation and implementation of security and safety infrastructure in all district facilities	Terrorism	1, 2, 5	
5	Construct storage facility for sand/salt or other hazard preparedness materials	Hazardous materials incident, infrastructure failure, river flood, severe winter storm	1, 2, 3, 5	
6	Install check valves on waste water infrastructure at critical facilities	Flash flood	2, 5	
7	Install berm at critical facilities	River flood	1, 2, 5	
8	Share hazard information on the District's website	All hazards	1, 4, 5	

Center Point-Urbana Community School District Mitigation Strategy

All identified hazards are addressed by at least one mitigation action in Center Point-Urbana CSD's final mitigation strategy. Several mitigation actions address multiple hazards due to the similar impacts. Mitigations actions for flood or severe weather hazards are often similar. Refer to Table 135 for the district's mitigation strategy. Center Point-Urbana CSD did not remove any mitigation actions.

Table 135: Center Point-Urbana CSD Mitigation Strategy

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
1	Construct a tornado safe room as a multi-purpose addition to district facilities	Thunderstorm, lighting, and hail, tornado and windstorm	1, 2, 3, 5	X	No significant progress to report
2	Retrofit facilities for high wind hazard events	Thunderstorm, lighting, and hail, tornado and windstorm	1, 2, 3, 5	X	No significant progress to report
3	Purchase and install generators in critical facilities	Thunderstorm, lighting, and hail, infrastructure failure, tornado and windstorm, severe winter storm	1, 2, 3, 5	X	A generator is installed at the primary school, and conduit is installed for hook up at the high school
4	Add air conditioning to all district facilities	Extreme heat	1, 3, 5	X	Air conditioning has been installed at most district facilities
5	Identify and implement stormwater management solutions on district property	Flash flood, infrastructure failure	1, 2, 3, 5	X	This project will be ongoing as the District is anticipating future expansion
6	Provide hazard information through District website or newsletter	All hazards	1, 3, 4, 5		

College Community School District Mitigation Strategy

All identified hazards are addressed by at least one mitigation action in College CSD's final mitigation strategy. Several mitigation actions address multiple hazards due to the similar impacts. Mitigations actions for flood or severe weather hazards are often similar. Refer to Table 136 for the district's mitigation strategy. College CSD did not remove any mitigation actions.

Table 136: College CSD Mitigation Strategy

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Inclusion in Existing Plan	Update/Notes
1	Purchase and install generators for critical facilities	Thunderstorm, lightning, and hail, infrastructure failure, tornado and windstorm, severe winter storm	1, 3, 5	X	A generator was installed at the District Office. The District is considering a generator for the Transportation & Operations Office.
2	Construct a tornado safe room in new district facilities	Thunderstorm, lightning, and hail, tornado and windstorm	1, 2, 3, 5	X	The District will consider including a safe room as part of a new facility.
3	Install cameras and intruder locks in all school facilities	Terrorism	1, 5	X	Cameras have been installed, and the District is considering upgrades to the system.
4	Install additional redundancy and/or backup for communications equipment and/or the server	Infrastructure failure; severe winter storm; terrorism; thunderstorm, lightning, and hail; tornado and windstorm	1, 3, 5		
5	Install a warning siren	Hazardous materials incident, radiological incident, tornado and windstorm	1, 5		The District may look into existing/needed coverage near the sports facilities.
6	Research/install lightning detection system	Thunderstorm, lightning, and hail	1, 5		
7	Provide educational notices regarding hazards on the school website	All hazards	1, 4, 5		
8	Research/install an additional internet service	Infrastructure failure	1, 3, 5		

Linn-Mar Community School District Mitigation Strategy

All identified hazards are addressed by at least one mitigation action in Linn-Mar CSD's final mitigation strategy. Several mitigation actions address multiple hazards due to the similar impacts. Mitigations actions for flood or severe weather hazards are often similar. Refer to Table 137 for the district's mitigation strategy.

Table 137: Linn-Mar CSD Mitigation Strategy

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Update/Notes
1	Complete structural retrofit of data center or move to hardened facility	Earthquake; expansive soils; infrastructure failure; severe winter storm; thunderstorm, lightning, and hail; tornado and windstorm	2, 3, 5	
2	Install generators at critical facilities	Infrastructure failure; thunderstorm, lightning and hail; severe winter storm; tornado and windstorm	1, 2, 3, 5	
3	Install a tornado safe room at a critical facility	Tornado and windstorm	1, 4, 5	
4	Infrastructure retrofit of critical facilities	Infrastructure failure	1, 2, 3, 5	
5	Install cameras at critical facilities	Terrorism	1, 4	
6	Complete flood mitigation project near Indian Creek	River flood	1, 2, 5	
7	Include hazard-related information on the District website	All hazards	1, 4, 5	

Mount Vernon Community School District Mitigation Strategy

All identified hazards are addressed by at least one mitigation action in Alburnett CSD's final mitigation strategy. Several mitigation actions address multiple hazards due to the similar impacts. Mitigations actions for flood or severe weather hazards are often similar. Refer to Table 138 for the district's mitigation strategy.

Table 138: Mount Vernon CSD Mitigation Strategy

ID	Proposed Mitigation Action	Hazard(s) Addressed	Goal(s) Addressed	Update/Notes
1	Complete a comprehensive safety audit of all district schools and facilities in cooperation with the Mount Vernon Police Department	All hazards	1, 4	Audit to be completed in spring of 2018
2	Develop a comprehensive safety and crisis response handbook for the entire district	All hazards	1, 4	Handbook to be developed prior to 2018-2019 school year
3	Establish a new District Safety/Crisis Team	All hazards	1, 4	Safety/Crisis Team to be established in spring of 2018
4	Train staff in intruder response using the Four E's protocol: Educate, Escape, Evade, Engage and/or ALICE protocols	Terrorism	1, 4	Training to take place on a yearly basis beginning in 2018-2019
5	Train students in intruder response using the Four E's protocol: Educate, Escape, Evade, Engage and/or ALICE protocols	Terrorism	1, 4	Training to take place on a yearly basis beginning in 2018-2019
6	Purchase and install generators for critical facilities	Infrastructure failure; thunderstorm, lightning and hail; severe winter storm; tornado and windstorm	1, 3, 5	The distirct offices are high priority because the district needs to maintain communication capabilities during a hazard event. Maintaining backup power generators for wastewater infrastructure is also a high priority.
7	Construct a tornado safe room in new district facilities	Thunderstorm, lightning and hail; tornado and windstorm	1, 5	To be considered with any new construction projects

[26] Iowa Economic Development Authority. Grant: B-13-DS-19-0001 April 1, 2018 thru June 30, 2018 Performance Report. P. 2.
[27] http://iowawatershedapproach.iowa.gov/#section2. Accessed 31 August 2018.
[28] Goals from the Benton County hazard mitigation plan

Action Plan

To determine how a mitigation strategy should be completed, an action plan and timeline for mitigation actions was determined through a prioritization process that considered local priorities and capabilities identified in the Community Attributes chapter of the plan, potential benefit, and estimated cost. Ultimately, mitigation actions were assigned a priority level, which determines the potential timeline for completion. Refer to Table 139 and Table 140.

