Carroll County Multi-Jurisdictional Hazard Mitigation Plan 2026

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Chapter 1: Introduction

Purpose

FEMA defines mitigation as any sustained action taken to reduce or eliminate long-term risk to life and property from a hazard event. The goal of mitigation is to decrease the need for response as opposed to simply increasing the response capability. For the purpose of this plan, mitigation discussions focus on specific actions taken to reduce loss of life and property from hazards by modifying the built environment and undertaking other actions to reduce the risk and potential consequences of these hazards.

Section 322 of the Stafford Act, 42 U.S.C. 5165 as amended by DMA 2000 (Public Law 106-390), provides for states, tribes, and local governments to undertake a risk-based approach to reducing risks of natural hazards through mitigation planning. FEMA implemented hazard mitigation planning provisions through regulations at 44 CFR Part 201. This plan was prepared in accordance to the regulations set forth in 44 CFR §201.6. Under this regulation, local governments must have an approved plan to apply for and/or receive funding through the Hazard Mitigation Grant Program, Pre-Disaster Mitigation, Flood Mitigation Assistance, and Severe Repetitive Loss programs.

The purpose of the Carroll County Multi-Jurisdictional Hazard Mitigation Plan is to reduce the effects that hazards have on people and property in Carroll County. Hazard mitigation planning is the process through which hazards that threaten jurisdictions are identified, likely impacts of those hazards are determined, mitigation goals are set, and appropriate strategies to lessen impacts are identified, prioritized, and implemented. This document will be used to plan and prioritize future mitigation projects in Carroll County. This plan will comply with the appropriate Federal and State laws and planning requirements while making the county and communities eligible for certain federal disaster assistance, specifically the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program, Pre-Disaster Program, and the Flood Mitigation Assistance Program.

Two of the most important components of emergency management deals with disaster recovery and hazard mitigation. Hazard mitigation is the only phase of emergency management specifically dedicated to breaking the cycle of damage, reconstruction, and repeated damage. This plan demonstrates Carroll County's commitment to reduce risks due to hazards, and serves as a tool to help decision makers facilitate mitigation activities and resources.

Assurance to Compliance with FEMA Requirements

This multi-jurisdictional mitigation plan complies with Iowa Homeland Security and Emergency Management Division's and FEMA's planning guidance; FEMA regulations, rules, guidelines, and checklists; Code of Federal Regulations; existing Federal and State laws; and such other reasonable criterion as the President/Governor, Federal/State legislatures and IHSEMD/FEMA may establish in consultation with local governments while the plan is being developed. This plan also helps with the minimum planning requirements for all FEMA mitigation programs, such as the Flood Mitigation Assistance (FMA) Program, the Pre-Disaster Mitigation (PDM) Program, and the Hazard Mitigation Grant Program (HMGP), and where appropriate, other FEMA mitigation related

programs such as the National Earthquake Hazards Reduction Program (NEHRP), the National Flood Insurance Program (NFIP), and the Community Rating System (CRS).

Planning Process

Region XII Council of Governments was hired by Carroll County to facilitate the development of the Multi-Jurisdictional Plan. Region XII used the FEMA prescribed process to complete this plan. The plan was developed by the Planning Team which included representatives from incorporated cities, local businesses and organizations, and local residents. Participants in the planning process and measures taken to solicit and encourage public participation are identified in the public participation section. Planning guidance from FEMA and IHSEMD has established a framework used to complete the planning process. This plan is organized around the four-phase process that includes: organizing resources, assessing risks, developing the mitigation plan, and implementing the plan. This plan is an update and looks different from previous plans as planning processes have changed, the planning team has more experience, good examples have been examined and plan update requirements are found throughout.

Meetings

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

Region XII staff moderated the committee meetings. There was no set time limit for each meeting, but most lasted between one and two hours, depending on the committee's discussion. Each city held meetings to discuss and adopt the hazard mitigation plan.

Region XII met with each jurisdiction individually during city council meetings or County Supervisor meetings throughout August and September 2025 and January and February 2026. These meetings allowed Region XII staff to present an overview of the plan requirements as outlined in FEMA guidance, with particular note of multi-jurisdictional requirements. Previous critical facility maps were handed out along with the community profiles, and committee members were asked to add or remove facilities as necessary. To ensure accuracy, these maps were also sent to city staff. Discussion about which hazards should be included in the plan were held and the hazards identified in the 2023 State of Iowa Hazard Mitigation Plan was referenced. Committee members scored hazards based on probability, severity, warning time, and duration.

During city meetings, city staff and elected officials were given their respective community profiles, previous goals, and respective appendix. In order to determine plan goals, goals from the previous plan were handed out, and evaluated. The evaluation led to adding new goals, and the determination of what goals the committee wanted to include was completed. Along with the discussion of the goals were the mitigation actions, as these ensure that the city meets their goals. Each city's respective goals and mitigation actions can be found in their respective appendix. The County goals are located in Chapter 4.

When necessary, there were a couple additional meetings held to allow for additional input outside of the committee meetings. School board members were invited to their respective city meetings, but staff attended each school board for the adoption of the plan to answer any questions.

Participation

To be a participating jurisdiction, certain guidelines needed to be met. These guidelines include:

- An official of the jurisdiction must attend the planning team meetings;
- Participate in surveys and data collection activities;
- Participate in a local planning session in the jurisdiction, as needed, to finalize local elements of the plan;
- Review the plan draft and provide applicable feedback;
- Adopt the final plan.

The jurisdictions that participated in the creation of this plan include Carroll County, City of Arcadia, City of Breda, City of Carroll, City of Coon Rapids, City of Dedham, City of Glidden, City of Halbur, City of Lanesboro, City of Lidderdale, City of Manning, City of Ralston, City of Templeton, City of Willey, Carroll Community School District, Kuemper Catholic School System, Coon Rapids-Bayard Community School District, Glidden-Ralston Community School District, IKM-Manning Community School District. The following table lists the appointed

Audubon County Planning Committee		
Jurisdiction	**Name**	**Position**
Carroll County Emergency Management	Jeff Cullen	County EMA
Carroll County	Gene Meiners	Supervisor Chair
City of Arcadia	John Liechti	Mayor
City of Breda	Dan Snyder	Mayor
City of Carroll	Gerald Fleshner	Mayor
City of Coon Rapids	Jeffrey Anthofer	Mayor
City of Dedham	Tom Seidl	Mayor
City of Glidden	Sara Fleecs	Mayor
City of Halbur	Bryan Wittrock	Mayor
City of Lanesboro	Jamie Hanlon	Mayor
City of Lidderdale	Max Wenck	Mayor
City of Manning	Joe Maas	Mayor
City of Ralston	Curt Hike	Mayor
City of Templeton	Ken Behrens	Mayor
City of Willey	Kristin Nehring	Mayor
Carroll Community School District	Dr. Casey Berlau	Superintendent
Kuemper Catholic School System	John Steffes	President
Coon Rapids-Bayard Community School District	Thomas Ridder	Superintendent
Glidden-Ralston Community School District	Thomas Ridder	Superintendent
IKM-Manning Community School District	Dr. Angela Huseman	Superintendent

Other organizations were invited to participate in the planning process and develop projects within one or more of the jurisdictions. The following table lists people who attended at least one meeting in addition to the committee members. The input from the following individuals helped fully develop the Hazard Mitigation Plan.

Additional Plan Contributors		
Jurisdiction	Name	Position
City of Coon Rapids	Codi Willenburg	City Council Member
City of Coon Rapids	Janelle Kracht	City Council Member
City of Coon Rapids	Mike Deeth	City Council Member
City of Coon Rapids	Larry Lenz	City Council Member
City of Coon Rapids	Jes Leighty	City Clerk
City of Templeton	Mark Bauer	City Council Member
City of Templeton	Cory Drees	City Council Member
City of Templeton	Ethan Irlbeck	Public Works
City of Templeton	Nicole Kathol	City Clerk
City of Templeton	Natasha Boecke	City Council Member
City of Templeton	David Ramsey	City Council Member
City of Breda	Rhonda Martin	City Clerk
City of Breda	Chris Uhlenkamp	City Council Member
City of Breda	Samantha Pietig	City Council Member
City of Breda	Kayla Tiefenthaler	City Council Member
City of Breda	Jeff Riesberg	City Council Member
City of Glidden	Brooke Peterson	City Clerk/City Administrator
City of Glidden	Tom Weber	Public Works/ Fire Chief
City of Manning	Dawn Meyer	City Administrator/ Manning EMS
City of Manning	Justin Mundt	Public Works
City of Manning	Tyler Hoffmann	Police Chief
Manning Municipal Utilities	Jeremy Carroll	Utility Director
City of Arcadia	Wes Bierl	City Council Member
City of Arcadia	Linda Julin	City Council Member
City of Arcadia	Paul Hinners	City Maintenance
City of Arcadia	Julie Schroeder	City Clerk
City of Carroll	Dan Hannasch	Fire Chief
City of Carroll	Aaron Kooiker	City Manager
City of Lanesboro	Linette DeSart	City Council Member
City of Lanesboro	Wanda Batta	City Council Member
City of Lanesboro	Emily Winker	City Clerk
City of Lanesboro	Kevin Winder	City Council Member
City of Lanesboro	Kelly Addison	City Council Member
City of Ralston	Melinda Hinners	City Clerk
City of Ralston	Chad Stevens	Zoning Administrator/ City of Jefferson
City of Ralston	Annie Johnston	City Council Member
City of Ralston	Drew Sorensen	City Council Member
City of Ralston	Casey Smick	City Council Member
Carroll County	Mark McCrea	County Supervisor
City of Lidderdale	Mike Skinner	City Council Member

Additional Plan Contributors		
City of Lidderdale	Alex Scharfenkamp	City Council Member
City of Lidderdale	Tony Brown	City Council Member
City of Lidderdale	Paul Daniel	City Maintenance
City of Lidderdale	Chris Daniel	City Clerk
City of Lidderdale	Brad Christie	City Council Member
City of Halbur	Caleb Hopkins	City Council Member
City of Halbur	Dan Drake	City Council Member
City of Halbur	Kim Risselman	City Council Member
City of Halbur	Ali Eischeid	City Council Member
City of Halbur	Scott Mikkelsen	City Council Member
City of Halbur	Matt Leonard	City Council Member
City of Halbur	Jessica Borkowski	City Clerk

This plan, as it includes many jurisdictions that serve one another provided a unique opportunity for the members of one jurisdiction to provide input for multiple jurisdictions. Fire departments from certain cities have jurisdictions that cover portions of the county, and many departments provide mutual and automatic aid on calls. This allows for department members to communicate concerns about jurisdictions outside their own, with evidence to back-up these comments. School districts overlap in similar fashions as the fire department jurisdictions. Many members of communities, while they reside in one community, may work or have business in others, allowing these members to spend large amounts of time interacting with other jurisdictions and being involved in jurisdictions outside their hometowns. This unique opportunity has created a large amount of information being shared on various jurisdictions during each jurisdiction's meeting.

Public Involvement

44 CFR 201.6(b): 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 planning approval.

Committee and additional meetings were open to the public. Agendas were posted in the Courthouse or respective jurisdiction prior to each meeting. Public outreach was strongly sought after at the mitigation action meeting, as well as during the draft plan period. The public was invited to each meeting as notice was given within the city's council meeting agenda, county supervisor agenda, or school board agenda. The public was invited to attend and participate, and feedback which helped shape the mitigation actions and determine critical facilities was provided during these meetings from private citizens. All meetings were conducted in compliance with Chapter 21 of the Code of Iowa.

The hazard mitigation plan was discussed during various city council, county supervisor, and school board meetings, which are all conducted in compliance with the Iowa Open Meeting Law-Iowa Code Chapter. Many of the jurisdictions within this plan are small, rural, communities which in general have been considered underserved as resources are limited and these communities can be overlooked for programs which larger communities benefit from. All members of each community were reached using the same notification methods of regular meeting notifications which include posting on social media, posting around the community, notice on a jurisdiction's website, and sometimes notification in the newspaper.

When the plan reached draft stage, the public was encouraged to view it online and leave comments and criticisms. The plan was available in a paper format, but was uploaded to the Region XII website with a survey link also being available for public comment. Notice of the plan being available for public comment was made public through conversations with city officials and social media. There were no comments received from the public survey about th e plan and its contents. On May 26, 2026, a draft of the plan was uploaded to Region XII's website which is accessible to all members of the public. If the public wished to view the plan prior to this, they were able to request it from either their jurisdiction, either county, or Region XII COG. After May 26, as spelling/grammar changes were made, the newest draft was uploaded to the website. Jurisdictions were advised to use the link that would lead interested parties to the website, to reduce paper waste, and to ensure the newest draft was readily available. While the plan was made public through various postings on social media, links on websites, and a few newspaper postings, there were no comments received from the public about the plan or its contents.

To obtain input from outside organizations who have an interest on Carroll County's jurisdictions, an email was sent to organization heads requesting input on the plan. A list of these organizations, along with a copy of the email can be found in the Rural County appendix.

Plan Content

This plan evaluates all aspects of hazard mitigation. The plan is split into six chapters, which serve as an overview for the plan. The first chapter is an introductory chapter which explains the planning process used in development of the plan. Carroll County's general background is given in chapter two. The planning process is put in motion by explaining the specific steps taken to generate each jurisdiction's risk assessment (chapter 3), vulnerability assessment and loss estimates (chapter 4), and mitigation strategies (chapter 5). The final chapter of the plan explains how the plan was adopted and how it will be maintained in the future.

Appendices A-F present the details of each jurisdiction's hazard mitigation plan outcomes. Each appendix includes the jurisdiction's critical infrastructure, risk assessment, vulnerability and loss estimates, mitigation strategies, flood maps (when applicable), and resolution adopting the plan.

Section 201.6 (c)(5): [The local hazard mitigation plan shall include] documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan. For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.

Plan Content Updates/Changes

In all phases of the planning process, the planning team reviewed the existing sections of the plan and provided comments on necessary changes. Planning requirements from FEMA and other applicable bodies become increasingly stringent, requiring new and updated data.

Referenced Plans

Referenced plans throughout the planning process and within this document include:

- Iowa State Hazard Mitigation Plan, 2023
- Carroll, Crawford, Greene, and Sac Counties Multi-Jurisdictional Hazard Mitigation Plan 2020
- FEMA State and Local Hazard Mitigation Planning How-to Guides

Many other plans that are jurisdiction specific were utilized in the development of each jurisdiction's appendix. These plans included, but are not limited to: comprehensive plans, city codes, zoning codes, strategic plans, previous hazard mitigation plans, capital improvement plans, housing needs assessments, and building codes. These plans were used to develop portions of each jurisdiction's appendix.

Chapter 2: County Profile

Carroll County

History

The area that is now Carroll County, Iowa, was known simply as "the swamp land" by early settlers. It was first used by local Native Americans for hunting and was seen as a watering stop for people heading to California in pursuit of gold. Carroll County was created on January 15, 1851, as part of 49 new counties in the western part of Iowa. However, it wasn't until 1852 when the area received its first permanent settlers who were intrigued by the fertile soil that was present. The county, and eventually the city, was named after Charles Carroll of Carrollton, Maryland. He was the only Roman Catholic to sign the Declaration of Independence, and the longest living signer.

An 1856 act of Congress encouraged the expansion of rail lines through Iowa, which led to the city of Carroll being created. Carroll was originally started and laid out by the Chicago and North Western Railroad in the late 1860's. Carroll's first building was a warehouse for the railroad. This new hamlet was declared the county seat on April 28, 1868, after the county records were moved there from the small town of Carrollton, located in southeast Carroll County.

Carroll's first courthouse was built in 1869 in the town square at a cost of $4,000 and the first permanent school was built the same year. The Chicago Great Western Railway was built in 1902 and ran from the northeastern part of the county, through Carroll, and then southwest to Manning. The proclamation for the Lincoln Highway was signed on September 10, 1913. This route, starting at Times Square in New York City and ending in San Francisco, would be the first transcontinental highway in the United States. Grading for the portion of the road in Carroll County began in 1917. The highway runs through the center of the county, including the cities of Ralston, Glidden, Carroll, and Arcadia.

Geography and Environment

Carroll County is located in the west central part of Iowa. Greene, Calhoun, Sac, Crawford, Shelby, Audubon and Guthrie Counties are all bordering counties. The main means of transportation for residents of Carroll County is either Highway 30 intersecting the county east/west, Highway 71 intersecting the county north/south or Highway 141 which runs east/west along the southern border of Carroll County. The City of Carroll is the county seat and is located in the center of the county. The 569 square mile county is made up of thirteen incorporated communities: Arcadia, Breda, Carroll, Coon Rapids, Dedham, Glidden, Halbur, Lanesboro, Lidderdale, Manning, Ralston, Templeton, and Willey.

The highest elevation in Carroll County can be found in the southwestern corner of the county. Here, the elevation can reach as much as 1,550 feet above sea-level. As you move east through the county, where many of the communities are located, the county continues to decline to as little as 1,154 feet. Map 2.1 displays the elevation distribution of Carroll County.

Map 2.1: Carroll County Elevation

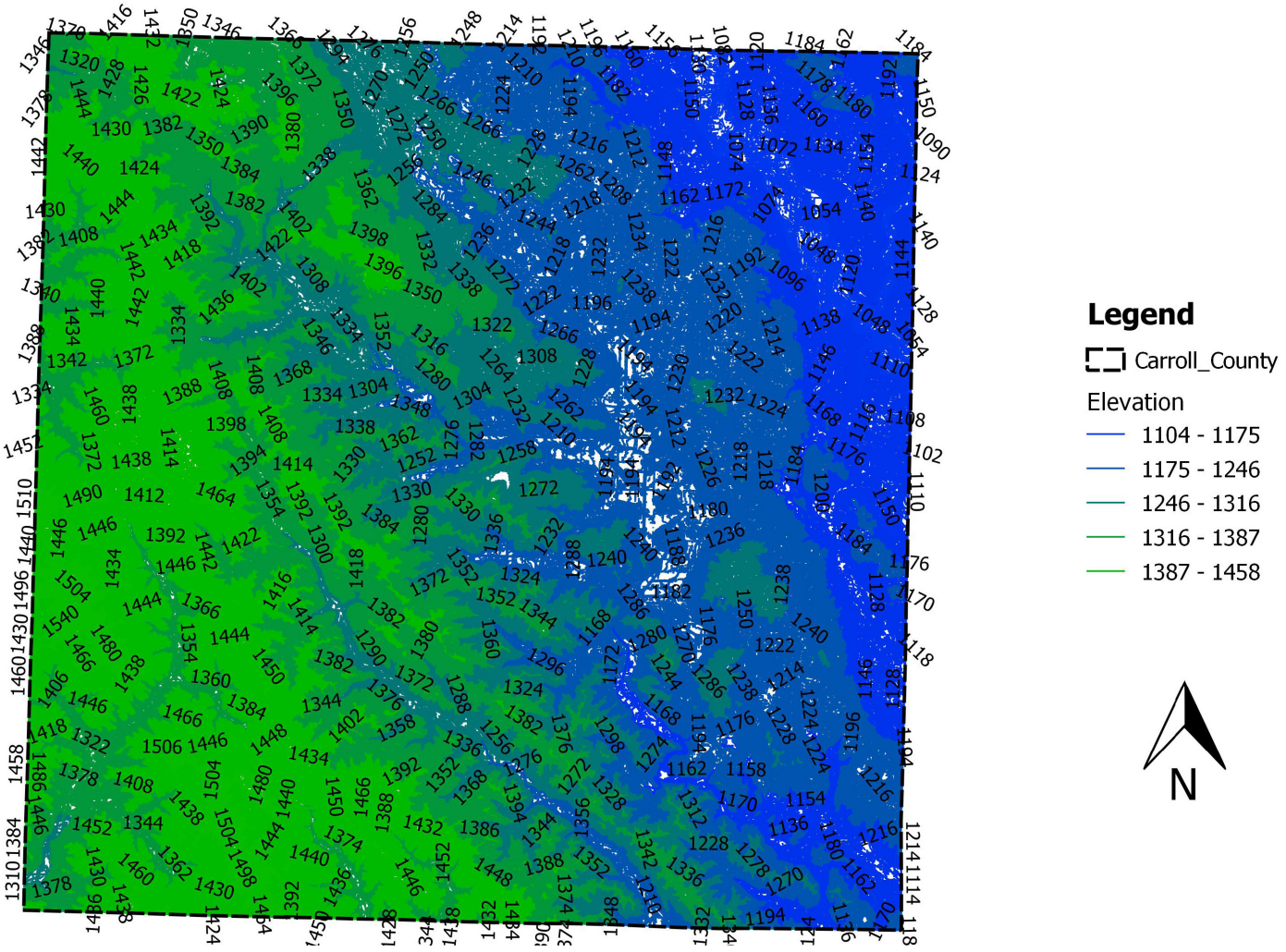


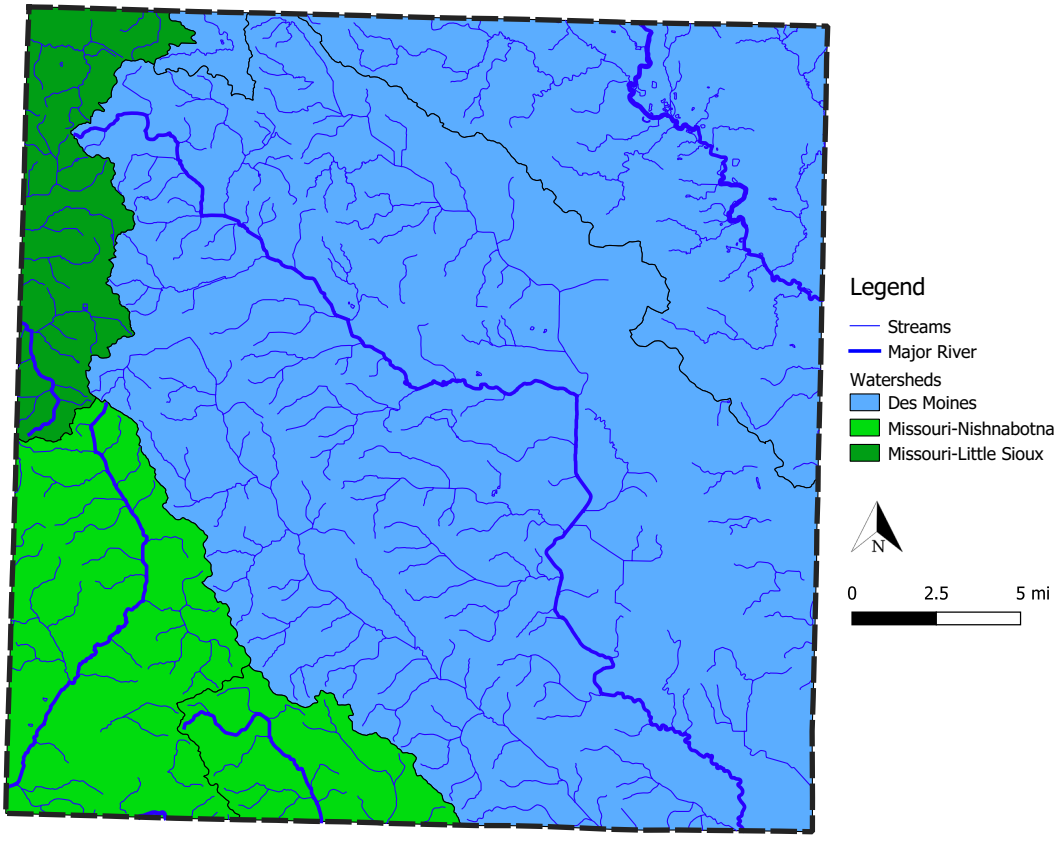
Table 2.1: Soils of Carroll County

Soil Association	% of County	Description
Clarion-Nicollet-Webster	31%	This association consists of soils on young till plains. They are nearly level to strongly sloping, well drained, somewhat poorly drained, and poorly drained, loamy and silty soils that formed in glacial till or in local glacial sediment, found on uplands.
Clarion-Storden	6%	These soils are found on glacial moraine areas. They are moderately sloping to very steep, well drained, loamy soils that formed in glacial till, found on uplands.
Wadena-Coland-Storden	6%	These soils can be found on flood plains, terraces, glacial outwash plains, and valley side slopes. They are nearly level to very steep, well drained and poorly drained, loamy soils that formed in glacial outwash sediment, alluvium, and glacial till; found on uplands and bottomlands.

Soil Association	% of County	Description
Marshall-Exira	35%	These soils are soils on ridges, side slopes, and valleys. They are nearly level to moderately steep, well drained, silty soils that formed in loess, found on uplands.
Marshall-Exira-Burchard	14%	These soils are on rides and side slopes that are dissected by valleys. They a re nearly level to steep, well drained and moderately well drained, silty and loamy soils that formed in loess and on glacial till, found on uplands
Colo-Ackmore-Calco	6%	These are silty soils on alluvial flood plains. They are nearly level to gently sloping, poorly drained, silty soils that formed in alluvium, found on bottomlands.
Gara-Knox-Armstrong	2%	These are soils on rather narrow ridges and long side slopes. They are moderately sloping to very steep, well drained to somewhat poorly drained, loamy and silty soils that formed in glacial till and loess; found on uplands.

There are a number of major rivers located in Carroll County. Those rivers include the North Raccoon River, Purgatory Creek, Middle Raccoon River, East Boyer River, West Nishnabotna River and Brushy Creek. Also found in Carroll County is Swan Lake, located just south of the City of Carroll. Map 2.2 shows the local watersheds of Carroll County as well as the streams and major rivers. The majority of the county is located in the Des Moines River watershed. The northwest corner of the county is located in the Missour-Little Sioux watershed and the southwestern corner of the county is located in the Missouri-Nisnabotna watershed.

Map 2.1: Carroll County Watersheds



Transportation

The principal highways in Carroll County are listed in Table 2.2, in addition to the approximate mileage of farm-to-market and secondary roads in the county. Carroll County contains two U.S. Highways and one State Highway. Outside city limits, the average daily traffic on Highway 30 is between 3,680 and 8,000. Outside city limits, Highway 71 has average annual daily traffic counts from 770 to 5,200.

The participating communities in Carroll County have roads to all developed areas. Most of the roads in the incorporated communities are seal coated or paved. Most communities have gravel roads as well. Western Iowa Transit provides public transit using an "on-demand" service throughout the county.

The Arthur N. Neu Municipal Airport is the only airport located in Carroll County. It is located east of the City of Carroll and is one of the busiest airports in Western Iowa. The airport has two paved and lighted runways measuring 3,300' and 5,500'. The airport has space for 24 airplanes. The "Iowa Aviation System Plan" identifies the airport as an Enhanced Service airport. Enhanced Service airports have runways 5,000 feet or greater in length with facilities and services that accommodate a full range of general aviation activity, including most business jets.

Table 2.2: Carroll County Transportation Network

Roadway	Mileage (approximate)	Communities Served
U.S. Highway 30	24 miles	Arcadia, Carroll, Glidden, Ralston
U.S. Highway 71	27 miles	Carroll, Templeton
IA Highway 141	23 miles	Coon Rapids, Dedham, Templeton, Manning
Farm-to-Market	373 miles	All
Secondary Roads (area serviced)	1,007 miles	All

Demographics

The population of an area is one of the most important assets because without people, there is no labor force, entrepreneurs, taxpayers, and buyers of goods and services. Carroll County's population has seen an overall decline since 1960. There have been some periods of small growth, but the overall trend has been downward, limiting the amount of influence the population can exert on development. Since 2010, Carroll County has lost 0.3% of its total population. Since 2000, there has been a population loss of 3.1% in the county.

Population size, composition, and distribution influence the range of businesses a county can support, the pool of workers from which to draw, and the demand for and supply of services. Population trends give county leaders information on what kind of services need to be provided and offers prospective employers an overview of the local labor force. Figure 2.1 displays Carroll County's population from 1960 to 2020.

Figure 2.1: Carroll County Population: 1960-2020

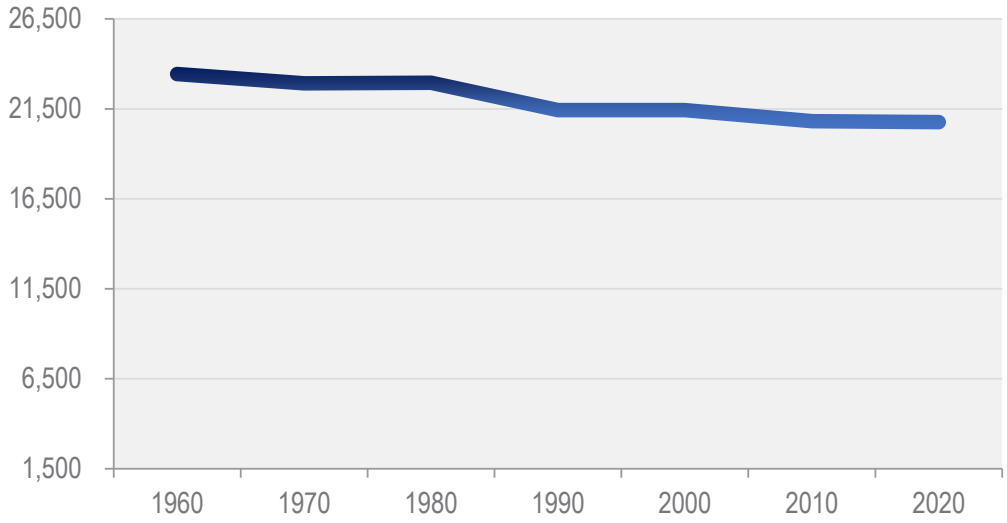
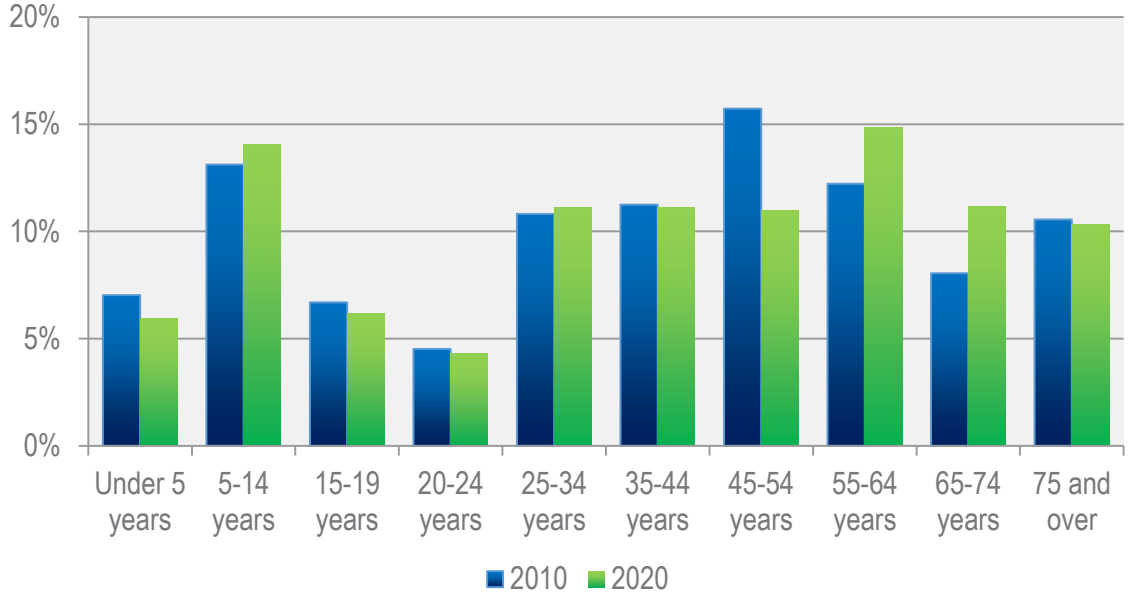


Figure 2.2 compares the age distribution throughout Carroll County from 2010 to 2020. Overall, there has been a decline in the county's population since 2010, with the largest decreases occurring in the 45-54 and under 5-year-old ranges. The largest population increases happened in the 65-74 and 55-64 age cohorts. This is consistent with other rural Iowa communities, as it is normal to see a decrease in population from the 5-14 age cohort to 15-24, as young adults in the 15-24 age range tend to leave their hometowns in search of higher education. Once these individuals start families, many move home or back to a smaller community where the cost of living is lower.

Figure 2.2: Carroll County Age Distribution, 2010 & 2020



Housing

One of the most important aspects to attract new residents is housing, and attracting new residents is important to rural Iowa counties. The current housing stock, type of houses, and housing availability and affordability are determining factors for potential residents.

According to the American Community Survey Estimates, between 2010 and 2022, Carroll County gained a total of 139 housing units. During the same time frame, the number of vacant homes increased by 126 units. These numbers are consistent with the population decrease the county has seen since 2010. The number of renter-occupied units decreased by 118 units, while owner-occupied units increased by 131 units. Table 2.3 shows the housing trends for Carroll County from 2010 to 2022.

Table 2.3: Carroll County Housing Units: 2010 & 2022

	2010		2022	
	Number	Percent	Number	Percent
Occupied Housing Units	8,683	92.6%	8,696	91.4%
Owner-Occupied	6,486	74.7%	6,617	76.1%
Renter-Occupied	2,197	25.3%	2,079	23.9%
Vacant Housing Units	693	7.4%	819	8.6%
Total Housing Units	9,376	100.0%	9,515	100.0%

This breakdown is important during hazard events due to the populations that occupy these units. Homeowners who occupy their home may be more likely to want to rebuild, while vacant homes, if damaged, would either sit vacant with no activity, or may be torn down. Renters are unpredictable as some may choose to stay within the same location, or they may decide to move.

According to the 2022 American Community Survey Estimates (Table 2.4), the median housing value was $162,000. Of the homes in Carroll County, 22.1% are valued less than $100,000. While Carroll County's population has slightly declined, there have been a number of new builds within the County in the recent past. It is expected that this trend will continue with new homes being built on a continual basis. However, the County's housing stock has a large number of older homes and the rehabilitation of these homes will improve the safety and reduce the susceptibility to numerous hazards.

Table 2.4: Carroll County Value of Owner-Occupied Units, 2022

Value of Housing Unit	Percent of Homes
Less than $50,000	6.1%
$50,000 to $99,999	16.0%
$100,000 to $149,999	23.7%
$150,000 to $199,999	17.2%
$200,000 to $299,999	21.1%
$300,000 to $499,999	12.8%
$500,000 to $999,999	2.9%
$1,000,000 or more	0.3%

Source: American Community Survey

Figure 2.3: Carroll County Year Housing Units Constructed, 2022

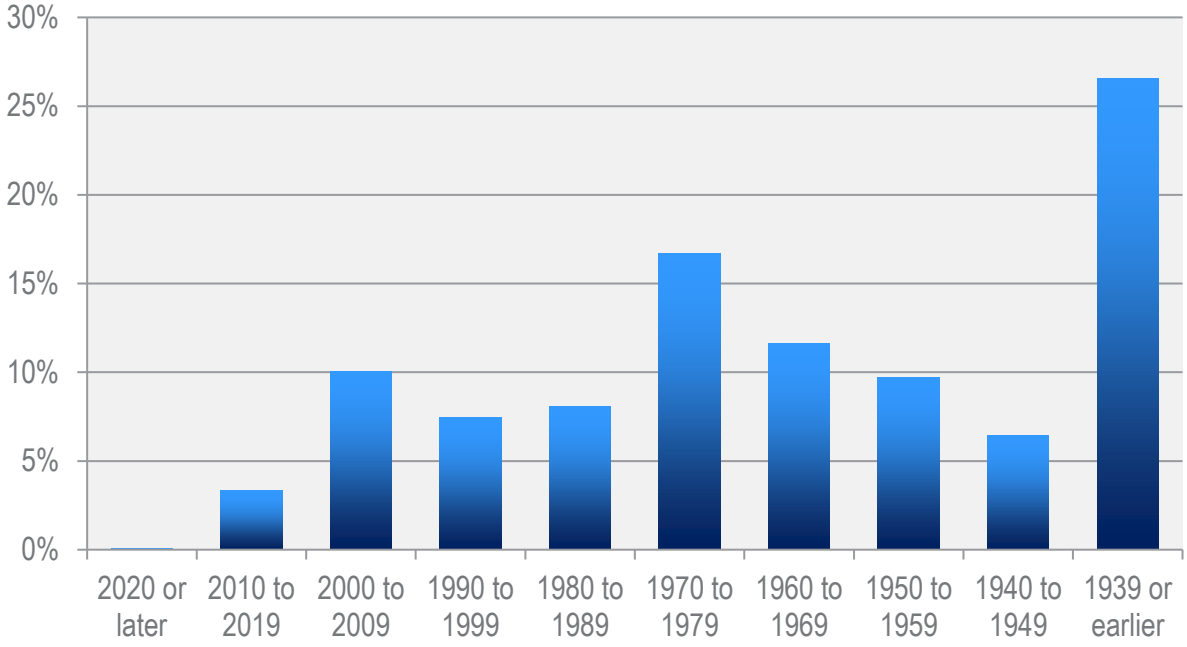


Figure 2.3 shows that 26.5% of the housing units in Carroll County were constructed before 1939. From 1940 to 1979, home construction was pretty steady, with between 6% and 17% of the county's homes being built in each of these decades. Older homes generally show deterioration in the structural aspect and in the overall general features. These homes were built to the standards of the time, and may not meet current building codes and standards, making them more susceptible to damage from hazards such as fires, severe storms, and other hazardous weather conditions.

Survey estimates show that there have been minimal builds since 2010. There have been new builds in rural areas and limited within the county's cities. Virtually all homes within the county have adequate gas or other fuel heating systems and kitchen facilities. Most homes are connected to the public water and sewer, except in rural areas, where many homes are connected to individual septic tanks.

Economics

Household income is one of the most important indicators of the economic base in Carroll County. In 2022, Carroll County's median household income was $68,041, 4% behind the State of Iowa's median of $70,571. Survey estimates show that 16.2% of the county's households make less than $25,000 per year, while 32.3% of the households make over $100,000. An area's economy relies heavily on strong household income levels as higher incomes mean households have more spending power to purchase various goods and services. Higher income levels can be related to better employment opportunities, and changes to bring in workers from other counties. Table 2.5 shows the household income in 2022 inflation-adjusted dollars.

Table 2.5: Carroll County Household Income: 2022

Income (In 2016 Inflation-Adjusted Dollars)	Number of Households	Percent
Less than $10,000	328	3.8%
$10,000 to $14,999	416	4.8%
$15,000 to $24,999	669	7.7%
$25,000 to $34,999	719	8.3%
$35,000 to $49,999	1,054	12.1%
$50,000 to $74,999	1,565	18.0%
$75,000 to $99,999	1,140	13.1%
$100,000 to $149,999	1,834	21.1%
$150,000 to $199,999	590	6.8%
$200,000 or more	381	4.4%
Total households	8,696	100.0%
Median household income (dollars)	$68,041	--
Mean household income (dollars)	$84,303	--

The county's rural towns primarily serve as agricultural service centers and retail trade centers, but manufacturing activity is also found in areas throughout the county. Carroll County's strongest employment sectors are education and healthcare followed by manufacturing. A complete breakdown of the workforce aged 16 and over by industry is found in table 2.6.

Carroll County has an active labor force, with a large percentage of both men and women participating. July 2022 Iowa Workforce Development information shows 2.2% of the County's labor force was estimated to be unemployed. Traditionally, the planning area's labor participation rate has been within the average or below average compared to Iowa, and much lower than the national average. Overall, Carroll County has a fairly stable economy with diverse industry sectors represented. Few employers have closed and new ones have opened, changing the economy's outlook.

Table 2.6: Employment by Industry, 2022

Industry	Number	Percentage
Civilian employed population 16 years and over	10,755	100.0%
Agriculture, forestry, fishing and hunting, and mining	802	7.5%
Construction	689	6.4%
Manufacturing	1,582	14.7%
Wholesale trade	620	5.8%
Retail trade	1,181	11.0%
Transportation and warehousing, and utilities	790	7.3%
Information	180	1.7%
Finance and insurance, and real estate and rental and leasing	688	6.4%
Professional, scientific, and management, and administrative and waste management services	460	4.3%
Educational services, and health care and social assistance	2,490	23.2%
Arts, entertainment, and recreation, and accommodation and food services	533	5.0%
Other services, except public administration	458	4.3%
Public administration	282	2.6%

Existing Documents & Capabilities

Table 2.7 provides a compilation of the current planning and regulatory documents in place for Carroll County. The table also shows the last update of each plan. These documents help the county mitigate the impacts of hazard events in the county. First and foremost, the previous hazard mitigation plan, as well as this document lays out specific strategies to help the city reduce the impact hazards have on the community and those who live in it. The County updated their comprehensive plan in 2024 and evaluated the past and future growth. Between the comp plan and the zoning ordinance, it was determined that farmland is to be converted on a conservative basis, and that development should be contained within previously developed areas of the county to not create additional hazard impacts. Floodplain regulations have been implemented to ensure that no construction happens within the floodplain, or if it is to happen within the floodplain to ensure that all necessary regulations are met.

Carroll County is a county with a limited population. This limited population leads to a small tax base, which leads to a smaller overall county budget. While the County budget is smaller, it is still required to offer the same services to its residents as larger counties. This leaves a smaller budget left to do mitigation actions without outside assistance. The smaller budget has led to older infrastructure, limited planning, and reduced personnel. While the county itself is limited, it can be assisted by the local COG to assist with finding funding and additional planning opportunities. The county already is a part of numerous 28E agreements to examine the future health and safety of the county and expanding the number of these agreements would only continue to benefit the parties involved. Partnering with other counties and/or jurisdictions may be beneficial to completing necessary projects, of all types, and may create opportunities that previously may have not been possible.

Table 2.7: Carroll County's Existing Documents

Document	Yes/No	Year
Previous HMP	Yes	2020
Comprehensive Plan	Yes	2024
Building Code	No	-
Zoning Ordinance	Yes	2018
Strategic Plan	No	-
Housing Needs Assessment	Yes	2016
NFIP Participant	Yes	1977
Floodplain Regulations	Yes	2017

NFIP Participation

In the past, there have been instances of flooding within the rural Carroll County. The County started participating in the NFIP in 1977, and the flood maps were updated and adopted in 2017. The county's FIRMs can be found in Appendix A. The Zoning Administrator also acts as the Floodplain Administrator for the city. Any development/demolition in the floodplain is required to obtain a permit which regulates the development/demolition and lays out the NFIP regulations that must be followed. Carroll County participates in the NFIP and implements substantial improvement / substantial damage provisions in the following manner: Local officials (1) determine the cost of work, (2) determine the market value of buildings, (3) make SI/SD determinations and provide determinations to property owners, and (4) require owners to obtain permits to bring substantially improved and substantially damaged structures into compliance with the floodplain management requirements.

Outlook and Future Development

Since the last plan update, there has been limited development in the rural portions of Carroll County. There have been some residential structures built outside of city limits, but these instances are limited and mostly concentrated around the City of Carroll and the City of Manning. There has also been some industrial development/expansion spread sporadically throughout the county.

Looking towards the life of this plan, the population of the rural part of the county is likely to continue a slow decline, as has been the case in recent years, with little growth likely within the City of Carroll, and the City of Manning as residential infill. Most rural development will be residential, but some may be commercial, industrial, and recreational. Conversion of farmland on a very modest scale is likely, but development is not likely in potential flood hazard areas.

Critical Facilities

Critical Facilities are facilities that are critical to the health and welfare of the population and are especially important following hazard events. Every jurisdiction is unique in such way that the list of critical facilities can vary widely from community to community. Examples of critical facilities include, but are not limited to: hospitals and other medical facilities, police and fire stations, emergency operations centers, evacuation shelters, public works facilities, schools and colleges, transportation systems (airways, highways, railways, waterways), lifeline utility systems (potable water, wastewater, oil, natural gas, electricity, communication systems), high potential loss facilities (nuclear power plants, dams, military installations), and hazardous material facilities (corrosives, explosives, flammable materials, radioactive materials, toxins, etc.). The critical facilities for Carroll County can be found in map 2.3 and are listed in table 2.9.

Essential Infrastructure and Services

Knowing what services and infrastructure serve the county as a whole, and each individual community can be beneficial in a time of disaster so the appropriate companies can be contacted in need of utility shutoff or transportation routes. The County's essential infrastructure and services can be found in table 2.8.

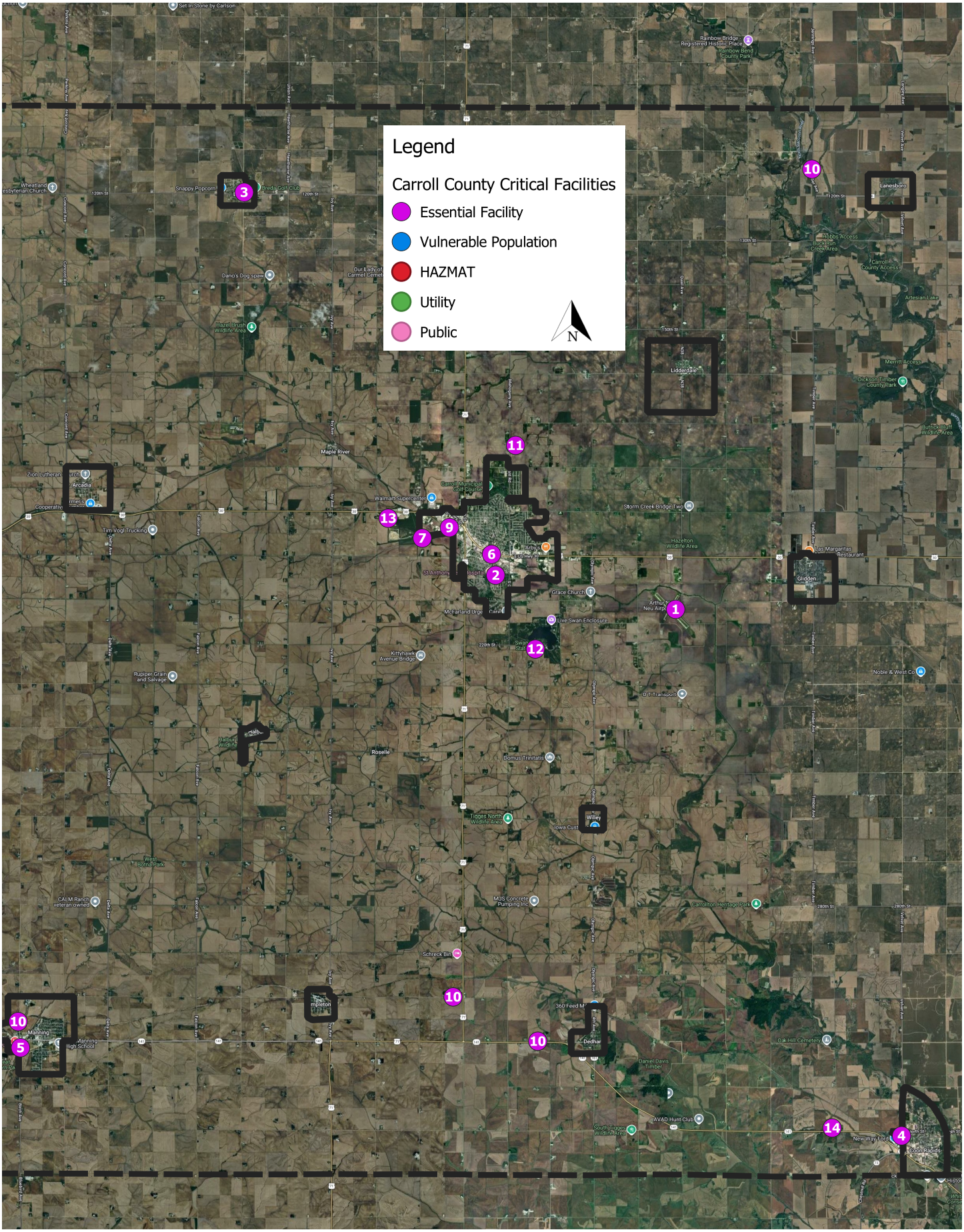
Table 2.8: Essential Infrastructure and Services

Major Arterials	U.S. Highways 30 & 71, IA Highway 141	**Air Service**	Arthur N. Neu Municipal Airport
Water Service	West Central Iowa Rural Water, Municipal, Regional Water	**Sewer Service**	Septic Systems, Municipals
Electric Service	MidAmerican Energy, Raccoon Valley Electric Cooperative, Breda Municipal, Coon Rapids Municipal, Manning Municipal, Alliant Energy, Denison Municipal Utilities, Western Iowa Power Cooperative	**Gas Service**	MidAmerican Energy, Black Hills Energy, Manning Municipal Gas, Alliant Energy, Coon Rapids Municipal
Sanitation/Solid Waste	Local Haulers	**Landfill**	Carroll County Landfill
Phone and Internet	Mediacom, Western Iowa Networks, wireless, Templeton Telephone Company, Arcadia Telephone Co-Op	**Law Enforcement**	Carroll County Sheriff
Fire Service	12 city departments	**Ambulance Service**	Carroll County Ambulance

Table 2.9: Carroll County Critical Facilities

Number on Map	Name	Address	Type
1	Arthur N. Neu Municipal Airport	21177 Quail Avenue, Carroll	Essential Facility
2	Based Ambulance/Paramedics	Carroll	Essential Facility
3	Based Ambulance/Paramedics	Breda	Essential Facility
4	Based Ambulance/Paramedics	Coon Rapids	Essential Facility
5	Based Ambulance/Paramedics	Manning	Essential Facility
6	Carroll County Courthouse/ Communication Tower	114 E 6th Street, Carroll	Essential Facility
7	Carroll County Landfill	19111 Kittyhawk Ave, Carroll	Essential Facility
8	County Secondary Road Shop and Storage	1400 W 6th Street, Carroll	Essential Facility
9	Storm	Various	Essential Facility
10	911 Towers	Various	Essential Facility
11	Back-up Tower	Mahogany Avenue, Carroll	Essential Facility
12	Carroll County Conservation Center	22676 Swan Lake Trail Drive	Essential Facility

Map 2.3: Carroll County Critical Facilities



Chapter 3: Local Hazard Analysis & Risk Assessment

The hazard analysis and risk assessment (HARA) is a process for determining the emergency management needs for a jurisdiction. The determination is possible when the knowledge of the hazards is combined with the knowledge of the impact it would have on citizens and property within the jurisdiction. The HARA process includes four steps and shows the jurisdictions how frequently damage from a particular event could occur; the extent of damage; and which portions of the jurisdiction could be impacted during an event.

Step 1: Identify Hazards – determine which hazards can affect the jurisdiction.
What kinds of hazards can affect the jurisdiction? What happened in the past that the jurisdiction should have known about?

Many people are only aware of the most obvious risks, usually as a result of a disaster that affected their community in recent years such as a tornado or flood. In many cases, a large majority of the population is not aware of certain hazards because they have not affected the jurisdiction during their lifetime.

Step 2: Community Profile – determine if and to what extent these hazards will affect the assets of the jurisdiction.
What will be affected by these hazards? Are there buildings, roads, utilities, or other facilities in the jurisdiction that will be damaged or destroyed by these hazards? Are there concentrations of certain populations in the hazard area that are especially vulnerable, such as elderly, children, or non-English speaking people? Are there unique or symbolic characteristics about the jurisdiction that will be impacted adversely by a hazard? How will the economy of the jurisdiction or region be impacted by the occurrence of the hazard?

An inventory will help identify the assets that can be damaged or affected by the hazard event. In many cases, jurisdictional assets may be vulnerable to more than one type of hazard, in which the jurisdiction may need to look at different characteristics of the same asset to understand its vulnerability to each type of hazard. For example, if a building is subject to both floods and tornadoes, the jurisdiction will be interested in the location and elevation of the building in order to determine how much of the structure and its contents will be damaged by flooding. The jurisdiction will also be interested in the construction of the building and its ability to resist physical damage caused by high winds and debris during a tornado.

Step 3: Profile Hazard Events – determine how impactful a hazard can be
How "big" is each hazard's potential impact? Will it affect every area the same or will certain areas get hit harder than others? How often will each type of hazard impact the jurisdiction?

It is important to know the location and amount of land area that may be affected by certain hazard types. For example, there may be areas that can be affected repeatedly by a hazard in one part of the jurisdiction such as floodplains adjacent to streams and rivers or areas around chemical facilities, or there may be potential jurisdiction-wide impacts from events such as windstorms or winter storms.

Hazards can create direct damages, indirect effects, and secondary hazards to jurisdictions. Direct damages are caused immediately by the event itself, such as a bridge washing out during a flood. Indirect effects usually

involve interruptions in asset operations and community functions. For example, when a bridge is washed out due to a flood, traffic is delayed or rerouted, which then impacts individuals, businesses, and public services that depend on the bridge for transportation. Secondary hazards are caused by the initial hazard event, such as when flooding causes a dam break. While this is a disaster in its own right, its consequent damages should be included in the damage calculations of the initial hazard event. Loss estimations will include a determination of the extent of direct damages to property and indirect effects on functional use.

Step 4: Prioritizing Hazards – determine which hazards need to be addressed through mitigation planning
Which hazards are priorities for planning? Which hazards are candidates for special attention for response planning? Which hazards should mitigation efforts be focused on? Which hazards require further planning for post-disaster recovery?

Through completion of steps 1, 2, and 3, the hazards can be sorted by their composite score. The hazards with a higher score represent a higher risk to the jurisdiction. At first glance, the top third can be taken as the first priority group, the following third as the second priority group, and the remaining third as the third priority group. Adjustments can be made to this preliminary ranking by the planning team.

Since the last plan update was approved by the jurisdiction in 2020, there have been two disaster declarations in Carroll County, DR-4483-IA and EM-3480-IA, both related to the COVID-19 Pandemic. Declaration DR-4483-IA included the entire state of Iowa, with the incident period being March 17, 2020 to May 11, 2023. Declaration EM-3480-IA also included the entire state of Iowa, with the incident period being January 20, 2020 to May 11, 2023. More information about these declarations can be found in the applicable hazard section later in this chapter.

Table 3.1: State of Iowa Hazards

Natural	Non-Natural
Drought	Animal/Crop/Plant Disease
Tornadoes and other High Wind Events (including derechos)	Pandemic Human Disease
Flooding - River	Hazardous Materials
Flooding - Flash	Infrastructure Failure
Severe Winter Storms	Radiological Incident
Hail and Lightning Storms	Terrorism
Excessive Heat	Transportation Incident
Dam and Levee Failure	
Landslides	
Earthquakes	
Wildfire, including Grass Fire	
Sinkholes	
Expansive Soils	

Hazard Profiles

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

This plan's risk assessment was completed on a planning area wide basis, rather than analyzing each jurisdiction. Unique conditions within participating jurisdictions are noted in each hazard profile. School districts worked with their respective communities in determining the risk analysis, which leads to each school district and the community that they are located in having similar risk assessments.

The hazard analysis identified potential hazards that could affect Carroll County for the purpose of mitigation planning. It is important to note that the focus of mitigation is on reducing long-term risks of damage or threats to public health and safety caused by hazards and their effects.

To identify the hazards that threaten the planning area, the Hazard Mitigation Committee reviewed hazard data from the National Climatic Data Center among other sources, and discussed the impacts of each hazard required by FEMA, and natural and human-caused hazards that were included in the State of Iowa Hazard Mitigation Plan. Hazards that the committee determined could affect Carroll County are shown in table 3.2.

Table 3.2: Hazards Affecting Carroll County

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

Not all of the hazards were determine to affect Carroll County. The hazards shown in table 3.3 was eliminated.

Table 3.3: Hazards Not Affecting Carroll County

Hazard	Reason for Omission
Landslides	There is no known agency that documents historical data on landslides. The best available data was personal knowledge of the committee. The committee decided to eliminate landslides due to their limited occurrences and impacts.
Sinkholes	There is no history of sinkholes in the county. Source: IADNR, Iowa Geological Survey

Included in the assessment of each hazard is a statement recognizing the potential that the hazard will impact the jurisdiction over the life of the plan, and in some cases, breaks it down to within the next year. These statements rank the potential of the hazard impacting the jurisdiction into four categories which are shown and described below:

- Highly Unlikely - Less than 10% chance that this hazard will impact the jurisdiction within the noted timeframe

- Unlikely - 10% to less than 50% chance this hazard will impact the jurisdiction within the noted timeframe
- Likely - 50% to 90% chance the jurisdiction will experience the hazard within the noted timeframe
- Highly Likely - Greater than 90% chance the jurisdiction will experience the hazard within the noted timeframe

Animal/Plant/Crop Disease

An outbreak of disease that can be transmitted from animal to animal or plant to plant represents an animal/plant/crop disease. A disease outbreak will likely have economic implications, cause crop production losses, and possibly have environmental damages.

A plant disease is any abnormal condition that alters the appearance or function of a plant. It is a physiological process that affects some or all plant functions and may reduce the quality and/or quantity of the harvested product.

Fungi are the largest and perhaps most well-known group of plant pathogens. The vast majority of fungi do not cause disease. However, numerous fungi can cause plant disease, and a relatively small number of them cause disease in humans and livestock.

Bacteria are perhaps more familiar as the cause of human and animal diseases, such as tuberculosis and pneumonia. Nonetheless, some bacteria can also be destructive plan pathogens. Like bacteria, viruses are probably most familiar as the cause of human and animal diseases, such as influenza, polio, rabies, smallpox, and warts. Viruses, however, also cause several plant diseases.

Nematodes are microscopic, non-segmented, round, slender worms. Several thousand species of nematodes are found in soil, fresh and salt water, animals, and within or on plants throughout the world. Some nematodes are parasites on animals, plants, insects of fungi (Soybean Diseases-ISU Extension Office).

Table 3.4 displays some common plant and crop diseases found in Iowa. The animal diseases are either found in Iowa or could potentially be found in Iowa.

Table 3.4: Animal, Plant, and Crop Diseases

Animal	**Plant**	**Crop**	
Avian Influenza	**Trees**	**Corn**	**Soybean**
BSE "mad cow"	Anthracnose	Anthracnose Leaf Blight	Anthracnose Stem Blight
Brucellosis	Bur Oak Blight	Common Rust	Asian Soybean Rust
Chronic Wasting Disease	Cankers	Common Smut	Bacterial Blight
Epizootic Hemorrhagic Disease	Dutch Elm Disease	Ear Rot	Bacterial Pustule
Exotic Newcastle Disease	Emerald Ash Borer	Eyespot	Bean Pod Mottle
Foot and Mouth Disease	Leaf Spot	Gray Leaf Spot	Brown Spot
Johne's Disease	Oak Wilt	Nematodes	Cercospora Leaf Blight

Animal	Plant	Crop	
Pseudorabies	**Trees**	**Corn**	**Soybean**
Rabies	Pine Wilt	Northern Leaf Blight	Downy Mildew
Scrapie	Thousand Cankers Disease	Northern Leaf Spot	Frogeye Leaf Spot
Tuberculosis	Verticillium Wilt	Southern Rust	Root Rot
West Nile Virus	**Ornamental (Garden)**	Salk Rot	Soybean Cyst Nematode
	Anthracnose	Stewart's (Wilt) Disease	Soybean Mosaic Virus (SMV)
	Black Spot	**Alfalfa**	Stem Rot
	Crown Gall	Bacterial Wilt	Sudden Death Syndrome (SDS)
	Crown Rot	Crow Rot	
	Gray Mold	Fusarium Wilt	
	Leaf Spot	Nematodes	
	Nematodes	Root Rot	
	Powdery Mildew	Verticillium Wilt	
	Rose Mosaic		
	Tomato Spotted Wilt Virus		
	Verticillium Wilt		

Avian Influenza

Found amongst poultry, most Avian Influenza strains are classified as low pathogenicity and cause few clinical signs in infected birds. In contrast, high pathogenicity is a severe and extremely contagious strain that leads to death. This disease is of concern in Iowa because the state leads the nation in egg production. Production operations randomly test for the disease and will notify the Iowa Department of Agriculture and Land Stewardship (IDALS) if there is a sign of the disease.

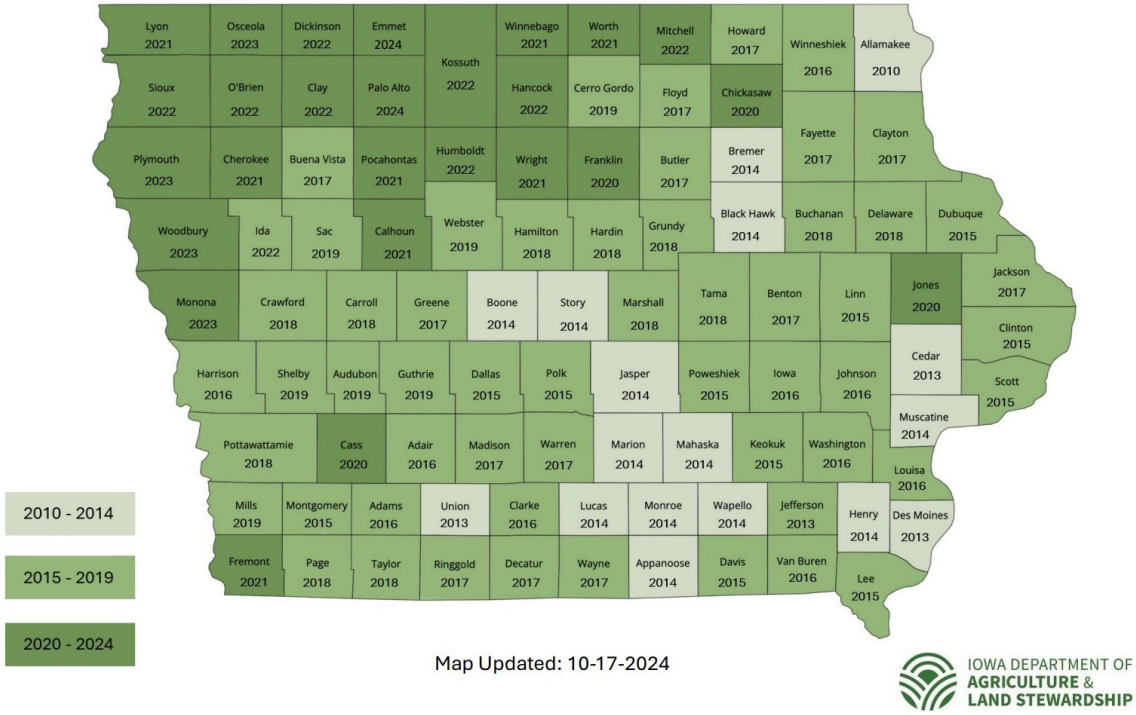
Emerald Ash Borer

Emerald Ash Borer (EAB) is a small green invasive wood-boring beetle that attacks and kills ash trees. The adults live on the outside of ash trees, feeding on the leaves during the summer. The larvae feed on the living plant tissue by tunneling underneath the bark of the trees, which disrupts the vascular flow and ultimately leads to the tree's death. EAB attacks native ash trees of any size, age, or stage of health and trees that have been attacked can die within two years.

Much of Iowa's forestland is densely populated with ash trees and Iowa's community street trees are heavily planted with ash cultivars. Iowa has an estimated 50 million rural ash trees and 3 million urban ash trees (USFS, 2008). EAB was first introduced to Iowa in May of 2010, when they were found on an island in the Mississippi River in Allamakee County. By 2012, EABs were caught in separate locations in Allamakee County, confirming that they had moved inland. EAB has since spread to 98 Iowa counties and have killed millions of ash trees.

According to the Iowa DNR the Emerald Ash Borer was discovered in Audubon County in 2019. Map 3.1 shows when the Emerald Ash Borer was discovered in the 98 affected Iowa counties.

Map 3.1: Iowa Emerald Ash Borer Detection



Rabies

Rabies is a deadly viral disease found in mammals that infects the central nervous system, ultimately causing disease in the brain and death. It is most often transmitted by animal bites, specifically in bats, skunks, coyotes, foxes, and raccoons. The rabies infection is nearly always fatal unless prompt treatment is administered before symptoms begin. In Iowa, the two most common strains are found in bats and skunks, and many different species can be infected with them. In 2012, thirty-one cases of animal rabies were reported in Iowa, consisting of seventeen bats, nine skunks, three bovine, and one feline. It is important to note that data is greatly influenced by the number of animals tested (Iowa Department of Public Health).

Soybean Cyst Nematode (SCN)

The SCN is the most important pathogen of soybean in Iowa. Damage may not be obvious; however, yield losses up to 40% on susceptible varieties are possible. Infected plants usually occur in patches within a field. SCN survives in the soil as eggs within dead females called cysts. These eggs can survive several years in the absence of a soybean crop. The second stage juvenile hatches from the eggs and infects soybean plants. Unfortunately, conditions that favor soybean growth are also favorable for SCN development. The number of SCN in afield can be greatly reduced through proper management, but it is impossible to eliminate SCN from a field once it is established (ISU Extension).

Stewart's (Wilt) Disease

Caused by bacteria, this disease is generally more destructive on sweet corn than on popcorn or dent corn. It is unique because its spread depends almost completely on an insect: the corn flea beetle. High levels of ammonium nitrogen and phosphorus tend to increase susceptibility, while high levels of calcium and potassium tend to decrease susceptibility. High temperatures also enhance development of the disease (ISU Extension).

In Carroll County, 68% of the land is dedicated to agricultural uses. With such a large percentage of land dedicated to agricultural uses including animal and crop uses, it is likely that animal/plant/crop diseases will impact at least a portion of the county annually. On average, these diseases do not cause widespread damage, but can last weeks to months. There have been some instances where an entire species of plant is effected and widespread damage is caused, i.e. Emerald Ash Borer. Climate changes including the increased average atmospheric temperature and increase in the moisture holding capacity of the air, it is anticipated that there will be increased pressure on agriculture from diseases and pests. As plant hardiness zones shift northward due to the warming climate, invasive plant and animal species may become more common. (Iowa Hazard Mitigation Plan, 2023)

While each instance of animal/plant/crop disease is different, there are some measures that may be taken to mitigate the spread of diseases.

- Not moving firewood from county to county
- Encourage reporting of potential disease outbreaks
- Encourage the use of preventative health care for animals
- Routine cleaning and disinfection
- Creating plans for preventing infections disease
- Creating plans for responding to infectious diseases
- Increased training for veterinarians and farmers about diseases and their presentations

Drought

Droughts are defined as periods of prolonged dry weather that lasts long enough to cause serious problems such as crop damage and/or water supply shortages. The severity of the drought depends upon the degree of moisture deficiency, the duration, and the size of the affected area. The four ways droughts can be defined are meteorological, hydrological, agricultural, and socioeconomic. A meteorological drought is a drought that refers to the precipitation deficiency, hydrological droughts pertain to the declining surface and groundwater supplies, agricultural droughts refer to soil moisture deficiencies, and socioeconomic droughts refer to physical water shortages affecting people.

In Iowa, the highest occurrence of drought conditions are associated with meteorological and agricultural as a result of either a decline in precipitation or low soil moisture. Droughts can have widespread adverse economic, environmental, and social impacts as rivers, reservoirs, groundwater levels, and soil moisture decrease. Droughts can be spotty or widespread and last from a few weeks to a number of years. During prolonged droughts, communities can notice serious impact on their water supply and economy, and increased demand for water and electricity may result in shortages of resources. If agricultural production is damaged or destroyed by a loss of crops or livestock, food shortages can occur. While droughts are generally associated with extreme heat, droughts can and do happen during cooler months.

The Palmer Drought Severity Index (PDSI) was developed by Wayne Palmer in the 1960s and uses temperature and rainfall information in a formula to determine dryness. The PDSI is most effective in determining long-term drought (several months) and is not as efficient with short-term forecasts. An advantage of the Palmer Index is that it is set to local climate, so it can be applied to any part of the country to demonstrate relative drought or rainfall conditions. The Palmer Index uses 0 as normal, with drought conditions shown as negative numbers and excess rainfall shown as positive numbers. Figure 3.1 displays the Palmer Drought Severity Index for the Carroll County climate division from 2018-2024. The Palmer Drought Severity Index has seven categories of wet and dry conditions that are displayed in table 3.1.

Figure 3.1: Palmer Drought Severity Index, 2018-2024

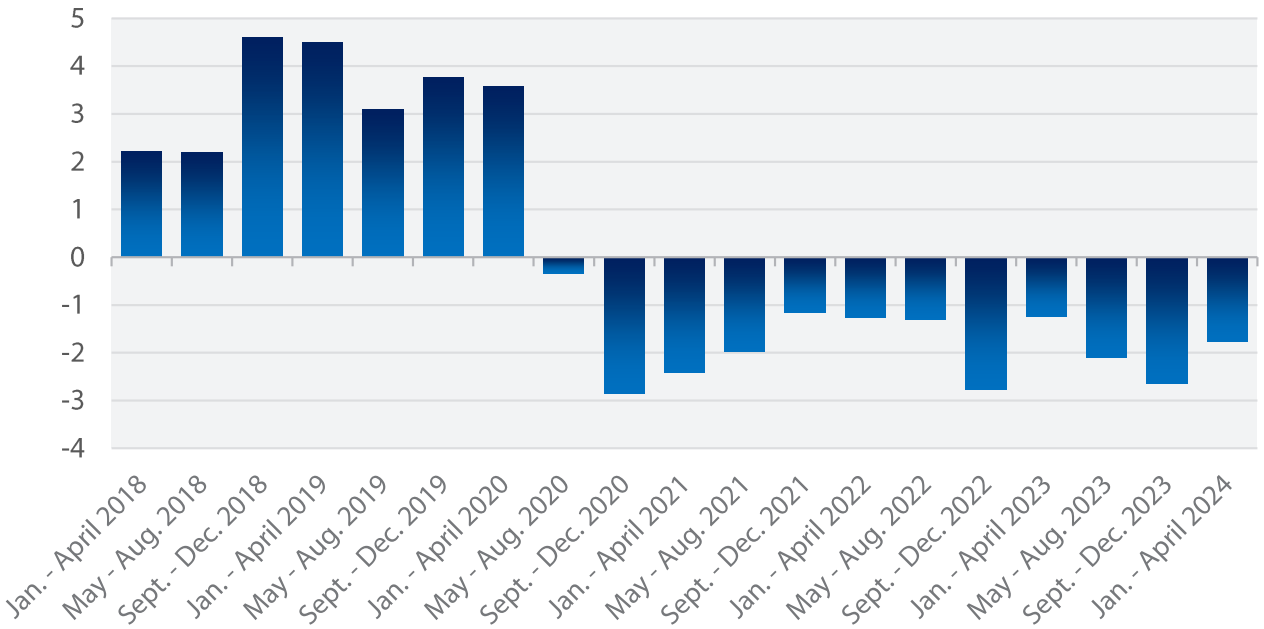


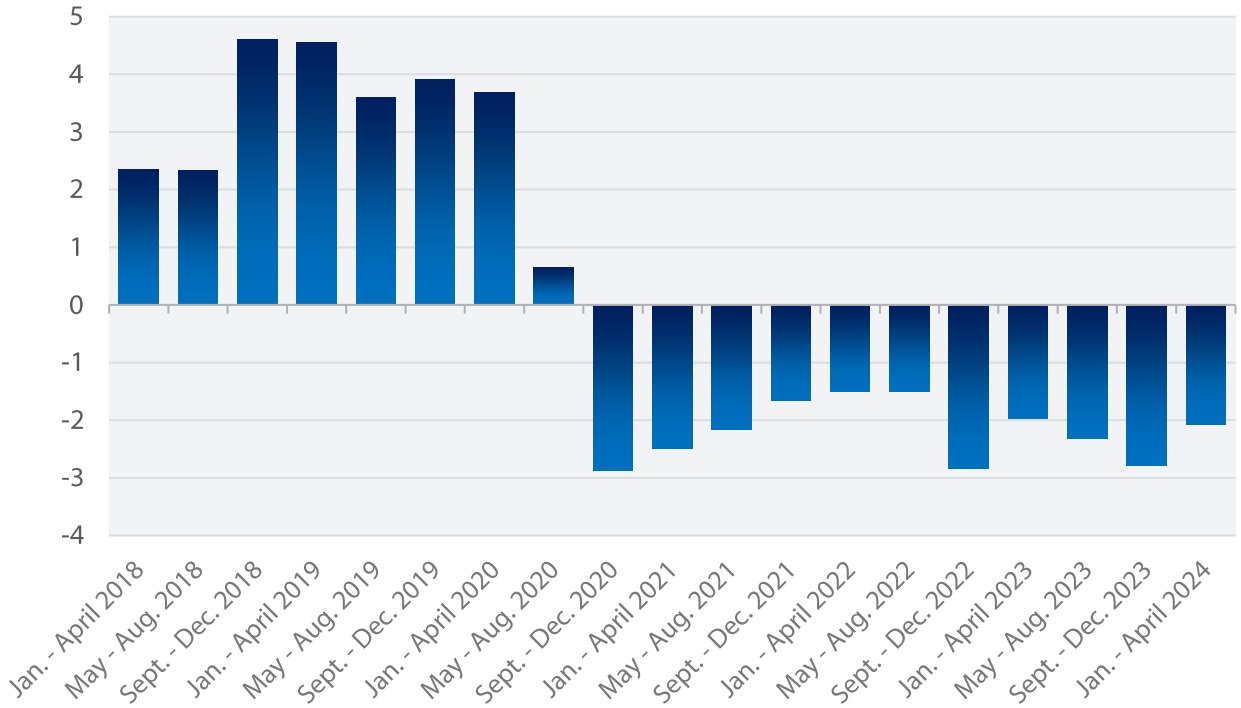
Table 3.5: Palmer Drought Severity Index

Numerical Value	Condition
-4.0 or less	Extreme Drought
-3.0 to -3.9	Severe Drought
-2.0 to -2.9	Moderate Drought
-1.9 to 1.9	Near Normal
2.0 to 2.9	Unusual Wet Spell
3.0 to 3.9	Very Wet Spell
4.0 or more	Extremely Wet

Source: NOAA

The Palmer Hydrological Drought Index (PDHI) shows hydrological drought and wet conditions, which more accurately reflects groundwater conditions, reservoir levels, etc. The hydrological impacts of a drought take longer to develop and longer to recover, therefore PDHI responds more slowly to changing conditions than PDSI. Figure 3.2 shows the Palmer Hydrological Drought Index for Carroll County from 2018-2024.

Figure 3.2: Palmer Hydrological Drought Index, 2018-2024



Since 2020, Carroll County has experienced 28 droughts. The National Center for Environmental Information did not report any crop or property damage due to the droughts. These 28 droughts occurred from 2020-2024. According to the National Weather Service, the average drought in Carroll County lasted 22 days.

When droughts occur, they tend to affect more than just one county or state. It is likely that if one portion of Carroll County experiences a drought, that the entire county as a whole would as well. As the agriculture sector is reliant on precipitation and when droughts occur it tends to be the most impacted sector. During water shortages, water dependent manufacturers are also affected. Drinking water is drawn from surface and groundwater sources, so prolonged droughts may affect all citizens if there were to be a drop in the stream flow coupled with the drop in the water table.

Over the past century, studies have been conducted that show meteorological droughts are never the result of one single cause. Scientists are not able to predict a drought more than a month or so in advance, as predicting droughts depends on forecasting precipitation and temperature. Anomalies of precipitation and temperature may last weeks, to months, to even decades and is dependent on several unstable weather systems at the global level. Drought prediction improvements differ by region, season, and climate. The U.S. Drought Monitor map provides a weekly summary of drought conditions across the United States and combines a variety of data-based drought indices, indicators and local expert input.

Droughts to not pose as much threat to physical structures as they do to humans and the environment. During the past five years, Carroll County has experienced 28 drought events, but with none causing property or crop damage. These events also caused no deaths or injuries. With twenty-eight drought events happening within the county during the past five years, it is anticipated that the county will continue to see periods of drought annually. From 2020 to 2024, at least five drought events occurred each year, with the exception of 2022. The previous reporting period did not experience any events. While the frequency of these events has increased, the amount of damage caused by them has not increased from the previous planning period, when there no crop damage reported.

While there are no mitigation actions jurisdictions can take to stop drought instances, there are actions that can be undertaken to alleviate the effects of them.

- Create a response plan
- Have a plan in place for reduction of water usage
- Educate the public on the effects of a drought and how they can do their part
- Encourage communities to create additional redundancy in their water systems to reduce loss

Earthquake

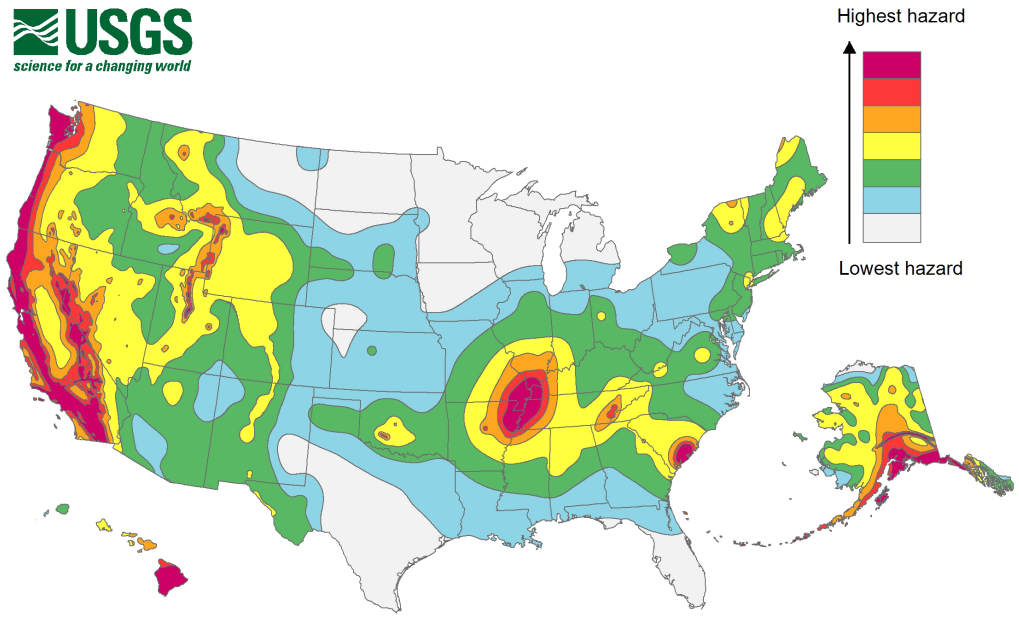
An earthquake is any shaking or vibration of the earth caused by the sudden release of energy that may impose a direct threat on life and property. It is a sudden, rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface. This shaking can: cause buildings and bridges to collapse; disrupt gas, electric, and phone service; and sometimes trigger landslides, flash floods, and fires. (Iowa Hazard Mitigation Plan 2023).

Carroll County is located in the lowest risk Seismic Zone. Previously this zone was categorized as Seismic Zone 1, but the USGS map shown in Figure 3.3 recognizes this area as the lowest hazard zone. Most structures in Iowa are not built to earthquake standards, but because of the relatively low magnitude of a possible quake, property damage would likely be minor foundational damage. The most vulnerable structures are houses built on poorly consolidated substrate, especially floodplain materials.

Iowa as a whole has experienced the effects of only a few earthquakes in the past 175 years. The epicenters of thirteen earthquakes have been located in the state, with the majority along the Mississippi River. While more than twenty earthquakes have occurred in or around Iowa over the past 175 years, they have not seriously impacted the state.

There is a low probability of an earthquake causing damage in Iowa, but that does not mean that Iowans could not feel the effects of an earthquake. Iowans may feel earthquake shaking on occasion, but it may feel more like the vibrations similar to a passing large truck. Southeast Iowa has a greater risk of damage than the other portions of the state.

Map 3.2: USGS 2018 Long-Term National Seismic Hazard



Carroll County is located in lowest earthquake hazard designation area. This designation comes from the United States Geological Survey, who ranks areas based on the past faults and earthquakes, behavior of seismic waves as they travel through different parts of the U.S. crust, and the near-surface site conditions at a specific location of interest (USGS). Carroll County has not experienced an earthquake in the recorded past, and is unlikely to experience an earthquake in the future. The county does not rank within the top 10 most vulnerable counties in Iowa to earthquakes. Iowa as a whole anticipates $1,024,407 in expected annual loss due to earthquakes with the top ten counties anticipating $570,494 of that amount. The remaining 88 counties are anticipated to share the remaining $453,913 in expected annual loss (average of $5,158 per county). This information, coupled with the location of the planning area, have assisted in the determination that this particular hazard is unlikely to affect the planning area. If an earthquake were to occur, it is more likely that the planning area would feel minor aftershocks and suffer extremely minimal damage.

Expansive Soils

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. The hazard develops gradually and seldom presents a threat to life. The hazard occurs in many parts of the southern, central, and western United States. The availability of data on expansive soils varies greatly. For large areas of the United States, little information is reported other than field observations of the physical characteristics of clay.

The most extensive damage from expansive soils happens to highways and streets. Houses and one-story commercial buildings are most apt to be damaged by the expansion of soils than are multi-story buildings, which usually are heavy enough to counter swelling pressures. The warning time for expansive soils is consistent with other geological hazards that occur slowly over time.

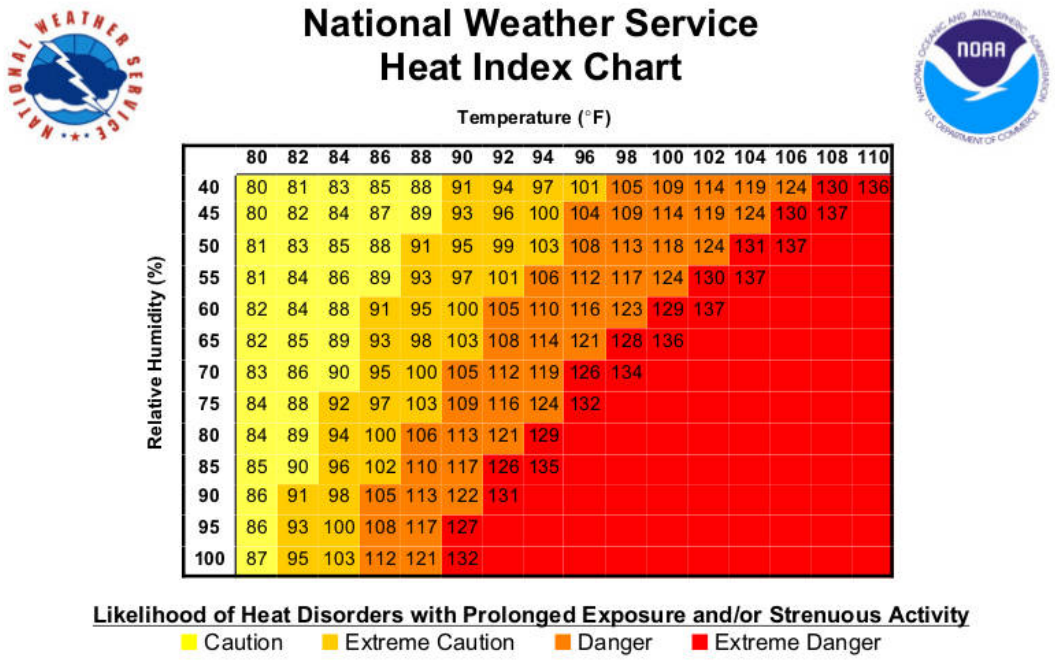
There have been no past instances of disasters associated specifically to expansive soils in Iowa (State of Iowa Hazard Mitigation Plan, 2023). Also, there is no comprehensive data available to compare losses throughout the region and State of Iowa. With no past instances of expansive soil damage or events within the planning area, extensive mitigation measures for this hazard are unnecessary. One potential mitigation measure could be to test and analyze soils prior to construction to ensure proper codes are met.