Table 139: Benefit vs. Cost Criteria

Type	Benefit	Cost
High	Results are likely immediate and/or widespread reduction of risk from hazard(s) addressed; generally supported by the community; lead agency has capabilities	Existing funding is not adequate to complete the project; funding may only be available through grants/assistance; anticipated to cost greater than $100,000
Medium	Results are likely a long-term reduction of risk from hazard(s) addressed and/or results are not widespread; potential community opposition; lead agency has capabilities	Requires amending the budget and/or requires a bond to complete the project; anticipated to cost between $10,000 and $100,000
Low	Results are difficult to determine and/or may not result in long-term reduction of risk from hazard(s) addressed; definite community opposition; lead agency may encounter capability issues	Existing funding is adequate or the project can be completed through volunteer and/or staff time; anticipated to cost less than $10,000

Table 140: Mitigation Action Priority Level Criteria

Priority Level	Potential Project Timeline
1	1–5 years
2	5–10 years
3	10–15 years

For most jurisdictions, not all mitigation actions considered in the prioritization process met exact criteria. The planning team in each jurisdiction developed the final action plan to ensure priority levels reflect local priorities and capabilities. It should be noted, not all jurisdictions identified all three priority levels for mitigation actions. Some jurisdictions have adopted a shorter term focus for completing mitigation actions.

Requirement §201.6 (c)(3)(iii-iv): (c) The plan shall include the following:… (3) A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools. This section shall include:... (iii) An action plan describing how the actions identified in paragraph (c)(3)(ii) of this section 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. (iv) For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.

In addition to the potential benefit, cost, and priority level of a mitigation action, the action plan also identifies who in the jurisdiction is the mitigation action lead, potential partners, and funding sources. In the action plan for each jurisdiction, some of the identified potential partners and funding sources are abbreviated. is reference for the abbreviations. All other partners and funding sources are explanatory.

Table 141: Potential Partner and Funding Abbreviations

Potential Partner or Funding	Abbreviation
Iowa Homeland Security and Emergency Management Division	IHSEMD
Iowa Department of Agriculture and Land Stewardship	IDALS
Iowa Department of Natural Resources	Iowa DNR
Iowa Department of Transportation	IDOT
Iowa Economic Development Authority	IEDA
Iowa Flood Center	IFC
Linn County Emergency Management Agency	Linn County EMA
East Central Iowa Council of Governments	ECICOG
Community School District	CSD
Federal Government—General Services Administration	GSA
Pre-Disaster Mitigation	PDM
Hazard Mitigation Grant Program	HMGP
Flood Mitigation Assistance	FMA
Community Development Block Grant	CDBG
United States Department of Agriculture	USDA

Linn County Action Plan

The Linn County planning committee reviewed the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 142 for the County's action plan.

Table 142: Linn County Action Plan

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	1	Participate in the Community Resilience Program and implement supporting projects	Planning and Development Director	Cedar Rapids, Linn County EMA, Greater Cedar Rapids Community Foundation, ECICOG, United Way, and faith-based community	High	Low – High	County, partners, Resilient America, and others to be identified
1	2	Expand outdoor and indoor notification systems	Linn County EMA	IHSEMD; DAEC	High	Medium – High	County, PDM, HMGP
1	3	Construct multi-purpose tornado safe rooms in critical facilities and determine areas in the county that would benefit from the addition of a multi-purpose tornado safe room	Planning and Development Director	County Engineer, Linn County EMA, IHSEMD	High	High	County, PDM, HMGP
1	4	Determine options and feasibility of stronger regulations to protect electricity distribution infrastructure from wind and ice damage	Planning and Development Director	Power providers	Medium	Low	County
1	5	Purchase and install generators in critical facilities	County Engineer	IHSEMD	High	Medium - High	County, PDM, HMGP
1	7	Identify and complete flood mitigation projects to protect identified critical facilities and infrastructure	County Engineer	Planning and Development	High	Medium – High	County, PDM, HMGP, FMA
1	8	Acquire, relocate, elevate, and/or demolish structures in the floodplain	Planning and Development Director	IHSEMD	High	High	County, PDM, HMGP, FMA

Table 142: Linn County Action Plan, continued

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	9	Strengthen the Floodplain Ordinance to reduce development in the floodplain	Planning and Development Director	IDNR	High	Low	County
1	10	Strengthen development-related ordinances to improve stormwater management in new development	Planning and Development Director	County Engineer, IDNR	High	Low	County
1	11	Improve the county's rating in the Community Rating System	Floodplain Manager	Planning and Development	High	Low	County
1	12	Establish the use of the HAZUS and Iowa Flood Center flood inundation modeling systems with the Linn County Emergency Management Agency	Planning and Development Director and County Engineer	Iowa Flood Center, Linn County EMA	Medium	Low	County
1	13	Participate in the development and implementation of the Indian Creek Watershed Management Plan to improve water management, which may include regulatory or structural projects	Planning and Development Director	County Engineer and Secondary Roads	High	Medium - High	County, PDM, HMGP, FMA, others to be identified
1	14	Provide hazard-related educational materials on the county website	Planning and Development Director	Information Technology, Linn County EMA	Medium	Low	County
1	15	Encourage the Linn County Food Systems Council to identify the scope and potential necessity for a food security plan addressing access to food during and after hazard events	Planning and Development Director	Linn County Food Systems Council	Low	Low	To be identified
1	16	Continue continuity planning in all county departments	All department directors	Linn County EMA	Medium	Medium – Low	County
1	17	Participate actively in the watershed management authorities (WMA) that Linn County is a member of and support the WMA plans.	Planning and Development/Linn County Conservation	WMA's	High	Medium–Low	County
1	18	Complete and maintain a debris management plan and all related contracts.	Linn County EMA, Engineering & Secondary Roads		High	Low	County
2	6	Provide residential home rehabilitation and/or emergency repair program to prevent major damage to homes during hazard events	Planning and Development Director	ECICOG	Medium	Medium – High	County, others to be identified

Alburnett Action Plan

The Alburnett planning committee reviewed the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 143 for the City's action plan.

Table 143: Alburnett Action Plan

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	1	Public education project	City Clerk	Fire Department	High	Low	City
1	2	Construct a new fire station	Fire Chief	City	Medium	High	City
1	3	Complete stormwater/culvert improvement project for Roosevelt St.	Public Works	IHSEMD	High	Medium–High	City, HMGP, PDM
1	4	Install backup generators at critical facilities.	Public Works	IHSEMD	High	Medium	City, HMGP, PDM
2	5	Complete and maintain a debris management plan and all related contracts	City Council	Linn County EMA	High	Low	City

Bertram Action Plan

The Bertram planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 144 for the City's action plan.

Table 144: Bertram Action Plan

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	2	Replace and repair bridges damaged by flash flooding	Mayor	FEMA, IDOT, engineering consultant	High	High	City, FEMA
1	3	Acquire, relocate, elevate, and/or demolish structures in flood hazard areas	Mayor	FEMA	High	Medium–High	City, PDM, FMA, HMGP
1	5	Establish communication procedure for hazard events	Mayor	Linn County EMA	Medium	Low	City
1	6	Establish plan to address Oak Wilt in public areas	Mayor	IDNR	Medium	Low–Medium	City
1	7	Identify and complete stormwater management improvements to reduce flood damage risk	Mayor	Engineering consultant	High	Low–High	City, PDM, HMGP, others to be identified
1	8	Establish evacuation routes/policies for hazardous materials incidents	Mayor	Linn County EMA, Linn County Sheriff's Office	Medium	Low	City
1	9	Participate in the Lower Cedar Watershed Management Authority and its watershed planning process.	Mayor	Lower Cedar Watershed Management Authority	High	Low–Medium	City
1	10	Complete and maintain a debris management plan and all related contracts.	Bill Mulhulland, City Council	Linn County EMA	High	Low	
2	1	Construct a multi-purpose safe room	Mayor	Linn County EMA, IHSEMD, consulting architect	High	Medium–High	City, PDM, HMGP
2	4	Establish public cooling center policy	Mayor	Linn County EMA	Medium	Low	City

Cedar Rapids Action Plan

The Cedar Rapids planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 145 for the City's action plan.