Extreme Heat

Extreme heat is the number one weather-related killer in the United States, and has the highest 30-year average compared to other weather events. The 30-year average for heat-related deaths is 130 per year, 49 more than flooding, which has the second highest average. Extreme heat conditions are defined by summertime weather that is substantially hotter and/or more humid than average for a location at that time of year. This includes temperatures (including heat index) in excess of 100 degrees Fahrenheit or at least three consecutive days of 90 plus degree weather. Heat advisories are issued at 105 degrees and warnings are issued at 115 degrees. A heat index is a temperature that tells how hot it really feels when relative humidity is added to the actual air temperature. When exposed to full sunshine, the heat index can be increased by 15 degrees. Figure 3.4 displays heat index and likelihood of experiencing a heat disorder with rising temperatures and humidity.

The body's ability to cool itself is affected during extreme heat. When the body heats too rapidly, to cool itself properly or when too much fluid or salt is lost through dehydration or perspiration, the body temperature rises and heat-related illnesses may develop. These illnesses can include heat cramps, sunstroke, heat exhaustion, and heat stroke. As heat stroke can be deadly, immediate medical attention is necessary.

Figure 3.3: National Weather Service Heat Index Chart



Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Since 2020, Carroll County has not experienced extreme heat events. The last extreme heat event happened during the last planning period, in July 2016. No deaths or property and crop damage were reported.

Many factors can determine how extreme heat affects all types of life. Older adults, young children, people with disabilities, and those who work outdoors are more susceptible to illnesses caused by heat. Households that do not have air-conditioning are also more at risk, as they cannot escape the heat. Livestock and other animals are also adversely affected by extreme heat and this event at the wrong time can inhibit crop production. Roadways and railroad tracks can also be distorted or even fail during extreme heat.

Carroll County is anticipated to experience extreme heat events within the planning period. Extreme heat events can be predicted a few days in advance. When the heat index is expected to exceed 105 degrees for at least two consecutive days, the National Weather Service initiates alert procedures. Since extreme heat events have to have at least three days of 90-plus degree weather, these events are expected to last a minimum of three days, but no more than seven days. With proper precautions taken, there should be little to no harm done to humans or livestock.

While mitigation actions for jurisdictions are unable to stop excessive heat events, there are actions that can be taken to protect the populations from the effects of this hazard.

- Create a response plan
- Designate cooling shelters and equip shelters with necessary items
- Suspend utility shutoffs during excessive heat events
- Publicize information related to personal safety during heat events

Flash Flood

Flash flooding is one of the most dangerous weather events because there is little to no warning time. Flash floods occur when the water along a stream or low-lying area rises rapidly. These events happen within six hours of a significant rainfall. They are caused by heavy rainfall in a short amount of time from intense storms, slow-moving storms, or storms repeatedly moving over the same area. Other flash floods can be caused by dam or levee failures, or sudden releases of water held by an ice jam. Some flash floods are strong enough to roll boulders, tear out trees, destroy buildings or bridges, and scour out new channels.

Areas with dense populations are at a high risk of flash floods, as the construction of buildings, highways, driveways, and parking lots increases runoff. Streams through cities are sometimes routed underground into storm drains and during heavy rains, the storm drains can be overwhelmed and flood roads and buildings, particularly low spots such as underpasses, underground parking garages, and basements. Areas near rivers are at risk from flash floods. Levees are often built along rivers and used to prevent high water from flooding bordering land.

Nearly half of all flash flood deaths occur as vehicles are swept downstream after the driver drives onto the flooded highway. Six inches of fast-moving water can knock a person off their feet; water only twenty-four inches (two feet) deep can carry away most vehicles. The National Weather Service has the "Turn Around Don't Drown" program to educate the public about the dangers of floods and fast-moving waters.

The National Weather Service has developed classes of flash flood warnings.

Table 3.6: Flash Flood Warning Levels

Base	Used most of the time, when flash flood impact is possible
Considerable	Used rarely, when there are indications flash flooding capable of unusual severity or impact is imminent or ongoing and urgent action is needed to protect lives and property.
Catastrophic	Used exceedingly rarely, when a flash flood threat to life and catastrophic damage is occurring or is imminent, and floodwaters have risen or will rise to levels rarely if ever seen.

Since 2020, Carroll County has not experienced flash flooding events. This is considerably lower than the five events reported from 2014 to 2019. The last recorded flash flood occurred in Templeton in May 2016, resulting in $10,000 in property damage.

Land that is located within a floodplain or in low-lying areas are at the most risk of experiencing flash floods. Properties that have aging sewer systems can also be at risk due to the design of the drains. Older systems were designed for what was necessary at the time, and current capacities could be significantly larger. When possible, the National Weather Service forecasts flash flood watches 12-36 hours in advance when conditions look favorable for a flash flood. Although a watch is issued 12-36 hours in advance, warnings, on average, are issued thirty minutes to an hour before the flood occurs.

While there is a good deal of information pertaining to river flooding for the state, data for flash floods is not readily available. Flash floods occur with little to no warning, and with no data being used to predict future instances, it is important that Carroll County is prepared for these events. Even though the county has not experienced flash floods within last planning period, flash floods are unpredictable and the jurisdiction needs to be prepared for all results of this type of event. It is important that the jurisdiction is prepared to minimize the damage caused by these events by implementing mitigation items prior to their occurrences.

Climate change is anticipated to increase the number of flash floods that impact the planning area. Precipitation is expected to increase in intensity, but may not increase in frequency. Average annual precipitation is anticipated to increase 1" to 4" by 2050, but heavy precipitation events are likely to be more common.

There are some mitigation actions that can be implemented to alleviate the effects of flash floods.

- Restore rivers and drainage districts to prevent flooding
- Encourage the jurisdiction to participate in the NFIP
- Encourage permeable pavement installation
- Educate homeowners about on-site stormwater management practices

Grass/Wild Land Fires

A grass/wildland fire is an uncontrolled fire that threatens life and property in either rural or wooded areas. When conditions are favorable, such as periods of drought when natural vegetation is drier, fires are more likely to occur.

Wildland fires are a serious threat to life and property in the United States. Fire seasons have become progressively worse over the past fifty years due to the combination of drought, warmer temperatures, high winds, and an excess of dried vegetation in forests and grasslands. As the wildland threat grows, so does the cost of fighting the fires. Although lightning is a common ignition source of wildland fires, nine out of ten fires are started directly or indirectly by people through debris burning, campfires, arson, discarded smoking products, sparks from equipment in operation, arced power lines, or other means.

Weather is the most variable of the factors that affect fire behavior. The combination of wind, temperature, and humidity affects how fast wildland fires can spread. Strong winds can push the flames toward new fuel sources or pick up and transfer burning embers, sparks, and other materials that are capable of starting "spot fires". Temperature affects the spread of wildland fires because the temperature of the fuel affects how quickly or slowly they will reach their ignition point and burn. Humidity dampens the fuel, slowing the spread of flames.

Grass and Wild Land fires are the most common types of fires that occur in Carroll County, and all jurisdictions can be affected by this hazard. Most jurisdictions have been affected by a grass or wild land fire in the past, but these types of fires tend to occur in the rural parts of the county most often. Consistent and accurate data is not readily available for the county, but in total, the area fire departments report multiple incidents per year.

Fire severity is a quantitative measure of the effects of a fire on the environment, typically considering both the damage to vegetation and the impacts on the soil. Fire severity is described along a spectrum, ranging from unburned/low severity, to moderate severity, and high severity. Fire severity is driven by multiple factors that affect how a fire behaves. Those factors are often depicted in what's called a "fire behavior triangle." The three major factors in the triangle are: the weather conditions during the fire (wind, temperature, humidity); the topography of the landscape (slope, aspect); and the amount, arrangement, and types of fuels that are present during the fire.

Table 3.7: Fire Severity

Low	A fire that has limited effect on overstory trees (<30% mortality), understory vegetation, and soils.
Moderate	A fire producing variable, moderate effects on overstory trees, averaging 30-80% of the vegetation killed, and/or moderate soil exposure.
High	A fire producing a high percent of overstory tree mortality (>80%) and/or extensive mineral soil exposure.

According to the National Interagency Fire Center (NIFC), the United States saw 56,580 fires resulting in 8,924,884 acres burned. Iowa reported no wildland fires in 2024. According to the NIFC, no fire in Iowa has been reported as a historically significant wildfire or a large wildfire (more than 100,000 acres). The NIFC puts out a monthly National Significant Wildland Fire Potential Outlook, warning areas where wildland fires have the potential to breakout.

Maps 3.3 and 3.4 on the next page show the likelihood of wildfires in Carroll County and the risk these fires pose to homes within the county. Utilizing available data, the jurisdictions within the county are anticipated to fight at least one grass/wildland fire annually throughout the life of this plan. The probability of fighting more than one annually is highly likely.

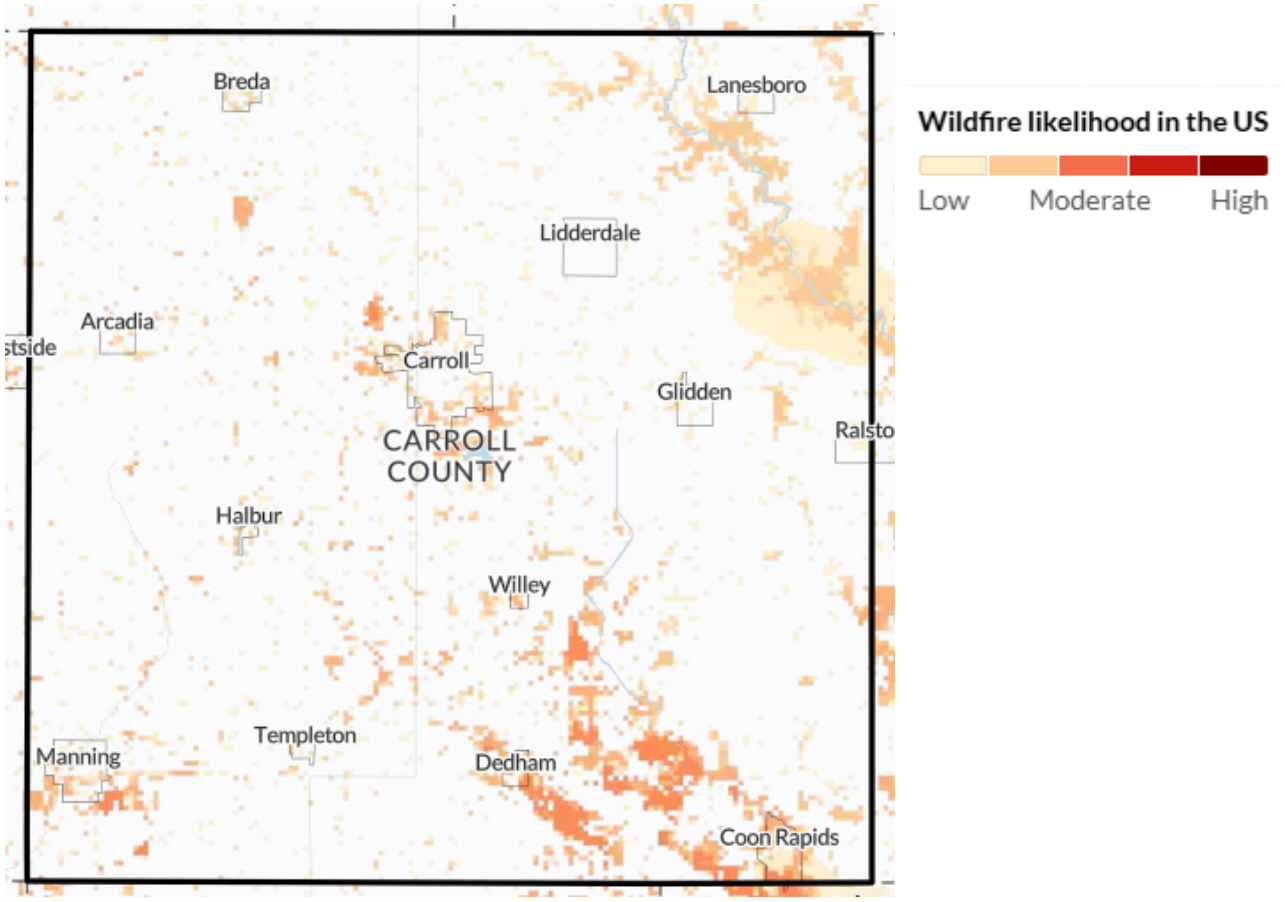
Most grass/wildland fires are contained to highway right-of-way and rail right-of-way ditches; however, high winds can turn a small fire into a multi-acre grass fire within a matter of minutes. The extent is dependent of weather conditions and topography. Grass/wildland fires occur without warning and can spread rapidly. The majority of Iowa wildfires are short in duration.

Grass and wildland fires are unpredictable and Carroll County is susceptible to these hazard events. While the county and its jurisdictions are at risk of grass/wildland fires, recent data has shown that the risk to humans is reduced. These fires tend to primarily damage crops and other property (including farm machinery). Fires are not uncommon in Iowa, therefore it is important that the jurisdictions are informed on the mitigation actions that can reduce the impact these fires have on the environment and population. These fires are anticipated to increase over the planning period. Droughts are anticipated to become more common due to climate change, which will make dry vegetation more prone to ignition. High temperatures will also pull moisture from vegetation.

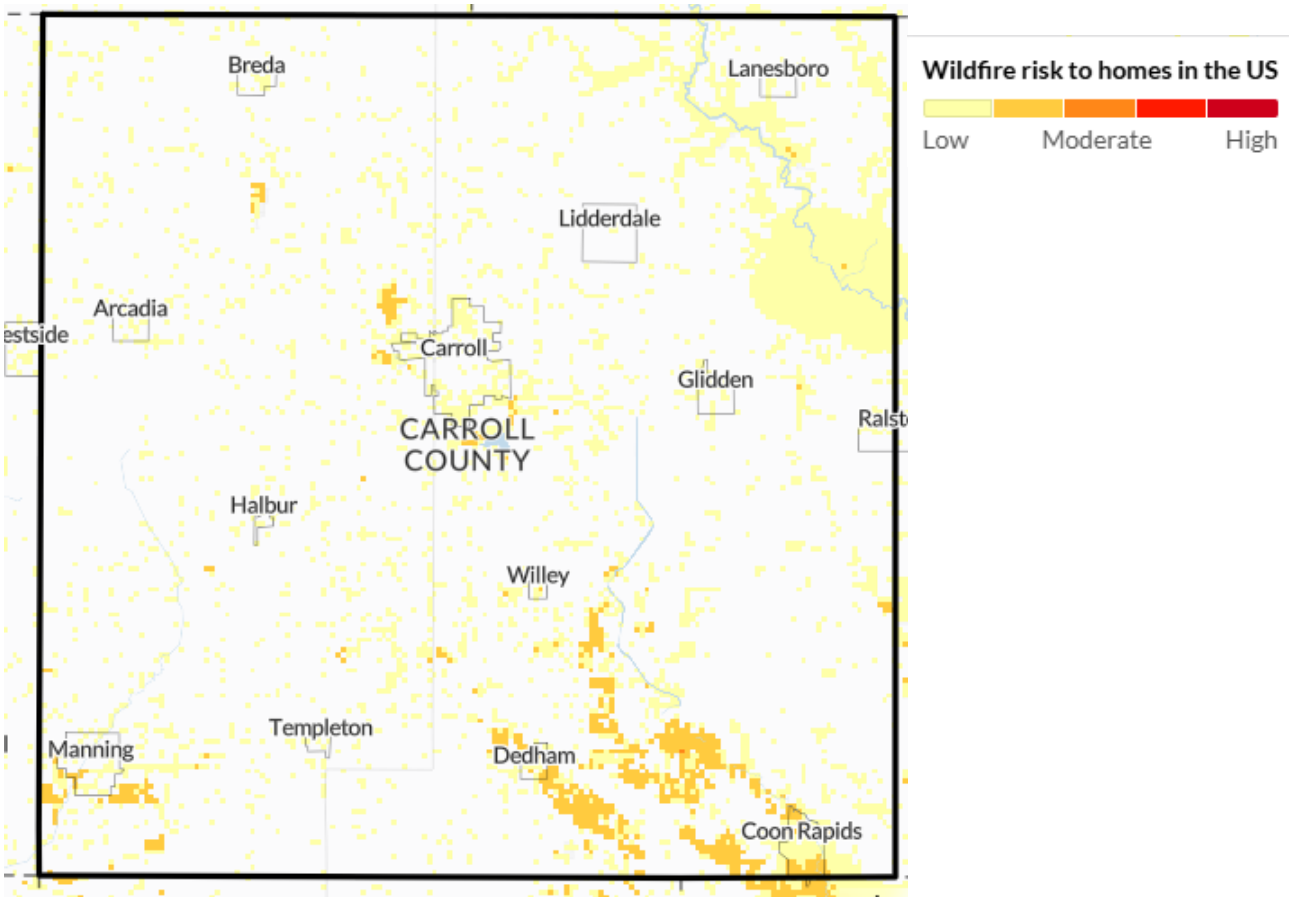
Mitigation actions to minimize the effect of grass and wildland fires can include:

- Proper training for first responders
- Ensure first responders have adequate equipment to fight fires
- Education of citizens on preparedness and reaction prior to and during a wildfire

Map 3.3: Wildfire Likelihood



Map 3.4: Wildfire Risk to Homes



Human Disease

This hazard includes a medical, health, or sanitation threat to the general public, such as a contamination, epidemics, plagues, insect infestations, and pandemics. Public health action to control infectious disease in the 21st century is based on the 19th century discovery of microorganisms as the cause of many serious diseases (e.g., cholera and Tuberculosis). Disease control resulted from improvements in sanitation and hygiene, the discovery of antibiotics, and the implementation of universal childhood vaccination programs. Scientific and technologic advances played a major role in each of these areas and are the foundation for today's disease surveillance and control systems. Scientific findings have contributed to a new understanding of the evolving relationship between humans and microbes (Iowa Hazard Mitigation Plan 2023).

Prior to 2020, this hazard was not at the forefront of the public view. That is until the COVID-19 pandemic hit worldwide. This pandemic caused major disruptions within the healthcare fields, society, and economies at all levels. To this day, the effects that the COVID-19 pandemic had on the world are still being felt.

The Iowa Department of Public Health tracks epidemiological statistics in Iowa. Public health agencies work to protect Iowans from infectious diseases and preserve the health and safety of Iowans through disease surveillance, investigation of suspect outbreaks, education, and consultation to county, local, and health agencies. As of 2013, 67 infectious diseases were designated as notifiable at the national level. A notifiable disease is one for which regular, frequent, and time information regarding individual cases is considered necessary for the prevention and control of the disease.

A pandemic human disease is defined as a disease that has spread around the world to many people. The word "pandemic" means occurring over a wide geographic area and affecting an exceptionally high proportion of the population (Merriam-Webster Dictionary). Some examples of pandemic diseases, past and present, include Tuberculosis, Polio, HIV/AIDS, SARS, and Influenza. Response and recovery to a pandemic disease will likely be lengthy.

The COVID-19 pandemic started in China in 2019 and by early 2020 the United States declared an emergency. This pandemic led to quarantine and social-distancing. Individualized responses happened on a jurisdiction by jurisdiction case with some jurisdictions implementing the public to "stay at home," some jurisdictions restricting large gatherings, closing schools and daycares, closing local bars and restaurants, requiring masks and some even required vaccines. The United States officially declared the end of the pandemic incident period on May 11, 2023. The COVID-19 pandemic triggered multiple declarations within the state and nation. The two declarations in Iowa were EM-3480-IA and DR-4483-IA. Under DR-4483-IA both individuals and public assistance was available for the public to utilize. This DR designation allowed $30,857,350.22 of Individual and Household Program dollars to be approved, $278,916,181.53 of Public Assistance grant Dollars to be obligated and $11,864,979.19 obligated to the Hazard Mitigation Grant Program. The EM-3480-IA declaration supplemented the state and local efforts in providing emergency services, such as the protection of lives, property, public health, and safety, or to lessen or avert the threat of a catastrophe in any part of the United States.

In Carroll County, from the onset of the pandemic to March 10, 2023, there were 5,680 cases of COVID-19 reported with 84 deaths being related to the disease.

There have been two cases of measles in Iowa in 2019, since then, however, there have been no additional cases reported. Prior to 2019, there were no cases reported since 2011. Since 2018, there have been 37 cases of mumps in Iowa. Prior to that, a statewide Mumps outbreak began in the summer of 2015 and lasted throughout 2017, causing over 1,200 confirmed cases of the disease (Iowa Department of Public Health).

The COVID-19 pandemic brought human disease back to the forefront of the public eye and reminded Iowans that they are not exempt from disease outbreaks. Audubon County experienced the effects of the pandemic and forced jurisdictions to react and be proactive to the ever-changing guidelines. While another pandemic of the COVID-19 magnitude may not happen in the near future, there are other diseases that effect the counties on a regular basis and lessons learned from the pandemic may be beneficial when looking to mitigate the effects of all human disease. It is likely that the county will face some form of human disease during the life of this plan.

Some mitigation actions that jurisdictions can consider include:

- Create plans to disseminate accurate information on a regular basis
- Create plans to mitigate the spread of disease (quarantine, improved personal hygiene)
- Work with the public to ensure that the jurisdiction still can provide necessary services

River Flooding

A river flood occurs when water levels rise due to heavy rains, persistent thunderstorms over the same area for extended periods of time, snow melt, ice jams, or dam/levee breakage. Other factors that contribute to flooding include topography, soil conditions, and ground cover. Flooding may impact an area with only a few inches of water or cover entire houses, it could last a couple days or carry on for several weeks. As much as 90% of the damage related to all natural disasters (excluding droughts) is caused by flooding and associated debris flow. On average, flooding causes more than $2 billion in property damage each year.

Flooding is the most common of all natural hazards- it occurs in every U.S. state and territory and is a threat experienced anywhere in the world that receives rain. From 1983-2012, floods in the United States have killed more people than tornadoes, hurricanes, or lightning. Since 1900, flooding has caused more than 10,000 deaths, and though numbers can fluctuate from year to year, the thirty-year national average is 89. It is believed that many people underestimate the power and force of water; six inches of fast-moving water can knock a person off their feet, twenty-four inches can carry away most automobiles.

Between 2020 and 2024, Carroll County has not experienced floods, which is considerably lower than the last planning period. From 2014 to 2019, the county recorded three floods that caused a total of $20,000 in property damage, but no reported crop damage or deaths.

Climate change is anticipated to increase the number of river floods that impact the planning area. Precipitation is expected to increase in intensity, but may not increase in frequency. Average annual precipitation is anticipated to increase 1" to 4" by 2050, but heavy precipitation events are likely to be more common.

The National Flood Insurance Program (NFIP) was created by Congress in 1968 to mitigate future flood loses. The NFIP is designed to provide an insurance alternative to disaster assistance to meet the escalating costs caused by floods. The flood insurance is offered to homeowners, renters, and business owners if their community participates in the NFIP. Participating communities must agree to adopt and enforce ordinances to reduce the risk of flooding. According to FEMA, as of Aug. 6, 2024, Carroll County and the cities of Arcadia, Carroll, Coon Rapids, Dedham, Glidden, Manning, and Templeton participate in the NFIP.

The National Weather Service provides flood forecasts for the State of Iowa. Local National Weather Service forecast offices issue flood watches 12-36 hours in advance of a possible flood. Warnings are issued when river flooding is occurring or imminent.

The report Climate Change Impacts on Iowa 2010 ("Report") notes that there is a trend toward more frequent intense rainfall events. If this trend continues, flash flooding events and their associated impacts will likely occur more often in Iowa. As for riverine flooding, very heavy precipitation does not always result in flooding, but it can when the very heavy precipitation occurs frequently without enough time for the watershed to drain properly. The impact of these climate changes in Iowa may be impacting eastern Iowa more than the rest of the state. Carroll County has regions that are susceptible to river flooding. Even though the county has not experienced flooding during the last planning period, this hazard still requires attention, with that attention focused on the flood prone areas. Reducing the impacts of flooding can reduce the impacts on the population, crops, and property.

Mitigation actions to minimize the effect of river flooding can include:

- Implement the "watershed approach" for flood reduction when appropriate
- Get all jurisdictions within the county to participate in NFIP
- Create plans which limit construction within floodplains
- Elevate or protect wastewater lift stations
- Put in impervious manholes, pumps, or backflow prevention, or similar small-scale flood protection projects
- Promote the implementation of green infrastructure
- Educate the public about flood preparation and response
- Reduce erosion and flooding through riverbank improvement projects

Severe Winter Storms

Every year, winter weather kills hundreds of people in the United States, primarily from automobile accidents, overexertion, or exposure. Severe winter storm events can include blizzard conditions, heavy snow, blowing snow, freezing rain, heavy sleet, and extreme cold. They are most common from the months of October to April.

The various types of severe winter weather can cause considerable damage. Heavy snow can immobilize transportation systems, take down trees and power lines, collapse buildings, and lead to the loss of livestock and wildlife. Loose snow begins to drift when wind speed reaches 9-10 mph under freezing conditions. The potential for drifting is substantially higher in open country than urban areas where buildings, trees, and other features obstruct the wind. Ice storms have resulted in fallen trees, broken tree limbs, downed power lines and utility poles, fallen communications towers, and impassable transportation routes. Severe ice storms have caused total electric power outages over large areas of Iowa and rendered assistance unavailable to those in need due to impassible roads. Extreme cold often accompanies a winter storm or is left in its wake. Prolonged exposure to the cold can cause frostbite or hypothermia and become life threatening. Table 3.8 displays the definitions for severe winter storms.

Table 3.8: Severe Winter Storm Definitions

Blizzard	Sustained or frequent winds of 35 mph or greater; falling and/or blowing snow that frequently reduces visibility to 1/4 of a mile or less; conditions are expected to last for a minimum of three hours
Frost/Freeze	Frost describes the formation of thin ice crystals on the ground or other surfaces in the form of scales, needles, feathers, or fans. Frost develops under conditions similar to dew, except the temperatures of the Earth's surface and earthbound objects falls below 32°F. A freeze is when the surface air temperature is expected to be 32°F or below over a widespread area for a climatologically significant period of time. Use of the term is usually restricted to advective situations or to occasions when wind or other conditions prevent frost. The National Oceanic and Atmosphereic Administration groups these two events together when recording data.
Heavy Snow	4" or more of snow in 12 hours or less, 6" or more of snow in 24 hours or less
Ice Storm	Damaging accumulations of more than 1/4" of ice are expected during freezing rain
Sleet Storm	Pellets of ice composed of frozen or mostly frozen raindrops; these pellets cause slippery surfaces. Heavy sleet is a relatively rare occurrence defined as an accumulation of sleet covering the ground to a depth of 1/2" or more
Extreme Cold/ Wind Chill	Temperatures at or below 0 degrees Fahrenheit and wind chill temperatures at -25 degrees Fahrenheit for at least three hours is considered extreme cold. Wind chill is not the actual temperature, but rather how wind and cold feel on exposed skin.
Winter Storm Event	A combination of heavy snow, blowing snow, and/or dangerous wind chills that can lead to hazardous conditions and potential disruptions.

Between 2020 and 2024, Carroll County experienced fifteen severe winter storm events: three blizzards, one cold/wind chill event, three extreme cold/wind chill events, four heavy snow events, and four winter storms, meaning that more than one significant hazard met or exceeded locally defined warning criteria.

Bridges and overpasses are particularly dangerous because they freeze before other structures. This, along with heavy snow, can cause hazardous conditions that can slow or stop the flow of supplies as well as disrupt emergency and medical services.

Carroll County experiences several instances of severe winter storms each year. Some of these events cause reported damage, but the majority do not. The economic impact of winter weather each year is huge, with costs of snow removal, damage repairs, and loss of business in the millions. While the severe winter storm events in Carroll County caused no reported damage, they cost the local jurisdictions money to remove the snow and ice these hazards caused. Each jurisdiction spends numerous hours planning for snow removal and emergency service response during these events. While there is little that can be done to prevent these events, jurisdictions continue to strive for a quick and efficient response that will reduce costs to taxpayers.

Mitigation actions to minimize the effect of severe winter storms can include:

- Electric utility retrofit/hardening
- Encourage the use of NOAA radios
- Purchase and installation of back-up electrical generation
- Educate the population about carbon monoxide and its dangers and ways to reduce the potential for carbon monoxide poisoning

Thunderstorm/Lightning/Hail

The National Weather Service has developed effective weather advisories that are widely distributed. Accurate information is made available hours in advance if a severe winter storm is threatening an area. A winter storm can range from a heavy snow over a few hours to blizzard conditions that last several days.

A thunderstorm is a rain shower during which thunder occurs. Since thunder comes from lightning, all thunderstorms have lightning. Most thunderstorms are 15 miles in diameter and last an average of 30 minutes. A thunderstorm is classified as "severe" when it contains one or more of the following:

- Hail three-quarter inch or greater
- Winds gusting in excess of 57.5 mph
- Tornado

There are about 100,000 thunderstorms each year in the United States and approximately 10% of those results in severe thunderstorms. Severe thunderstorms are found most often from Texas to Southern Minnesota. Thunderstorms are common in the spring and summer months, and during the afternoon and evening hours. However, thunderstorms can occur year-round and at all hours.

There are four types of thunderstorms: single cell, multi-cell cluster, multi-cell line, and supercell.

Single Cell

Single cell thunderstorms typically last less than 30 minutes and are not usually severe; however, it is possible for a single cell storm to produce a brief severe weather event with heavy rainfall and occasionally a weak tornado.

Multi-Cell Cluster

Multi-cell cluster thunderstorms are the most common type of thunderstorm. The multi-cell cluster consists of multiple cells, moving along as one unit, with each cell in a different phase of the thunderstorm life cycle. It can produce moderate size hail, flash floods, and weak tornadoes. While to multi-cell cluster may last for several hours, each cell in a multi-cell cluster only lasts about 20 minutes.

Multi-Cell Line

Multi-cell line thunderstorms consists of a long line of storms with a continuous well-developed gust front at the leading edge of the line. The line of storms can be solid, or there can be gaps and breaks in the line. These thunderstorms can produce hail up to golf-ball size, heavy rainfall, and weak tornadoes, but they are best known to produce strong downdrafts.

Supercell

Supercell thunderstorms are rare, but highly organized and pose a high threat to life and property. A supercell thunderstorm is similar to a single-cell thunderstorm because they both have one main updraft. The difference is that the updraft of a supercell is extremely strong, reaching speeds of 150-175 mph. It is set apart from the other thunderstorm types due to the presence of rotation. The rotating updraft of a supercell thunderstorm helps it to produce extreme severe weather threats, such as giant hail (more than two inches in diameter), strong downbursts of 80 mph or more, and strong to violent tornadoes. The leading edge of a supercell is usually light rain as heavier rain tends to fall closer to the updraft with severe weather typically forming towards the rear of the storm.

Unlike other weather hazards that often involve sophisticated watches and warnings from the National Weather Service, lightning can occur anywhere there is a thunderstorm. It is one of the most underrated severe weather hazards, yet ranks as one of the top weather killers in the United States. According to the National Weather Service, from 2008-2017, lightening killed an average of thirty-one people each year, with hundreds of documented injuries. It is estimated that lightening causes more than one billion dollars in damage each year.

There are three types of lightening: ground flashes, cloud-to-ground, and cloud flashes

Ground Flashes

Natural ground flashes occur because of normal electrification in the environment while artificially initiated lightning occurs because of strikes to very tall structures, airplanes, and towers. Natural lightning travels from the cloud to the ground; artificially initiated lightning travels from the ground to the cloud.

Cloud-to-Ground

Cloud-to-ground lightning is the result of a step leader, a channel of negative charge, traveling downward through the cloud. As it nears the ground, the negatively charged step leader is attracted to a channel of positive charge, called a streamer, normally through something tall such as a tree, house, or telephone pole. When the leader and streamer connect, a powerful electrical current begins flowing, resulting in a flash of lightning.

Cloud Flashes

Cloud flashes sometimes have visible channels that extend out into the air and around the storm, but they do not strike the ground. A related term for cloud flashes is heat lightning.

The lightning rate peaks in the summer months, specifically July, with rapid increase during May and rapid decrease in September. Most lightning occurs during the afternoon or early evening. Besides causing injury and death, a lightning strike can result in extensive property damage by sparking a fire or surging through the electrical circulatory of a home or business. Damage to the emergency management center may affect warning systems, communications equipment, and computer systems.

Hail is a form of precipitation that occurs when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere where they freeze into ice. There is no clear distinction between storms that do and do not produce hailstorms. Nearly all severe thunderstorms produce hail, though it may melt before reaching the ground. Hailstorms can have layers like an onion if they travel up and down in an updraft, or they can have no layers if they are "balanced" in an updraft. One can tell how many times a hailstone traveled to the top of a storm by counting the layers. Drops of super-cooled water hit the ice and freeze on it, causing it to grow. Hail falls when it becomes heavy enough to overcome the strength of the updraft and is pulled by gravity towards earth.

Hail size is estimated by comparing it to a known object. Most hail storms are made up of a mix of sizes, and only the very largest hail stones pose serious risk to people caught in the open. Hail that is quarter size (one inch) or larger is considered severe. The stronger the thunderstorm updraft, the larger the hailstone can grow. The largest hailstone recovered in the United States fell in Vivian, South Dakota on June 23, 2010, with a diameter of 8 inches and a circumference of 18.62 inches. It weighed one pound and fifteen ounces.

Damage from hail approaches $1 billion in the United States annually and most of the damage is to crops. Crops are particularly vulnerable and even relatively small hail can destroy them in a matter of minutes. Vehicles, roofs, buildings, homes, and landscaping are other things that are most commonly damaged by hail. Hail only rarely results in loss of life directly, although injuries can occur.

Data collected from the National Climatic Data Center (NCDC) shows that Iowa experiences many thunderstorm and lightning events every year. Between 2020 and 2024, there were 17 days with thunderstorm/lightning/hail instances in Carroll County. There were seven days with hail reported, and thirteen with thunderstorm wind reported. These storms resulted in $50,000 property or crop damages. Thunderstorms can bring other hazards that the jurisdiction may face such as heavy rain, flash flooding, river flooding, tornadoes, and high winds. Those in unprotected areas, mobile homes, or automobiles during a storm are most at risk.

Between 1997 and 2012, Iowa experienced, on average, 628,511 cloud-to-ground flashes per year. This ranks Iowa fifteenth nationally in terms of cloud-to-ground flash densities with 11.1 flashes per square mile. From 1959-2011, Iowa experienced 72 fatalities due to lightning (Vaisasla). Iowa's last reported lightning fatality was in 2008. Lightning injures more people than it kills and leaves some victims with life-long health problems.

Some thunderstorms can be seen approaching, while others hit without warning. The National Weather Service usually issues severe thunderstorm watches a few hours before the storm hits an area, but an area may only have minutes after a warning is issued. Most single-cell thunderstorms are 15 miles in diameter and last an average of 30 minutes. However, multi-cell cluster thunderstorms are the most common type of thunderstorm and can last several hours.

Carroll County is extremely likely to experience thunderstorms/lighting/hail during the planning period. Thunderstorms are not restricted by jurisdictional boundaries, therefore the entire county can be impacted by one event. Research indicates that these the county is likely to expect two to four hailstorms annually. This hazard typically does not cause harm to property, crops, and people, but can cause reported damage to all. Instances of these hazard events has increased due to climate change. Warming summers and higher quantities of water in the atmosphere will likely fuel increased thunderstorm development.

Based on information collected from FEMA for the Iowa Hazard Mitigation Plan, Carroll County is categorized as experiencing relatively low hail expected annual loss and also relatively low lightning expected annual loss. Both people and property are vulnerable to this hazard and mitigation actions should be implemented to reduce the overall vulnerability of the county.

Mitigation actions to minimize the effects of thunderstorms/lighting/hail may include:

- Encourage the use of NOAA weather radios
- Construct shelters or safe rooms at public locations where there people gather
- Provide education on how to respond to thunderstorm events, especially if they are not at home
- Electric system hardening, including putting electric systems underground

Tornadoes are the most violent of all atmospheric storms. A tornado is a narrow, violently rotating column of air that extends from the base of a thunderstorm to the ground. The funnel is made visible by dust and debris sucked up and condensation of water droplets in the center of the funnel.

There are two types of tornadoes: those that come from the supercell thunderstorm and those that do not. Tornadoes that form from a supercell thunderstorm are most common, and often are the most dangerous. In a supercell, the tornado is a very small extension of a larger rotation that can be as large as ten miles in diameter and up to 50,000 feet fall. Field studies show that as few as 20% of all supercell thunderstorms produce tornadoes. Non-supercell tornadoes are circulations that form without a rotating updraft. One type of non-supercell tornado is the gustnado. A gustnado tornado has a whirl of dust and/or debris at or near the ground with no condensation funnel. Another non-supercell tornado is a landspout. A landspout tornado is a narrow, rope-like condensation funnel that forms when the thunderstorm cloud is still growing and has no rotating updraft, instead the spinning motion originates near the ground. Waterspouts are similar to landspouts; except they occur over water. Damage from non-supercell tornadoes tends to be F2 or less.

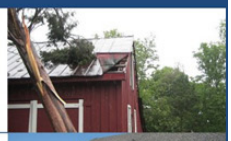
The Enhanced Fujita Scale (EF-Scale) replaced the Fujita Scale on February 1, 2007. The EF Scale addresses some of the Fujita Scale limitations identified by meteorologists and engineers. The EF Scale is still a set of wind estimates, not measurements, based on damage. The original Fujita Scale lumped together homes, schools, mobile homes, vehicles, and trees in one short description of damage for each F-Scale category. In the EF-Scale, detailed descriptions are given for examples of damage to twenty-three types of buildings, taking into account types of buildings, construction quality and maintenance, and five additional objects like trees, towers, and poles. Wind speed estimates are then provided for each structure and type of damage (www.weather.com). Table 3.10 shows the estimated wind speed for the Enhanced Fujita Scale, as well as the expected damage associated with the tornado's intensity. Table 3.9 displays the relationship between tornado strength and associated damages.

Approximately 1,000 tornadoes hit the nation yearly, killing an average of 60 people per year—mostly from flying or falling debris. The peak tornado season for the northern plains and upper Midwest is in June or July. Most tornadoes occur between 3 pm and 9 pm; however, it is important to remember that they can happen at all hours of the day and any day of the year.

Table 3.9: Tornado Facts

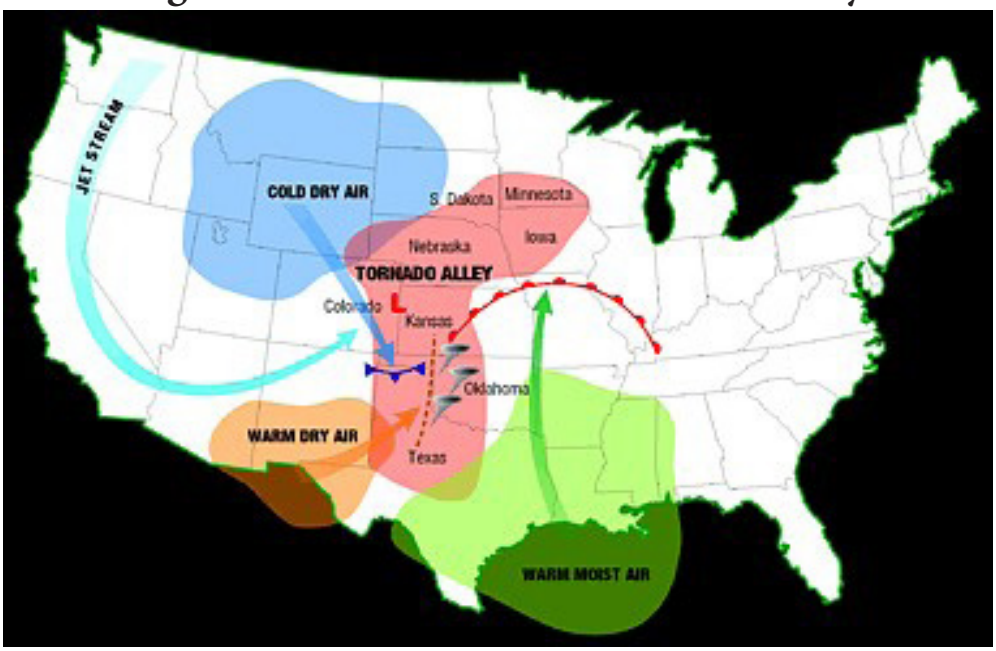
Weak Tornadoes (EF0 and EF1)	Strong Tornadoes (EF2 and EF3)	Violent Tornadoes (EF4 and EF5)
88% of all tornadoes	11% of all tornadoes	1% of all tornadoes
Less than 5% of all tornado deaths	Nearly 30% of all tornado deaths	70% of all tornado deaths
Lasts 1-10+ minutes	May last 20 minutes or longer	Can exceed 1 hour
Light to moderate damage	Considerable to severe damage	Devastating to incredible damage

Table 3.10: Tornado Ratings and Expected Damage

EF Rating	Wind Speeds	Expected Damage		
EF-0	65-85 mph	'Minor' damage: shingles blown off or parts of a roof peeled off, damage to gutters/siding, branches broken off trees, shallow rooted trees toppled.		
EF-1	86-110 mph	'Moderate' damage: more significant roof damage, windows broken, exterior doors damaged or lost, mobile homes overturned or badly damaged.		
EF-2	111-135 mph	'Considerable' damage: roofs torn off well constructed homes, homes shifted off their foundation, mobile homes completely destroyed, large trees snapped or uprooted, cars can be tossed.		
EF-3	136-165 mph	'Severe' damage: entire stories of well constructed homes destroyed, significant damage done to large buildings, homes with weak foundations can be blown away, trees begin to lose their bark.		
EF-4	166-200 mph	'Extreme' damage: Well constructed homes are leveled, cars are thrown significant distances, top story exterior walls of masonry buildings would likely collapse.		
EF-5	> 200 mph	'Massive/incredible' damage: Well constructed homes are swept away, steel-reinforced concrete structures are critically damaged, high-rise buildings sustain severe structural damage, trees are usually completely debarked, stripped of branches and snapped.		