Table 145: Cedar Rapids Action Plan

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	1	Participate in the Community Resilience Roundtable Program and implement supporting projects	City Manager	Linn County	High	Low	City, partners, Resilient America, and others to be identified
1	2	Install flood warning system on Indian Creek	Indian Creek Watershed Management Authority	Iowa DNR, Cedar Rapids, Marion, Linn County, ACE, IFC	High	Medium	ACE, USGS, IFC
1	3	Complete stormwater outfall backflow protection project	Public Works		High	Medium	City Stormwater Utility
1	4	Install backup power sources for traffic lights	Public Works	IDOT	High	Low–High	City, others to be identified
1	5	Complete Vinton Ditch improvements	Public Works		High	High	CDBG, Local Option Sales Tax, FMA
1	6	Acquire, relocate, elevate, and/or demolish structures in flood hazard areas or structures subject to repetitive damage	Public Works	IHSEMD, ACE	High	High	City, ACE, HMGP, PDM, FMA
1	7	Expand the city's outdoor warning siren system	City Manager	IHSEMD, Linn County EMA	High	Medium	City, HMGP, PDM
1	8	Construct safe rooms in public facilities and recreation areas	City Manager and Parks and Recreation	Linn County EMA	High	High	City, HMGP, PDM

Table 145: Cedar Rapids Action Plan, continued

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	9	Harden public facilities to withstand wind and other severe weather damage	City Manager and Public Works		High	High	City, HMGP, PDM
1	11.01	Complete the city's Flood Control System (FCS) Project phase from Ellis Ln. NW to I-380	Public Works	ACE, FEMA, Iowa DNR	High	High	City, CDBG, State, other locally available sources
1	11.02	Complete the city's Flood Control System (FCS) Project phase replacing and raising the 8th Ave. Bridge	Public Works	ACE, GSA	High	High	City, ACE, other locally available sources
1	11.03	Complete the city's Flood Control System (FCS) Project phase from I-380 to 8th Ave. SW	Public Works	ACE, FEMA, Iowa DNR	High	High	City, State, other locally available sources
1	11.04	Complete the city's Flood Control System (FCS) Project phase from 8th Ave. SW to 12th Ave. SW (Ingredion)	Public Works	ACE, FEMA, Iowa DNR	High	High	City, State, other locally available sources
1	11.05	Complete the city's Flood Control System (FCS) Project phase from 12th Ave. SW to Cedar Rapids/Linn County Solid Waste Agency Site 1	Public Works	ACE, FEMA, Iowa DNR	High	High	City, State, other locally available sources
1	11.06	Complete the city's Flood Control System (FCS) Project phase from I-380 at 7th St. NE to Cargill (bean facility) and around Quaker Oats to A Ave. NE	Public Works	ACE	High	High	City, ACE, other locally available sources
1	11.07	Complete the city's Flood Control System (FCS) Project phase from A Ave. NE to 8th Ave. SE	Public Works	ACE	High	High	City, ACE, other locally available sources
1	11.08	Complete the city's Flood Control System (FCS) Project phase from 8th Ave. SE to Alliant Substation	Public Works	ACE	High	High	City, ACE, other locally available sources
1	11.09	Complete the city's Flood Control System (FCS) Project phase from Alliant Substation to Cargill (corn facility)	Public Works	ACE	High	High	City, ACE, other locally available sources
1	11.10	Complete the city's Flood Control System (FCS) Project phase installing 30 gate closures and 11 pump stations	Public Works	ACE	High	High	City, ACE, other locally available sources

Table 145: Cedar Rapids Action Plan, continued

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	12	Complete the City's Flood Control System (FCS) Edgewood Bridge and approach improvements	Public Works	IHSEMD	High	Medium–High	City, HMGP, PDM, FMA
1	13	Develop and implement a City response plan for Indian Creek flooding	Public Works	Indian Creek Watershed Management Authority	High	High	Stormwater Utility Enterprise Fund, HMGP, PDM, FMA
1	14	Add detention basins and other stormwater infrastructure to increase stormwater management capability and reduce flood risk	Public Works		Medium	Medium–High	Stormwater Utility Enterprise Fund, FMA
1	15	Update Stormwater Master Plan and prioritized Capital Improvement Project list	Public Works	IHSEMD	High	Medium	Stormwater Utility Enterprise Fund, CDBG, HMGP, PDM, FMA
1	16	Complete and maintain a debris management plan and all related contracts	City Manager		High	Low	City
1	17	Participate actively in the watershed management authorities (WMA) that Cedar Rapids is a member of and support the WMA's plans.	Public Works	WMA's	High	Low	City
1	18	Where possible, identify and implement projects that complement the Flood Risk Management goal and objectives of the Indian Creek Watershed Management Plan	Public Works	IHSEMD			City, HMGP, PDM, FMA, other locally available grants
1	19	Install backup generators at critical facilities/pumping stations	Finance		High	Medium	City, HMGP, PDM
1	20	Complete vulnerability assessment of Joint Communications and address any vulnerabilities	Information Technology		High	Low–Medium	City

Table 145: Cedar Rapids Action Plan, continued

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	21	Continue development of Cedar River Flood Response Plan	Public Works	IFC	High	Medium	City
1	22	Update Sanitary Sewer Master Plan and prioritized Capital Improvement Project list	Public Works	IHSEMD	High	Medium	Sanitary Sewer Utility Enterprise Fund, City, CDBG, HMGP, PDM, FMA
1	23	Implement mitigation projects outlined in Repetitive Loss Area Analysis	Public Works	IHSEMD	High	Low–High	City, HMGP, PDM, FMA
2	10	Add additional shallow water wells to city's water supply	Utilities		High	High	City

Center Point Action Plan

The Center Point planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 146 for the City's action plan.

Table 146: Center Point Action Plan

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	1	Improve communication capabilities with equipment update and developing a communication plan with local agencies	City Administrator	Fire Department, Linn County EMA	Medium	Medium	City, Fire Agency, others to be identified
1	2	Construct a multi-purpose safe room in conjunction with new public facilities	City Administrator	Public Library Board, Fire Department	High	High	City, HMGP, PDM
1	3	Retrofit existing City Hall or construct a new City Hall to withstand natural hazards including a dedicated generator	City Administrator	IHSEMD	High	Medium–High	City, HMGP, PDM
1	4	Construct a new Fire Station with a dedicated generator	Fire Chief	City, IHSEMD	High	High	Fire Agency, City, HMGP, PDM
1	5	Digitize city and public records	City Clerk	---	Medium	Low	City
1	7	Complete the high priority phases of the city's comprehensive stormwater improvement plan	City Administrator	Public Works	High	High	City, CDBG, and others to be identified
1	8	Education residents about the importance of disconnecting their sump pumps from the sanitary sewer	City Administrator	Public Works	Medium	Low	City
1	9	Develop a stream debris cleaning program	City Administrator	Public Works, IDNR	High	Low	City, Iowa DNR, and others to be identified

Table 146: Center Point Action Plan, continued

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	10	Acquire, relocate, elevate, and/or remove structures in flood hazard areas	City Administrator	ECICOG	High	Medium–High	City, PDM, HMGP, FMA
1	11	Complete and maintain a debris management plan and all related contracts	City Clerk		High	Low	City
1	12	Post disaster/hazard information to city website	City Clerk		High	Low	City
1	13	Install generators at critical facilities	City Administrator	IHSEMD	High	Low–Medium	City, HMGP, PDM
3	6	Upgrade water infrastructure with 6” lines to provide system access for fire protection	City Administrator	Public Works	High	High	City, others to be identified

Central City Action Plan

The Central City planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 147 for the City's action plan.

Table 147: Central City Action Plan

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	1	Acquire, relocate, and/or demolish structures in flood hazard areas	City Administrator	IHSEMD	High	High	City, HMGP, PDM, FMA
1	2	Sanitary and storm sewer system improvements to prevent system backup in structures	City Administrator	IDNR	High	High	City, HMGP, PDM, FMA, CDBG
1	3	Identify and complete flood protection for the wastewater treatment facility	City Administrator	IDNR	High	High	City, HMGP, PDM, FMA
1	8	Replace the Fire Department's personal protective equipment	Fire Chief	None	High	Medium	Fire Department
1	12	Purchase and install portable generators for critical facilities	City Administrator	Linn County EMA, IHSEMD	High	Low/ Medium	City, PDM, HMGP
1	13	Share hazard risk information on the City's website	City Administrator	Linn County EMA	High	Low	City
1	14	Participate actively in the Upper Wapsipinicon Watershed Management Authority and support its watershed plan.	Mayor	Upper Wapsipinicon Watershed Management Authority	High	Low–Medium	City
1	15	Complete and maintain a debris management plan and all related contracts.	Public Works	Linn County EMA	High	Low	City
2	4	Identify and/or construct a storage facility for maintenance equipment and flood protection supplies	City Administrator	---	Medium	Medium	City
2	5	Complete bank stabilization along the river and bridges	City Administrator	IDNR	High	High	City, HMGP, PDM, FMA
2	6	Expand outdoor warning system coverage	City Administrator	Linn County EMA	High	Medium	City and HMGP
2	7	Construct a multi-purpose community safe room	City Administrator	IHSEMD, Linn County EMA	Medium	High	City, HMGP, PDM

Table 147: Central City Action Plan, continued

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
2	9	Develop a plan for the imminent emerald ash borer infestation	City Administrator	Iowa DNR, Cedar Rapids/Linn County SWA	Medium	Low	City
2	10	Complete bank stabilization near the water tower	City Administrator	IDNR	Medium	High	City, HMGP, PDM, FMA
2	11	Expand the storm sewer system to increase capacity	City Administrator	IDNR	High	High	City, CDBG, others to be identified

Coggon Action Plan

The Coggon planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 148 for the City's action plan.

Table 148: Coggon Action Plan

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	1	Update the emergency response plan	City Clerk	Fire Department, Linn County EMA	High	Low	City
1	2	Acquire, relocate, elevate, and/or demolish structures in flood hazard areas	City Clerk	IHSEMD	High	High	City, PDM, HMGP
1	3	Improve, structurally protect, or relocate water and wastewater facilities to maintain service	City Clerk	IHSEMD, IDNR	High	High	City, PDM, HMGP, CDBG, others to be identified
1	4	Purchase power generators for critical facilities, including water and sanitary sewer facilities	City Clerk	IHSEMD	High	Medium	City, PDM, HMGP
1	5	Establish a communication plan for city officials, staff, and emergency response teams, and if needed, purchase communication equipment	City Clerk	Fire Department	Medium	Low–Medium	City, others to identified
1	6	Create a wellness check program for residents who want to be checked on during or after certain hazard events	City Clerk	Fire Department, Linn County EMA	Medium	Low	City
1	7	Purchase or secure access to an all-terrain vehicle for off-road emergencies	Fire Chief	Linn County EMA	Low	Low–Medium	City
1	8	Designate shelter for park and campground users, if needed, and/or consider other facilities for a tornado safe room and construct the room.	City Clerk	Linn County EMA	High	Low–High	City, PDM, HMGP
1	9	Complete a flood risk reduction project around Savage Park	City Clerk	IHSEMD	High	Medium–High	City, PDM, HMGP

Table 148: Coggon Action Plan, continued

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	10	Complete and maintain a debris management plan and all related contracts	City Clerk	Linn County EMA	High	Low	City
1	11	Participate actively in the Upper Wapsipinicon Watershed Management Authority and support the watershed plan	City Clerk/ Councilmember	Upper Wapsipinicon Watershed Management Authority	High	Low–Medium	City

Ely Action Plan

The Ely planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 149 for the City's action plan.

Table 149: Ely Action Plan

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	1	Construct a multi-purpose safe room in public facilities	City Administrator	Linn County EMA, IHSEMD	High	High	City, PDM, HMGP
1	2	Complete Fuhrmeister Street stormwater improvements	City Administrator	Public Works	High	High	City, PDM, HMGP, CDBG, others to be identified
1	3	Add hazard-related information to the city website	City Administrator	Fire Department	Medium	Low	City
1	4	Purchase/replace backup power generators for critical facilities	City Administrator	Public Works, IHSEMD	High	Medium	City, PDM, HMGP
1	5	Evaluate and mitigate risk from Rogers Creek	City Administrator	IHSEMD, Iowa DNR, Linn Count Soil and Water Conservation District	High	Medium–High	City, HMGP, PDM, FMA
1	6	Evaluate and mitigate Rowley St. flash flooding	Public Works	IHSEMD	High	Medium–High	City, HMGP, PDM, FMA
1	7	Evaluate and create hazardous materials response plan	Fire Department	Linn County EMA	High	Low–Medium	
1	8	Complete and maintain a debris management plan and all related contracts	City Administrator	Linn County EMA	High	Low	City

Fairfax Action Plan

The Fairfax planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 150 for the City's action plan.

Table 150: Fairfax Action Plan

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	1	Add additional well and water storage facility	City Clerk	Public Works, IDNR	High	High	City, Bonds
1	2	Expand warning siren coverage	City Clerk	Linn County EMA, IHSEMD	High	Medium–High	City, PDM, HMGP
1	3	Purchase and install backup power generators for outdoor warning sirens	City Clerk	IHSEMD	High	Medium	City, PDM, HMGP
1	5	Construct a multi-purpose safe room	City Clerk	Linn County EMA, IHSEMD	High	High	City, PDM, HMGP
1	6	Determine the feasibility of a lightning warning system for outdoor recreation areas and purchase, if feasible	City Clerk	Public Works	Medium	Low	City
1	7	Improve and expand the city's stormwater management system	City Clerk	Public Works	High	High	City, PDM, HMGP, FMA, others to be identified
1	8	Purchase appropriate size water pumps	City Clerk	Public Works	High	Medium	City, other locally available grants
1	9	Coordinate with railroad companies and improve signals at crossings near the city's recreational facilities	City Clerk	Union Pacific Railroad and CRANDIC Railroad	Medium	Low–Medium	City, railroad companies
1	10	Develop a drought plan	City Clerk	IDNR	High	Low	City

Table 150: Fairfax Action Plan, continued

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	11	Purchase and install backup power generators at critical facilities	City Clerk	Public Works	High	Medium	City, HMGP, PDM
1	12	Replace W. Cemetery Rd. bridge around 2021, following IDOT work	IDOT	Public Works, Fire and Rescue	High	High	State transportation funds
1	13	Install additional security at infrastructure facilities	Public Works		High	Medium	City, other locally available grants
1	14	Complete source water and wellhead protection plan for the Iowa Department of Natural Resources	Public Works		High	Medium	City
1	15	Share hazard risk information on City website	City Clerk	Linn County EMA	High	Low	City
1	16	Complete and maintain a debris management plan	Public Works		High	Low	City
2	4	Purchase weather radios for city buildings	City Clerk	---	Medium	Low	City

Hiawatha Action Plan

The Hiawatha planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 151 for the City's action plan.