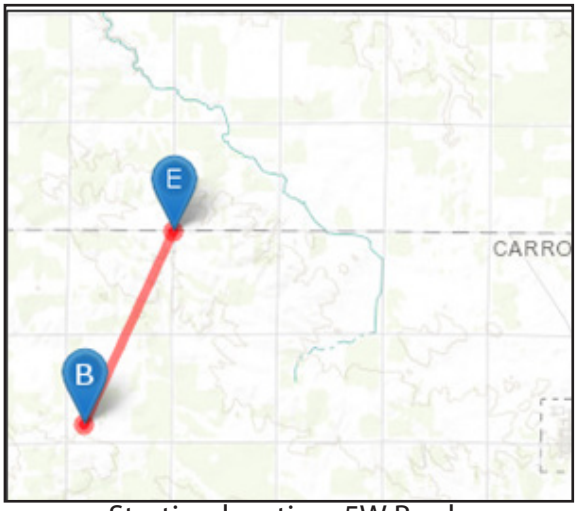
Tornado Alley is a nickname given to the area of the United States that consistently experiences a high frequency of tornadoes each year. The relatively flat land in the Great Plains allows cold, dry, polar air from Canada to meet warm, moist, tropical air from the Gulf of Mexico. A large number of tornadoes form when these two air masses meet. Figure 3.4 depicts the warm and cold air masses, as well as Tornado Alley.

Figure 3.4: Air Masses and Tornado Alley



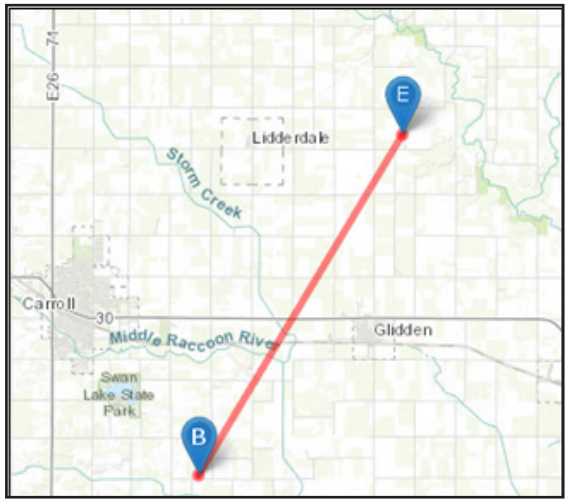
According to the National Climatic Data Center, there has been four tornadoes and three funnel clouds in Carroll County from 2020 to 2024. One tornado was categorized as EF1 and caused a total of $80,000 in property damage. The other three tornadoes were categorized as EFU (EF-Unknown) and no crop or property damage were reported. The funnel clouds also did not cause any property or crop damage. Among the four tornadoes, no fatalities or injuries were reported.

Map 3.5: Carroll County EFU Tornado 12/15/2021



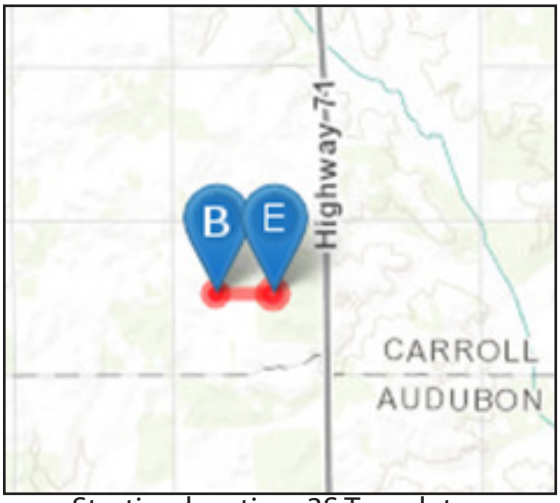
Starting location: 5W Breda
12/15/2021 17:13 CST-6
Ending location: 4WNW Breda
12/15/2021 17:15 CST-6
Scale: EFU, Width: 50 yards, Length: 1.99 Miles
Property Damage: $0 Crop Damage: $0

Map 3.6: Carroll County EF1 Tornado 12/15/2021



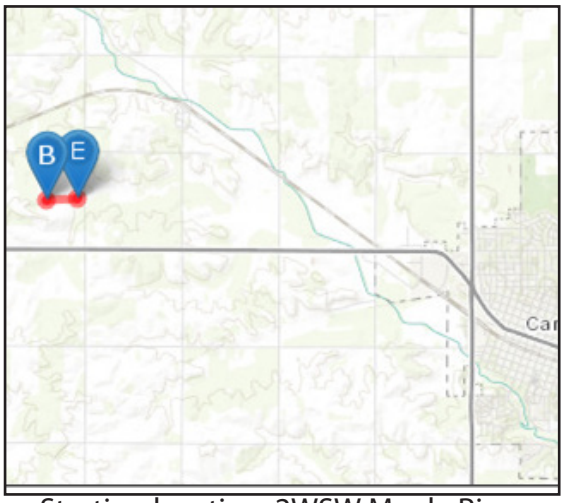
Starting location: 2NNE Willey
12/15/2021 17:19 CST-6
Ending location: 3E Lidderdale
12/15/2021 17:26 CST-6
Scale: EF1, Width: 80 yards, Length: 9.65 Miles
Property Damage: $80,000 Crop Damage: $0

Map 3.7: Carroll County EFU Tornado 07/07/2022



Starting location: 3S Templeton
07/07/2022 13:32 CST-6
Ending location: 3S Templeton
07/07/2022 13:34 CST-6
Scale: EFU, Width: 20 yards, Length: 0.36 Miles
Property Damage: $0 Crop Damage: $0

Map 3.8: Carroll County EFU Tornado 08/05/2023



Starting location: 2WSW Maple River
08/05/2023 20:24 CST-6
Ending location: 2SW Maple River
08/05/2023 20:25 CST-6
Scale: EFU, Width: 25 yards, Length: 0.32 Miles
Property Damage: $0 Crop Damage: $0

Advancement in weather forecasting has allowed tornado watches to be delivered up to hours in advance. However, the best lead-time for a specific severe storm and tornado is about thirty minutes. Tornadoes can develop and change paths rapidly, limiting the warning time. They can last from several seconds to over an hour, though most tornadoes last about five minutes. The aforementioned tornadoes were not the cause for any disaster declarations. From 2020 to 2024, tornadoes in Carroll County lasted an average of 3 minutes.

Carroll County has a high probability of experiencing tornado events within the five-year planning period of this plan. Although there have been advancements in the predictability of the events, the warning time is still limited, putting people and property at a high risk of damage. Damage to the economy can continue to happen even after the weather event has ended. Damage caused by tornadoes can cause counties, cities, and the public large amounts to clean up the damage, get streets opened back up, and utilities back up and running. Educating the public about tornadoes and what to do in the event of one occurring can be a mitigation effort that can save lives.

Climate change's impact on tornadoes is uncertain. The intensity and frequency do not appear to be changing, although evidence suggests that "tornado alley" is shifting east. The likelihood of a tornado in Iowa has not significantly shifted, but as temperatures rise, the length of tornado season may increase.

Mitigation actions to minimize the effects of tornadoes may include:

- Encourage the use of NOAA weather radios
- Construct shelters or safe rooms
- Installation of storm sirens
- Electric system hardening, including putting electric systems underground
- Adoption and enforcement of higher building standards with the jurisdictions

Windstorm

Damaging winds are classified as those exceeding 50-60 mph. Damage from severe thunderstorm winds account for half of all severe reports in the lower forty-eight states and are more common than damage from tornadoes. According to the majority of Storm Prediction Center forecasts, severe wind is the most difficult threat to forecast because they come from a wider range of environments than just supercells, tornadoes, or large hail. Damaging wind events can develop with little advanced warning as they can occur on their own, with severe winter storms, or with severe thunderstorms.

There are several types of damaging winds: straight-line, downdrafts, downbursts, microbursts, gust front, derecho, and bow echo.

Straight-Line

Straight-line winds are any thunderstorm wind that is not associated with rotation and is used mainly to differentiate from tornadic winds. Most thunderstorms produce some straight-line winds as a result of outflow generated by the thunderstorm downdraft.

Downdrafts

Downdrafts are a small-scale column of air that rapidly sinks towards the ground.

Downbursts

Downbursts are strong downdrafts with horizontal dimensions larger than 2.5 miles, resulting in an outward burst of wind on or near the ground. Although usually associated with thunderstorms, downbursts can occur with showers too weak to produce thunder.

Microbursts

Microbursts are small, concentrated downbursts that produce an outward burst of damaging winds at the surface. Microbursts are generally small (less than 2.5 miles) and short-lived, lasting only five to ten minutes.

Gust Front

A gust front wind is the leading edge of rain-cooled air that clashes with warmer thunderstorm inflow. Gust fronts are characterized by a wind shift, temperature drop, and gusty winds out ahead of a thunderstorm.

Derecho

A derecho wind is a widespread thunderstorm wind event caused when new thunderstorms form along the leading edge of an outflow boundary. The thunderstorms feed on this boundary and continue to reproduce themselves. Derechos typically occur in the summer months when complexes of thunderstorms form over the plains and northern plains states. Usually these thunderstorms produce heavy rain and severe wind, as they can last a long time and cover such large areas.

Bow Echo

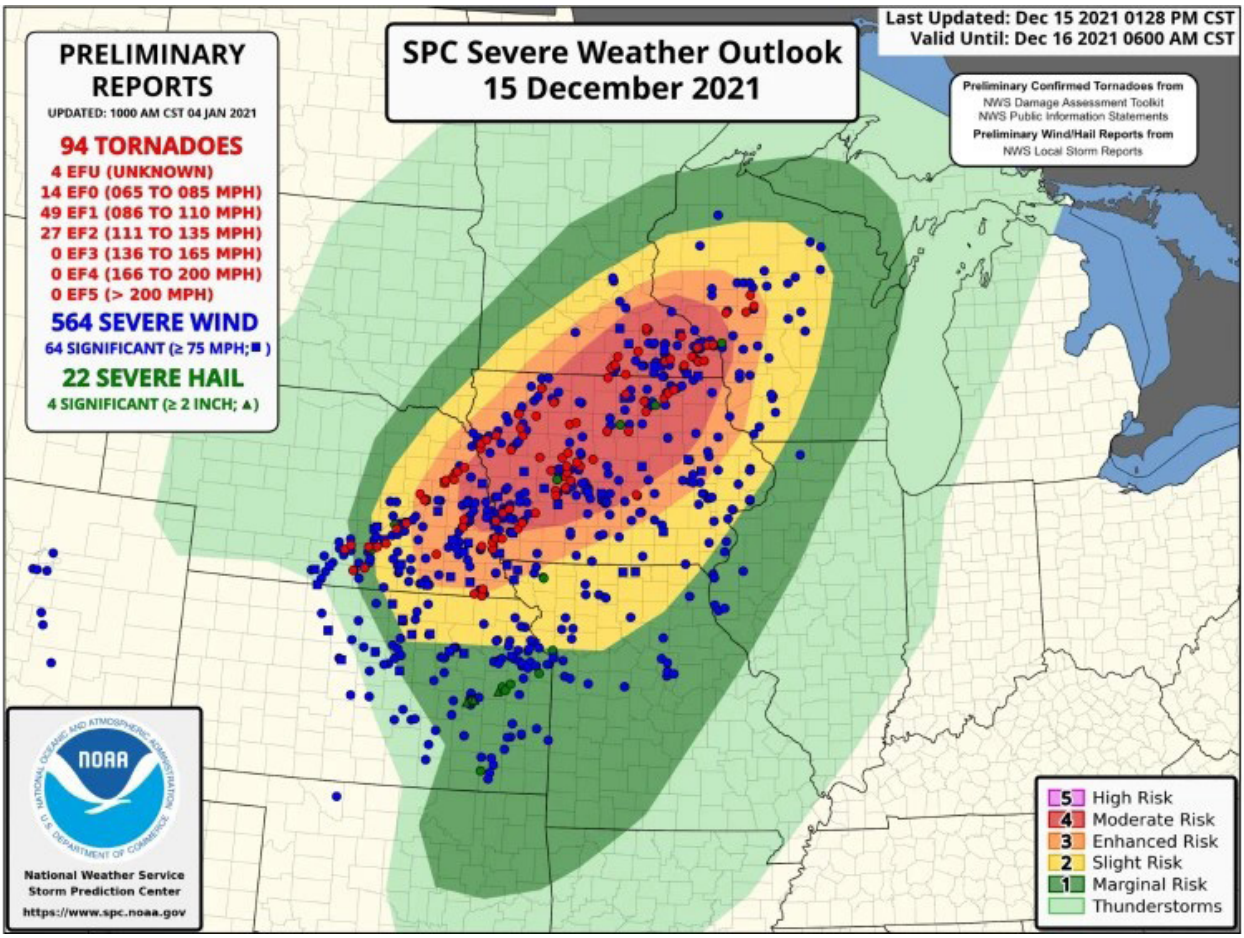
A bow echo wind is a radar echo which is linear but bent outward in a bow shape. Damaging straight-line winds often occur near the "crest" or center of a bow echo. Bow echo winds can be over 186 miles in length, last for several hours, and produce extensive wind damage at the ground.

Microbursts and downbursts are very dangerous to aviation. They are known for their ability to produce wind shears which can slow airspeed and cause aircrafts to lose altitude at a very critical time for flight near the ground. A plane will encounter strong headwinds followed by strong tailwinds as it enters and flies through a microburst. Great strides have been made in understanding and avoiding the risk from low altitude wind shears. Major airports routinely use Terminal Doppler Weather Radars, developed during the 1990s. These radars pay particular attention to weather conditions occurring within a few miles of the airport, especially conditions that might cause deadly microbursts.

From 2020 to 2024, Carroll County experienced four high wind events. The first one occurred on March 10, 2021, in which gusts of 50 to 60 mph and sustained winds between 35 to 40 mph were reported for several hours. Increasing convergence across southern Iowa contributed to the development of thunderstorms and hail reports.

On December 15, 2021, another high wind event was a derecho coupled with thunderstorms and tornadoes, being the first-ever December derecho in the United States. This event could be observed throughout the whole state of Iowa, causing 63 tornadoes statewide and thunderstorm winds that could exceed 80 mph. During the event, gusts were recorded at over 70 miles per hour throughout most of the affected area, and in some areas, wind gusts were recorded at over 80 miles per hour. Although no property or crop damage were reported for this specific event, its occurrence can be associated with disaster declaration DR-4642-IA, to be declared on February 23, 2022. The declaration obligated $252,342 for emergency work and $3,946,830 in permanent work. It also obligated $861,231 in hazard mitigation assistance.

Map 3.9: December 15, 2021 Weather Events



The other two high wind episodes in Carroll County occurred in 2022, where wind gusts of 40 to over 60 mph were recorded. No property or crop damage were reported.

Damaging winds can develop with little advanced warning. The National Weather Service has developed a windstorm warning system similar to other events such as tornadoes, winter storms, and thunderstorms, and watches are issued when conditions are favorable. Advisories are issued when sustained winds of 31 to 39 mph are expected to last for three hours or longer, or when there are wind gusts of 46 to 57 mph. Windstorm warnings are issued when there are sustained winds of 40 mph or greater for one hour or more, or when there are wind gusts of 58 mph or greater for one hour or more. Windstorm watches are generally delivered hours in advance, but the best warning lead-time for a specific storm is about 30 minutes.

Carroll County is likely to experience windstorms over this planning period. Those most at risk during windstorms include people in mobile homes, at campgrounds, or at other dwellings without secure foundations. Windstorms may have a destructive path that is tens of miles wide and the duration could range from hours to days. Damages can include broken tree branches, roof damage, broken windows, or crop damage. There are a number of projects each jurisdiction can undertake to improve the safety for the residents and protection of property during a windstorm.

Climate change's impact on windstorms in Carroll County and Iowa is uncertain. The intensity and frequency do not appear to be changing. The likelihood of a windstorm impacting the planning area has not significantly shifted, but as temperatures rise, the length of the severe weather season may increase.

Some of the mitigation actions that jurisdictions can implement to reduce the impact of a windstorm include:

- Encourage the use of NOAA weather radios
- Construct shelters or safe rooms
- Installation of storm sirens
- Electricity hardening/under grounding
- Purchase and installation of backup generators for critical facilities
- Develop and enforce building codes

Combination Hazards

HAZMAT Incident

A hazardous material is one that may cause damage to persons, property, or the environment when released to soil, water, or air. Hazardous materials are categorized as toxic, corrosive, flammable, irritant, or explosive. They can pose a risk to life, health, or property, possibly requiring evacuation, a hazardous material incident can occur at a fixed location, in pipeline transportation, or while transporting hazardous materials.

A fixed hazardous materials incident is the accidental release of chemical substances or mixtures, which presents a danger to public health or safety during production or handling at a fixed facility. Chemicals are manufactured and used in every-increasing types and quantities- each year over 1,000 new synthetic chemicals are introduced and as many as 500,000 products pose physical or health hazards and can be defined as hazardous chemicals. Hazardous material incidents generally affect a localized area and the use of planning and zoning can minimize the area of impact.

A pipeline transportation incident occurs when a break in a pipeline creates the potential for an explosion or leak of a dangerous substance (oil, gas, etc.) possibly requiring evacuation. 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. Inspection and maintenance of the pipeline system, along with marked gas line locations, and an early warning and response procedure can lessen the risk to those near the pipelines.

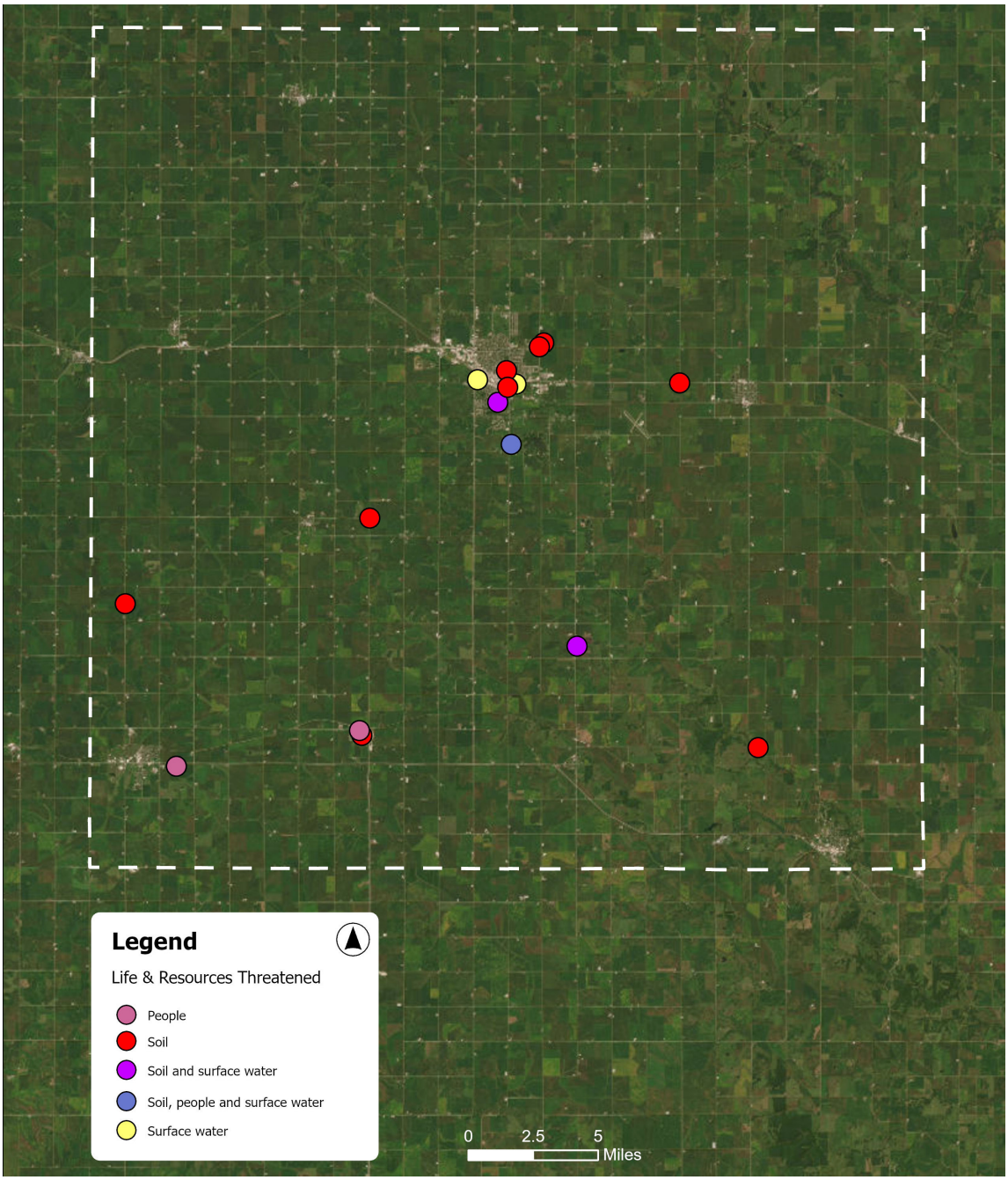
A hazardous materials transportation incident constitutes an accidental release of chemical substances or mixtures that presents a danger to public health or safety during transportation. Large quantities of hazardous materials are transported daily on Iowa's streets, highways, interstates, and railways. The DOT regulates the routes and speed limits used by carriers an monitor the types of hazardous materials crossing state lines. More and more potentially hazardous materials are being used in commercial, agricultural, and domestic uses, and are being transported on roadways and railways (Iowa Hazard Mitigation Plan 2023).

The State of Iowa requires any person manufacturing, storing, handling, transporting, or disposing of a hazardous substance to notify the department and local law enforcement of the occurrence of a hazardous condition. According to the Iowa Department of Natural Resources Hazardous Substance Database, Carroll County had 17 reported hazardous spills between January 1, 2020 and December 31, 2023. Of the 17 reported spills, nine threatened the soil, three spills posed threats to humans, two threatened surface water, two threatened both the soil and surface water, and one threatened people, the soil, and surface water. None of them posed a threat to groundwater.

While there were a large number of reported spills between 2020 and 2023, the committee based their probability score on the likelihood of a high impact spill occurring. A high impact spill is defined as an environmental emergency by the Environmental Protection Agency. An environmental emergency is a sudden threat to the public health or the well-being of the environment, arising from the release or potential release of oil, radioactive materials, or hazardous chemicals into the air, land, or water (Iowa Hazard Mitigation Plan 2023).

A hazardous material spill can occur almost anywhere and with little to no warning. Public address systems, television, radio, and the NOAA Weather Radios are used to disseminate emergency messages about hazardous material incidents. The following map displays where the spills occurred from 2020 to 2023 in Carroll County.

Map 3.10: Carroll County Hazardous Spill Locations 2020-2023



Hazardous Spills are a man-made hazard that while actions can be taken to reduce the number of spills and reduce the impact these spills have on the man-made and natural environment, it is unlikely that these spills will be completely eliminated. The map in this section show that these spills are most likely to occur on roadways with increased amounts of traffic and in areas where there are larger populations. In general, safeguards are increasing to reduce the impact spills have, but the amount of more potentially-hazardous materials that are used on a day-to-day basis is increasing. Carroll County should anticipate a hazardous spill occurring and plan to respond in a quick and efficient manner if required.

Mitigation actions to minimize the effect of a Hazardous Materials Incident can include:

- Create or contract with a HAZMAT response team for incident response
- Encourage businesses to complete employee training, installation of containment systems, and regular maintenance and inspection of hazardous material storage and equipment

Infrastructure Failure

This hazard encompasses the following hazards: communications 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.

Communications Failure

Communications failure is the widespread breakdown or disruption of normal communication capabilities. This could include major telephone outages, loss of local government radio facilities, and long-term interruption of electronic broadcast services. Emergency 911, law enforcement, fire, emergency medical services, public works, and emergency warning systems are just a few of the vital services which rely on communication systems to effectively protect citizens. Disruptions and failures can range from localized and temporary to widespread and long-term.

Energy Failure

An extended interruption of service either electric, petroleum, or natural gas, which by an actual or impending acute shortage of usable energy could create a potential health problem for the population and possibly mass panic. International events could 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 ice storms can disrupt transportation and distribution systems. Stockpiles of energy products eliminate short disruptions but can increase the level of risk to the safety of people and property near the storage site.

Structural Failure

The collapse (all or part) of any public or private structure including roads, bridges, towers, and buildings is considered a structural failure. A road, bridge, or building may collapse due to the failure of the structural components or because the structure was overloaded. Natural events such as heavy snow may cause the roof of a building to collapse under the weight of the snow. Heavy rains and flooding can undercut and washout a road or bridge. The age of the structure is sometimes independent of the cause of the failure. Enforcement of building codes can better guarantee that structures are designed to hold-up under normal conditions, routine inspection of older structures may alert inspectors to "weak" points. The level of damage and severity of the failure is dependent on factors such as the size of the building or bridge, the number of occupants of the building, the time of day, day of week, amount of traffic on the road or bridge, and the type and amount of products stored in the structure (Iowa Hazard Mitigation Plan 2010).

Structural Fire

A structural fire is an uncontrolled fire in a populated area that threatens life, property, is beyond normal day-to-day response capability, and has the potential for large economic loses. Most structural fires occur in residential structures, but the occurrence of a fire in a commercial or industrial facility could affect more people and pose a greater threat to those near the fire or fighting the fire because of the volume or type of material involved.

No widespread communications failures have occurred in Iowa. Local incidents due to weather conditions, equipment failure, excavation incidents, and traffic accidents have been reported. The energy crisis of the 1970s had significant impacts on consumers in Iowa. High inflation and unemployment were associated with the dependence on foreign oil during that time. An energy shortage of that magnitude has not affected Iowa

since. There have been sporadic structural failures across the counties. Most have included homes, commercial structures, or communications towers. Structural fires occur occasionally and are quickly extinguished by local fire departments.

Most of the highly necessary communication systems have backup and redundant designs to provide continuity of service. Most communication failures would be limited to localized areas. They can have a negative impact on businesses that are dependent on the internet for servicing and communicating with customers. Communication failures can hamper emergency response efforts when they are not able to communicate as quickly or effectively with injured citizens, and vice versa.

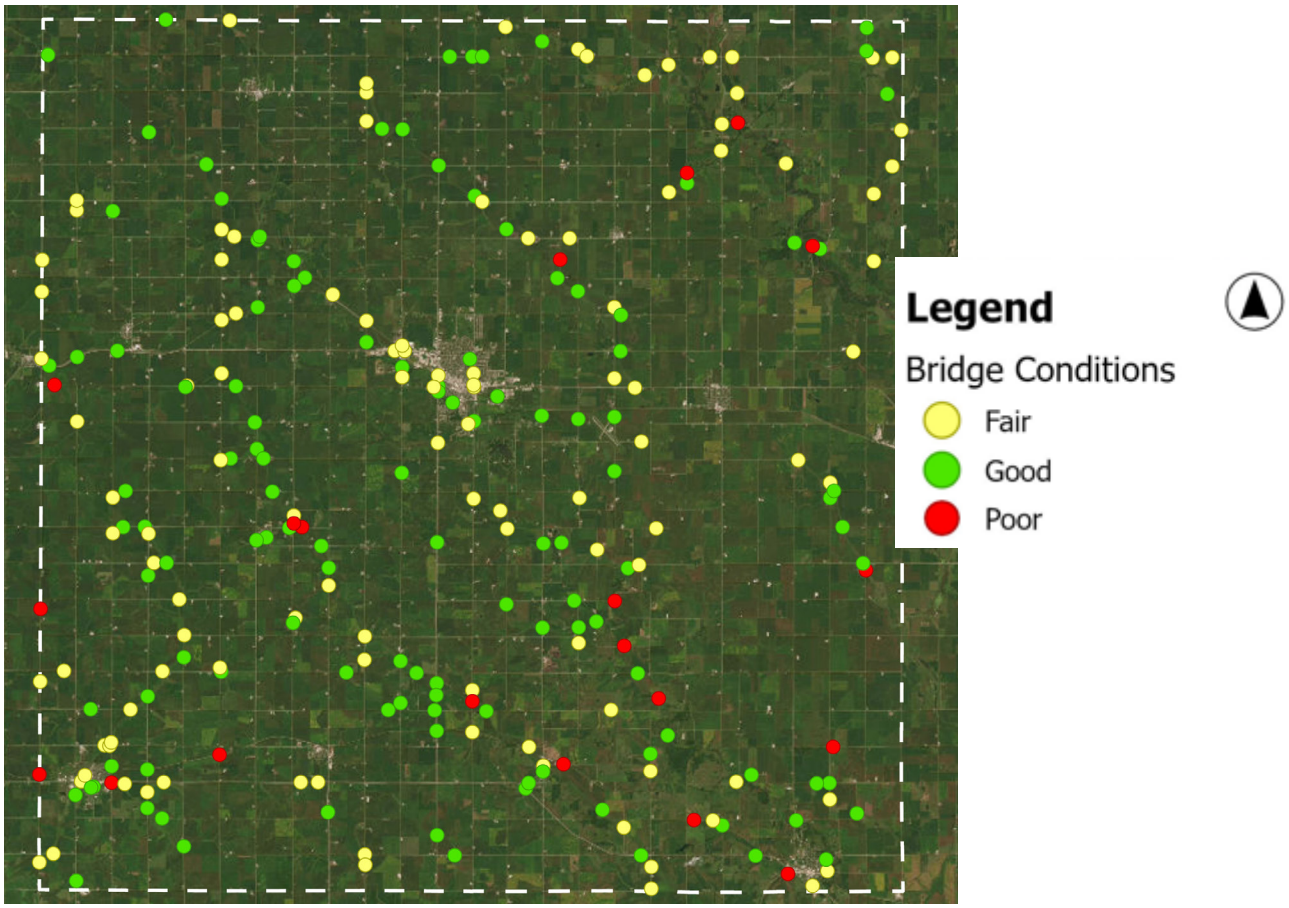
The effects of a petroleum or natural gas shortage would be felt throughout the state. Iowa is almost entirely dependent on out-of-state resources for oil, coal, and natural gas. Electricity failure can result from many hazard events. Severe winter storms, thunderstorms, lightning, extreme heat, tornadoes, high winds, transportation incidents, and others can cause power outages. The loss of electricity could also cause many problems throughout towns including the shutdown of water pumps, sump pumps, and communications.

Damages from structural fires can range from minor aesthetic damage to completely destroying the building. Many factors determine the strength of a fire including: wind, fuel sources, and density of buildings. Older structures with outdated electrical systems and fire codes are particularly vulnerable to fires. 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.

When a structure does fail, the level of damage and severity of the failure is dependent on factors such as the size of the structure, the number of occupants in, on, or near the structure, the time of day, day of week, etc. Structural failure can be caused by the age of the structure, poor maintenance, of by other hazard events such as tornadoes, fires, floods, or severe winter storms.

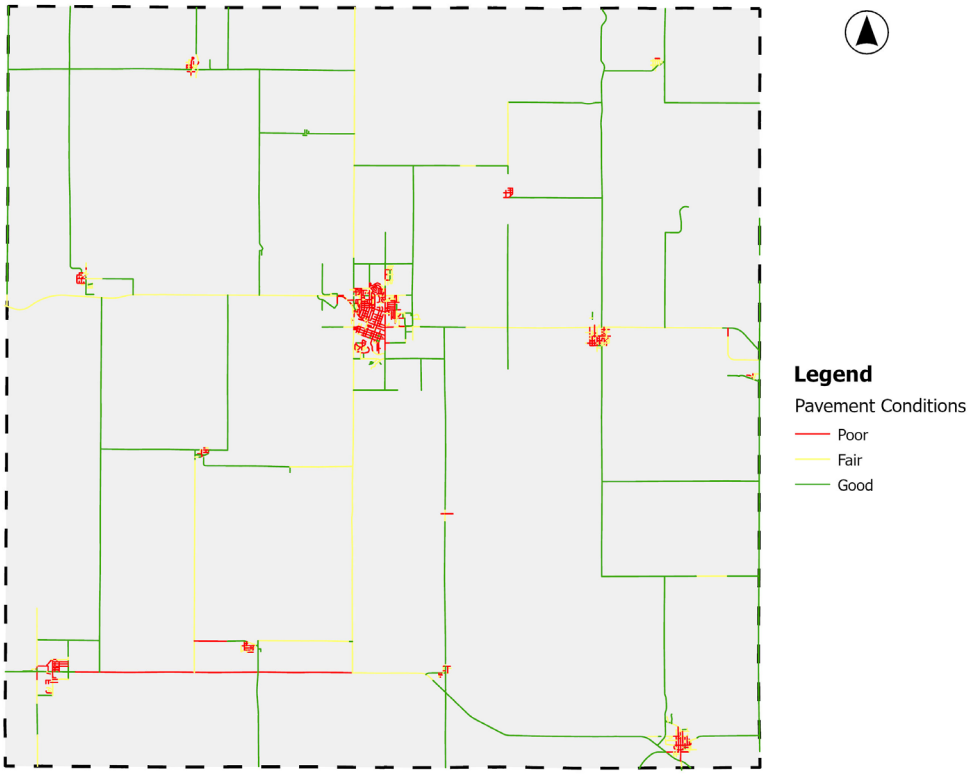
Map 3.11 shows the number of state and county bridges in good, fair, and poor condition for Carroll County as of March 11, 2024. Bridges in good condition represent 47.81% of the County's bridges, 44.22% of the bridges are in fair condition, and 7.97% of the bridges are in poor condition.

Map 3.11: Carroll County Bridge Conditions



Map 3.12 shows the pavement condition of state and county roadways in Carroll County from 2024 data.

Map 3.12: Carroll County Pavement Conditions



Carroll County is vulnerable to infrastructure failures, as they occur with little or no warning. It is impossible to predict a communication failure, power outage, fires, or structural failure. While a petroleum or natural gas shortage may be predicted in advance, emergencies can rise suddenly and unexpectedly. Communication failures and power outages can last from several minutes to several days, depending on the nature of the outage and the area that the outage covers. Petroleum and natural gas distribution problems can lead to shortages locally for a few days. The duration of structural fires and structural failures is dependent on the size of hazard. These hazards also are hard to track the total economic impact they have on each county. Within the life of this plan, it is anticipated that each county will experience an infrastructure failure of some kind with an unknown magnitude. Each jurisdiction should plan to implement mitigation actions to alleviate the effects of these instances.

Mitigation actions to minimize the effects of infrastructure failure may include:

- Implement a bridge repair program to fix poor quality bridges
- Create and enforce building codes

Levee/Dam Failure

A dam is defined as an artificial barrier with the ability to impound water, wastewater, or any liquid-borne material for the purpose of storage or control of water. Dams are constructed for a variety of uses, including flood control, erosion control, water supply impoundment, hydroelectric power generation, and recreation.

A dam failure occurs when there is an uncontrolled release of impounded water, resulting in downstream flooding, which can affect life and property. FEMA states that dams can fail for one or a combination of the following reasons:

- Overtopping caused by floods that exceed the capacity of the dam
- Deliberate acts of sabotage
- Structure failure of materials used in dam construction
- Movement and/or failure of the foundation supporting the dam
- Settlement and cracking of concrete or embankment dams
- Piping and internal erosion of soil in embankment dams
- Inadequate maintenance and upkeep

In Iowa, dams are classified according to the downstream damages that would occur if that dam were to fail. The higher the risk, the higher the standards that have to be met during dam construction and modification. There are three dam classifications: High Hazard, Significant Hazard, and Low Hazard. High Hazard dams have to meet the state's highest level of criteria and are inspected on a two-year cycle. Dam hazard potential classifications have nothing to do with the condition of a dam, only the potential for death and/or destruction due to the size of the dam, the size of the impoundment, and the characteristics of the area downstream of the dam.

A dam is classified as a High Hazard when it is located in an area where dam failure may create a serious threat of loss of human life. A Significant Hazard Dam is where failure may damage isolated homes or cabins, industrial or commercial buildings, moderately traveled roads, interrupt major utility services, but are without substantial risk of loss of human life. Dams are also classified as Significant Hazard when the dam and its impoundment are themselves of public importance, such as dams associated with public water supply systems, industrial water supply or public recreation, or which are an integral feature of a private development complex. Low Hazard dams are classified as such where damages from a failure would be limited to loss of the dam, livestock, farm outbuildings, agricultural lands and lesser used roads, and where loss of human life is considered unlikely.

Levees differ from dams in that they are constructed alongside the edge of a stream or river channel to manage or prevent water flow into the adjacent land. They were first built in the United States more than 150 years ago and were traditionally used by farmers to protect agricultural areas form frequent flooding, but since then levees have been built to protect urban areas. Artificial levees are typically needed to control the flow of rivers meandering through broad, flat floodplains. Levees are usually constructed from dirt, clay, or artificial material such as concrete or steel and are built wide enough so that they will not collapse or be eroded when saturated with moisture from rivers running at unusually high levels. Grass or some other dense vegetation can be planted on top of the levee's bank to minimize erosion.

It is important to note that levees reduce the risk of flooding, but no not eliminate it. The failure of a levee can be attributed to overtopping or breaching. Overtopping occurs when the river rises higher than a levee's crown. Breaching can result from the loss of structural integrity of a wall, dike, berm or elevated soil by erosion, piping, saturation, under seepage, and even animal burrows. Levees can and do deteriorate over time, so regular maintenance and periodic upgrades are necessary to ensure a levee performs as designed.

Nearly 85% of levees are locally owned and maintained. It is the responsibility of the levee's owner to provide evidence that the levee meets or exceeds minimum federal requirements. A levee is certified if evidence has been presented showing that the system meets current design, construction, maintenance, and operation standards to provide risk reduction from the one-percent-annual-chance-flood.

According to the National Inventory of Dams, Carroll County has 11 dams as of 2024. The dams that are included in the inventory meet at least one of the following criteria:

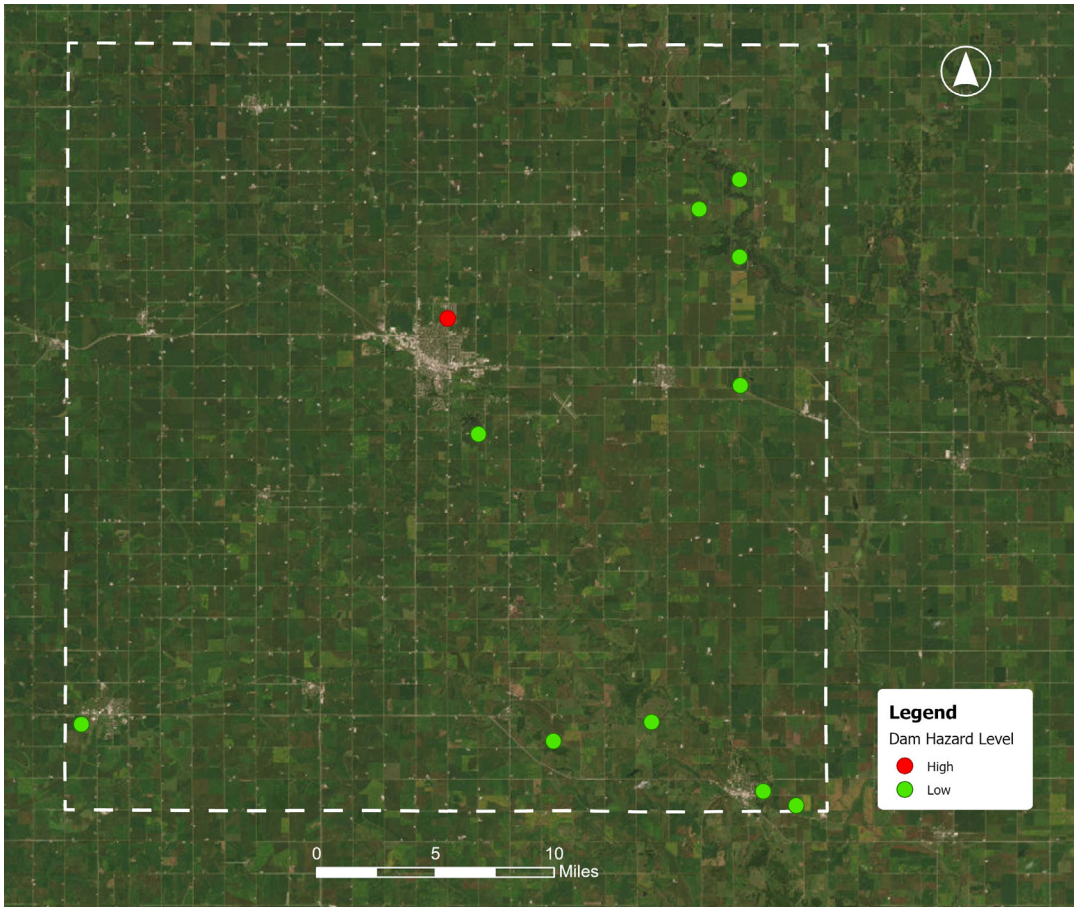
- High hazard classification—loss of human life is likely if the dam fails
- Significant hazard classification – possible loss of human life and likely significant property or environmental destruction
- Equal or exceed 25 feet in height and exceed 15 acre-feet in storage
- Equal or exceed 50 acre-feet storage and 6 feet in height

Of the eleven Carroll County dams in the inventory, one is considered to be a high hazard dam and the remaining ten are considered low hazard dams. There have been no known occurrences of dam failure in Carroll County. Sound design, quality construction, and continued inspections and repairs reduce the probability of dam failure. Carroll County's dams and their hazard ranking can be found in map 3.13.