Table 151: Hiawatha Action Plan

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	1	Construct new fire station	Fire Chief	Policy and Administration	High	High	City, others to be identified
1	2	Purchase and install backup power generators in critical facilities	City Administrator	Public Works	High	Medium – High	City, PDM, HMGP
1	4	Construct tornado safe rooms in public facilities	City Administrator	Public Works	High	High	City, PDM, HMGP
1	5	Determine feasibility of requiring storm shelters in manufactured home or multi-family housing developments	Community Development Director	Policy and Administration	High	Low	City
1	6	Participate in the Indian Creek Watershed Management Authority planning process and implement the plan	Community Development Director	Public Works and Policy and Administration	Medium	Low – High	City, PDM, HMGP, FMA, others to be identified
1	7	Continue water, sewer, and stormwater infrastructure improvements to reduce infiltration	City Engineer	Public Works, Water, and Policy and Administration	High	High	City, PDM, HMGP, FMA, others to be identified
1	8	Acquire, relocate, elevate, and/or demolish structures in flood hazard areas	Community Development Director	Policy and Administration	High	High	City, PDM, HMGP, FMA
1	9	Determine feasibility of strengthening the city's floodplain ordinance	Community Development Director	Policy and Administration	High	Low	City
1	10	Identify potential urban wildland interface improvements	Community Development Director	Fire and Rescue Department	Medium	Low	City

Table 151: Hiawatha Action Plan, continued

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	11	Provide hazard-related information on the city website	City Administrator	Linn County EMA	Medium	Low	City
1	12	Where possible, identify and implement projects that complement the Flood Risk Management goal and objectives of the Indian Creek Watershed Plan	City Administrator	Indian Creek WMA	High	Medium–High	City, HMGP, PDM, FMA
1	13	Complete and maintain a debris management plan and all related contracts.	City Administrator	Linn County EMA	High	Low	City
2	3	Identify gaps in outdoor warning siren coverage and expand, if needed	City Administrator	Linn County EMA	High	Medium	City, PDM, HMGP

Lisbon Action Plan

The Lisbon planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 152 for the City's action plan.

Table 152: Lisbon Action Plan

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	1	Educate residents about weather radios	City Administrator	Police and Fire Department, Linn County EMA	Medium	Low	City
1	2	Expand warning siren coverage	City Administrator	Linn County EMA	High	Medium	City, PDM, HMGP
1	3	Develop education program for community safe rooms	City Administrator	Police and Fire Department, Linn County EMA	Medium	Low	City
1	4	Develop and implement watershed protection plan	City Administrator	Mount Vernon, IDNR, others to be identified	High	Low - High	City, PDM, FMA, HMGP, others to be identified
1	5	Develop map of past hazard materials incidents	City Administrator	Linn County EMA	Low	Low	City
1	6	Improve stormwater management system	City Administrator	Consulting engineer	High	Low – High	City, PDM, FMA, HMGP, others to be identified
1	7	Educate residents about hazards	City Administrator	---	Medium	Low	City
1	8	Install a community safe room at a critical facility or sports facility	City Administrator	IHSEMD	High	High	City, HMGP, PDM
1	9	Complete a flood mitigation project around the wastewater treatment facility	City Administrator	IHSEMD	High	High	City, HMGP, PDM

Marion Action Plan

The Marion planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 153 for the City's action plan.

Table 153: Marion Action Plan

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	1	Construct tornado safe rooms in public facilities	City Engineer	IHSEMD	High	High	City, PDM, HMGP
1	2	Determine feasibility of requiring storm shelter or tornado safe rooms in new structures	Planning and Development Director		High	Low	City
1	3	Purchase and install backup power generators in critical facilities and/or replace obsolete generators	City staff	IHSEMD	High	Medium–High	City, PDM, HMGP
1	4	Assess outdoor warning siren coverage and expand coverage, if needed	Fire Chief	Linn County EMA, IHSEMD	High	Medium	City, PDM, HMGP
1	5	Participate in the Indian Creek Watershed Management Authority planning process and implement the plan	City Engineer	Indian Creek Watershed Management Authority, IHSEMD	High	Medium	City, PDM, HMGP, FMA, others to be identified
1	6	Acquire, relocate, elevate, and/or demolish structures in flood hazard areas	Planning and Development Director	IHSEMD	High	High	City, PDM, HMGP, FMA
1	8	Construct two new fire station with a tornado safe room	Fire Chief	Fire Department, IHSEMD	High	High	City, PDM, HMGP
1	9	Where possible, identify and implement projects that complement the Flood Risk Management goal and objectives of the Indian Creek Watershed Management Plan	Stormwater Coordinator	ICWMA	High	Low–High	City, HMGP, PDM, FMA, other locally available grants
1	10	Complete and maintain a debris management plan and all related contracts.	Fire Chief	Linn County EMA	High	Low	City

Table 153: Marion Action Plan, continued

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	11	Include hazard or disaster preparedness information in the Marion Messenger (City newsletter).	Communications Director		High	Low	City
1	12	Perform an annual inspection of existing storm shelters in mobile home communities to ensure continued compliance with access and safety requirements.	Fire Department		High	Medium	City
2	7	Develop alternative source of drinking water	Water Director	IDNR	Medium	Medium–High	City, others to be identified

Mount Vernon Action Plan

The Mount Vernon planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 154 for the City's action plan.

Table 154: Mount Vernon Action Plan

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	1	Develop public awareness campaign for local hazards	Emergency Management Coordinator	City Administrator, Police and Fire Department, Linn County EMA	Medium	Low	City
1	2	Develop process to notify special needs population	Emergency Management Coordinator	City Administrator, Police and Fire Department, Linn County EMA	Medium	Low	City
1	3	Develop program to educate the public about the need to expand emergency services as the community grows	Emergency Management Coordinator	City Administrator, Police and Fire Department, Linn County EMA	Low	Low	City
1	4	Purchase and install backup power generators in critical facilities	City Engineer	City Administrator, Public Works	High	Low – High	City, PDM, HMGP
1	5	Adopt restrictive permit process for large events	Emergency Management Coordinator	City Administrator, Zoning, Linn County EMA	Medium	Low	City

Table 154: Mount Vernon Action Plan, continued

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	6	Expand outdoor warning siren coverage	City Administrator	City Administrator, City Engineer, Zoning, Linn County EMA	High	Medium - High	As the city grows
1	7	Develop an education program about tornado safe rooms to encourage developers and homeowners to incorporate storm shelters or tornado safe rooms into homes	Emergency Management Coordinator	City Administrator, Zoning, Linn County EMA	Medium	Low	City
1	8	Educate residents about the importance of flood, renters, and homeowners insurance	Emergency Management Coordinator	City Administrator	Low	Low	City
1	9	Construct a multi-purpose tornado safe room in public facilities and recreation areas	City Administrator	City Engineer, Emergency Management Coordinator, IHSEMD	High	High	City, PDM, HMGP
1	10	Encourage the construction of storm shelters and structural hardening against high wind hazards in schools, daycares, adult care, and other facilities with vulnerable populations	Emergency Management Coordinator	City Administrator, Zoning, Linn County EMA	Low	Low	City
1	11	Encourage developers and contractors to offer and market wind resistant building materials	Emergency Management Coordinator	City Administrator, Zoning, Linn County EMA	Low	Low	City
1	12	Participate in the Community Rating System	Floodplain Manager	Zoning, IDNR	High	Low	City
1	13	Participate in a watershed planning process, if available, and implement the plan	City Administrator	City Engineer, Zoning, IDNR	High	Low - High	
1	14	Educate owners about check valves	Emergency Management Coordinator	Public Works	Medium	Low	City

Table 154: Mount Vernon Action Plan, continued

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	16	Educate local businesses about hazardous material incident mitigation strategies	Emergency Management Coordinator	Fire Department	Medium	Low	Fire Department
1	18	Improve snow emergency route and evacuation plan	Public Works Lead Operator	Police and Fire Department, Emergency Management Coordinator, Linn County EMA, IDOT	Medium	Low	City
1	19	Develop inflow and infiltration strategies to mitigate against overflow at wastewater facilities	City Engineer	Public Works, IDNR	High	Medium – High	City
1	20	Study the benefits of sprinkler systems for residents, businesses, and developers	Emergency Management Coordinator	Fire Department	Low	Low	City
1	21	Where possible, implement floodplain management and other hazard mitigation strategies in development projects, and ensure strategies remain consistent with the Comprehensive Plan.	Emergency Management Coordinator	ECICOG	High	Low	City
1	22	Complete and maintain a debris management plan and all related contracts	City Administrator/Public Works Director	Linn County EMA	High	Low	City
2	17	Develop map of historic hazardous material incidents	Emergency Management Coordinator	Fire Department, Linn County EMA, IDNR	Low	Low	City
3	15	Acquire, relocate, elevate, and/or demolish structures in flood hazard areas	City Administrator	Zoning, IHSEMD	High	High	City, PDM, HMGP, FMA

Palo Action Plan

The Palo planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 155 for the City's action plan.

Table 155: Palo Action Plan

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	1	Construct a tornado safe room in new public facilities	City Clerk	Public Works, Linn County EMA, IHSEMD	High	High	City, PDM, HMGP
1	2	Purchase and install backup power generators in critical facilities	City Clerk	Public Works	High	Low – Medium	City, PDM, HMGP
1	3	Require storm shelters in new manufacturing home developments	City Clerk	City Council	Medium	Low	City
1	4	Determine potential benefits of petitioning Linn and Benton County to make Dry Creek a designated waterway	City Clerk	Public Works, Linn County Conservation	Low	Low	City
1	5	Complete water, sewer, and stormwater system improvements	Maintenance Superintendent	IDNR	High	High	City, PDM, HMGP, CDBG, others to be identified
1	6	Participate in a watershed planning process, if available, and implement the plan	City Clerk	---	High	Low – High	City, PDM, HMGP, others to be identified
1	7	Participate in the Community Rating System	City Clerk	IDNR	High	Low	City
1	8	Acquire, relocate, elevate, and or demolish structures in the floodplain	City Clerk	IHSEMD	High	High	City, PDM, HMGP
1	9	Recruit volunteers to the Fire Department	Fire Chief	City Clerk	Medium	Low	Fire Department
1	10	Add hazard related information to the city website	City Clerk	Fire Department, Linn County EMA	Medium	Low	City
1	11	Complete creek bed stabilization projects	City engineer	IHSEMD	Medium–High	Medium–High	City, PDM, HMGP
1	12	Conduct EMT training	Fire Department	City, Linn County EMA	High	Medium	City

Table 155: Palo Action Plan

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	13	Create a disaster response plan for Palo	City Clerk		High	Low–Medium	City
1	14	Develop a debris management plan and maintain all related contracts	City Clerk	Linn County EMA	High	Low	City

Prairieburg Action Plan

The Prairieburg planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 156 for the City's action plan.

Table 156: Prairieburg Action Plan

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	1	Upgrade outdoor warning siren to increase coverage area, include remote activation capability, and backup power source	City Clerk	IHSEMD	High	Medium	City, PDM, HMGP
1	2	Modify the Fire Station backup power generator to be portable	Fire Chief	Public Works	Medium	Low	City
1	3	Develop and implement a fire safety campaign	Fire Chief	Linn County EMA	Medium	Low	City
1	4	Purchase new CPAP devices	Fire Chief	---	Medium	Low	Fire Department
1	5	Purchase hazardous materials containment boom	Fire Chief	---	Medium	Low	Fire Department
1	6	Purchase fire swatters	Fire Chief	---	Medium	Low	Fire Department
1	7	Purchase chainsaw for each fire truck	Fire Chief	---	Medium	Low	Fire Department
1	8	Purchase a leaf blower	Fire Chief	---	Medium	Low	Fire Department
1	9	Periodically borrow an electronic speed sign and place on major city routes	City Clerk	Linn County Sheriff's Office	Medium	Low	City
1	10	Develop an emergency assistance program	City Clerk	Linn County EMA	High	Low	City
1	11	Develop an emergency operations plan for the city and conduct a practice drill	City Clerk	Fire Department, Linn County EMA	Medium	Low	City
1	12	Complete and maintain a debris management plan and all related contracts.	City Clerk	Linn County EMA	High	Low	City

Robins Action Plan

The Robins planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 157 for the City's action plan.

Table 157: Robins Action Plan

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	1	Construct a multi-purpose safe room	City Clerk	IHSEMD, consulting architect	High	High	City, PDM, HMGP
1	2	Purchase and install stationary generators at lift stations and replace obsolete generators	City Clerk	Linn County EMA, IHSEMD	High	Medium	City, PDM, HMGP
1	3	Participate in the Indian Creek Watershed Management Authority planning process and implement the plan	Mayor	Indian Creek Watershed Management Authority	High	Low–High	City, PDM, FMA, HMGP, others to be identified
1	5	Improve stormwater management system	City Clerk	Indian Creek Watershed Management Authority, consulting engineer	High	Low–High	City, PDM, FMA, HMGP, others to be identified
1	6	Expand warning siren coverage, as development expands	City Clerk	Linn County EMA, IHSEMD	High	Medium	City, PDM, HMGP
1	7	Establish ideal emergency travel routes when major travel routes are blocked	Fire Chief and Police Chief	Linn County EMA, IDOT	High	Low	City
1	8	Purchase brush truck for the Fire Department	Fire Chief	---	Medium	High	City, Assistance to Firefighter Grant, others to be identified
1	9	Establish proper computer network security	City Clerk	IT consultant, Linn County EMA	Medium	Low	City

Table 157: Robins Action Plan, continued

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	10	Construct a regional retention basin	May	Linn County EMA, IHSEMD, neighboring municipalities	High	High	City, PDM, HMGP, FMA
1	11	Complete and maintain a debris management plan and all related contracts	Public Works	Linn County EMA	High	Low	City
3	4	Acquire, relocate, elevate, and or demolish structures in flood hazard areas	City Clerk	IHSEMD, FEMA	High	Medium–High	City, PDM, FMA, HMGP

Springville Action Plan

The Springville planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 158 for the City's action plan.

Table 158: Springville Action Plan

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	1	Purchase and install backup power generator in critical facilities	Public Works Director	IHSEMD	High	Medium	City, PDM, HMGP
1	2	Assess warning siren coverage and expand or replace existing sirens, if needed	City Clerk	Linn County EMA, IHSEMD	Medium	Medium	City, PDM, HMGP
1	3	Complete water and sewer infrastructure improvements	Public Works Director	IDNR	High	High	City, CDBG, others to be identified
1	4	Acquire, relocate, elevate, and/or demolish structures in the floodplain	City Clerk	IHSEMD	High	High	City, PDM, HMGP, FMA
1	5	Add hazard related information the city's website	City Clerk	Linn County EMA	Medium	Low	City
1	6	Update the city's all-hazard emergency response plan	City Clerk	Public Works, Linn County EMA	Medium	Low	City
1	7	Install safe room at a critical facility	City Clerk	IHSEMD	High	High	City, PDM, HMGP
1	8	Update Duane Arnold Energy Center Preparedness Plan	Fire Chief	Linn County EMA, DAEC	Medium	Low	City
1	9	Complete and maintain a debris management plan and all related contracts	City Clerk	Linn County EMA	High	Low	City

Walker Action Plan

The Walker planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 159 for the City's action plan.