The Iowa DNR is responsible for the state's dam safety program. The program involves the review and approval for the construction of new dams, maintaining an inventory of existing dams that meet minimum size criteria, and the periodic inspection of certain dams. The inventory excludes all dams less than six feet in height regardless of storage capacity and dams less than fifteen-acre feet of storage regardless of height. Currently, there are approximately 3,800 dams in the state's inventory.

A majority of Iowa's dams on major rivers are well past their design life cycles. The average life span of a dam is fifty years. The average age of dams in Carroll County is 48 years, with the average completion year of 1976. This means that within the next one to three years, these dams will reach the end of their design life. With the majority of these dams being at the end of their design life, it is important that they are routinely inspected and maintained to ensure that the dams continue to function properly. The proper maintenance of these dams is important as there are people and properties located in the area which a dam failure would greatly impact. A dam failure could result in everything from minor property damage to significant property damage and potentially death.

Map 3.13: Carroll County Dams and Hazard Ranking



Although Carroll County has not had a dam failure in the reporting period, a dam failure can occur without warning, leaving little or no time for those downstream to escape. Some weak areas and possible failure points can be identified shortly ahead of a failure, allowing some time for evacuation and possible repair of the dam. Similar to dam failures, levee failures are difficult to predict and can occur without warning. High water levels that may result in the overtopping of a levee can sometimes be predicted hours in advance; however, if a levee is breached, there may not be any warning time. Mitigation actions that the jurisdictions may decide to implement could include both prevention and response actions to alleviate the impacts.

Mitigation actions that may be implemented to reduce the impacts of a dam failure may include:

- Consider the creation of a dam failure emergency action plan
- Budget for the demolition and reconstruction of old higher hazard dams to reduce potential for failure

Radiological Incident

A radiological event is an incident resulting in a release of radiological material at a fixed facility to include power plants, hospitals, laboratories and the like. Although the term "nuclear accident" has no strict technical definition, it generally refers to events involving the release of significant levels of radiation. Most commercial nuclear facilities in the United States were developed in the mid-1960s and are designed to withstand aircraft attack. Therefore, they should withstand most natural hazards even though they may not have been specifically designed for those forces (Iowa Hazard Mitigation Plan 2023).

Emergency Classification is a set of plant conditions which indicate a level of risk to the public. Nuclear power plants use the four emergency classifications listed below in order of increasing severity.

Notification of Unusual Event

Under this category, events are in process or have occurred which indicate potential degradation in the level of safety of the plant. No release of radioactive material requiring off-site response or monitoring is expected unless further degradation occurs.

Alert

If an alert is declared, events are in process or have occurred that involve an actual or potential substantial degradation in the level of safety of the plant. Any releases of radioactive material from the plant are expected to be limited to a small fraction of the Environmental Protection Agency (EPA) protective action guides (PAGs).

Site Area Emergency

A site area emergency involves events in process, or which have occurred, that result in actual or likely major failures of plant functions needed for protection of the public. Any releases of radioactive material are not expected to exceed the EPA PAGs except near the site boundary.

General Emergency

A general emergency involves actual or imminent substantial core damage or melting of reactor fuel with the potential for loss of containment integrity. Radioactive releases during a general emergency can reasonably be expected to exceed the EPA PAGs for more than the immediate site area (US Nuclear Regulatory Commission).

The Nuclear Regulatory Commission (NRC) defines two emergency planning zones around each nuclear power plant. The exact size and configuration of the zones vary from plant to plant due to local emergency response needs and capabilities, population, land characteristics, access routes, and jurisdictional boundaries. Generally, the two types of emergency planning zones are:

Plume Exposure Pathway

The Plume Exposure Pathway extends about ten miles in radius around the plant. The primary concern is exposure of the public to, and the inhalation of, airborne radioactive contamination.

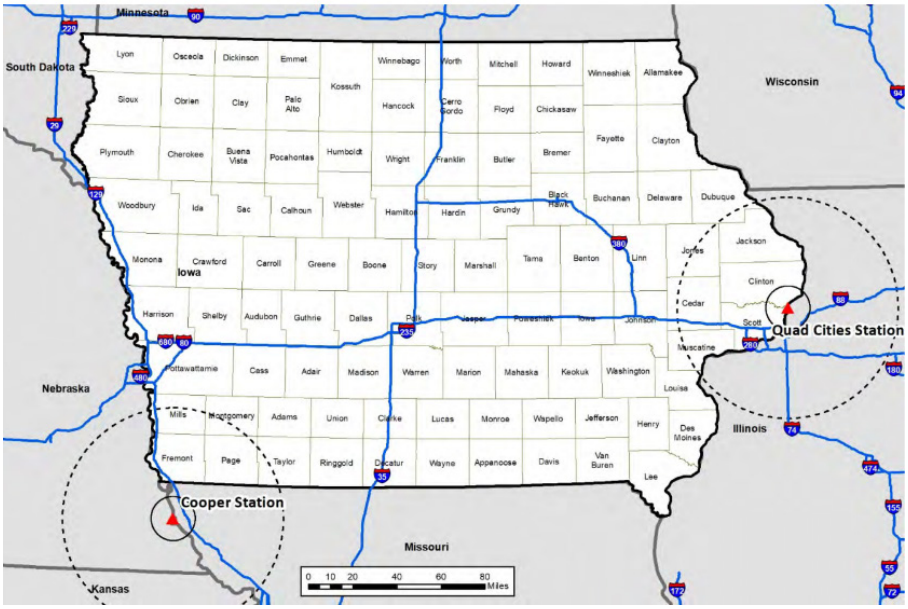
Ingestion Pathway

The Plume Exposure Pathway extends about ten miles in radius around the plant. The primary concern is exposure of the public to, and the inhalation of, airborne radioactive contamination.

The Ingestion Pathway extends about fifty miles in radius around the plant. The primary concern is ingestion of food and liquid that is contaminated by radioactivity.

There are two nuclear power plants that operate close to Iowa's borders; the Quad Cities Generating Station near Cordova, Illinois, and the Cooper Nuclear Station near Brownsville, Nebraska. The map below identifies the location of each facility as well as the 10-mile and 50-mile planning buffers. Neither of these power plants are close enough to the planning area to be included in the 10 or 50 mile planning buffer, but it is still important to recognize their locations and the disruptions that an event at one of these plants could cause within the state.

Map 3.14: Nuclear Plants Impacting Iowa, 2023



Although no longer a power-producing plant, the Fort Calhoun Station was operable until the fuel was removed by November 13, 2016, and will not be considered fully closed until 2026. The site continues to be monitored and follows protocol for site decommissioning.

There have been no general emergency incidents in the United States since the NRC established the classification system in 1980. Iowa has one nuclear power plant located in Linn County. There are three other nuclear power plants near Iowa's borders. In over fifty years of nuclear power production in the United States, no deaths or injuries from radiation have been recorded among the general public.

Time, distance, and shielding minimize radiation exposure to the body. Radiological incidents occur with little or no warning. However, the danger to the residents in Carroll County is minimal. Map 3.12 displays the potential transportation routes that nuclear waste could travel throughout the State of Iowa. The map shows that one potential route of travel would be Interstate 80, which is not intersecting the county. Since 1990, hundreds of shipments have been made through Iowa. There have been no occurrences of a radiological incident in the state. Transportation accidents are the most common type of incident involving radioactive materials because of the sheer number of radioactive shipments (Iowa Hazard Mitigation Plan, 2023).

Terrorism

This hazard encompasses the following: enemy attack, biological terrorism, agro-terrorism, chemical terrorism, conventional terrorism, cyber terrorism, radiological terrorism, and public disorder. These include 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 violation of the criminal laws of the United States. These actions may cause massive destruction and/or extensive casualties.

Enemy Attack

An enemy attack incident that would cause massive destruction and extensive casualties. An all out war would affect the entire population. Some areas would experience direct weapons' effects: blast, heat, and nuclear radiation; others would experience indirect weapons' effects, primarily radioactive fallout. (Iowa Hazard Mitigation Plan, 2023)

Biological Terrorism

The use of biological agents against persons or property for purposes of intimidation, coercion, or ransom can be described as biological terrorism. Liquid or solid contaminants can be dispersed using sprayers/aerosol generators or by point of line sources. Biological agents may pose viable threats from hours to years depending upon the agent and the conditions in which it exists. Depending on the agent and the effectiveness in which it was deployed, contamination can be spread by wind or water. Infections can also be spread by human or animal vectors.

Agro-Terrorism

Agro-Terroism is causing intentional harm to an agricultural product or vandalism of an agricultural/ animal related facility. Activities could include the following: intentional release of lab animals, deliberate contamination of bulk milk tanks, poisoning animals, destruction of crops/facilities, and theft of agricultural products, machinery or chemicals, and vandalism of agricultural facilities.

Chemical Terrorism

The use or threat of chemical agents against persons or property for purposes of intimidation, coercion, or ransom. Liquid/aerosol or dry contaminants can be dispersed using sprayers or other aerosol generators. Chemical agents may pose viable threats for hours to weeks depending on the agent and the conditions in which it exists. Contamination can be carried out of the initial target area by people, vehicles, water, and wind.

Conventional Terrorism

The use of conventional weapons and explosives against persons or property for purposes of intimidation, coercion, or ransom. Hazard effects are instantaneous; additional secondary devices may be used, lengthening the duration of the hazard until the attack site is determined to be clear. The extent of damage is determined by the type and quantity of explosive. Effects are generally static other than cascading consequences, incremental structural failures, etc. Conventional terrorism can also include tactical assault of sniping from remote locations.

Cyber Terrorism

Cyber terrorism is an electronic attack using one computer system against another in order to intimidate people or disrupt other systems. Cyber terrorism may last from minutes to days depending upon the type of intrusion, disruption, or infection. Generally, there are no direct effects on the built environment, but secondary effects may be determined depending upon the system being terrorized. Inadequate security can facilitate access to critical computer systems, allowing them to be used to conduct attacks.

Radiological Terrorism

Radiological terrorism is the use of radiological materials against people or property for purposes of intimidation, coercion, or ransom. Radioactive contaminants can be dispersed using sprayers/aerosol generators, or by point of line sources such as munitions, covert deposits, moving sprayers, or by the detonation of a nuclear device.

Public Disorder

Public disorder is the assembling of people together in a manner to substantially interfere with pubic peace to constitute a threat, and with use of unlawful force or violence against another person, or causing property damage or attempting to interfere with, disrupting, or destroying the government, political subdivision, or group of people. Examples include mass demonstrations, or direct conflict by large groups of citizens, as in marches, protest rallies, riots, and non-peaceful trikes. Labor strikes and work stoppages are not considered in this hazard unless they escalate into a threat to the community (Iowa Hazard Mitigation Plan 2023).

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. The Iowa National Guard headquarters resides at Camp Dodge in Johnston. There have been no enemy attacks on or in Iowa in modern times and it is unlikely that Iowa would be a primary target during an enemy attack. However, an enemy attack is still a possibility due to international conflicts and the large number of weapons in existence throughout the world.

Following September 11, 2001, the country became more aware that terrorism is a very real threat. The Center for Disease Control (CDC) & Health Resources and Services Administration (HRSA) felt public health departments and hospitals would play a large role in preparedness for bioterrorism. In September 2002, the Iowa Department of Public Health (IDPH) received grant funding from the CDC for public health preparedness and funding from HRSA for hospital readiness efforts. All Iowa public health departments and hospitals are responsible for these efforts in their counties. The IDPH has set up six regions across Iowa to work together in these planning and preparedness efforts.

Agro-terrorism incidents have occurred in the State of Iowa, although on a limited scale. Animal rights activists have vandalized or released animals in agricultural facilities; also, there has been vandalism to agricultural facilities or incidents of disgruntled employees causing damage to animals and animal products. There are frequent cases of theft of agricultural machinery, products, and chemicals. Chemical terrorism is even more uncommon than agro-terrorism. There have only been two identified chemical terrorism incidents in Iowa. One incident involved mailing rat poison to a number of state and local officials; and the other incident involved individuals breaking into a city's water supply facility and suspected of depositing chemicals in the water.

The State of Iowa has experienced many bomb threats. In the spring of 2002, eighteen pipe bombs were found in mailboxes in five states stretching from Illinois to Texas, including Iowa. Five pipe bombs were found in the state and six people were injured in the bombings in Iowa and Illinois. In 2005 and 2006, pipe bombs were used in attempted murder cases in Forest City and Altoona.

Cyber-security and critical infrastructure protection are among the most important national security issues facing the United States today, and they will likely only become more challenging in the future. Recent attacks have disrupted electronic commerce and have had a debilitating effect on public confidence on the Internet.

Although large-scale destructive civil disturbances are rare, the potential is always there for an incident to occur. Often times, television, radio, and internet coverage help to spread the incident to other uninvolved

or unaffected areas, exacerbating an already difficult situation. Alcohol is often involved in public disorder, especially related to college campuses, sporting events, and concerts (Iowa Hazard Mitigation Plan 2010).

Unfortunately, there will never be a way to totally eliminate all types of terrorism. Carroll County is unlikely to experience a terrorism incident within the planning period, but with the uncertain nature of the world, each jurisdiction may want to plan for the response and mitigation of the attack. If a person or persons are inclined to cause death and destruction, they are usually capable of finding a way to carry out their plans. Areas near government buildings, military complexes, and transportation, communication, and fuel facilities, would experience the largest impacts. Because Iowa serves as a food provider to the world, there is an increased risk of agro-terrorist activity. A full-scale attack in the foreseeable future is not likely; however, a limited attack could take place that could potentially threaten target areas. Acts of terrorism can be immediate and often come after little or no warning. The duration of a terrorist attack depends on the type of terrorism. A biological, chemical, or radiological attack could affect people/property for days, weeks, months, even years, depending on the substance used and the size of the area impacted. Conventional terrorism usually involves firearms and/or explosives. These events are short-term in nature, and would not be expected to last very long. The committee determined that on average, a terrorism event would last less than one day.

Mitigation actions that may be implemented to prevent or reduce the impacts of a terrorism may include:

- Promote the "If You See Something, Say Something" campaign

Transportation Incident

This hazard includes all modes of transportation- air, highway, railway, and waterway. This includes any transportation accident that directly threatens life and which results in property damage and/or death(s)/injury(s) and/or adversely impacts a community's capabilities to provide emergency services.

An air transportation incident may involve a military, commercial, or private aircraft. Air transportation is playing a more prominent role in transportation as a whole. Airplanes, helicopters, and other modes of air transportation are used to transport passengers for business and recreation, as well as thousands of tons of cargo. A variety of circumstances can result in an air transportation incident: mechanical failure, pilot error, enemy attack, terrorism, weather conditions, and on-board fires can all lead to an incident. 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 the flight.

A highway transportation incident can be single or multi-vehicle requiring responses exceeding normal day-to-day capabilities of response agencies. An extensive surface transportation network exists in Iowa; local residents, travelers, businesses, and industries rely on this network on a daily basis. Hundreds of thousands of trips a day are made on the streets, roads, highways, and interstates in the state; if the designed capacity of the roadway is exceeded, the potential for major highway incident increases. Weather conditions play a major factor in the ability of traffic to flow safely in and through the state.

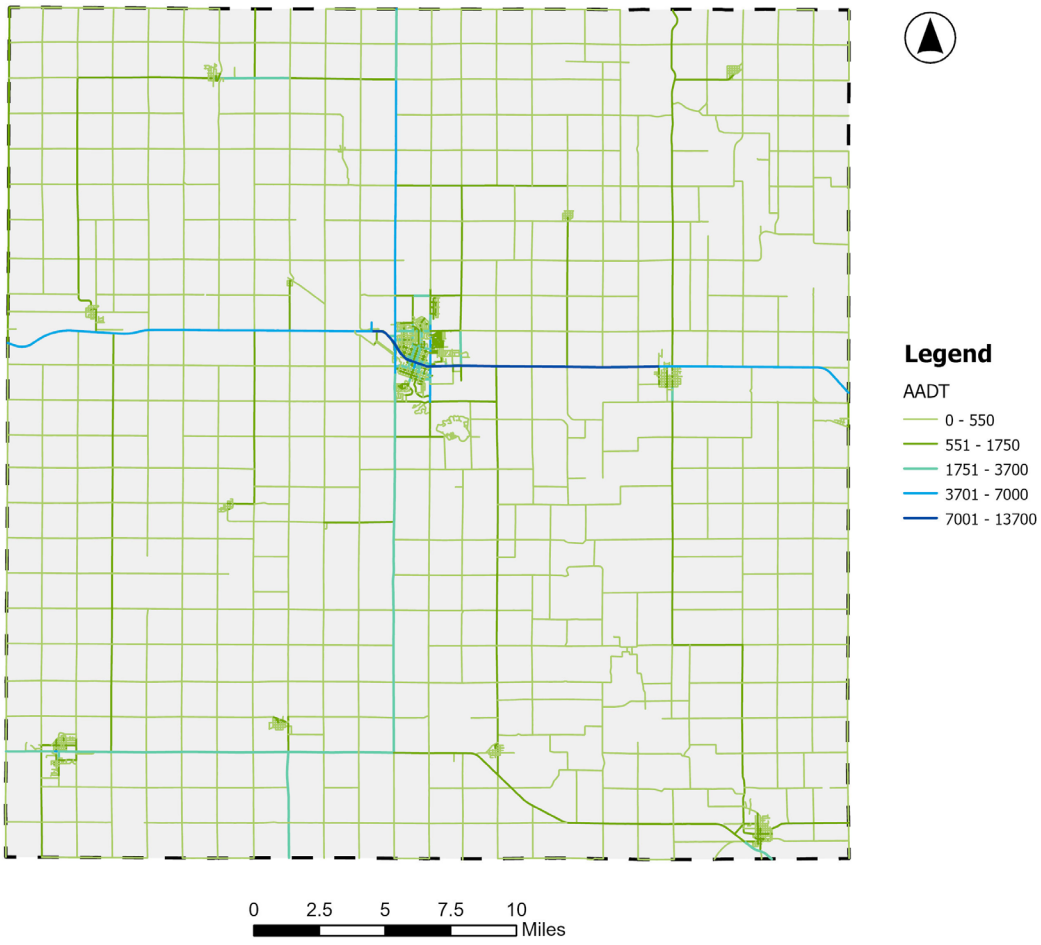
Railway incidents may include derailments, collisions, and highway/rail crossing accidents. Train incidents can result from a variety of causes: human error, mechanical failure, faulty signals, and/or problems with the track. Results of an incident can range from minor "track hops" to catastrophic hazardous material incidents and even human/animal casualties. With the many miles of track in Iowa, vehicles must cross the railroad tracks at numerous at-gate crossings.

Waterway incidents will primarily involve pleasure crafts on rivers and lakes. In the event of an incident involving a water vessel, the greatest threat would be drowning, fuel spillage, and/or property damage. Waterway incidents may also include events in which a person, persons, or object falls through the ice on partially frozen bodies of water (Iowa Hazard Mitigation Plan 2023).

The predominant transportation network in the planning area, as well as the State of Iowa, is highways and roads. All modes of transportation, including air, rail, trails, and transit systems require the use of highways and roads.

Map 3.13 displays the major highways and their average annual daily traffic (AADT) in Carroll County. AADT is a measurement providing the average number of vehicles per day on a given roadway segment over a one-year period. According to the Iowa Department of Transportation, from 2017 to 2023, Carroll County had 1,598 traffic accidents. These accidents resulted in 15 fatalities and 578 injuries. Over 35% of the accidents in Carroll County caused an injury or fatality.

Map 3.15: Carroll County AADT

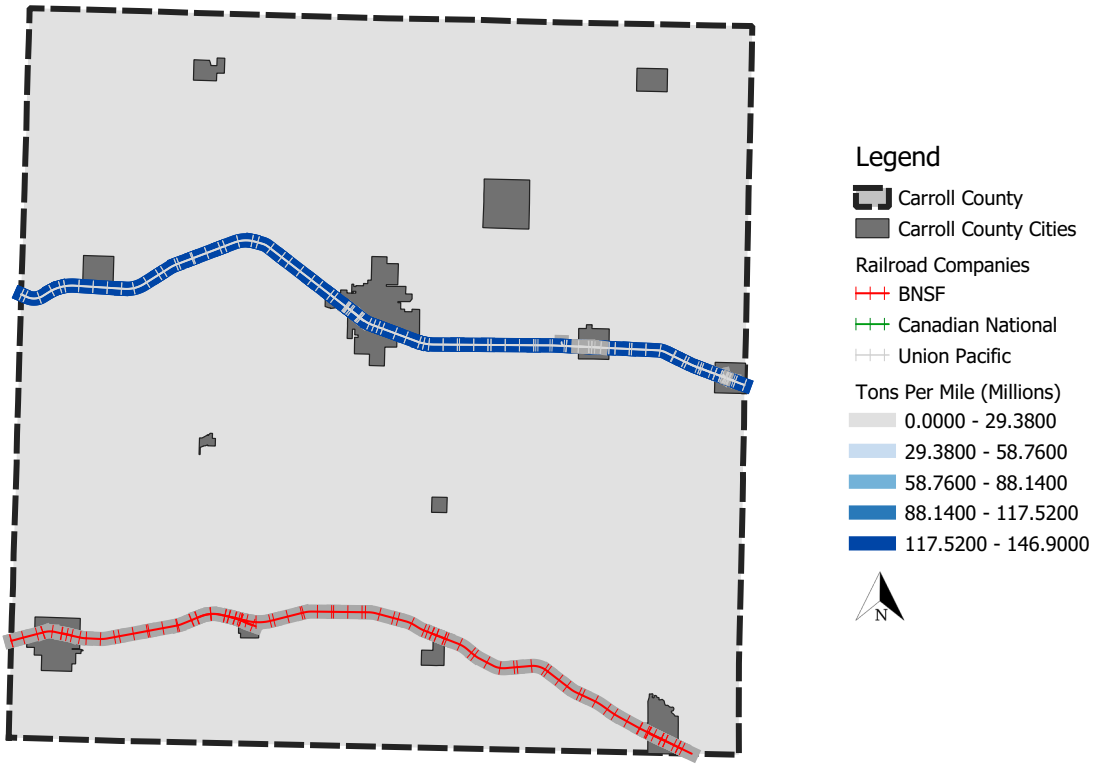


As the volume of traffic on streets, highways, and interstates increase, the number of traffic accidents will increase too. The combination of traffic volume, weather conditions, mechanical error, and human error creates the potential for a traffic accident.

Railroads are a vital part of Iowa's overall transportation system, helping to move both freight and passengers safely and efficiently. Railroads are critical in moving some of Iowa's commodities including corn, soybeans, chemicals, motor vehicles, wood and paper products, minerals and ores, coal, and biofuels. Maintaining and improving railroad service in Iowa requires a proactive partnership between a number of organizations, including private rail carriers, rail shippers, passengers, the Iowa DOT, other state and federal agencies, and local governments.

Carroll County has a large rail presence, with the Union Pacific (UP) Railroad running through the central part of the county and the Burlington Northern Santa Fe (BNSF) Railroad running through the southern part of the county. Carroll County had an average of 33 thru train movements over a 24-hour period in 2024. On average, 32,750 vehicles within Carroll County cross railroad tracks daily. Map 3.16 shows the railroad carriers in Carroll County, along with their annual gross tons per mile.

Map 3.16: Carroll County Railroads



There have been no disasters causing waterway incidents in Iowa. There have been numerous search and rescue events involving a single person or small boats with only a few people on board. Small-scale incidents on lakes and rivers have resulted in the loss of life form pleasure craft collisions and/or falls from vessels. Carroll County does not have any navigable waterways for commercial purposes.

A number of resources were used in gathering the information used in this chapter. They are as follows: Iowa Hazard Mitigation Plan 2023; Association of State Dam Safety Officials; Iowa DNR; National Inventory of Dams; FEMA; National Weather Service; NOAA; National Climatic Data Center; National Drought Mitigation Center; National Wildfire Coordinating Group; National Fire Protection Association; National Severe Storms Laboratory; Vaisala Inc.; Storm Prediction Center; The Weather Channel; Iowa Department of Agriculture; Iowa State University Extension; American Association of Equine Practitioners; Iowa Department of Public Health; The Center for Food Security and Public Health; U.S. Nuclear Regulatory Commission; Iowa Department of Transportation; and Carroll County Home Health, Hospice and Public Health

Chapter 4: Vulnerability Assessment and Loss Estimates

The final step in the risk assessment is to identify the likely level of loss for each type of hazard determined to affect the jurisdiction. The vulnerability assessment and loss estimates assess the County's total exposure to identified hazards. The vulnerability assessment consists of a vulnerability overview for each profiled hazard, an evaluation of potential losses to existing development, a description of the methodology used to estimate losses, and data limitations/corrective actions.

Risk assessment information was gathered from all jurisdictions through discussions held at jurisdiction meetings. Information provided was compared to reported data and compiled. The information provided and discussions identified if a hazard had occurred in the jurisdiction previously, if the hazard was likely to occur in the future, the probability of the hazard occurring in a given year, the magnitude/severity the hazard would have on the jurisdiction, the amount of warning time before a hazard occurred, and the estimated duration that the hazard would last. The final risk assessments were written after further discussion with the Hazard Mitigation Committee, public responses and further detailed research on past hazard occurrences. The risk assessment information, as provided by Carroll County and individual jurisdictions in Appendices A through N, varies slightly due to geographical area and jurisdictional representatives' personal opinions on the identified hazards and their associated risks. For example, a transportation incident may impact each jurisdiction differently depending on the location of highways and airports in relation to the jurisdiction.

County-wide assessments have been determined for each hazard that could have affect a large portion of the county. These hazard assessments are represented in the Carroll County Appendices. Each individual city has assessed these individual hazards differently based upon history and experience.

Structural Inventory

A structural inventory was completed for the corporate limits of each jurisdiction in Carroll County, with the county included. Structural inventories were completed to determine the type, number and value of structures within each jurisdiction. This information is critical to help determine vulnerability and potential losses in each jurisdiction. Structures were classified into the following categories:

- Residential – structures which are primarily used or intended for human habitation.
- Commercial – structures primarily used or intended as a place business where goods, wares, services, or merchandise is stored or offered for sale. Commercial also includes hotels, motels, rest homes, structures consisting of three or more separate living quarters and any other buildings for human habitation that are used as a commercial venture.
- Industrial – structures used primarily as a manufacturing establishment.
- Agricultural – Structures located on all tracts of land which are used primarily for agricultural purposes, except buildings which are primarily used or intended for human habitation.

Loss Estimates

Potential losses for each hazard, as identified by each jurisdiction, were estimated using the structural inventory. It is beyond the scope of this plan to complete an inventory of structures and critical facilities located within the 100-year floodplain. The Iowa Department of Natural Resources, along with the Iowa Flood Center, created new, comprehensive, accurate floodplain maps for Iowa cities and counties. The maps show the boundaries of flooded areas for the 1% annual chance (100-year) and 0.2% annual chance (500- year) floods. According to the Iowa Department of Homeland Security and the Iowa Department of Natural Resources, there is only one repetitive loss property within Carroll County. This property is commercial, located in the City of Manning, and it is unknown if there is a structure still on the property. The results from the structural inventories are discussed in more detail for each jurisdiction in Appendices A through N.

To determine the extent of an area that is susceptible to damages from each hazard, the committee estimated the magnitude/severity of each hazard on the jurisdiction. The magnitude/severity is an assessment in terms of injuries, fatalities, and property and infrastructure damage. The number of structures in the hazard area was determined by taking the maximum magnitude/severity percentage from chapter 3. Table 4.1 shows the percentages used.

Table 4.1: Loss Estimate Magnitude and Severity Impacts

Description		Percentage Used in Loss Estimates
Catastrophic	More than 50% of property severely damaged Shutdown of facilities and services for more than 30 days Multiple deaths	100%
Critical	25% to 50% of property severely damaged Shutdown of facilities and services for at least 2 weeks Injuries/illnesses that results in permanent disability	50%
Limited	10% to 25% of property severely damaged Shutdown of facilities and services for more than a week Injuries/illnesses that do not result in permanent disability	25%
Negligible	Less than 10% of property severely damaged Shutdown of facilities and services for less than 24 hours Injuries/illnesses treatable with first aid	9%

The committee determined that Carroll County is vulnerable to the following hazards:

- Animal/Plant/Crop Disease
- Drought
- Extreme Heat
- Flash Flood
- Grass or Wild Land Fire
- HAZMAT Incident
- Human Disease
- Infrastructure Failure
- Levee/Dam Failure
- River Flooding
- Severe Winter Storms
- Thunderstorm/Lightning/Hail
- Tornado/Windstorm
- Terrorism
- Transportation Incident

Based on the potential impacts of each hazard that is listed above, the vulnerability and loss estimates for each jurisdiction in Carroll County were calculated. All structural data in the tables and figures are based on 2024 parcel data provided by the County Assessor and population data came from the 2020 U.S. Census.

The parcel data was manipulated to eliminate missing or incomplete information. Parcel data was not used if it did not have a designated land use or if it has a dwelling or building value of $0. The calculations for "Number of Vulnerable Structures" are based on those structures that are exposed to each hazard. While 100% of the jurisdiction may be vulnerable to a hazard, not 100% of it will necessarily experience damages due to the hazard. The "Number of People Vulnerable" for each hazard was based on the total population. By multiplying the total population for the county by the percentage of exposure, the number of residents at risk could be calculated.

It is unlikely that a jurisdiction can determine the impact any hazard will have. If a hazard were to impact the entire city, the numbers in table 4.2 show the number of people who would be affected and the maximum number of structures and their value. If this type of event were to occur, a shutdown of some facilities and services could last for at least two weeks and some injuries/illnesses would result in permanent disability to even death.

Table 4.2: Carroll County Maximum Exposure

Type of Structure	Value of Structures	Number of People
Agricultural	$78,933,300	20,760
Commercial	$285,114,803	
Industrial	$212,178,825	
Residential	$1,517,139,779	

The following hazards were determine to have a limited impact on Carroll County were they to occur.

- Dam and Levee Failure
- Expansive Soils
- Extreme Heat
- Flash Flood
- Grass or Wild Land Fire
- HAZMAT Incident
- River Flooding
- Thunderstorm/Lightning/Hail
- Tornado

A shutdown of some facilities and services could last more than a week and any injuries/illnesses would not result in permanent disability. It is estimated that 25% of the County would be impacted.

Table 4.3: Carroll County Limited Hazard Impacts

Type of Structure	Value of Structures	Number of People
Agricultural	$19,733,325	5,190
Commercial	$71,278,701	
Industrial	$53,044,706	
Residential	$379,284,945	

The following hazards were determine to have a critical impact on Carroll County were they to occur.

- Animal/Plant/Crop Disease
- Drought
- Earthquake
- Human Disease
- Infrastructure Failure
- Severe Winter Storms
- Transportation Incident
- Windstorm

A shutdown of some facilities and services could last for at least two weeks and some injuries/illnesses will result in permanent disability. It is estimated 50% of the County would be impacted.

Table 4.4: Carroll County Critical Hazard Impacts

Type of Structure	Value of Structures	Number of People
Agricultural	$39,466,650	10,380
Commercial	$142,557,402	
Industrial	$106,089,413	
Residential	$758,569,890	

Each individual jurisdiction and rural county loss estimates can be found in their respective appendix.

Chapter 5: Mitigation Strategies

Section 201.6 (c)(3)(i): The plan must contain a mitigation strategy that provides the jurisdictions 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 must include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

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

The hazard mitigation goals, objectives and actions are directly connected to the hazard analysis and risk assessment. After the hazard risk analysis was completed for each jurisdiction, broad-based county-wide goals were developed to address hazards and their impact on jurisdictions. The committee used a top-down approach where the overall goals were determined, then worked down to establish more specific objectives and even more specific mitigation actions. As a starting point, each jurisdiction was provided with the goals from their previous hazard mitigation plan. If a jurisdiction did not have a previous hazard mitigation plan, they were given the county's previous goals. This hazard mitigation plan's goals are identified as follows:

- Maintain and protect public infrastructure
- Minimize deaths, injuries, property loss, and vulnerability due to natural hazards
- Improve coordination, public communication, education, and awareness of hazards
- Enhance community protection
- Maintain and support public safety facilities, including equipment and training

Using the plan goals as a platform, each jurisdiction decided upon mitigation objectives and actions to help reduce or eliminate the impacts of hazards. Objectives were defined as strategies or steps to achieve the goals that have been set. They are more specific and narrower in scope than goals. It is important that the objectives be measurable in order to determine if the action was successfully implemented. Actions were defined as specific activities to reduce hazard risks. Actions can be classified into six mitigation categories-prevention, property protection, public education and awareness, natural resource protection, emergency services and structural projects.

Each committee member was supplied with a supplement to provide help in picking mitigation actions. The supplement was titled *Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards*. The booklet contained a list of possible hazard mitigation measures for communities compiled from FEMA. The list gives mitigation ideas for natural hazard types, such as flood, tornadoes and drought. A worksheet was also distributed to committee members with examples of mitigation objectives and actions from several approved mitigation plans. In addition, committee members were given copies of their jurisdiction's previous objectives and actions from past hazard mitigation plans. As extensive as the three resources were, they did not prohibit other local ideas for actions to save lives and prevent or reduce damages.

This plans mitigation goals and objectives fall under the state's three main goals to provide complete protection to the citizens of the county. Each of the county's goals falls under the umbrella of the states three main goals which include:

- Protect the health, safety, and quality of life for Iowa citizens while reducing or eliminating property losses, economic costs, and damage to the natural environment caused by a disaster.
- Ensure government operations, response, and recovery are not significantly disrupted by disasters.
- Expand public awareness and encourage intergovernmental cooperation, coordination, and communication to build a more resilient community against all hazards.

Action Plan

The Action Plan is a combination of the hazards addressed by each action, the prioritization of actions, the responsible department for the action, the estimated cost of the action, the potential funding source for the action, the mitigation measure category, and the target completion date of the action. All of these categories are explained in the following sections. The county-wide action plans can be found later in this chapter, the city and school district's Action Plans can be found in their respective appendix.

Priority

Priority for each action is determined as High, Moderate, or Low.

- High- Completing this action item is vital to the jurisdiction's efforts towards either mitigating hazards or responding to them. The benefit of completing this project is greater than the cost. These projects tend to need to be completed within a short timeframe.
- Moderate – Completing this action would benefit the city's efforts towards mitigating hazards or responding to them, but if these projects are not completed, the jurisdiction can still further their efforts. The cost of these projects equals the benefit on the jurisdiction. These projects need to be completed in the mid timeframe.
- Low- If this action were to be completed, the jurisdiction would benefit, but if it is not completed, it will not be detrimental to the city's hazard mitigation efforts or response. The cost of the project outweighs the benefit the project will have on the jurisdiction. These projects tend to be completed long-term.

Estimated Cost

Estimated costs for each action is determined as: minimal, low, moderate or high based on the following:

- Minimal – cost estimate is $9,999 or less
- Low – cost estimate ranges from $10,000 to $99,999
- Moderate – cost estimate ranges from $100,000 to $299,999
- High – cost estimate is $300,000 or greater

Mitigation Measure Categories

Prevention Actions

Prevention actions are intended to address future development. These actions influence the way land and buildings are developed and built. These actions ensure that future development does not increase hazard losses, and guides future development away from hazards. Examples of these actions include:

- Planning and zoning codes that limit development in a floodplain
- Building codes
- Capital improvement programs that prevent extension of public infrastructure into hazard areas
- Open space preservation and development of parks and recreational areas in hazard prone areas
- Storm water management regulations.

Property Protection Actions

Property protection actions modify existing structures or their surroundings to protect them from a hazard. These actions directly protect people and property at risk. Protecting a building does not necessarily affect the building's appearance and is therefore a popular mitigation action for historic and cultural sites. Examples of these actions include:

- Acquisition of lands that are vulnerable to damage
- Elevation
- Relocation of hazard-prone structures to safer areas
- Structural retrofits to reduce damage by future hazards
- Storm shutters
- Flood-proofing

Public Education and Awareness Actions

Actions to inform and educate citizens, elected officials, and property owners about hazards and the actions they can take to avoid potential damage and injury. These actions are directed toward property owners, business owners, and visitors to the community. Examples include:

- Outreach projects that provide hazard information to the public, business and property owners
- Real estate disclosure so that potential property owners are informed of the risk before purchase
- Hazard information centers
- School-age and adult education programs

Natural Resource Protection Actions

Actions that reduce the intensity of hazard effects and preserves or improves the quality of the environment and wildlife habitats. The actions are usually implemented by parks, recreation, or conservation agencies and organizations. These actions can include:

- Sediment and erosion control
- Stream corridor restoration
- Watershed management
- Forest and vegetation management
- Wetland restoration and preservation
- Expanding public open space

Emergency Services Actions

Actions that protect people and property before, during, and immediately after a disaster or hazard event. Examples of these actions are:

- Warning systems
- Emergency response services
- Protection of critical facilities and infrastructure

Structural Project Actions

Actions are called "structural" because they involve the construction of structures or devices to reduce the impact of hazards. Actions in this category directly protect people at risk. These actions can include:

- Dams
- Levees
- Floodwalls
- Retaining walls
- Safe rooms
- Reservoirs to store drinking water
- Diversion of storm water

Target Completion Date

The target completion date is the estimated amount of time that the jurisdiction feels the action can be completed in. It is broken into four categories:

- Short – 0 to 2 years
- Mid – 3 to 6 years
- Long – 7+ years
- Ongoing

There have been some changes in the plan's project priorities since the last update. Some projects that were prioritized as a high priority have been completed utilizing available grant and local funds. Other projects that were not high priority were implemented as funds were available, and those that either had no funding available or were not a high priority were not implemented during this planning period. The County's Mitigation Actions were developed with the county's new priorities in mind which have shifted from the last planning period due to changes in elected officials and staff. The priorities also have changed due to the county's economic climate and instances of hazards within the county.

Rural Carroll County Status of Previous Mitigation Actions

Table 5.1: Rural Carroll County Status of Previous Mitigation Actions

	Status				
Previous Actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not Implemented**
Additional warning sirens				X	
Educate public on hyper reach notification and continue to fund	X				
Promote NOAA radios to the public			X		
Complete current plan and make plans to update every five years			X		
Inform public on hazardous materials locations and hazards	X				
Find alternative water sources for fire protection	X				
Local and get permission to use farm ponds	X				
Use old farm wells to fill tanker storage					X
Designate shelters	X				
Enforce building codes, city codes, and zoning codes			X		
Purchase portable generators				X	
Encourage use of one call to avoid damage to utilities			X		
Encourage electric companies to bury their overhead power lines					X
Continue tree-trimming, enforcing ordinances when needed			X		

	Status				
Previous Actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not Implemented**
Provide funding needed to train personnel (fire, EMS, and police)			X		
Keep updating and upgrading ambulance fleet, snow plow equipment, sand trucks, etc			X		
Trouble shoot communication center problems (replacing towers or other equipment as needed to ensure consistent emergency page tones and text messages) and set-up and test back-up communication center			X		
Post stop signs or yield signs on the more than 900 miles of gravel roads throughout the County			X		
Continue to budget for and fund street repairs in each community and throughout the County			X		
Schedule bridge improvements and inspections, work on dams			X		
Back-up power for county fuel depot				X	
Complete drainage mitigation			X		
Maintain and improve airport facilities		X			
Continue County membership with Region 5 Hazardous Materials Team in Fort Dodge			X		
Back-up water plant infrastructure to re-route water in drought situations					X

Rural Carroll County Action Plan

Section 201.6 (c)(3)(iii): The mitigation strategy shall include an action plan, describing how the action 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 associated costs.

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

Table 5.2: Rural Carroll County Action Plan

Goal 1	**Enhance Community Protection**
Objective 1	Improve Public Warning Capabilities
Objective 2	Maintain Current Hazard Mitigation Plan
Objective 3	Hazardous Materials-tier II sites
Objective 4	Protect and Enforce Regulatory Measures in Existing and New Development Areas
Objective 5	Protect Against Fires
Objective 6	Provide Shelter Facilities in Case of Disasters
Goal 2	**Protect Against Power Outage**
Objective 1	Provide Back-Up Systems for Critical Systems and Assets
Objective 2	Use Prevention Techniques to Minimize Disruption in Services
Goal 3	**Maintain and Support Public Safety, Including Facilities, Equipment, and Training**
Objective 1	Improve First Responder Resources and Capabilities
Objective 2	Provide Needed Equipment and Facilities
Goal 4	**Update Communications Systems**
Objective 1	Enhance Cross-Agency, Intra-Agency and Inter-Agency Communications
Goal 5	**Maintain and Protect Public Infrastructure**
Objective 1	Maintain and Improve Roads, Bridges, and Other Transportation

Table 5.3: Rural Carroll County Mitigation Actions

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Additional warning sirens	Tornado	Mod	Com. Center	Low	County Funds, County Conservation Funds, HMGP with State Match, USDA Community Facilities	Emergency Services	Mid
Promote NOAA radios to the public	Tornado, Windstorm, Severe Winter Storms, Flash Flood, Hailstorm, Grass or Wild Land Fire	Low	Emergency Management	Minimal	County EMA, County Supervisors, Local Foundations	Emergency Services	Ongoing
Complete current plan and make plans to update every five years	All	High	County and Cities	Minimal	County EMA Budget, HMGP Planning Grant	Prevention	Mid
Inform public on hazardous materials locations and hazards	Hazardous Material, Transportation Incident, Radiological	Mod	Fire Department, Emergency Management, Emergency Services	Minimal	Fire Departments, Sheriff's Department, Secondary Roads	Public Education and Awareness	Ongoing
Find alternative water sources for fire protection	Grass or Wild Land Fire, Infrastructure Failure	Low	Fire Department	Minimal	Local Fire Departments	Emergency Services	Ongoing
Locate and get permission to use farm ponds	Grass or Wild Land Fire, Infrastructure Failure	Low	Fire Department	Minimal	Local Fire Departments	Emergency Services	Ongoing
Use old farm wells to fill tanker storage	Grass or Wild Land Fire, Infrastructure Failure	Low	Fire Department	Minimal	Local Fire Departments	Emergency Services	Ongoing
Designate shelters	Extreme Heat, Tornado, Severe Winter Storms	Mod	Emergency Management, City Councils	Minimal	Emergency Management, Carroll County Conservation,	Emergency Services	Short

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Enforce building codes, city codes, and zoning codes	Infrastructure Failure	Mod	City Councils	Low	City Budgets, Carroll County Planning & Zoning	Property Protection	Ongoing
Purchase portable generators	Tornado, Severe Winter Storms, Windstorm	Mod	Fire Department, Emergency Management, City Council	Low	County Supervisors, Carroll County Conservation, Local Foundations, HMGP with State Match	Emergency Services	Mid
Encourage use of one call to avoid damage to utilities	Infrastructure Failure	Low	Pipeline Utility, Fire Department, Emergency Services	Minimal	Municipal and Private Utility Companies, Fire Departments	Public Education and Awareness	Ongoing
Encourage electric companies to bury their overhead power lines	Infrastructure Failure	Low	Board of Supervisors, City Councils	Minimal	Municipal and Private Utility Companies, Iowa ENERGY RLF, GRID Grants	Public Education and Awareness	Ongoing
Continue tree-trimming, enforcing ordinances when needed	Windstorm, Tornado, Severe Winter Storms, Infrastructure Failure	Low	Board of Supervisors, City Councils	Low	City Budgets, Carroll County Board of Supervisors Budget	Property Protection	Ongoing
Provide funding needed to train personnel (fire, EMS, and police)	Grass/Wildland Fire, Tornado, Windstorm, HAZMAT Incident, Terrorism, Transportation Incident, Radiological, Infrastructure Failure	High	Board of Supervisors, City Councils, Emergency Management	Low	Local Foundations, Fire Department/ EMS/Police/Sheriff Budgets, FEMA AFG	Emergency Services	Ongoing
Keep updating and upgrading ambulance fleet, snow plow equipment, sand trucks, etc	Severe Winter Storms, Tornado, HAZMAT Incident, Radiological	Mod	Public Works	High	Secondary Roads, Carroll County EMS Budget, Local Foundations	Emergency Services	Ongoing

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Trouble shoot communication center problems (replacing towers or other equipment as needed to ensure consistent emergency page tones and text messages) and set-up and test back-up communication center	All	High	Emergency Management, 911 Board, Board of Supervisors, City Council	Moderate	Emergency Management Budget, Communication Center Budget, Local Foundations	Emergency Services	Mid
Post stop signs or yield signs on the more than 900 miles of gravel roads throughout the County	Transportation Incident	Low	Public Works, County Engineer	Low	County Engineer Budget, Sign Replacement Grants	Structural Project	Long
Continue to budget for and fund street repairs in each community and throughout the County	Infrastructure Failure, Transportation Incident	Mod	Board of Supervisors, County Engineer	High	Road Use Tax, LOST, City Budgets, County Budget	Structural Project	Ongoing
Schedule bridge improvements and inspections, work on dams	Infrastructure Failure, Transportation Incident	Mod	Board of Supervisors, County Engineer	High	Local, State, Federal	Structural Project	Ongoing
Back-up power/generator for county fuel depot	Tornado, Windstorm, Infrastructure Failure	Low	Board of Supervisors, County Engineer	Low	Carroll County Supervisors	Prevention	Mid
Complete drainage mitigation	Dam and Levee Failure, Infrastructure Failure	Low	Board of Supervisors, County Engineer	Moderate	Carroll County Supervisors	Structural Project	Ongoing
Maintain and improve airport facilities	Terrorism, HAZMAT Incident, Infrastructure Failure	Low	City Councils	Moderate	Carroll County Airport Authority Board	Structural Project	Long
Continue County membership with Region 5 Hazardous Materials Team in Fort Dodge	HAZMAT Incident, Terrorism, Radiological, Grass or Wild Land Fire	High	Board of Supervisors, Fire Departments, Emergency Management	Low	Carroll County Board of Supervisors Budget, Emergency Management Budget, Local Fire Department Budgets	Emergency Services	Ongoing

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Back-up water source in drought situations	Drought, Infrastructure Failure	Mod	Public Works	High	City Utility Funds, Rural Water Funds, CDBG, Iowa SRF, USDA Grants and Loans	Prevention	Long
Purchase and install a generator at the Carroll County Conservation Center (Emergency Operation Center & Shelter)	Severe Winter Storm, Infrastructure Failure, Tornado, Thunderstorm/ Lightning/Hail, Extreme Heat	High	Comm. Center, County EMA, Sheriff's Department	Mod	Carroll County Supervisors, Local Foundations, HMGP with State Match, Sheriff's Department	Emergency Services	Short
Purchase and install a generator at the Carroll Rec Center (shelter)	Severe Winter Storm, Infrastructure Failure, Tornado, Thunderstorm/ Lightning/Hail, Extreme Heat	High	County EMA, City of Carroll, Carroll Parks and Recreation	Mod	Carroll County Supervisors, Local Foundations, HMGP with State Match, Sheriff's Department, City of Carroll General Fund	Emergency Services	Short
Install storm sirens in Rural County	Tornado, Windstorm, Thunderstorm/ Lightning/Hail	Mod	Com. Center, County EMA	Low	County Funds, County Conservation Funds, HMGP with State Match, USDA Community Facilities	Emergency Services	Mid

Chapter 6: Plan Maintenance and Adoption

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

Monitoring, Evaluating, and Updating the Plan

With the adoption of this plan, the Emergency Management Commission will be tasked with initiating the review, evaluation, and maintenance of the plan. The Emergency Management Commission will be in charge of making it a priority to update the Carroll County Multi- Jurisdictional Hazard Mitigation Plan. The Carroll County Multi-Jurisdictional Hazard Mitigation Plan will be evaluated once a year for potential changes, and to maintain compliance with FEMA rules and regulations. If Carroll County, or any individual city, decides to update the plan, the Emergency Management Commission will be responsible to initiate the update. If there is not an update within four years of the plan being adopted, then the process will begin to update the plan. The Emergency Management Commission will coordinate the meeting time and place and will notify the other members of the committee. If a new committee needs to be formed, it should be compromised of representatives of the city government, businesses, citizens, emergency staff, school board, etc. The members of the Emergency Management Commission agree to:

- Meet annually to monitor and evaluate the implementation of the hazard mitigation plan
- Act as a forum for hazard mitigation issues
- Disseminate hazard mitigation ideas and activities to all members of the committee
- Pursue the implementation of hazard mitigation actions that are included in the plan
- Monitor any sources of possible funding to help the jurisdictions implement the plan's recommended actions
- Monitor and assist in implementation and update of this plan
- Inform and gather input from the public

The primary duty of the Carroll County Emergency Management Commission, in relation to maintaining and updating this plan, is to see that the plan is successfully carried out and report to the Board of Supervisors, and to make information available to the public regarding the status of the plan and the progress of hazard mitigation actions.

Implementation Policies and Issues

The hazard mitigation planning team was created to develop the mitigation plan and guide the plan preparer. The planning team should not formally end with the approval of the plan. The planning team should become a watchdog to help local officials move the plan's goals forward and should take a key role in implementing projects. Members can help remind public officials of that particular year's mitigation strategy and possible funding options and can volunteer in the implementation process for certain actions. The team and local governments may participate in the process and engage regional organizations, state agencies, colleges, schools, NGOs, and churches via memoranda of agreement.

Throughout the mitigation plan, there are gaps in data that are outlined in the plan. In addition to specific mitigation actions in this chapter, it is important that the Carroll County jurisdictions review this plan periodically as the County prepares for the next five-year update of this Plan. This process would help satisfy FEMA Region VII requirements. Missing data should be found and included by the next major update.

This hazard mitigation plan is a guide for future policy planning for participating jurisdictions in the county. The plan considers demographic trends and projections, community background information, current and future political decisions, and overall important goals and objectives for the county's jurisdictions. The goals and objectives have been developed to reflect the general consensus of the county's Hazard Mitigation Planning team, the broad range of elected officials, and the citizenry of the county. These recommendations have been developed to look five-plus years into the future with the expectation that periodic updates will occur in order to reflect changes within the county.

The success of this plan will require the support of the emergency management commission/agency, elected officials, department heads, and volunteers (including civic groups, academia, and general citizens). Cooperation from the public and private sectors will allow implementation of the recommendations that will provide long-term benefits for the entire county and each jurisdiction. By implementing these recommendations, the jurisdictions will be furthering other civic goals also.

Simply listing a project or discussing an issue does not cause anything to be done about it. It is vital that the jurisdictions make a sustained effort to implement projects, actions, and policies as outlined in this plan. Reviewing the text intermingled among the tables and lists also provides ideas on how to carry out the plan and meet mitigation goals. This chapter also provides more details about the regular activities involved in carrying out this plan and preparing for future planning efforts.

The following ideas should be kept in mind when considering how the plan should be implemented.

- Funding and resources are very limited due to the small population size, modest land value and tax base, and other funding obligations that make it impossible to save for long-term emergency needs.
- Audubon County has a limited number of volunteers and support agencies to handle either mitigation projects or response needs. Funding is too limited to provide proper training and equipment, and volunteers do not have the time to undertake the necessary training. Many volunteers and staff wear multiple "hats" and cannot meet all the demands when hazards occur.
- Many members of the public are apathetic to hazards and particularly to the sustained efforts necessary to mitigate them. Some citizens and public officials do not properly respect the need for mitigation planning, the risks the county face, and the roles they have in the process. Few members of the general public have attended planning meetings.
- Information and data to bring about detailed hazard analysis and the analysis of possible mitigation actions is often lacking on a local level.
- Local jurisdictions have limited legal authority to implement some possible mitigation actions.
- Because prioritization is needed in order to effectively use limited resources, it is important that the jurisdictions perform studies on community infrastructure and services provided.
- Because of the risk of failure of investments in key hazard areas where the area is defined, the jurisdictions should consider a policy to prohibit or limit public expenditures for capital improvements in such areas.
- Small towns should use mitigation before hazards occur as a means to be prepared for the fact that, in a widespread hazard, resources are not likely to be available to them until larger jurisdictions are served.

Annual Review and Plan Maintenance Process

The DMA of 2000 suggests that each local jurisdiction review the plan annually. Principally, each jurisdiction's government body and key staff should review the actual implementation plan for that jurisdiction. A review of capabilities, goals/objectives, and proposed actions is particularly warranted. It is important that the review notes and suggested changes be made at a public meeting and records are kept. If any of the changes relate to a project that is being submitted to FEMA, such as through a PDM, FMA, or HMGP application, the jurisdiction must adopt the changes at a council or supervisor meeting to make the changes officially part of the plan and thus eligible for mitigation funding. The local jurisdictional body, such as city council, board of supervisors, or school board, is responsible for ensuring reviews are completed.

The public should be invited to all formal meetings where the plan is discussed and possible changes can be made. Local media should be used to alert the public. Each jurisdiction is responsible for review of the parts of the plan relevant to the said jurisdiction.

Evaluation of progress can be achieved by monitoring changes in vulnerabilities identified in the plan. Changes in vulnerability can be identified by noting:

- Decreased vulnerability as a result of implementing recommended actions
- Increased vulnerability as a result of failed or ineffective mitigation actions, and/or
- Increased vulnerability as a result of new development (and/or annexation)

The annual reviews and updates to this plan will:

- Consider changes in vulnerability due to action implementation
- Document success stories where mitigation efforts have proven effective
- Document areas where mitigation actions were not effective
- Document any new hazards that may arise or were previously overlooked
- Incorporate new data or studies on hazards and risks
- Incorporate new capabilities or changes in capabilities
- Incorporate growth and development-related changes to inventories, and
- Incorporate new action recommendations or changes in action prioritization

In order to best evaluate the mitigation strategy during plan review and update, the participating jurisdictions will follow the following process:

- A representative from the responsible office identified in each mitigation action will be responsible for tracking and reporting the action status on an annual basis to the jurisdictional HMPC member and providing input on any completion details or whether the action still meets the defined objectives and is likely to be successful in reducing vulnerabilities.
- If the action does not meet identified objectives, the jurisdictional HMPC member will determine what additional measures may be implemented, and an assigned individual will be responsible for defining action scope, implementing the action, monitoring success of the action, and making any required modifications to the plan.
- As part of the annual review process, the Audubon County Emergency Management Coordinator will provide the updated mitigation strategy with current status of each mitigation action to local elected officials of various jurisdictions requesting that the mitigation strategy be incorporated, where appropriate in other planning mechanisms.

Changes will be made to the plan to accommodate for actions that have failed or are not considered feasible after a review of their consistency with established criteria, time frame, community priorities, and/or funding resources. Actions that were not ranked high but were identified as potential mitigation activities

will be reviewed as well during the monitoring and update of this plan to determine feasibility of future implementation. Updating of the plan will be by written changes and submissions, as the planning team deems appropriate and necessary, and as approved by the Carroll County Boards of Supervisors and the governing boards of the other participating jurisdictions.

Opportunities for Publicity

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

Several times the local media can make comments about the effort and successes that may arise:

- Adoption of the mitigation plan
- Receipt of approval by FEMA
- Initiation and completion of tangible mitigation actions or projects
- Update and evaluation meetings and results

Annually, each jurisdiction is to hold at least one public meeting or hearing so that the public can comment on the status of the mitigation plan's implementation and changes that are needed to the plan.

Incorporation into Other Planning Mechanisms

Section 201.6 (c)(4)(ii): [The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvements, when appropriate.
The planning team is partly responsible to ensure that the public officials are incorporating mitigation actions into relevant plans and planning mechanisms, such as zoning, annexation plans, and bonding proposals. Communities should also include mitigation initiatives as regular line items in community capital or operational budgets to ensure ongoing funding for hazard mitigation initiatives.

The local jurisdictions did not incorporate any of the mitigation actions into existing plans in any formal sense since the previous plan was adopted. However, mitigation ideas were incorporated informally in budget decisions, such as to fund a mitigation action. The jurisdictions commit to improved formal planning efforts in the next five years. Ways each jurisdiction will incorporate this plan can be found in their respective appendix.

Where possible, Carroll County and all other jurisdictions, will consider the findings from this document when updating or creating new planning and operating documents. Examples of planning documents that would benefit from information provided in this plan include, but are not limited to:

- Incorporated City Codes
- Carroll County Comprehensive Plan
- Carroll County Code of Ordinances
- Carroll County Zoning Ordinance
- Other existing and future plans, such as water conservation plans, storm water management plans, and parks and recreation plans

As of the writing of this plan, not all of the above-mentioned plans are in place within Carroll County. It is anticipated that this plan would be used to guide the creation of the documents listed above, if they were to be developed. Some jurisdictions have some documents currently in place, but if the document is to be updated, the hazard mitigation plan should be referenced in the update. In plans that are currently written, utilizing the hazard mitigation plan will be vital when looking to expand and improve the jurisdiction's mitigation to hazards.

Appendix A: Rural Carroll County

Table A.1: Rural Carroll County Risk Assessment

Hazard	Comments
Animal/Plant/Crop Disease	Rural Carroll County is predominately agricultural land. While this land use represents the majority, there have been limited reported losses from animal/plant/crop disease throughout the county in general. Some specialized industries, like the bird farmers have had large impacts due to the bird flu that has impacted large portions of the bird populations. The Emerald Ash Borer has caused a large amount of trees to become diseased and die, causing the county conservation to begin to cut these trees down and will need to replace them in the future.
Drought	Drought occurrences have increased across the state, and Carroll County has not been exempt from this hazard. Droughts continue to increase in severity and while there is little warning, this hazard can cause both direct and indirect issues for the county and it's residents.
Earthquake	There have been no instances of earthquake in Carroll County, and the committee feels there will be no instances during the life of this plan.
Expansive Soils	There have been no instances of expansive soils in Carroll County, and the committee feels there will be no instances during the life of this plan.
Extreme Heat	Extreme heat events continue to impact Carroll County. Education may be one of the best action tools to combat the effects of extreme heat as individuals need to know the effects of extreme heat and how it can affect the body. With one extreme heat event occurring in the past five years, Carroll County is predicted to have at least one event recorded over the life of this plan.
Flash Flood	While flash floods have little to no warning time, with no instances within the last planning period, the committee has determined this hazard is not a high priority hazard to address, but will consider mitigation actions to prepare the county for response to an event. Even with no instances in the last five years, the committee believes that with the severity of the storms, that the county is estimated to experience one flash flood every three years.
Grass/Wild Land Fire	Grass and wild land fires are most commonly field fires or controlled burns that get out of hand. This hazard can pose a large threat to the county as elements out of anyone's control, such as wind direction and speed, can change this hazard from harmless and controlled to out of control in a matter of minutes and can pose a threat to life. Grass/Wild Land Fires have a high probability of occurring each year with a minimum of ten events anticipated annually.

HAZMAT Incident	Carroll County reported 29 hazardous spills within the last reporting period. Five spills impacted the air, 20 impacted the land, and four impacted surface water. With this many instances within five years, the committee feels that this hazard poses a threat to the county and mitigation actions should be strongly considered and implemented to prevent any further instances.
Human Disease	Iowa and more specifically Carroll County is still feeling the effects of the COVID-19 pandemic. The pandemic has reignited the need to plan for future outbreaks and examine the county's current practices. The pandemic also reminded the public the importance of staying informed and staying vigilant to protect themselves.
Infrastructure Failure	Infrastructure failures occur with little to no warning and can cause major disruptions within the community. Planning to respond to this hazard is important to the county to protect lives and property. The most likely infrastructure failure within Carroll County would be structural failure of either bridges or roadways. As these instances have no warning time, planning must be completed prior to an event happening to be able to respond in a quick manner.
Levee/Dam Failure	Of the nine Carroll County dams in the inventory, one is considered to be a high hazard dam. The remaining eight dams are considered low hazard dams. There have been no known occurrences of dam failure in Carroll County. Sound design, quality construction, and continued inspections and repairs reduce the probability of dam failure. While there have been no instances of failure in the past, with the age and classifications of the dams in the county, this hazard should be high priority.
Radiological	During the previous planning period, there were no instances of Radiological Incident in Carroll County, and the committee does not anticipate any happening in the next planning period. If an incident were to occur, the committee feels it would be a small, contained situation that would not threaten the county as a whole.
River Flooding	Large portions of Carroll County are located within flood zones. While there is a large amount of land in the flood zones, there were no reported instances of flooding within the planning period. While there have been no instances of river flooding in the last reporting period, it is important that the County stay vigilant and plan for river flooding instances. With storms intensifying, flood chances have increased within the county, and is anticipated that at least one flood event will happen annually within Carroll County.
Severe Winter Storm	Severe Winter Storms continue to impact Carroll County. Examining the past history and climate change, the county estimates that there will be a minimum of two severe winter storm events each year. These storms while historically, have caused little damage, continue to build in strength, threatening property and lives within Carroll County. The warning period of this hazard continues to grow with meteorological advances, but can still pose great risks to the county.
Terrorism	There have been no instances of terrorism in Carroll County during the previous planning period and the committee feels there will be no instances during the life of this plan. If an instance were to occur, the committee feels it would be a targeted incident that would not threaten the entire community.
Thunderstorm/ Lightning/Hail	Thunderstorm/lightning/hail instances are frequent within the county. While they are frequent, most storms pose no threat to life, crops, or property. This hazard is prevalent in the county but is normally not severe in nature.

Tornado	Carroll County has experienced four tornadoes in the recent past. Three of these were classified as EFU tornadoes and the other was an EF1. The EF1 tornado did $80,000 in property damage. While damage from these tornadoes was limited, it is important for the county to continue to plan for the response to tornadoes as storms within Iowa continue to grow in strength. As past instances have led the county to anticipate a minimum of one tornado a year, preparing the public and county is vital to ensuring there is no loss of life.
Transportation Incident	Speed limits on the majority of Carroll County's paved roads is set to 55 miles per hour and traffic incidents at these speeds can cause damage to property and life. The committee anticipates that this hazard will effect the county in varying degrees throughout the planning period.
Windstorm	Recent windstorms have caused large amounts of reported damage to properties. These hazard events continue to build in magnitude, causing increasingly large amounts of damage to property and posing threats to lives. The recent derechos effected Carroll County prompting the community to prepare more effectively for these hazards. At a minimum, Carroll County anticipates at least one high wind event annually.

Appendix B: City of Arcadia

Community Profile

History

After the Civil War ended, construction of the Chicago and Northwestern Railroad began through western Iowa. This historical event resulted in the emergence of many small railroad towns, including Arcadia. When the railroad was constructed, a switch station was also completed in the present location of Arcadia. This switch station was known as "Tip Top". Later, a wealthy New Englander named Isaac Newton Voris rode the Northwestern train from California to New York. Voris quickly fell in love with the rolling plains of western Iowa and bought four thousand acres surrounding Tip Top.

The town was then platted and called Arcadia, which means "any place of quiet and contentment". By 1881, Arcadia was incorporated and quickly became one of the more attractive towns in the county. The first lot bought resulted in the construction of a general store. Additional buildings such as a grocery store, saloon, barber shop, hardware store, carpentry, drugstore, music hall, blacksmith, shoe store and numerous dwelling units followed. The first school house was constructed in 1873. The one room school house received an upgrade in 1881 to consist of three rooms. Arcadia has seen periods of growth and decline throughout history, and now is seen as a quality bedroom community to Carroll.

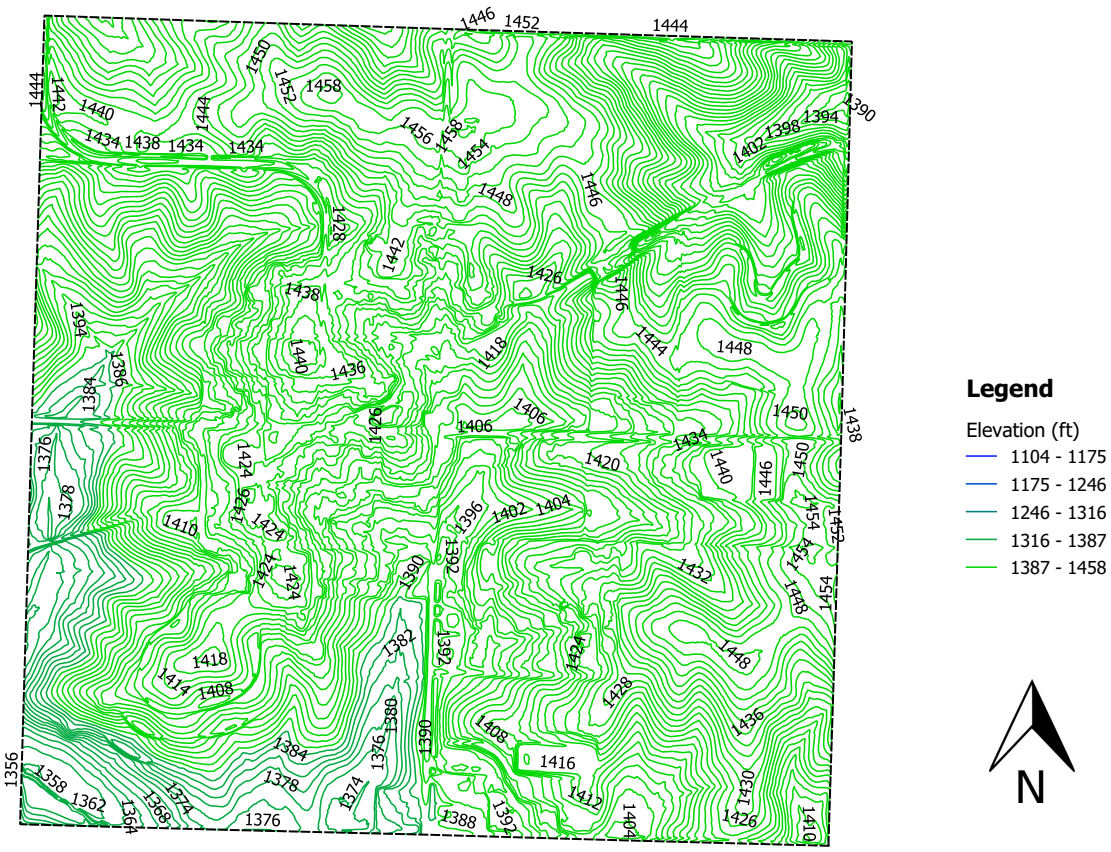
Geography and Environment

Arcadia is located on the western side of Carroll County. Arcadia is fortunate to have Highway 30 run east/west just south of town. This provides residents with easy commuting to Carroll and other regional communities.

Arcadia is 10.4 miles from Carroll, 18.5 miles from Denison, 29.5 miles from Lake City, 32.8 miles from Coon Rapids and 37 miles from Audubon.

The highest elevation in Carroll County can be found along the eastern side of the county. Here, the elevation can reach as much as 1,550 feet above sea-level. Arcadia sits at the highest elevation of any other community in Carroll County. Elevations range from 1,360 feet in the southwest corner to 1,458 feet towards the northern part of town. Map B.1 displays the City of Arcadia's elevation.

Map B.1: City of Arcadia Elevation



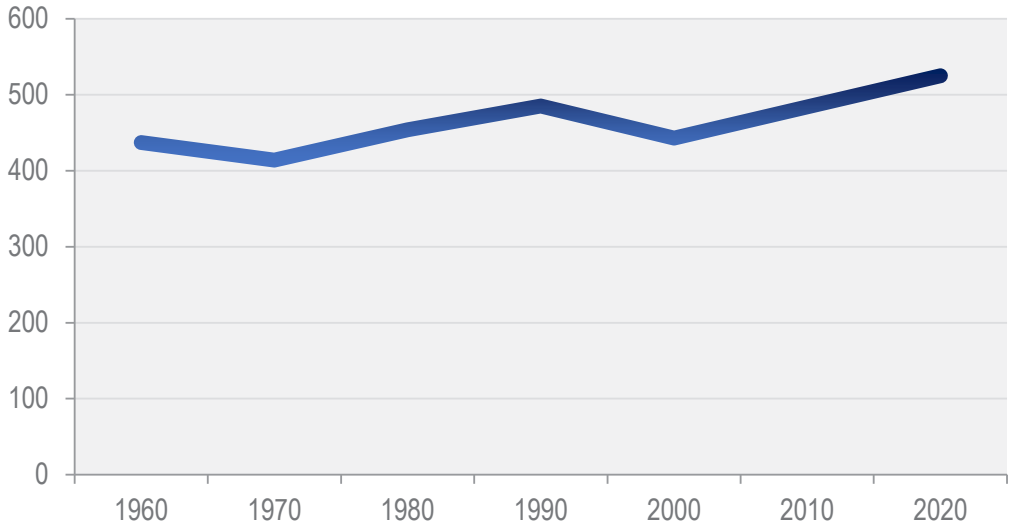
Demographics

The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Arcadia's population through past, present, and future trends of the region.

The size and composition of a community's population can exert influence on its development. For instance, population size, composition, and distribution influence the range of businesses a community can support, the pool of workers from which to draw, and the demand for and supply of services. Similarly, the effect people have on the social, economic, and physical environments depends upon the composition, expectations, and distribution of the population. A population's age distribution, income levels, ancestry, and educational attainment are some of the characteristics that mold a community. Population trends give community leaders and elected officials information on what kind of services need to be provided and offers prospective employers an overview of the local labor force.

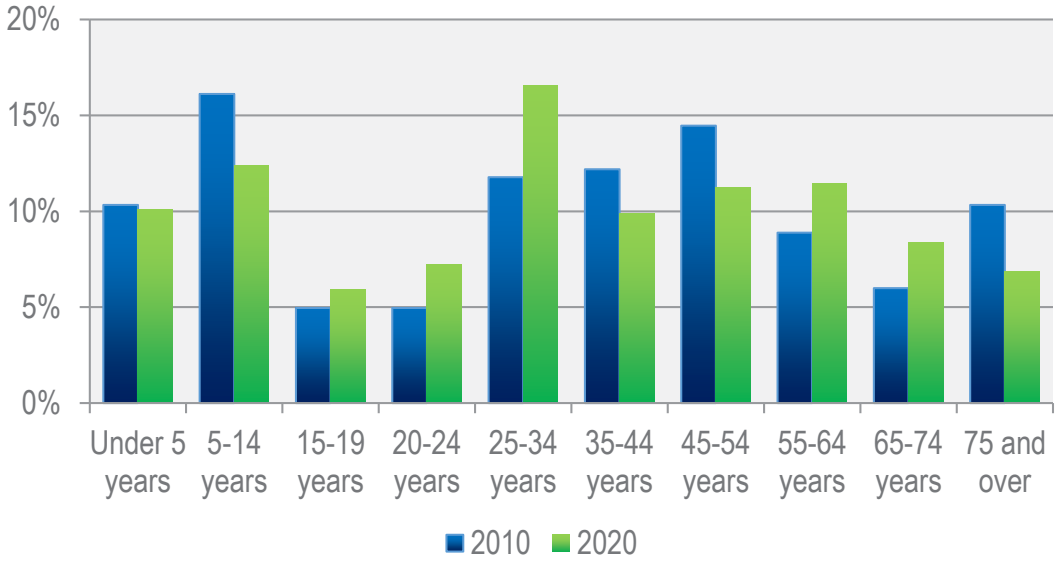
Over the past 50 years, the City of Arcadia has experienced a gradual growth. In 1960, Arcadia had a population of 437. Since then, the City's population has increased 20% (88 residents) to 525 in 2020. The most dramatic changes happened between 2000 and 2020, when the city gained a total of 82 residents, being 41 residents between 2000 and 2010 and 41 residents between 2010 and 2020.

Figure B.1: City of Arcadia Historic Population, 1960-2020



Arcadia's population is slightly different from the county's population as there is not the large spike in older residents as seen in other parts of the county. The largest age group is 25-34 years old, followed by the 5-14 year-old cohort. Figure B.2 displays the age of the city's population in 2020 compared to 2010.

Figure B.2: City of Arcadia Age Distribution, 2010 & 2020



Housing

A community's ability to attract new residents is important. One of the most important aspects to attracting residents is housing. A community's housing stock, type of households, and housing availability and affordability are determining factors.

Since 2010, the city's housing stock has increased by 16 units, divided between renter- and owner-occupied. During this time, the City saw a 20% decrease in vacant properties. Table B.1 shows a breakdown of the city's occupied and vacant housing units.

Table B.1: City of Arcadia Housing Units, 2010 & 2022

	2010		2022	
	Number	Percent	Number	Percent
Occupied Housing Units	185	94.9%	203	96.2%
Owner Occupied	162	87.6%	171	84.2%
Renter Occupied	23	12.4%	32	15.8%
Vacant Housing Units	10	5.1%	8	3.8%
Total Housing Units	195	100.0%	211	100.0%

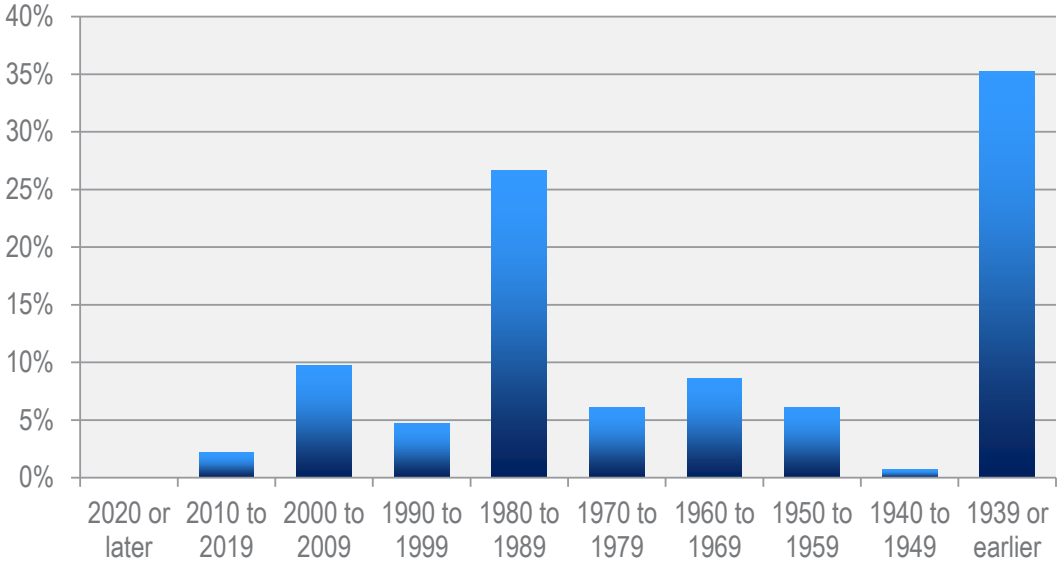
Arcadia, like many other small rural towns in Iowa, has a lower median housing value of $131,700. The State of Iowa has a median housing value of $181,700. The city's homes can be very affordable and can be used to attract new residents, but they may deteriorate faster and will need a number of repairs and updates. According to the 2022 American Community Survey Estimates, 24% of the city's homes are valued less than $100,000. A complete breakdown of the value of homes in Arcadia can be found in Table B.2. Knowing information about the city's housing stock is useful after a disaster hits to determine how much damage was done, and how it will affect the city moving forward.

Table B.2: City of Arcadia Value of Owner-Occupied Units, 2022

Value of Housing Unit	Percent of Homes
Less than $50,000	8.4%
$50,000 to $99,999	15.6%
$100,000 to $149,999	41.9%
$150,000 to $199,999	10.1%
$200,000 to $299,999	17.9%
$300,000 to $499,999	4.5%
$500,000 to $999,999	1.7%
$1,000,000 or more	0.0%

Figure B.3 showcases the year housing units within the City of Arcadia were constructed. Like most of the county, Arcadia has a large portion (35.3%) of the homes constructed in 1939 or earlier. The city also experienced spikes in construction during 1980-1989 and a considerable increase during 2000-2009. The 1980s saw 26.6% of the city's homes being built. During the 2000s, 9.7% of the city's housing stock was constructed. Building standards of today utilize the most recent construction materials and safety features, ensuring that the new residential structures are as safe as possible. This does not mean that older homes are more unsafe, just that they may be more susceptible to hazard damage.

Figure B.3: City of Arcadia Year Housing Units Constructed, 2022



Economics

Household income is an important indicator of the economic base in Carroll County. In Arcadia, the median household income is $66,667 which would classify a large number of the households in Arcadia as "working" or "middle" class. The City of Arcadia's household income breakdown is similar to the other rural communities in the area, and the combination of more affordable housing with the current incomes generally provides residents with a decent quality of life. Construction is the largest industry within the City, which differs slightly from the County as a whole. Due to the small size of Arcadia, many employees commute to other larger neighboring cities like Carroll and Denison where more employment opportunities are present.

Table B.3: City of Arcadia Household Income, 2022

Income and Benefits (2022 Inflation-Adjusted Dollars)	Number of Households	Percent of Households
Less than $10,000	2	0.7%
$10,000 to $14,999	0	0.0%
$15,000 to $24,999	13	4.8%
$25,000 to $34,999	16	5.9%
$35,000 to $49,999	41	15.1%
$50,000 to $74,999	91	33.5%
$75,000 to $99,999	32	11.8%
$100,000 to $149,999	65	23.9%
$150,000 to $199,999	10	3.7%
$200,000 or more	2	0.7%
Median Household Income	$66,667	-
Mean Household Income	$75,497	-

Arcadia, overall, is a small community in a small rural county. A large percentage of the businesses within the county serve the largely agricultural economy. Table B.4 breaks down what industry Arcadia residents work in. Construction employs the largest cohort of residents, with 30.8% employed in this industry. The second largest is educational services, and health care and social assistance, with 18.3% of the residents employed in this industry, followed by transportation and warehousing, and utilities, with 12.1% employed.

Table B.4: City of Arcadia Employment by Industry, 2022

Industry	Number	Percent
Total civilian non-farm employment, 16 years and over	585	100%
Agriculture, Forestry, Fishing, Hunting, Mining	25	4.3%
Construction	180	30.8%
Manufacturing	34	5.8%
Wholesale Trade	35	6.0%
Retail Trade	43	7.4%
Transportation and warehousing and utilities	71	12.1%
Information	0	0.0%
Finance and insurance, and real estate and rental and leasing	11	1.9%
Professional, scientific, management, administrative, and waste management services	31	5.3%
Educational, health care, and social assistance	107	18.3%
Arts, entertainment, recreation, accommodation, and food services	26	4.4%
Other services, except public administration	18	3.1%
Public Administration	4	0.7%

Existing Documents & Capabilities

Table B.5 provides a compilation of the current planning and regulatory documents in place for the City of Arcadia. The table also shows the last time the documents were last updated. These documents help understand the process the city has already undertaken and what documents can be created to help guide the city. First and foremost is the previous hazard mitigation plan as this document lays out specific strategies to help the city reduce the impact hazards have on the community and those who live in it. The city's zoning code was created to keep certain zones away from one another to reduce the risk to humans and structures. The different zones can pose different threats to others, such as some industrial uses having a higher HAZMAT incident probability which if located in a residential zone, could pose large health issues to the overall population. The zoning codes also include information for street and sidewalk regulations which can reduce the number of transportation incidents. The adoption of state building codes ensures that all new and major renovation structures meet the necessary requirements for electrical, plumbing, structural adequacy. This reduces the impact hazards have on structures as they are built to withstand certain minimums. The City's housing needs assessment has allowed the city to take inventory of the current housing situation and determine what steps are necessary to reduce the impact hazards have on the housing stock.

The City of Arcadia is a proactive community, which benefits them in regards to mitigation of hazards. Creating a comprehensive plan would allow the city to take inventory of the city's current assets and evaluate them through the comprehensive planning process. A capital improvement plan which lays out future projects and necessary funding would help the city budget for, and allow them to be proactive, not reactive to future

needs. Expanding conversations with the local COG and engineering firms would allow the city to explore additional options that have worked in similar communities facing similar situations. Outside organizations are also beneficial with finding funding for projects which otherwise may be out of the city's budget. Road, water, and sewer infrastructure continues to need upgrades and pursuing funding opportunities could reduce impacts of hazards on these infrastructure types. Training staff to current requirements would allow for a more thought-out response to a hazard or hazard warning. Cross training staff regardless of responsibility on different departments can better prepare the city and can lead to things being noticed that previously went unnoticed.

Table B.5: City of Arcadia Existing Documents

Document	Yes/No	Year
Previous HMP	Yes	2020
Comprehensive Plan	No	-
Building Code	State	2010
Zoning Ordinance	Yes	2015
Strategic Plan	No	-
Housing Needs Assessment	Yes	2016
NFIP Participant	Yes	1975
Floodplain Regulations	Yes	2002

NFIP Participation

In the past, there have been instances of flooding within the city limits of Arcadia. Arcadia started participating in the NFIP in 1975, and the flood map was updated and adopted in 2017. The city's FIRMs can be found in the later in this appendix. The City Clerk also acts as the Floodplain Administrator for the city. Any development/ demolition in the floodplain is required to obtain a permit which regulates the development/demolition and lays out the NFIP regulations that must be followed. Arcadia participates in the NFIP and implements substantial improvement / substantial damage provisions in the following manner: Local officials (1) determine the cost of work, (2) determine the market value of buildings, (3) make SI/SD determinations and provide determinations to property owners, and (4) require owners to obtain permits to bring substantially improved and substantially damaged structures into compliance with the floodplain management requirements.

Outlook and Future Development

Since the last plan update, there has been development within Arcadia on a moderate level. A few new homes have been constructed, increasing the city's housing stock. These homes have been located in the western portion of town, in the newly developed subdivision. There also has been some residential rehabilitation, which has improved the housing stock. In 2021, the cooperative build a solar field, just north of their property to reduce energy costs. Other commercial and industrial investments have occurred, but on a limited scale.

Over the life of this plan, the city anticipates this development to continue. The cooperative is anticipated to remain and maybe experience growth. There are other commercial and industrial businesses within the community that may expand within the life of this plan. Some of the commercial businesses are located on the city's main street, in the heart of town may experience investment/expansion. Residential development on a similar scale is expected to continue as well as residential rehabilitation.

Critical Facilities

Critical facilities are facilities that are critical to the health and welfare of the population and are especially important following hazard events. Every jurisdiction is unique in such way that the list of critical facilities can vary widely from community to community. Arcadia's critical facilities can be found on map B.2.