Table 159: Walker Action Plan

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	1	Purchase and install backup power generators in critical facilities	Public Works Technician	IHSEMD	High	Medium	City, PDM, HMGP
1	2	Construct tornado safe rooms in public facilities and recreation areas	City Clerk	Public Works Technician, IHSEMD	High	High	City, PDM, HMGP
1	3	Remove debris from creeks	City Clerk	IDNR	Medium	Low	City, others to be identified
1	4	Add hazard-related information to the city's website	City Clerk	Linn County EMA	Medium	Low	City
1	5	Purchase weather radios for the City Shop	City Clerk	Public Works	High	Low	City
1	6	Continue water, sewer, and stormwater infrastructure improvements	Public Works Technician	IDNR	High	High	City, CDBG, others to be identified
1	7	Add battery backup/generator hookups to sirens	Mayor/Fire Chief	IHSEMD	High	Low–Medium	City, PDM, HMGP
1	8	Complete and maintain a debris management plan and all related contracts.	City Clerk	Linn County EMA	High	Low	City
1	9	Evaluate and complete flood risk reduction projects	Public Works Technician	IHSEMD	High	Medium–High	City, PDM, HMGP, other locally available grants
1	10	Engage with the Middle Cedar Watershed Management Authority	City Clerk		Medium–High	Low	City
1	11	Purchase radios for city staff communication	Mayor		High	Low	City

Alburnett Community School District Action Plan

The Alburnett CSD planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 160 for the District's action plan.

Table 160: Alburnett CSD Action Plan

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	1	Purchase and install generators for critical facilities	Superintendent	IHSEMD	High	Medium	District, HMGP, PDM
1	2	Update secure entrances	Superintendent		High	Medium–High	District, other locally available grants
1	3	Construct tornado safe room at sports complex	Superintendent	IHSEMD	High	High	District, HMGP, PDM
1	4	Provide hazard information through District website or newsletter	Superintendent		High	Low	District
1	5	Create evacuation/response plan for rail incident/amend crisis plan	Superintendent		High	Low–Medium	District, other locally available grants

Cedar Rapids Community School District Action Plan

The Cedar Rapids CSD planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 161 for the District's action plan.

Table 161: Cedar Rapids CSD Action Plan

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	1	Purchase and install generators for critical facilities	Building and Grounds Manager	IHSEMD	High	Medium	District, HMGP, PDM
1	2	Construct a tornado safe room in new district facilities	Building and Grounds Manager	IHSEMD	High	High	District, HMGP, PDM
1	3	Install cameras and intruder locks in all school facilities	Building and Grounds Manager		High	Medium–High	District, other locally available grants
1	4	Continuation and implementation of security and safety infrastructure in all district facilities	Building and Grounds Manager		High	Medium–High	District, other locally available grants
1	5	Construct storage facility for sand/salt or other hazard preparedness materials	Building and Grounds Manager		High	High	District, other locally available grants
1	6	Install check valves on waste water infrastructure at critical facilities	Building and Grounds Manager	IHSEMD	High	Medium–High	District, HMGP, PDM, FMA
1	8	Share hazard information on the District's website	Assistant to Superintendent	Linn County EMA	High	Low	District
2	7	Install berm at critical facilities	Building and Grounds Manager	IHSEMD	High	High	HMGP, PDM, FMA

Center Point-Urbana Community School District Action Plan

The Center Point-Urbana CSD planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 162 for the District's action plan.

Table 162: Center Point-Urbana CSD Action Plan

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	1	Construct a tornado safe room as a multi-purpose addition to district facilities	Superintendent	Linn County EMA, IHSEMD	High	High	District, PDM, HMGP
1	2	Retrofit facilities for high wind hazard events	Superintendent	IHSEMD	Medium	Medium – High	District, PDM, HMGP
1	3	Purchase and install generators in critical facilities	Superintendent	IHSEMD	High	Medium – High	District, PDM, HMGP
1	4	Add air conditioning to all district facilities	Superintendent	---	High	High	District
1	5	Identify and implement stormwater management solutions on district property	Superintendent	Engineering consultant, IHSEMD	High	Medium – High	District, PDM, HMGP, FMA
1	6	Provide hazard information through District website or newsletter	Superintendent		High	Low	District

College Community School District Action Plan

The College CSD planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 163 for the City's action plan.

Table 163: College CSD Action Plan

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	1	Purchase and install generators for critical facilities	Superintendent	Director of Building and Grounds, IHSEMD, Linn County EMA	High	High	District, PDM, HMGP
1	2	Construct a tornado safe room in new district facilities	Superintendent	Director of Building and Grounds, IHSEMD, Linn County EMA	High	High	District, PDM, HMGP
1	3	Install cameras and intruder locks school facilities	Superintendent	Cedar Rapids Police Department, Linn County EMA	Medium	Medium–High	District, others to be identified
1	4	Install additional redundancy and/or backup for communications equipment and/or the server.	Superintendent		High	Medium	District, other locally available grants
1	5	Install a warning siren	Superintendent	IHSEMD, Linn County EMA	High	Medium	District, HMGP, PDM
1	6	Research/install lightning detection system.	Superintendent	Linn County EMA	High	Medium	District, other locally available grants
1	7	Provide educational notices regarding hazards on the school website.	Superintendent	Linn County EMA	High	Low	District
1	8	Research/install an additional internet service provider.	Superintendent		Medium	Low	District

Linn-Mar Community School District Action Plan

The Linn-Mar CSD planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 164 for the District's action plan.

Table 164: Linn-Mar CSD Action Plan

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	1	Complete structural retrofit of data center or move to hardened facility	Director of Technology		High	Medium	District
1	2	Install generators at critical facilities	Operations Manager	IHSEMD	High	Low–medium	District, HMGP, PDM
1	3	Install a tornado safe room at a critical facility	Operations Manager	IHSEMD	High	High	District, HMGP, PDM
1	4	Infrastructure retrofit of critical facilities	Operations Manager		High	Low–high	District, other locally available grants
1	5	Install cameras at critical facilities	Director of Technology		High	Medium	District, other locally available grants
1	6	Complete flood mitigation project near Indian Creek	Operations Manager	IHSEMD	High	Medium–high	District, HMGP, PDM, FMA
1	7	Include hazard-related information on the District website	Communications and Media Relations Coordinator	IHSEMD	High	Low	District

Mount Vernon Community School District Action Plan

The Mount Vernon CSD planning committee prioritized the mitigation actions in the jurisdiction's mitigation strategy to determine the potential benefit, cost, and priority level. Mitigation actions with a high priority level are expected to be addressed by the jurisdiction during the life of this plan. Refer to Table 165 for the District's action plan.