Essential Infrastructure

Knowing what services and infrastructure serve the city can be beneficial in a time of disaster so the appropriate companies can be contacted in need of utility shutoff or transportation routes. The city's essential infrastructure and services can be found in Table B.6.

Table B.6: City of Arcadia Essential Infrastructure and Services

Major Arterials	Division St., Center St.	**Air Service**	Arthur N. Neu Airport
Water Service	West Central Iowa Rural Water	**Sewer Service**	City of Arcadia
Electric Service	MidAmerican Energy	**Gas Service**	LP Tanks
Sanitation/Solid Waste	Private haulers	**Landfill**	Carroll County Landfill
Phone and Internet	Wireless	**Law Enforcement**	Carroll County Sheriff
Fire Service	Arcadia Volunteer Fire Department	**Ambulance Service**	Carroll County Ambulance Service

Table B.7: City of Arcadia Critical Facilities

Number on Map	Name	Address	Type
1	Arcadia City Hall	300 S Gault Street	Essential Facility
2	Arcadia Fire Department	205 Stanwood	Essential Facility
3	American Legion	210 West Head Street	Vulnerable Population
4	Farmer's Cooperative Elevator	12543 190th Street	HAZMAT
5	Railroad	South of town	HAZMAT
6	St. John's Catholic Church	610 South Gault Street	Vulnerable Population
7	Water Tower	400 Redig Road	Utility
8	Zion Lutheran Church	118 West Tracy Street	Vulnerable Population
9	Underground gas line	North side of town	HAZMAT
10	FAC gas line	Near FAC	HAZMAT
11	Water Tower Valve Vault	402 Redig Road	Utility
12	FAC Anhydrous Storage	East Side of Co-Op Property	HAZMAT

Map B.2: City of Arcadia Essential Infrastructure and Services

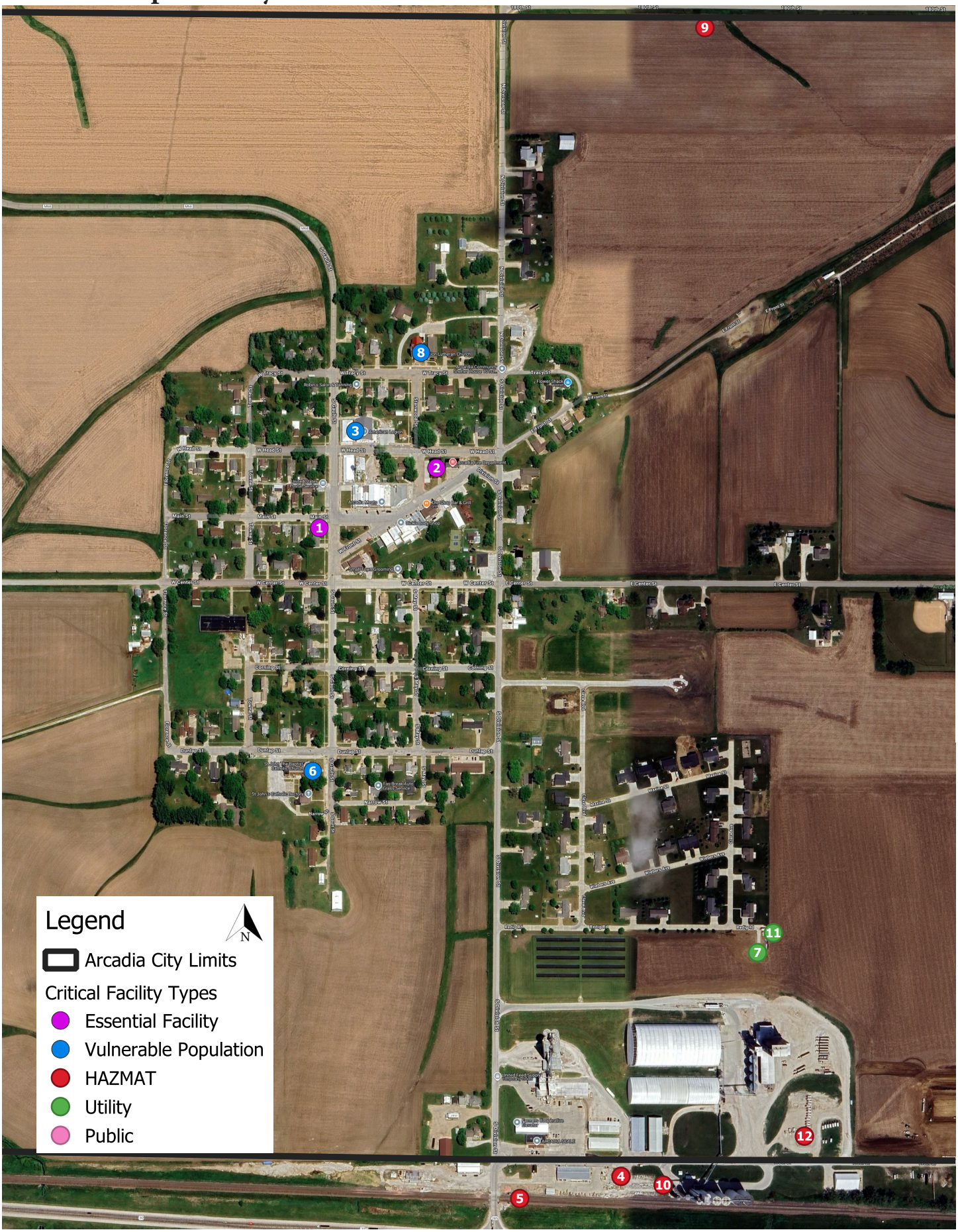


Table B.8: City of Arcadia Risk Assessment

Hazard	Comments
Animal/Plant/Crop Disease	The City of Arcadia contains a measurable amount of agricultural land. Although this land represents a recognizable portion of the community, there have been minimal reported losses from animal/plant/crop disease within in the community. While this does impact the community, it is normally indirectly impacted.
Drought	Drought occurrences have increased across the state, and the City of Arcadia has not been exempt from this hazard. Droughts continue to increase in severity and while there is little warning, this hazard can cause both direct and indirect issues for the City and it's residents.
Earthquake	There have been no instances of earthquake in the City of Arcadia, and the committee feels there will be no instances during the life of this plan.
Expansive Soils	There have been no instances of expansive soils in the City of Arcadia, and the committee feels there will be no instances during the life of this plan.
Extreme Heat	Extreme heat events impact the City of Arcadia. Education may be one of the best action tools to combat the effects of extreme heat as individuals need to know the effects of extreme heat and how it can affect the body.
Flash Flood	Since 2020, there have been no reported instances of flash flooding in the City of Arcadia. Looking further back, there hasn't been any reported flash flooding in Arcadia since 2015. While flash floods have little to no warning time, with no instances within the last planning period, the committee has determined this hazard is not a high priority hazard to address, but will consider mitigation actions to prepare the community for response to an event.
Grass/Wild Land Fire	Grass and wild land fires are most commonly field fires or controlled burns that get out of hand in and immediately surrounding the city. This hazard can pose a large threat to the community as elements out of anyone's control, such as wind direction and speed, can change this hazard from harmless and controlled to out of control in a matter of minutes and can pose a threat to life.
HAZMAT Incident	Within the most recent planning period, there have been no instances of hazardous spills within the City of Arcadia. With events in the past five years, the committee feels this hazard is a small threat to the community, but mitigation actions should still be considered and implemented to prevent any instances in the future.
Human Disease	Iowa and more specifically the City of Arcadia are still feeling the effects of the COVID-19 pandemic. The pandemic has reignited the need to plan for future outbreaks and examine the city's current practices. The pandemic also reminded the public the importance of staying informed and staying vigilant to protect themselves.
Infrastructure Failure	Infrastructure failures occur with little to no warning and can cause major disruptions within the community. Planning to respond to this hazard is important to the community to protect lives and property. The most likely infrastructure failure within Arcadia would be structural failure of either bridges or roadways. As these instances have no warning time, planning must be completed prior to an event happening to be able to respond in a quick manner.

Levee/Dam Failure	There are no levees or dams located in the City of Arcadia, and there are no high hazard dams on waterways that lead into the city. It is unlikely that levee or dam failure will impact the city, although the city feels that planning for river flooding and planning for dam/levee failure can be similar in nature.
Radiological	During the previous planning period, there were no instances of Radiological Incident in Arcadia and the committee does not anticipate any happening in the next planning period. If an incident were to occur, the committee feels it would be a small, contained situation that would not threaten the community as a whole.
River Flooding	Arcadia has a small area of flood zone located n the very southwest corner of the city limits. This flood zone only contains farmland, no structures. While there have not been reported instances of flooding, there have been instances that locals know of. The city is likely to experience at least one flooding event within this plan's period. The probability and likelihood of some form of flooding impacting the community leads the committee to feel planning for river flooding should be addressed through mitigation actions.
Severe Winter Storm	Severe Winter Storms continue to impact the City of Arcadia. These storms while historically, have caused little damage, continue to build in strength, threatening property and lives within the city. The warning period of this hazard continues to grow with meteorological advances, but can still pose great risks to the community.
Terrorism	There have been no instances of terrorism in the City of Arcadia during the previous plan period and the committee feels there will be no instances during the life of this plan. If an instance were to occur, the committee feels it would be a targeted incident that would not threaten the entire community.
Thunderstorm/ Lightning/Hail	Thunderstorm/lightning/hail instances are frequent within the community. While they are frequent, most storms pose no threat to life, crops, or property. This hazard is prevalent in Arcadia but is normally not severe in nature.
Tornado	Carroll County has experienced a number of tornadoes in the recent past, but these have not been within or damaged the city of Arcadia. With the number of tornadoes that impact Carroll County growing, it is important for the city to continue to plan for the response to tornadoes as storms within Iowa continue to grow in strength. Preparing the public and community is vital to ensuring there is no loss of life.
Transportation Incident	Speed limits within the City of Arcadia are relatively low. With the community having lower speed limits, it is likely that any transportation incident between vehicles is likely to cause little damage to property or humans, but there is a chance of an incident which can cause extensive damage. The committee anticipates that this hazard will effect the community in varying degrees throughout the planning period.
Windstorm	Recent windstorms have caused reported damage to properties. The City of Arcadia has experienced at least six windstorms since 2020. These hazard events continue to build in magnitude, causing increasingly large amounts of damage to property and posing threats to lives. The recent derechos and other windstorms effected Arcadia prompting the community to prepare more effectively for these hazards.

Table B.9: Hazards Not Affecting the City of Arcadia

Hazard	Reason for Omission
Earthquake	Iowa as a whole has experienced the effects of few earthquakes in the past 175 years. The majority of the earthquakes were along the Mississippi River, therefore the city does not feel this hazard will impact them during this planning period.
Expansive Soils	While Iowa has expansive soils, due to the city's history of no issues in the past, the city felt this will not impact the jurisdiction over the life of this plan.

Loss Estimates

Table B.10: City of Arcadia Maximum Building and Population Exposure

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	4	$419,260	525
Commercial	22	$1,026,062	
Industrial	2	$4,550,213	
Residential	193	$26,315,549	

It is unlikely that a jurisdiction can determine the impact any hazard will have. If a hazard were to impact the entire city, the numbers in table B.10 shows the number of people who would be affected and the maximum number of structures and their value. If this type of event were to occur, a shutdown of some facilities and services could last for at least two weeks and some injuries/illnesses will result in permanent disability or even death.

The following hazards were determine to have a negligible impact on the city, if they were to occur.

Dam/Levee Failure
Landslide
Radiological
River Flooding
Transportation Incident
HAZMAT Incident

If a hazard were to report negligible impacts, it is anticipated that the numbers impacted would be similar to table B.11. If there were any shutdown of facilities or services, it is likely that these shutdowns would be for less than twenty-four hours. If any injuries were to occur, it is anticipated that these would be able to be treated with first aid. A negligible hazard would impact approximately 9% of the city.

Table B.11: City of Arcadia Negligible Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	0	$0	47
Commercial	2	$92,346	
Industrial	0	$0	
Residential	17	$2,368,399	

The following hazards were determine to have a limited impact on the city, if they were to occur.

Thunderstorm/Lightning/Hail
Severe Winter Storms
Extreme Heat
Flash Flood
Grass/Wild Land Fire
Infrastructure Failure

If a hazard were to report limited impacts, it is anticipated that the numbers impacted would be similar to table B.12. A shutdown of some facilities and services could last more than a week and any injuries/illnesses would not result in permanent disability. It is estimated that 25% of the city would be impacted.

Table B.12: City of Arcadia Limited Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	1	$104,815	131
Commercial	6	$256,516	
Industrial	1	$1,137,553	
Residential	48	$6,578,887	

The following hazards were determine to have a limited impact on the city, if they were to occur.

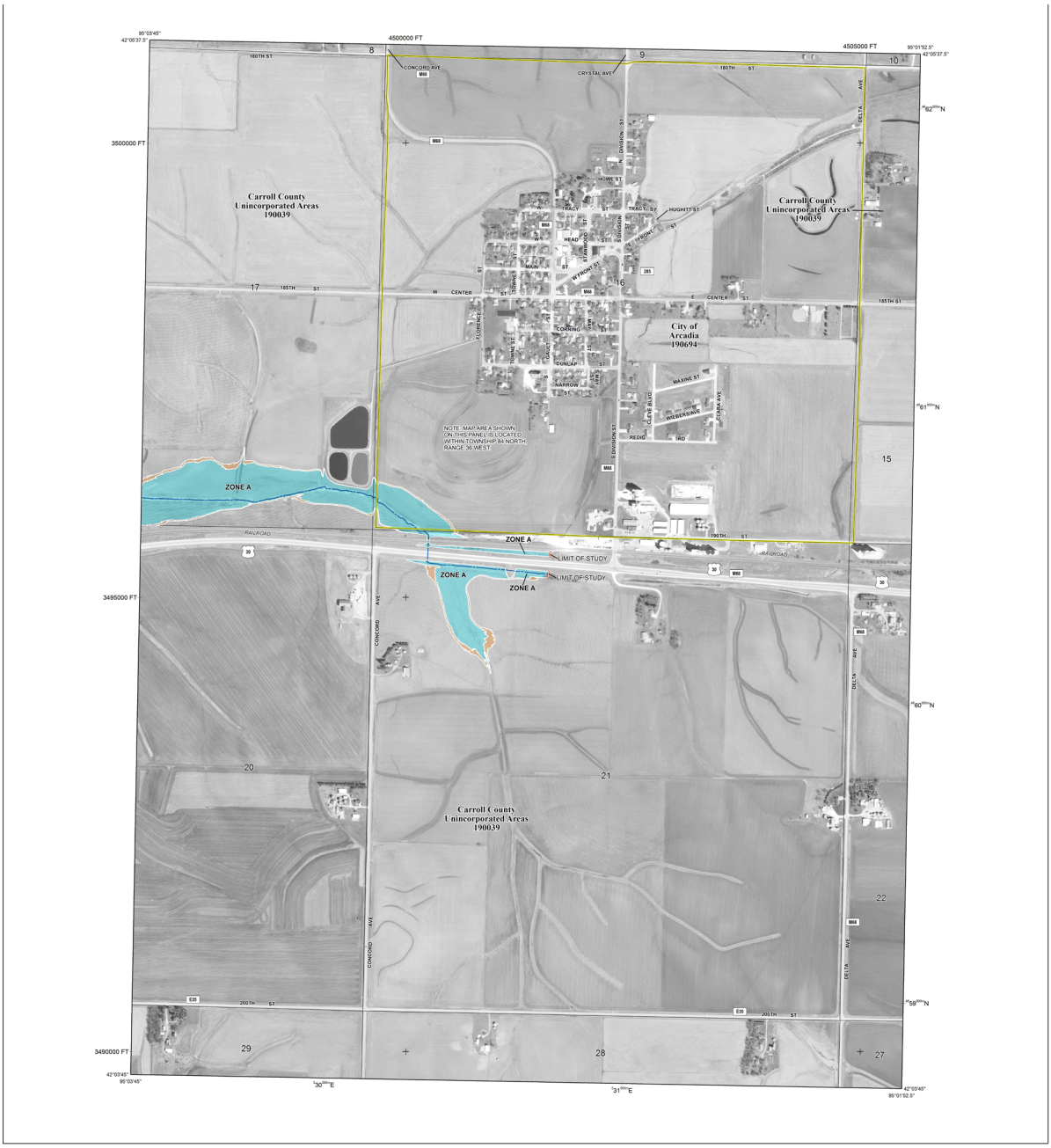
Drought
Animal/Plant/Crop Disease
Human Disease
Windstorm
Tornado

If a hazard were to report critical impacts, it is anticipated that the numbers impacted would be similar to table B.13. A shutdown of some facilities and services could last for at least two weeks and some injuries/illnesses will result in permanent disability. It is estimated 50% of the city would be impacted.

Table B.13: City of Arcadia Critical Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	2	$209,630	262
Commercial	11	$513,031	
Industrial	1	$2,275,107	
Residential	97	$13,157,775	

Flood Map



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A,V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee See Notes *Zone X*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was provided in digital format by the Iowa Department of Natural Resources. This information was derived from digital orthophotography at a 2-foot ground resolution from imagery flown in April 2009.

SCALE

Map Projection:
State Plane Iowa North (FIPS Zone 1401) Coordinate System, Lambert Conformal Conic Projection; North American Datum 1983, GRS 1980 spheroid; North American Vertical Datum of 1988

1 inch = 500 feet 1:6,000

0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR

FEMA
National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL 108 OF 400

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
ARCADIA, CITY OF	190694	0108	C
CARROLL COUNTY	190039	0108	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0108C

EFFECTIVE DATE
SEPTEMBER 15, 2017

There have been some changes in the plan's project priorities since the last update. Some projects that were prioritized as a high priority have been completed utilizing available grant and local funds. Other projects that were not high priority were implemented as funds were available, and those that either had no funding available or were not a high priority were not implemented during this planning period. The City's Mitigation Actions were developed with the city's new priorities in mind which have shifted from the last planning period due to changes in elected officials and staff. The priorities also have changed due to the city's economic climate and instances of hazards that have impacted the community.

Status of Previous Mitigation Actions

Table B.14: City of Arcadia Status of Previous Mitigation Actions

	Status				
Previous Actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not Implemented**
Water mitigation procedures during a drought			X		
Educate public on Alert Iowa			X		
Build a storm shelter					X
Keep updating and upgrading snow plow equipment, sand trucks, etc.			X		
Continue to budget for and fund street repairs			X		
Enforce building codes, city codes, and zoning codes			X		
Provide funding needed to train personnel (fire, EMS, and police)			X		
Encourage use of one call to avoid damage to utilities			X		
Keep fire hydrants updated and working, replacing as needed	X				
Post signs and increase police surveillance around critical facilities			X		
Purchase and install dry hydrant				X	
Acquire standby generator to power community building during power outages		X			
Continue training programs for fire personnel			X		
Schedule bridge improvements and inspections					X
Continue participation in National Flood Insurance Program			X		
Work with electric companies to bury overhead power lines			X		
Make sure fire volunteers trained to FF levels			X		
Update first responder notification equipment			X		
Continue to notify residents of tree limbs that are close to power lines to remove them			X		

	Status				
Previous Actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not Implemented**
Amend tree ordinance to prohibit planting trees under power lines	X				
Purchase portable generators		X			
Purchase new tanker	X				
Provide hazardous materials training for local emergency volunteers			X		
Continue tree-trimming, enforcing ordinances when needed			X		
Recruit and train new members whenever possible for Fire Department			X		
Make sure EMS volunteers trained to EMT-B or I			X		
Additional warning sirens	X				
Designate shelters	X				
Continue fire safety education			X		
Inform public on hazardous materials locations and hazards					X
Promote NOAA radios to the public				X	
Complete current plan and make plans to update every five years			X		
Purchase town tractor to assist with hazard clean-up	X				
Purchase new bunker gear for fire department				X	
Purchase new airpacks for the fire department				X	
Construct a new fire station which incorporates a community shelter	X				
Upgrade technology at city hall		X			
Construct new water tower	X				

Action Plan

Section 201.6 (c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

Section 201.6 (c)(3)(iii): The mitigation strategy shall include an action plan, describing how the action 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 associated costs.

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

Table B.14: City of Arcadia Action Plan

Goal 1	**Enhance Community Protection**
Objective 1	Improve Public Warning Capabilities
Objective 2	Maintain Current Hazard Mitigation Plan
Objective 3	Hazardous Materials-tier II sites
Objective 4	Protect and Enforce Regulatory Measures in Existing and New Development Areas
Objective 5	Provide Shelter Facilities in case of Disasters
Goal 2	**Protect Against Power Outage**
Objective 1	Provide Back-Up Systems for Critical Systems and Assets
Objective 2	Use Prevention Techniques to Minimize Disruption in Services
Goal 3	Maintain and Support Public Safety, Including Facilities, Equipment, and Training
Objective 1	Improve First Responder Resources and Capabilities
Objective 2	Provide Education and Training Programs to Increase Public and Responder Awareness
Objective 3	Maintain Needed Personnel for Fire and EMS
Objective 4	Provide Needed Equipment and Facilities
Goal 4	**Update Communications Systems**
Objective 1	Improve Public Warning Capabilities
Goal 5	**Maintain and Protect Public Infrastructure**
Objective 1	Maintain and Improve Roads, Bridges, and Other Transportation

Table B.15: City of Arcadia Mitigation Actions

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Water mitigation procedures during a drought	Drought	Mod	Emergency Services	Moderate	City Funds	Natural Resource Protection	Short
Educate public on Alert Iowa & encourage residents to sign up	Tornado, Thunderstorm/ Lightning/Hail, Windstorm, Severe Winter Storm, Flash Flood, HAZMAT Incident, Radiological, Grass/Wild Land Fire, Infrastructure Failure	Mod	City Council	Minimal	City Funds	Public Education and Awareness	Ongoing
Build a storm shelter	Tornado, Severe Winter Storms	Low	Emergency Services	Moderate	City Funds, HMGP, State Match, Local Foundations	Structural Project	Mid
Continue to budget for and fund street repairs	Infrastructure Failure	High	City Council	Low	City Funds, IDOT, Carroll County	Property Protection	Ongoing
Enforce building codes, city codes, and zoning codes	Infrastructure Failure, Tornado, Thunderstorm/ Lightning/Hail, Windstorm, River Flooding, Flash Flood	Mod	City Council	Low	City Funds	Property Protection	Ongoing
Encourage use of one call to avoid damage to utilities	Infrastructure Failure	High	Planning and Zoning	Minimal	City Funds, Local Private Utilities	Emergency Services	Ongoing
Keep fire hydrants updated and working, replacing as needed	Infrastructure Failure, Grass or Wild Land Fire	High	Fire Department	Low	City Funds, Iowa SRF, USDA grants and loans	Prevention	Ongoing
Post signs and increase police surveillance around critical facilities	Terrorism	Low	City Council	Low	City Funds, Carroll County	Public Education and Awareness	Mid

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Purchase and install dry hydrant	Grass or Wild Land Fire, Infrastructure Failure	High	Fire Department	Minimal	City Funds, Township Funds, Fire Department, Local Foundations	Emergency Services	Short
Acquire standby generator to power community building during power outages	Infrastructure Failure, Severe Winter Storm, Tornado, Windstorm, Thunderstorm/ Lightning/Hail	High	City Council	Minimal	City Funds, Local Foundations, HMGP, State Match	Emergency Services	Short
Continue participation in National Flood Insurance Program	River Flooding	Mod	City Council	Low	City Funds	Property Protection	Ongoing
Work with electric companies to bury overhead power lines	Infrastructure Failure, Tornado, Windstorm, Severe Winter Storms	Mod	City Council	Moderate	City Funds, Private Utilities, GRID Grants, Iowa Energy RLF	Property Protection	Mid
Continue to notify residents of tree limbs that are close to power lines to remove them	Infrastructure Failure, Tornado, Windstorm, Severe Winter Storms	Low	City Council	Minimal	City Funds	Property Protection	Ongoing
Purchase portable generators	Infrastructure Failure	Mod	Fire Department	Low	City Funds, Local Foundations, HMGP, State Match	Emergency Services	Short
Provide hazardous materials training for local emergency volunteers	Hazardous Material	Mod	Fire Department	Low	City Funds, Local Foundations	Emergency Services	Ongoing
Continue fire safety education	Grass or Wild Land Fire, Infrastructure Failure	Mod	Fire Department	Minimal	City Funds	Public Education and Awareness	Ongoing
Inform public on hazardous materials locations and hazards	HAZMAT Incident	Mod	Fire Department	Minimal	City Funds	Public Education and Awareness	Ongoing

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Promote NOAA radios to the public	Tornado, Windstorm, Flash Flood, River Flood, Thunderstorm/ Lightning/Hail, Severe Winter Storm, Grass/ Wildland Fire	High	City Council	Minimal	City Funds, Fire Department, Donations, Local Foundations	Public Education and Awareness	Ongoing
Complete current plan and make plans to update every five years	Animal/Plant/Crop Disease, Drought, Earthquake, Expansive Soils, Extreme Heat, Flash Flood, Grass/Wild Land Fire, HAZMAT Incident, Human Disease, Infrastructure Failure, Levee/Dam Failure, Radiological, River Flooding, Severe Winter Storm, Terrorism, Thunderstorm/ Lightning/Hail, Tornado, Transportation Incident, Windstorm	High	City Council	Minimal	City Funds, Carroll County, HMGP Planning Funds	Public Education and Awareness	Ongoing
Upgrade technology at city hall	Terrorism	High	City Council	Low	City Funds, Local Foundations	Prevention	Short
Search for a second water source/ second well	Drought, Infrastructure Failure	High	City Council	High	City Funds, CDBG, Iowa SRF, USDA Community Facilities	Prevention	Mid
Construct a new and larger lagoon	Infrastructure Failure	High	City Council	Mod	City Funds, CDBG, Iowa SRF, USDA Community Facilities	Structural Project	Short
Install riprap in current lagoon	Infrastructure Failure, Expansive Soils, Levee/ Dam Failure, River Flooding	High	City Council	Low	City Funds, CDBG, Iowa SRF, USDA Community Facilities	Structural Project	Short

Incorporation into Other Planning Mechanisms

Where possible, Arcadia will consider the findings from this document when updating or creating new planning and operating documents. Information from this plan will be utilized to update and expand the following documents:

- Hazard Mitigation Plan
- Building Code
- Zoning Ordinance
- Housing Needs Assessment

While the city currently does not have any of the plans listed below, if these plans were to be created during the life of this plan, this plan will be used to guide the development of:

- Water Conservation Plans
- Storm Water Management Plans
- Parks and Recreation Plans
- Floodplain Regulations
- Comprehensive Plan
- Strategic Plan

Appendix C: City of Breda

Community Profile

History

Settlers of Breda first arrived in 1869 from Galena, Illinois and Dickeyville, Wisconsin. Land was purchased for $4 an acre from the Railroad Company. The great Chicago fire of 1871 resulted in increased migration to western Iowa, and specifically Breda. By 1877, the Sioux City Branch of the Chicago and Northwestern Railroad was constructed through Breda. A depot was erected followed by numerous other buildings such as a warehouse, grocery store, several homes, a saloon, and a general store, resulting in the rise of Breda. Breda was named after a city in Holland and was recommended by Mrs. John Leduc. Breda was officially incorporated in October of 1877. By 1885, Breda consisted of 278 residents.

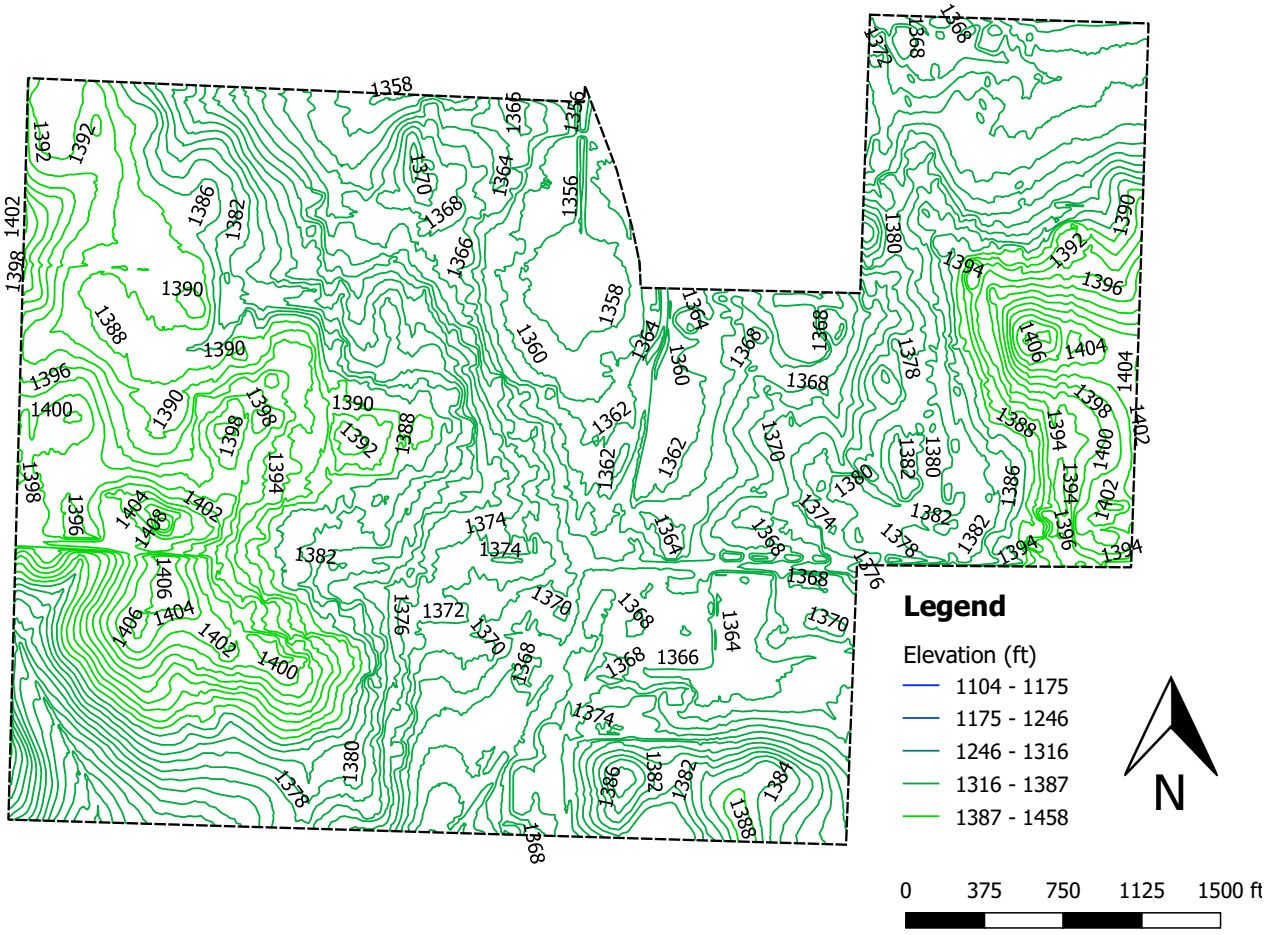
Breda has often been known as a "wet" town, having as many as seven to thirteen saloons at once. However, in 1912, the enactment of the "Moon Law" occurred. This law prohibited towns of less than 2,000 people to have more than one saloon in operation. Therefore, many of the current businesses were shut down. Today, Breda is seen as a friendly "bedroom" community for Carroll.

Geography and Environment

Breda is located in the northwest corner of Carroll County. Highway 71 is the main transportation route for Breda residents as it is located five miles to the east of town. Breda is conveniently close to other regional economic hubs including Carroll (13.5 miles), Denison (28.4 miles), Lake City (17.7 miles), Sac City (19.4 miles) and Audubon (40.1 miles).

The highest elevation in Carroll County can be found along the eastern side of the county. Here, the elevation can reach as much as 1,550 feet above sea level. Elevation levels for Breda range from 1,358 feet in the northern part of town to 1,408 feet towards the eastern city limits. Map C.1 shows the elevation for Breda in relation to the rest of Carroll County.

Map C.1: City of Breda Elevation



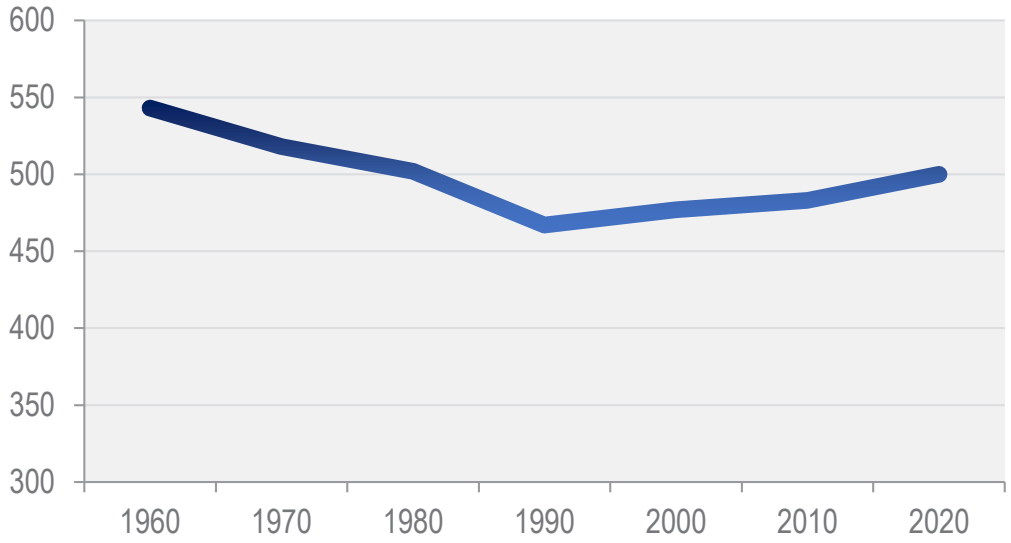
Demographics

The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Breda's population through past, present, and future trends of the region.

The size and composition of a community's population can exert influence on its development. For instance, population size, composition, and distribution influence the range of businesses a community can support, the pool of workers from which to draw, and the demand for and supply of services. Similarly, the effect people have on the social, economic, and physical environments depends upon the composition, expectations, and distribution of the population. A population's age distribution, income levels, ancestry, and educational attainment are some of the characteristics that mold a community. Population trends give community leaders and elected officials information on what kind of services need to be provided and offers prospective employers an overview of the local labor force.

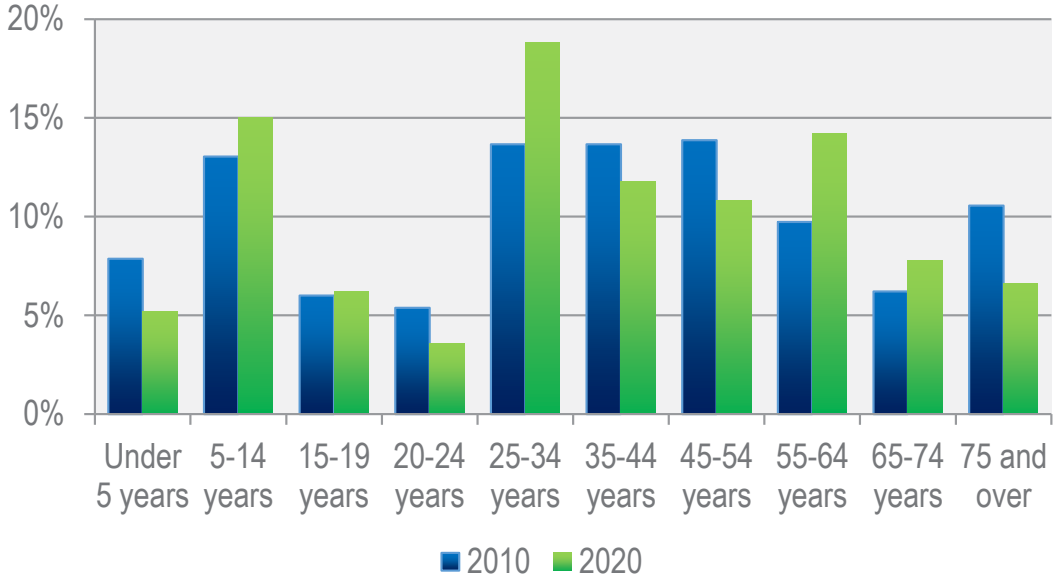
From 1960 to 1990, Breda's population experienced a slow decline. In 1960, Breda had a population of 543, while in 1990 the city was home to 467 residents. However, since 1990, the City's population has increased 7.1% (33 residents), from 467 to 500 in 2020. The most dramatic changes happened between 1980 and 1990, when the city experienced a loss of 35 residents. Figure C.1 shows the City of Breda's population trend since 1960.

Figure C.1: City of Breda Historic Population, 1960-2020



Breda's population is slightly different from the county's population as there is not the large spike in older residents as seen in other parts of the county. The largest age group is 25-34 years old, followed by the 5-14 year-old cohort. Figure C.2 displays the age of the city's population in 2020 compared to 2010.

Figure C.2: City of Breda Age Distribution, 2010 & 2020



Housing

A community's ability to attract new residents is important. One of the most important aspects to attracting residents is housing. A community's housing stock, type of households, and housing availability and affordability are determining factors.

Since 2010, the city's housing stock has increased by 8 units, divided between renter- and owner-occupied. During this time, the City saw a 33% increase in vacant properties. Table C.1 shows a breakdown of the city's occupied and vacant housing units.

Table C.1: City of Breda Housing Units, 2010 & 2022

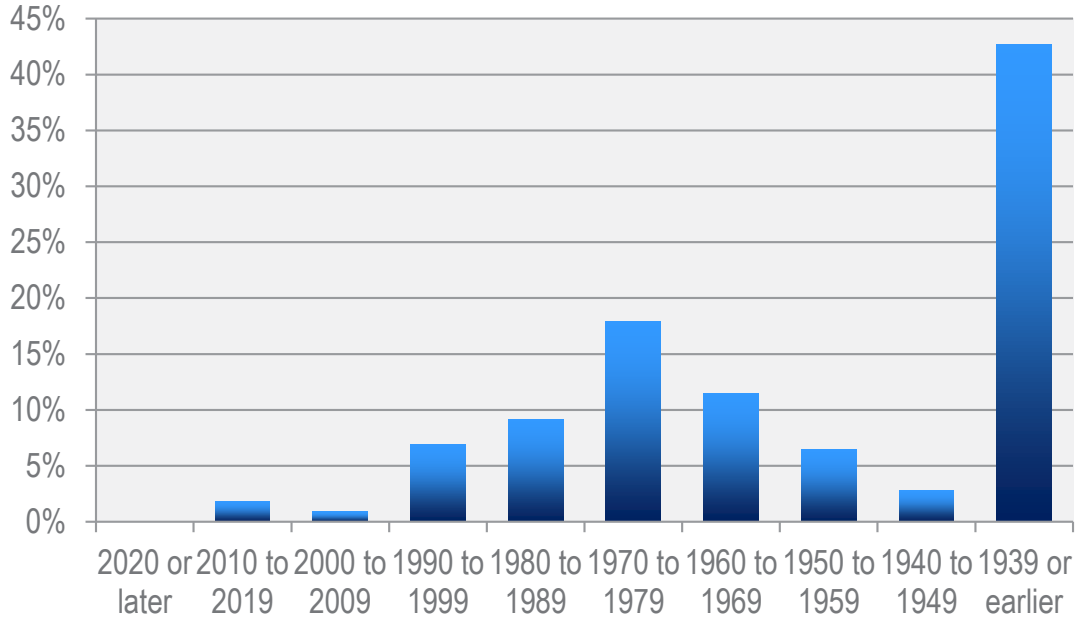
	2010		2022	
	Number	Percent	Number	Percent
Occupied Housing Units	211	93.4%	214	91.5%
Owner Occupied	174	82.5%	175	81.8%
Renter Occupied	37	17.5%	39	18.2%
Vacant Housing Units	15	6.6%	20	8.5%
Total Housing Units	226	100.0%	234	100.0%

Breda, like many other small rural towns in Iowa, has a lower median housing value of $135,400. The State of Iowa has a median housing value of $181,700. The city's homes can be very affordable and can be used to attract new residents, but they may deteriorate faster and will need a number of repairs and updates. According to the 2022 American Community Survey Estimates, 34.7% of the city's homes are valued less than $100,000. A complete breakdown of the value of homes in Breda can be found in Table C.2. Knowing information about the city's housing stock is useful after a disaster hits to determine how much damage was done, and how it will affect the city moving forward.

Table C.2: City of Breda Value of Owner-Occupied Units, 2022

Value of Housing Unit	Percent of Homes
Less than $50,000	2.8%
$50,000 to $99,999	31.9%
$100,000 to $149,999	20.1%
$150,000 to $199,999	13.9%
$200,000 to $299,999	18.1%
$300,000 to $499,999	11.1%
$500,000 to $999,999	0.0%
$1,000,000 or more	2.1%

Figure C.3: City of Breda Year Housing Units Constructed, 2022



According to the 2022 American Community Survey Estimates, Breda has a large portion (42.7%) of its homes constructed in 1939 or earlier. The 1970s experienced the second largest construction period with 17.9% of the city's homes being built during this time. Figure C.3 showcases the complete breakdown by decade. Building standards of today utilize the most recent construction materials and safety features, ensuring that the new residential structures are as safe as possible. This does not mean that older homes are more unsafe, just that they may be more susceptible to hazard damage.

Economics

Household income is an important indicator of the economic base in Carroll County. In Breda, the median household income is $57,426 which would classify a large number of the households in Breda as "working" or "middle" class. Table C.3 breaks down the city's households by income. The City of Breda's household income breakdown is similar to the other rural communities in the area, and the combination of more affordable housing with the current incomes generally provides residents with a decent quality of life. Many employees commute to other large neighboring cities like Carroll and Sac City where more employment opportunities are present.