Table 165: Mount Vernon CSD Action Plan

Priority Level	ID	Proposed Mitigation Action	Lead	Potential Partner(s)	Benefit	Cost	Potential Funding Source(s)
1	1	Complete a comprehensive safety audit of all district schools and facilities in cooperation with the Mount Vernon Police Department	Superintendent; Chief of Police	Police Department, Insurance Company	High	Low	Partnership with City of Mount Vernon
1	2	Develop a comprehensive safety and crisis response handbook for the entire district	Superintendent; Building Administrators	Police and Medical Personnel in Mount Vernon	High	Low	NA
1	3	Establish a new District Safety/Crisis Team	Superintendent	All Staff	High	Low	NA
1	4	Train staff in intruder response using the Four E's protocol: Educate, Escape, Evade, Engage and/or ALICE protocols	District Safety Team	Those trained in the Four E's and ALICE	High	Low	District funds
1	5	Train students in intruder response using the Four E's protocol: Educate, Escape, Evade, Engage and/or ALICE protocols	District Safety Team	Those trained in the Four E's and ALICE	High	Low	District funds
1	6	Purchase generator for backup power	Superintendent; Technology Director	FEMA, Iowa Homeland Security	High	Medium	Hazard Mitigation Grant (HMGP, PDM_
1	7	Add tornado safe room with new construction	Superintendent	FEMA, Iowa Homeland Security	High	High	Hazard Mitigation Grant (HMGP, PDM)

Plan Incorporation and Maintenance

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

In order for a multi-jurisdictional hazard mitigation plan to be effective and ultimately a worthwhile use of resources in each participating jurisdiction, there must be an established procedure to incorporate it into other plans, as well as to monitor, evaluate, and update it. As indicated throughout this plan, jurisdictions in Linn County vary in type and size, so plan incorporation and maintenance procedures will also vary. For example, larger jurisdictions may establish formal requirements while others may complete a periodic, informal plan review. Overall, local preferences determine plan incorporation and maintenance.

In each jurisdiction, a particular staff member is responsible for remaining aware of the jurisdiction's mitigation strategy and encouraging the completion of mitigation actions. In addition, this staff member will also be responsible—with a reminder from the planning consultant, the East Central Iowa Council of Governments—for completing a periodic review, formal or informal. If an update for a specific jurisdiction is needed during the five year life of this plan, the staff member will initiate an amendment process with the planning consultant.

In addition, the planning consultant will be involved in periodic plan reviews by providing information about funding opportunities and a reminder of the established maintenance procedure. The planning consultant will either attend review meetings, or the jurisdiction will provide relevant information to the planning consultant. As the regional planning agency, the planning consultant works with each participating jurisdiction on a regular basis.

During the plan effective period, there may changes in local conditions or priorities that result in the need to amend a mitigation strategy. The planning consultant will provide assistance to a jurisdiction that amends its mitigation strategy and communicate with Linn County Planning and Development during all steps in the process, which are the following:

1. The jurisdiction will work with the planning consultant to review the existing plan/mitigation strategy and develop the proposed mitigation action(s) to be amended into the jurisdiction's mitigation strategy.
2. The jurisdiction's governing body will allow public comment on the proposed amendment by either addressing the issue in a regular meeting or reconvening the hazard mitigation planning committee. The amendment will be approved by motion or resolution by the jurisdiction's governing body.
3. The planning consultant will submit the amendment to the mitigation strategy and action plan to Iowa Homeland Security and Emergency Management Department (IHSEMD). Once the amendment is approved by IHSEMD, the planning consultant will distribute the plan amendment information to all jurisdictions included in the plan.

Local jurisdictions may incorporate the plan or plan components into other local plans or planning mechanisms. Many Linn County jurisdictions' comprehensive plans reference the *Linn County Multi-Jurisdictional Hazard Mitigation Plan*. The City of Cedar Rapids, for example, has considered hazards and the environment in a chapter in their 2015 comprehensive plan,

EnvisionCR, refer to Appendix D. Plans and planning mechanisms which may benefit from incorporating or referencing the hazard mitigation plan include, but are not limited to, the following:

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

- Updates of the zoning code that may include additional regulations on buildings near identified hazard areas, which may include steep slopes, unstable soils, special flood hazard areas, proximity of residential areas to transportation routes, hazardous materials, and other hazards;
- Updates to comprehensive plans that include mitigation-related goals;
- Updates to watershed plans that address flood risk reduction;
- Updates to the subdivision ordinance relating to setback on properties that pose a higher than average risk from infrastructure failure or hazardous materials incidents;
- Updates to the building code that may include adoption of a full set of building codes or adoptions of more stringent building codes;
- Updates to the floodplain maps or floodplain regulations;
- Updates to the capital improvement plan, which may include mitigation of infrastructure, flood, or other hazards;
- Repetitive Loss Area Analysis (RLAA), which satisfies requirements of the Community Rating System (CRS)—refer to Appendix E for a copy of the RLAA for Cedar Rapids—
- Any new additions to the city/county code or administrative policies that may include but are not limited to solid waste regulations, landscape codes, evacuation plans, response plans, fire mitigation programs, and construction of retrofit programs;
- An overview of how the information contained in the hazard analysis and risk assessment was used in any other planning documents.

Since the plan is multi-jurisdictional and the county initiated this particular plan, a complete plan update will be initiated by Linn County approximately three years from plan approval. Linn County Planning and Development is responsible for completing plan updates. Future plan updates may be funded with Hazard Mitigation Assistance grant funding and prepared by a planning consultant that coordinates with Linn County. For the plan maintenance procedure in each participating jurisdiction, refer to Table 166.

Requirement §201.6 (c)(4)(iii): [The plan shall include the following:] (4) [A plan maintenance process that includes:] (iii) Discussion on how the community will continue public participation in the plan maintenance process.

Evaluation of the plan will occur during the plan update process. Whether or not mitigation actions are completed will determine the overall effectiveness of the plan. The impacts of hazard events during the life of the plan and results of mitigation actions will determine whether or not an effective mitigation strategy was established for each jurisdiction. All participating jurisdictions are committed to continuous improvement in future plan updates.

Through plan monitoring and review, jurisdictions will continue to seek public input. Each jurisdiction will make the plan available to the public for review at any time. Grant applications or reallocation of funding to complete mitigation actions must be approved by local officials, which will occur at public meetings where public input is allowed. In addition, a complete plan update will involve one, or more, hazard mitigation planning meeting that is open to the public.

Table 166: Linn County Plan Incorporation and Maintenance

Jurisdiction	Staff Member	Plan Incorporation	Monitor and Review	Evaluation and Update
Linn County	Stephanie Lientz	Formal adoption and the monitor and review process	September annually	To begin approximately three years after approval
Alburnett	Danielle Brecht		September annually	
Bertram	Lisa Berry		October/November annually	
Cedar Rapids	Adam Lindenlaub		June annually	
Center Point	Chelsea Huisman		April/May annually	
Central City	Shelley Annis		October/November annually	
Coggon	Brenda Quandt		October/November annually	
Ely	Denise Hoy		June annually	
Fairfax	Cynthia Stimson		August/September annually	
Hiawatha	Kim Downs		March/April annually	
Lisbon	Connie Meier		June annually	
Marion	Kesha Billings		November annually	
Mount Vernon	Doug Shannon		January annually	
Palo	Trisca Dix		May/June annually	
Prairieburg	Karen Bixler		April annually	
Robins	Lori Pickart		October annually	
Springville	Mark Bloom		June annually	
Walker	Connie Helms		April annually	
Alburnett CSD	Dani Trimble		July annually	
Cedar Rapids CSD	Laurel Day/John Galbraith		March annually	
Center Point-Urbana CSD	Matt Berninghaus		September annually	
College CSD	Jim Rotter		January/February annually	
Linn-Mar CSD	J.T. Anderson		November/December annually	
Mount Vernon CSD	Greg Batenhorst		May/June annually	

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