Table C.3: City of Breda Household Income, 2022

Income and Benefits (2022 Inflation-Adjusted Dollars)	Number of Households	Percent of Households
Less than $10,000	6	2.9%
$10,000 to $14,999	4	1.9%
$15,000 to $24,999	11	5.4%
$25,000 to $34,999	9	4.4%
$35,000 to $49,999	24	11.7%
$50,000 to $74,999	55	26.7%
$75,000 to $99,999	52	25.2%
$100,000 to $149,999	23	11.2%
$150,000 to $199,999	18	8.7%
$200,000 or more	4	1.9%
Median Household Income	$57,426	-
Mean Household Income	$86,772	-

Breda, overall, is a small community in a small rural county. Table C.4 breaks down what industry Breda residents work in. Manufacturing employs the largest cohort of residents, with 21.3% employed in this industry. Retail trade is the second largest industry for Breda residents, with 18.8% of residents employed in this industry, followed by educational services, and health care and social assistance, with 13.1% employed.

Table C.4: City of Breda Employment by Industry, 2022

Industry	Number	Percent
Total civilian non-farm employment, 16 years and over	282	100%
Agriculture, Forestry, Fishing, Hunting, Mining	23	8.2%
Construction	11	3.9%
Manufacturing	60	21.3%
Wholesale Trade	15	5.3%
Retail Trade	53	18.8%
Transportation and warehousing and utilities	12	4.3%
Information	13	4.6%
Finance and insurance, and real estate and rental and leasing	22	7.8%
Professional, scientific, management, administrative, and waste management services	11	3.9%
Educational, health care, and social assistance	37	13.1%
Arts, entertainment, recreation, accommodation, and food services	5	1.8%
Other services, except public administration	13	4.6%
Public Administration	7	2.5%

Existing Documents & Capabilities

Table C.5 provides a compilation of the current planning and regulatory documents in place for the City of Breda. The table also shows the last time the documents were last updated. These documents help understand the process the city has already undertaken and what documents can be created to help guide the city. First and foremost is the previous hazard mitigation plan as this document lays out specific strategies to help the city reduce the impact hazards have on the community and those who live in it. Breda has a comprehensive plan and a zoning code. These two documents work hand-in-hand to guide the future development of the city. The comprehensive plan takes a deep dive into the city's inventory of assets, utilities, and infrastructure. This plan also includes a hazard chapter which addresses some disaster response items as well as mitigation for the future. The city's zoning code was created to keep certain zones away from one another to reduce the risk to humans and structures. The different zones can pose different threats to others, such as some industrial uses having a higher HAZMAT incident probability which if located in a residential zone, could pose large health issues to the overall population. The zoning codes also include information for street and sidewalk regulations which can reduce the number of transportation incidents. The City's housing needs assessment has allowed the city to take inventory of the current housing situation and determine what steps are necessary to reduce the impact hazards have on the housing stock.

The City of Breda is a proactive community, which benefits them in regards to mitigation of hazards. A capital improvement plan which lays out future projects and necessary funding would help the city budget for, and allow them to be proactive, not reactive to future needs. Expanding conversations with the local COG and engineering firms would allow the city to explore additional options that have worked in similar communities facing similar situations. Outside organizations are also beneficial with finding funding for projects which otherwise may be out of the city's budget. Road, water, and sewer infrastructure continues to need upgrades and pursuing funding opportunities could reduce impacts of hazards on these infrastructure types. Training staff to current requirements would allow for a more thought-out response to a hazard or hazard warning. Cross training staff regardless of responsibility on different departments can better prepare the city and can lead to things being noticed that previously went unnoticed.

Table C.5: City of Breda Existing Documents

Document	Yes/No	Year
Previous HMP	Yes	2020
Comprehensive Plan	Yes	1999
Building Code	Yes	2017
Zoning Ordinance	Yes	2013
Strategic Plan	Yes	1998
Housing Needs Assessment	Yes	2017
NFIP Participant	No	-
Floodplain Regulations	No	-

NFIP Participation

The City of Breda is located in an area of minimal flood hazard and the surrounding flood zones were mapped in 2017. While the city and surrounding area has been mapped, with no flood areas found, the city does not participate in the NFIP.

Outlook and Future Development

Since the last plan update, there has been development within Breda on a moderate level. A few new homes have been constructed, increasing the city's housing stock. These homes have been located in the northwest portion of town, near the golf course. Along with residential development has been residential rehabilitation, which has improved the housing stock. Commercial and industrial development has occurred, but on a limited scale.

Over the life of this plan, the city anticipates this development to continue. Toyne Inc, is planning an expansion which will be an industrial expansion within the city. There are other commercial and industrial businesses within the community that may expand within the life of this plan. These businesses are located on the outskirts of town, for the most part. Some of the commercial businesses are located on the city's main street, in the heart of town. Residential development on a similar scale is expected to continue as well as residential rehabilitation.

Critical Facilities

Critical facilities are facilities that are critical to the health and welfare of the population and are especially important following hazard events. Every jurisdiction is unique in such way that the list of critical facilities can vary widely from community to community. Breda's critical facilities can be found on map C.2.

Essential Infrastructure

Knowing what services and infrastructure serve the city can be beneficial in a time of disaster so the appropriate companies can be contacted in need of utility shutoff or transportation routes. The city's essential infrastructure and services can be found in Table C.6.

Table C.6: City of Breda Essential Infrastructure and Services

Major Arterials	Iowa Highway 217	**Air Service**	Arthur N. Neu Airport
Water Service	City of Breda	**Sewer Service**	City of Breda
Electric Service	Breda Municipal, MidAmerican Energy	**Gas Service**	None
Sanitation/Solid Waste	Local Haulers	**Landfill**	Carroll County Landfill
Phone and Internet	Western Iowa Networks, Wireless	**Law Enforcement**	Carroll County Sheriff
Fire Service	Breda Community Fire Department	**Ambulance Service**	Carroll County Ambulance Service

Table C.7: City of Breda Critical Facilities

Number on Map	Name	Address	Type
1	Breda City Hall	108 North 2nd Street	Essential Facility
2	Breda Fire Department	North 1st Street	Essential Facility
3	Bruning Oil	105 South 1st Street	HAZMAT
4	Sparky's One Stop	212 Main Street	HAZMAT
5	St. Bernard's Church	206 North 2nd Street	Vulnerable Population
6	Water Tower	Main Street	Utility
7	Nutrien	112 Granite Avenue	HAZMAT
8	Water Treatment Plant	N 1st Street	Utility
9	Lift Station	N 1st Street	Utility

Map C.2: City of Breda Critical Facilities

Table C.8: City of Breda Risk Assessment

Hazard	Comments
Animal/Plant/Crop Disease	The City of Breda contains a measurable amount of agricultural land. Although this land represents a recognizable portion of the community, there have been minimal reported losses from animal/plant/crop disease within in the community. While this does impact the community, it is normally indirectly impacted.
Drought	Drought occurrences have increased across the state, and the City of Breda has not been exempt from this hazard. Droughts continue to increase in severity and while there is little warning, this hazard can cause both direct and indirect issues for the City and it's residents.
Earthquake	There have been no instances of earthquake in the City of Breda, and the committee feels there will be no instances during the life of this plan.
Expansive Soils	There have been no instances of expansive soils in the City of Breda, and the committee feels there will be no instances during the life of this plan.
Extreme Heat	Extreme heat events impact the City of Breda. Education may be one of the best action tools to combat the effects of extreme heat as individuals need to know the effects of extreme heat and how it can affect the body.
Flash Flood	Since 2020, there have been no reported instances of flash flooding in the City of Breda. Looking further back, there hasn't been any reported flash flooding in Breda since 2015. While flash floods have little to no warning time, with no instances within the last planning period, the committee has determined this hazard is not a high priority hazard to address, but will consider mitigation actions to prepare the community for response to an event.
Grass/Wild Land Fire	Grass and wild land fires are most commonly field fires or controlled burns that get out of hand in and immediately surrounding the city. This hazard can pose a large threat to the community as elements out of anyone's control, such as wind direction and speed, can change this hazard from harmless and controlled to out of control in a matter of minutes and can pose a threat to life.
HAZMAT Incident	Within the most recent planning period, there have been no instances of hazardous spills within the City of Breda. With events in the past five years, the committee feels this hazard is a small threat to the community, but mitigation actions should still be considered and implemented to prevent any instances in the future.
Human Disease	Iowa and more specifically the City of Breda are still feeling the effects of the COVID-19 pandemic. The pandemic has reignited the need to plan for future outbreaks and examine the city's current practices. The pandemic also reminded the public the importance of staying informed and staying vigilant to protect themselves.
Infrastructure Failure	Infrastructure failures occur with little to no warning and can cause major disruptions within the community. Planning to respond to this hazard is important to the community to protect lives and property. The most likely infrastructure failure within Breda would be structural failure of either bridges or roadways. As these instances have no warning time, planning must be completed prior to an event happening to be able to respond in a quick manner.

Levee/Dam Failure	There are no levees or dams located in the City of Breda, and there are no high hazard dams on waterways that lead into the city. It is unlikely that levee or dam failure will impact the city, although the city feels that planning for river flooding and planning for dam/levee failure can be similar in nature.
Radiological	During the previous planning period, there were no instances of Radiological Incident in Breda and the committee does not anticipate any happening in the next planning period. If an incident were to occur, the committee feels it would be a small, contained situation that would not threaten the community as a whole.
River Flooding	River flooding has not been reported in Breda. The most recent FIRM maps, adopted in 2017 show that Breda is an area of minimal flood hazard. Consequently, the City has not joined the NFIP and there is not public interest to participate. Because there is no past history of flooding and current maps do not show hazard areas in the city, the committee determined the risk of this hazard is very low. The low risk translates to the city not experiencing any instances of river flooding throughout the planning period.
Severe Winter Storm	Severe Winter Storms continue to impact the City of Breda. These storms while historically, have caused little damage, continue to build in strength, threatening property and lives within the city. The warning period of this hazard continues to grow with meteorological advances, but can still pose great risks to the community.
Terrorism	There have been no instances of terrorism in the City of Breda during the previous plan period and the committee feels there will be no instances during the life of this plan. If an instance were to occur, the committee feels it would be a targeted incident that would not threaten the entire community.
Thunderstorm/ Lightning/Hail	Thunderstorm/lightning/hail instances are frequent within the community. While they are frequent, most storms pose no threat to life, crops, or property. This hazard is prevalent in Breda but is normally not severe in nature.
Tornado	Carroll County has experienced a number of tornadoes in the recent past, but these have not been within or damaged the city of Breda. With the number of tornadoes that impact Carroll County growing, it is important for the city to continue to plan for the response to tornadoes as storms within Iowa continue to grow in strength. Preparing the public and community is vital to ensuring there is no loss of life.
Transportation Incident	Speed limits within the City of Breda are relatively low. With the community having lower speed limits, it is likely that any transportation incident between vehicles is likely to cause little damage to property or humans, but there is a chance of an incident which can cause extensive damage. The committee anticipates that this hazard will effect the community in varying degrees throughout the planning period.
Windstorm	Recent windstorms have caused reported damage to properties. The City of Breda has experienced at least six windstorms since 2020. These hazard events continue to build in magnitude, causing increasingly large amounts of damage to property and posing threats to lives. The recent derechos and other windstorms effected Breda prompting the community to prepare more effectively for these hazards.

Table C.9: Hazards Not Affecting the City of Breda

Hazard	Reason for Omission
Earthquake	Iowa as a whole has experienced the effects of few earthquakes in the past 175 years. The majority of the earthquakes were along the Mississippi River, therefore the city does not feel this hazard will impact them during this planning period.
Expansive Soils	While Iowa has expansive soils, due to the city's history of no issues in the past, the city felt this will not impact the jurisdiction over the life of this plan.

Loss Estimates

Table C.10: City of Breda Maximum Building and Population Exposure

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	2	$239,640	500
Commercial	45	$7,495,190	
Industrial	4	$2,788,760	
Residential	220	$33,230,190	

It is unlikely that a jurisdiction can determine the impact any hazard will have. If a hazard were to impact the entire city, the numbers in table C.10 shows the number of people who would be affected and the maximum number of structures and their value. If this type of event were to occur, a shutdown of some facilities and services could last for at least two weeks and some injuries/illnesses will result in permanent disability or even death.

The following hazards were determine to have a negligible impact on the city, if they were to occur.

Dam/Levee Failure	River Flooding
Landslide	Transportation Incident
Radiological	HAZMAT Incident

If a hazard were to report negligible impacts, it is anticipated that the numbers impacted would be similar to table C.11. If there were any shutdown of facilities or services, it is likely that these shutdowns would be for less than twenty-four hours. If any injuries were to occur, it is anticipated that these would be able to be treated with first aid. A negligible hazard would impact approximately 9% of the city.

Table C.11: City of Breda Negligible Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	0	$0	45
Commercial	4	$674,567	
Industrial	0	$0	
Residential	20	$2,990,717	

The following hazards were determine to have a limited impact on the city, if they were to occur.

Thunderstorm/Lightning/Hail	Flash Flood
Severe Winter Storms	Grass/Wild Land Fire
Extreme Heat	Infrastructure Failure

If a hazard were to report limited impacts, it is anticipated that the numbers impacted would be similar to table C.12. A shutdown of some facilities and services could last more than a week and any injuries/illnesses would not result in permanent disability. It is estimated that 25% of the city would be impacted.

Table C.12: City of Breda Limited Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	1	$59,910	125
Commercial	11	$1,873,798	
Industrial	1	$697,190	
Residential	55	$8,307,548	

The following hazards were determine to have a limited impact on the city, if they were to occur.

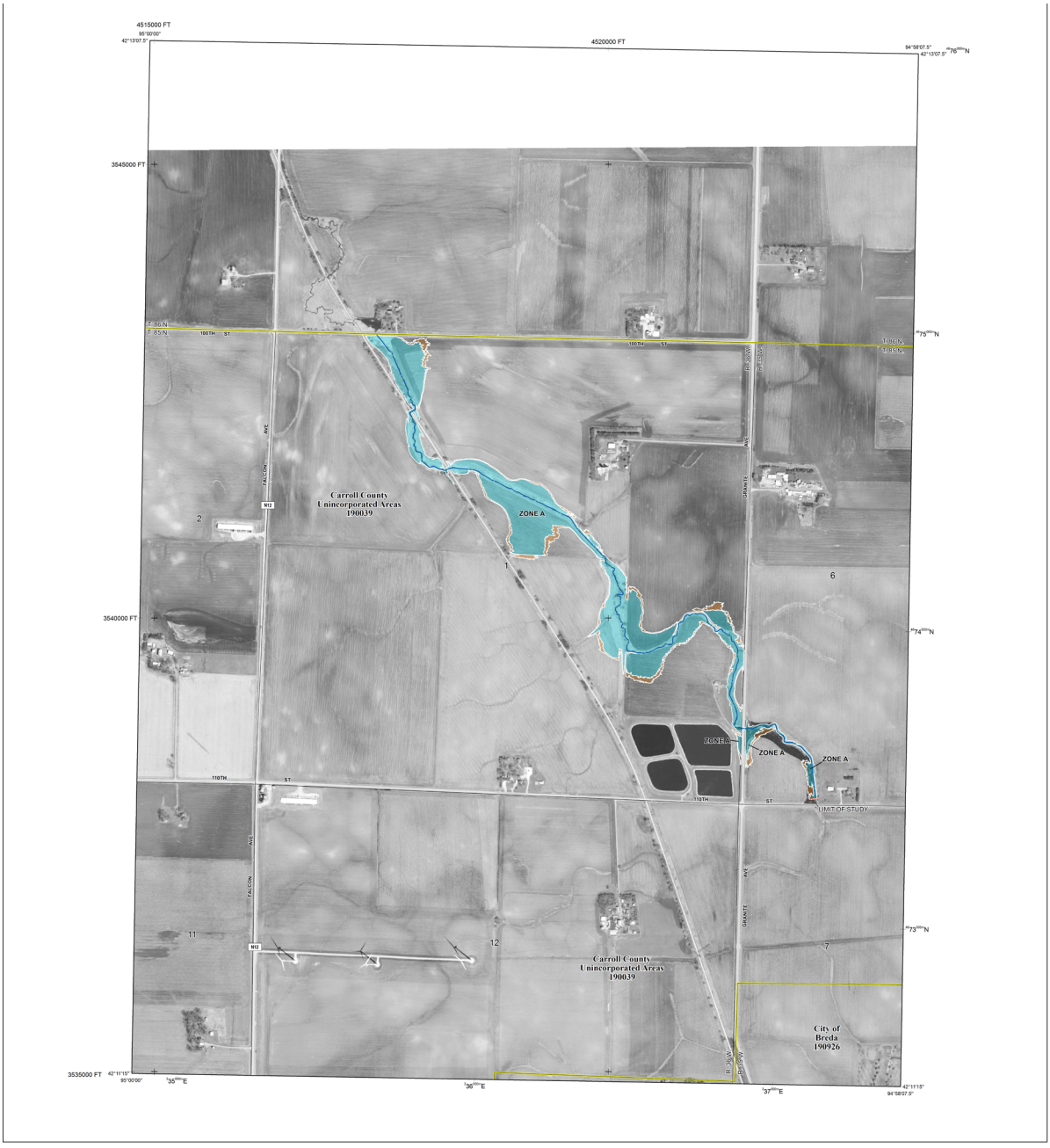
Drought
Animal/Plant/Crop Disease
Human Disease
Windstorm
Tornado

If a hazard were to report critical impacts, it is anticipated that the numbers impacted would be similar to table C.13. A shutdown of some facilities and services could last for at least two weeks and some injuries/illnesses will result in permanent disability. It is estimated 50% of the city would be impacted.

Table C.13: City of Breda Critical Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	1	$119,820	250
Commercial	23	$3,747,595	
Industrial	2	$1,394,380	
Residential	110	$16,615,095	

Flood Maps



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, V, A99
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee See Notes Zone X
- NO SCREEN Area of Minimal Flood Hazard Zone X

OTHER AREAS
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
- 8 Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

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SCALE

Map Projection:
State Plane Iowa North (FIPS Zone 1401) Coordinate System, Lambert Conformal Conic Projection; North American Datum 1983. GRS 1980 spheroid; North American Vertical Datum of 1988

1 inch = 500 feet 1:6,000

0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR

* PANEL NOT PRINTED

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL 28 OF 400

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
BREDA, CITY OF	190936	0028	C
CARROLL COUNTY	190039	0028	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0028C

EFFECTIVE DATE
SEPTEMBER 15, 2017

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

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- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee See Notes *Zone X*
- NO SCREEN Area of Minimal Flood Hazard *Zone X*

OTHER AREAS
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
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- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

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0 125 250 500 Meters

PANEL LOCATOR

* PANEL NOT PRINTED

FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL 36 OF 400

FEMA

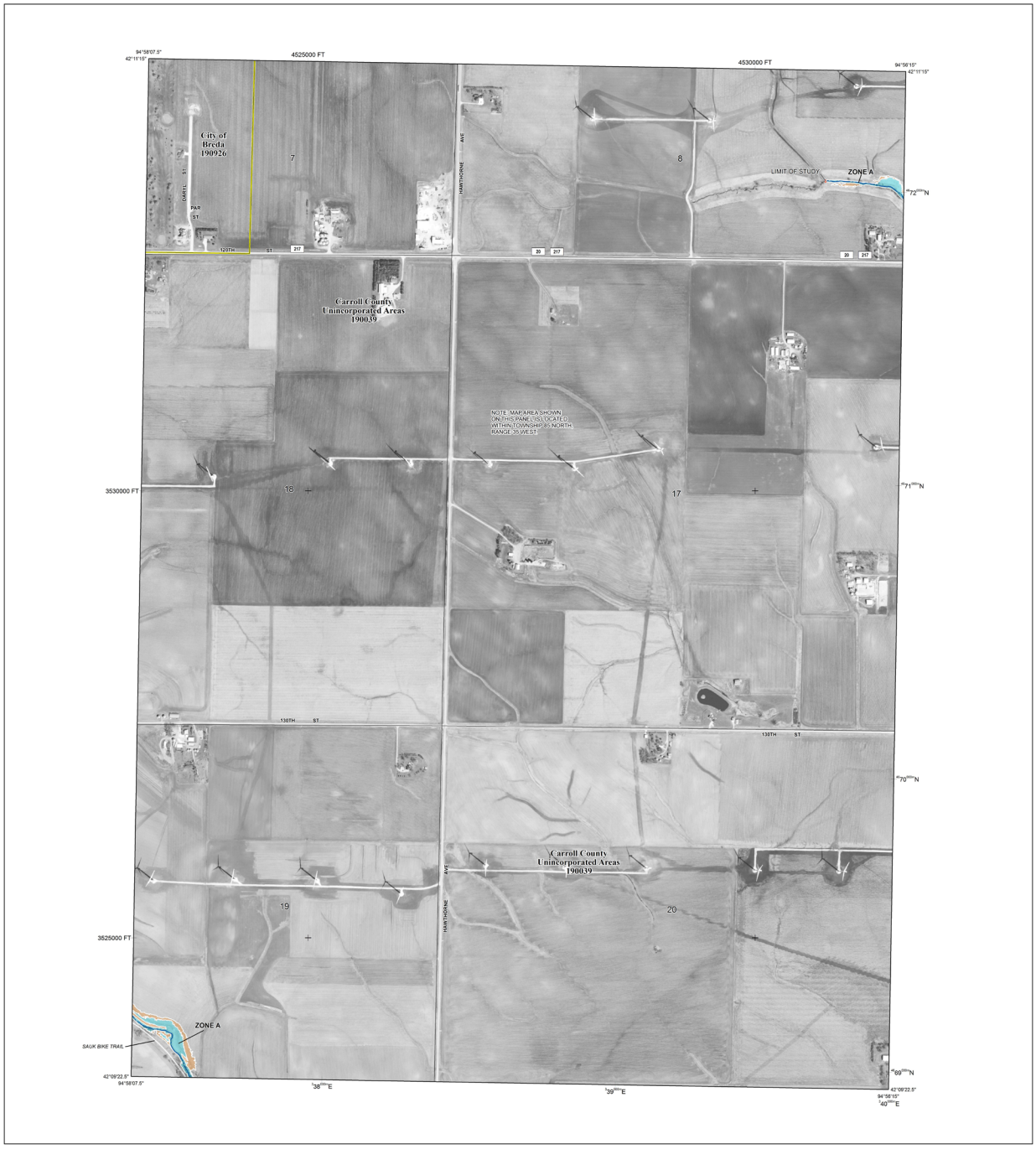
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
BREDA, CITY OF	190926	0036	C
CARROLL COUNTY	190039	0036	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0036C

EFFECTIVE DATE
SEPTEMBER 15, 2017



FLOOD HAZARD INFORMATION

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SCALE

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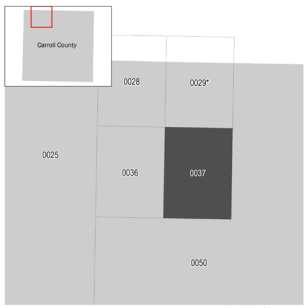
PANEL LOCATOR



* PANEL NOT PRINTED

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL 37 OF 400

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
BREDA, CITY OF	190926	0037	C
CARROLL COUNTY	190039	0037	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0037C

EFFECTIVE DATE
SEPTEMBER 15, 2017

There have been some changes in the plan's project priorities since the last update. Some projects that were prioritized as a high priority have been completed utilizing available grant and local funds. Other projects that were not high priority were implemented as funds were available, and those that either had no funding available or were not a high priority were not implemented during this planning period. The City's Mitigation Actions were developed with the city's new priorities in mind which have shifted from the last planning period due to changes in elected officials and staff. The priorities also have changed due to the city's economic climate and instances of hazards that have impacted the community.

Status of Previous Mitigation Actions

Table C.14: City of Breda Status of Previous Mitigation Actions

	Status				
Previous Actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not Implemented**
Provide funding needed to train personnel (fire, EMS, and police)			X		
Inform public on hazardous materials locations and hazards			X		
Purchase additional sirens as needed				X	
Educate public on hyper reach notification				X	
Promote NOAA radios to the public				X	
Designate shelters	X				
Continue having firefighters storm-spot			X		
Continue current procedures and upgrade equipment as necessary			X		
Regularly test backup generators			X		
Keep updating and upgrading snow plow equipment, sand trucks, etc.			X		
Regularly check the town's warning siren			X		
Adopt a Drought Policy				X	
Maintain the city's water storage tank			X		
Replace water mains	X				
Repair or replace storm and sanitary sewer lines			X		
Post signs and increase police surveillance around critical facilities			X		
Encourage use of one call to avoid damage to utilities			X		
Continue to budget for and fund street repairs			X		

	Status				
Previous Actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not Implemented**
Keep fire hydrants updated and working, replacing as needed			X		
Build a new fire station				X	
Enforce building codes, city codes, and zoning codes			X		
Work with electric companies to bury overhead power lines					X
Purchase new fire trucks		X			
Upgrade fire fighting equipment as necessary			X		
Build a new or repair the city shop	X				
Purchase/upgrade lift station pumps	X				
Improve electrical services			X		

Action Plan

Section 201.6 (c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

Section 201.6 (c)(3)(iii): The mitigation strategy shall include an action plan, describing how the action 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 associated costs.

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

Table C.15: City of Breda Action Plan

Goal 1	**Enhance Community Protection**
Objective 1	Improve Public Warning Capabilities
Objective 2	Maintain Current Hazard Mitigation Plan
Objective 3	Hazardous Materials-tier II sites
Objective 4	Protect and Enforce Regulatory Measures in Existing and New Development Areas
Objective 5	Provide Shelter Facilities in case of Disasters
Goal 2	**Protect Against Power Outage**
Objective 1	Provide Back-Up Systems for Critical Systems and Assets
Objective 2	Use Prevention Techniques to Minimize Disruption in Services
Goal 3	**Maintain and Support Public Safety, Including Facilities, Equipment, and Training**
Objective 1	Improve First Responder Resources and Capabilities
Objective 2	Provide Education and Training Programs to Increase Public and Responder Awareness
Objective 3	Maintain Needed Personnel for Fire and EMS
Objective 4	Provide Needed Equipment and Facilities
Goal 4	**Maintain and Protect Public Infrastructure**
Objective 1	Maintain and Improve Roads, Bridges, and Other Transportation
Objective 2	Maintain and Improve Water Mains, Power Lines, Stormwater Systems, and Other Critical Assets

Table C.16: City of Breda Mitigation Actions

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Inform public on hazardous materials locations and hazards	Hazardous Material	Low	Fire Department	Minimal	Fire Department Budget, City Funds	Public Education and Awareness	Mid
Purchase additional or new sirens as needed	Tornado, Windstorm, Thunderstorm/ Lightning/Hail	Mod	City Council	Low	City Funds, HMGP, USDA Community Facilities, Local Foundations	Emergency Services	Long
Educate public on hyper reach notification	Tornado, Windstorm, Hailstorm, Hazardous Material	Mod	Fire Department	Minimal	City Funds, Fire Department Budget	Public Education and Awareness	Ongoing
Promote NOAA radios to the public	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning, Dam/Levee Failure	Mod	Fire Department	Minimal	Fire Department Budget, Local Foundations, Donations	Public Education and Awareness	Ongoing
Continue to train and have firefighters be storm spotters as a backup to the city's storm siren	Tornado, Windstorm, River Flooding, Severe Winter Storms, Thunderstorm/ Lightning/Hail	Low	Fire Department	Minimal	City Funds, Fire Department, Local Foundations	Emergency Services	Ongoing
Regularly test backup generators	Infrastructure Failure	Low	Fire Department, Public Works	Minimal	City Funds	Emergency Services	Ongoing
Regularly check the town's warning siren	Tornado, Windstorm	Low	Fire Department	Minimal	Local	Emergency Services	Ongoing

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Adopt a Drought Policy	Drought	Low	City Council	Minimal	City Funds	Public Education and Awareness	Long
Maintain the city's water storage tank	Infrastructure Failure	High	City Council	High	City Funds, CDBG, SRF, USDA Grants and Loans	Structural Project	Mid
Repair or replace storm and sanitary sewer lines	Infrastructure Failure	High	City Council	High	City Funds, CDBG, SRF, USDA Grants and Loans	Structural Project	Long
Post signs and increase police surveillance around critical facilities	Terrorism	low	City Council	Low	City Funds	Property Protection	Long
Encourage use of one call to avoid damage to utilities	Infrastructure Failure	High	City Council	Minimal	City Funds, Private Utilities	Prevention	Ongoing
Continue to budget for and fund street repairs	Infrastructure Failure, Transportation Incident	High	City Council	High	City Funds, DOT	Structural Project	Ongoing
Keep fire hydrants updated and working, replacing as needed	Infrastructure Failure	Mod	City Council	Low	City Funds	Emergency Services	Ongoing
Build a new fire station that can double as a shelter	Extreme Heat, Severe Winter Storm, Infrastructure Failure, Tornado	Mod	City Council, Fire Department	High	City Funds, Local Foundations, Private Donations	Structural Project	Long
Enforce building codes, city codes, and zoning codes	Infrastructure Failure, Tornado, Windstorm, Dam/Levee Failure, Severe Winter Storms, Thunderstorm/ Lightning/Hail	Low	City Council	Moderate	City Funds	Prevention	Ongoing

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Work with electric companies to bury overhead power lines	Tornado, Windstorm, Extreme Heat, Severe Winter Storms, Thunderstorm/ Lightning/Hail	High	City Council	High	City Funds, Private Utility, GRID Grant, Iowa Energy RLF	Prevention	Long
Purchase generators for utility backups	Infrastructure Failure	High	City Council	Moderate	City Funds, HMGP, State Match, Local Foundations	Emergency Services	Short
Improve electrical services	Extreme Heat, Infrastructure Failure, Thunderstorm/ Lightning/Hail, Tornado, Windstorm	High	City Council, Public Works	Moderate	City Funds, Private Utility, GRID Grant, Iowa Energy RLF	Prevention	Ongoing

Incorporation into Other Planning Mechanisms

Where possible, Breda will consider the findings from this document when updating or creating new planning and operating documents. Information from this plan will be utilized to update and expand the following documents:

- Hazard Mitigation Plan
- Building Code
- Zoning Ordinance
- Housing Needs Assessment
- Strategic Plan
- Comprehensive Plan

While the city currently does not have any of the plans listed below, if these plans were to be created during the life of this plan, this plan will be used to guide the development of:

- Water Conservation Plans
- Storm Water Management Plans
- Parks and Recreation Plans
- Floodplain Regulations

Appendix D: City of Carroll

Community Profile

History

The area that is now Carroll County, Iowa, was known simply as "the swamp land" by early settlers. It was first used by local Native Americans for hunting and was seen as a watering stop for people heading to California in pursuit of gold. Carroll County was created on January, 15, 1851, as part of 49 new counties in the western part of Iowa. However, it wasn't until 1852 when the area received its first permanent settlers who were intrigued by the fertile soil that was present. The county, and eventually the city, was named after Charles Carroll of Carrollton, Maryland.

Carroll was originally started and laid out by the Chicago and North Western Railroad in the late 1860's. Carroll's first building was a warehouse for the railroad. This new hamlet was declared the county seat on April 28, 1868, after the county records were moved there from the small town of Carrollton, located in southeast Carroll County. At this time, the town was home to 11 residents. The City of Carroll City was officially incorporated in 1869. The name would later be changed to just "Carroll" in 1875.

Carroll's first courthouse was built in 1869 at a cost of $4,000 in the town square and the first permanent school was built the same year. In 1877, a new railroad branch was built just west of Carroll that ran to the northwest. The city was now connected to Sioux City, Chicago, and Council Bluffs. Like most Iowa railroad towns, Carroll really began to thrive in the late nineteenth century.

Unfortunately, on September 25, 1879, a majority of the business district in the city were burned down. Immediately after, the downtown area was being rebuilt. In 1880, the North Side School was built between 10th and 11th Streets on Adams. This was considered the edge of town at the time. Shortly after, the South Side School was built in 1883. This site is now Southside Park. In 1887, a new courthouse was built to replace the one that had burned down in 1886.

The Chicago Great Western Railway was built in 1902 and ran from the northeastern part of the county, through Carroll, and then southwest to Manning. St. Anthony Hospital opened in 1905 with thirty beds and seven doctors.

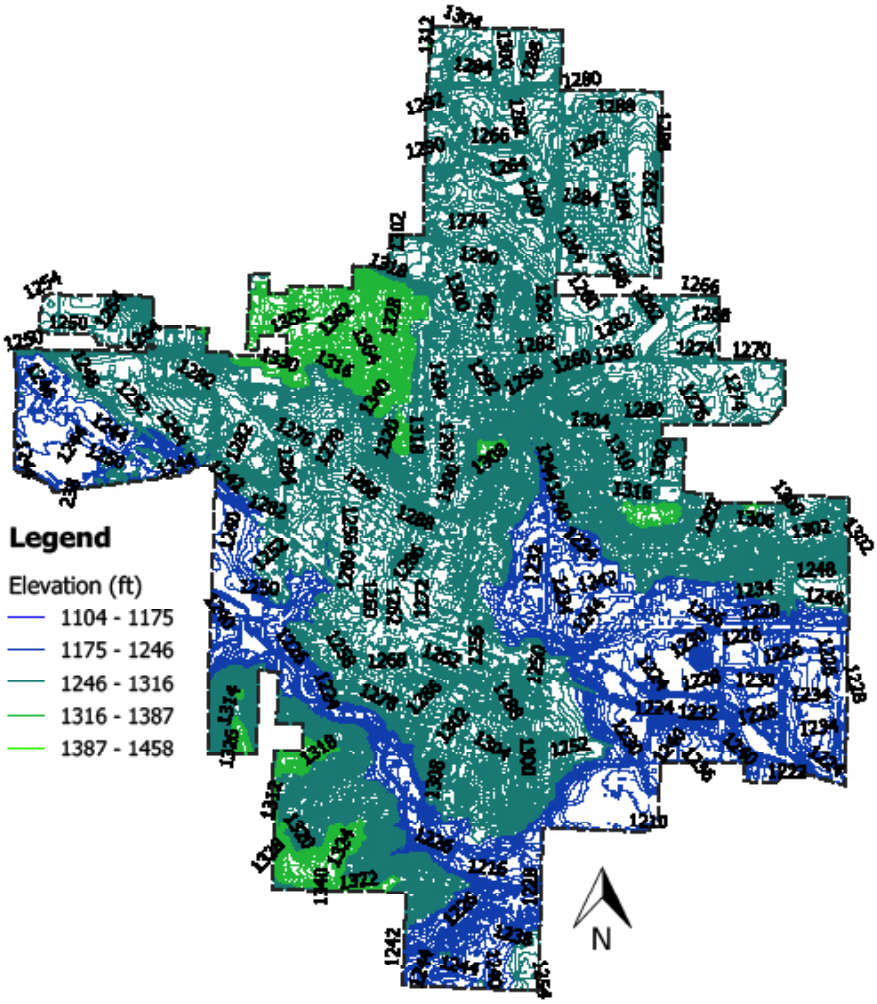
The proclamation for the Lincoln Highway was signed on September 10, 1913. This route, starting at Time Square in New York City and ending in San Francisco, would be the first transcontinental highway in the United States.

Geography and Environment

Carroll is located in the heart of Carroll County, and is the county seat. Its central location along with easy access makes it the economic hub within the region. Highway 30 intersects the community east/west, while Highway 71 runs north/south along the west side of town. Carroll is 27.3 miles from Denison, 27.4 miles from Jefferson, 45.8 miles from Guthrie Center, 65.4 miles form Ames, and 93.8 miles from Des Moines.

The highest elevation in Carroll County can be found along the eastern side of the county. Here, the elevation can reach as much as 1,550 feet above sea level. The elevation of Carroll ranges from 1,224 feet in the southeast corner to 1,362 feet in the northwest corner. The following map displays Carroll's elevation.

Map D.1: City of Carroll Elevation



Demographics

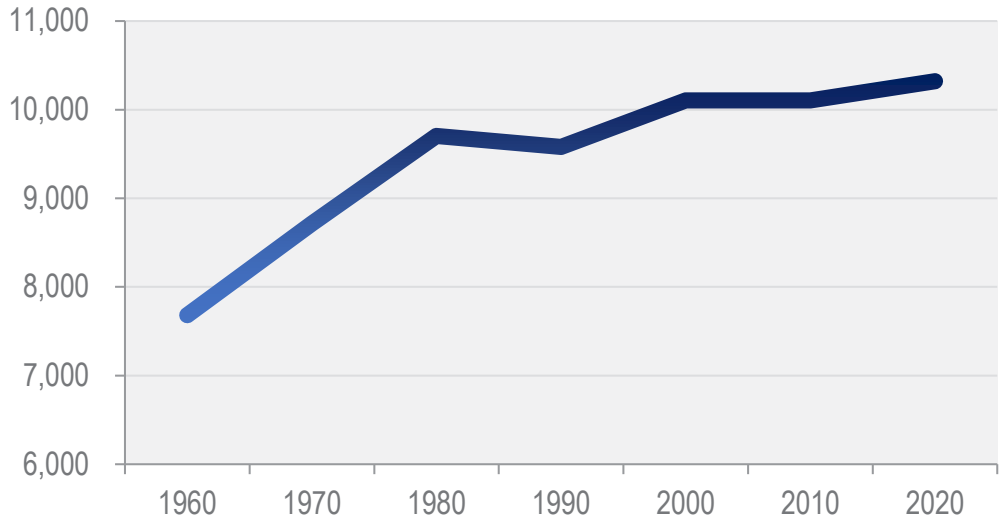
The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Carroll's population through past, present, and future trends of the region.

The size and composition of a community's population can exert influence on its development. For instance, population size, composition, and distribution influence the range of businesses a community can support, the pool of workers from which to draw, and the demand for and supply of services. Similarly, the effect people

have on the social, economic, and physical environments depends upon the composition, expectations, and distribution of the population. A population's age distribution, income levels, ancestry, and educational attainment are some of the characteristics that mold a community. Population trends give community leaders and elected officials information on what kind of services need to be provided and offers prospective employers an overview of the local labor force.

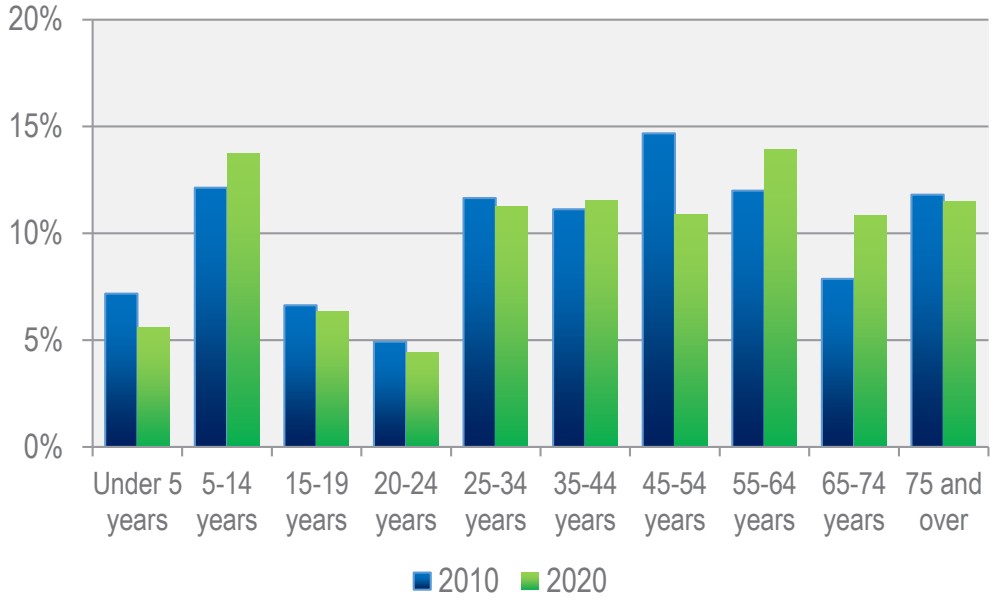
Population in Carroll has been experiencing growth in a declining rate since 1960. Current population in the city is 10,321. Carroll saw the largest increase of population from 1960-1970, when the number of residents grew by 1,034 people. Carroll should continue to grow as it is the regional leader in retail and employment, and many job opportunities have been created in the city. Figure D.1 shows the City of Carroll's population trend since 1960.

Figure D.1: City of Carroll Historic Population, 1960-2020



The City's population is not very different from other parts of Carroll County, and even most of the State of Iowa. Population cohorts at age 50 and above have generally higher numbers than other younger cohorts. This information can be found in figure D.2.

Figure D.2: City of Carroll Age Distribution, 2010 & 2020



Housing

A community's ability to attract new residents is important. One of the most important aspects to attracting residents is housing. A community's housing stock, type of households, and housing availability and affordability are determining factors.

Since 2010, the city's housing stock has increased by 168 units. Of these units, 143 were owner-occupied. During this same time, the City saw a 5% decrease in vacant properties. Table D.1 shows a breakdown of the city's occupied and vacant housing units.

Table D.1: City of Carroll Housing Units, 2010 & 2022

	2010		2022	
	Number	**Percent**	**Number**	**Percent**
Occupied Housing Units	4,357	92.7%	4,542	93.3%
Owner Occupied	2,999	68.8%	3,142	69.2%
Renter Occupied	1,358	31.2%	1,400	30.8%
Vacant Housing Units	341	7.3%	324	6.7%
Total Housing Units	4,698	100.0%	4,866	100.0%

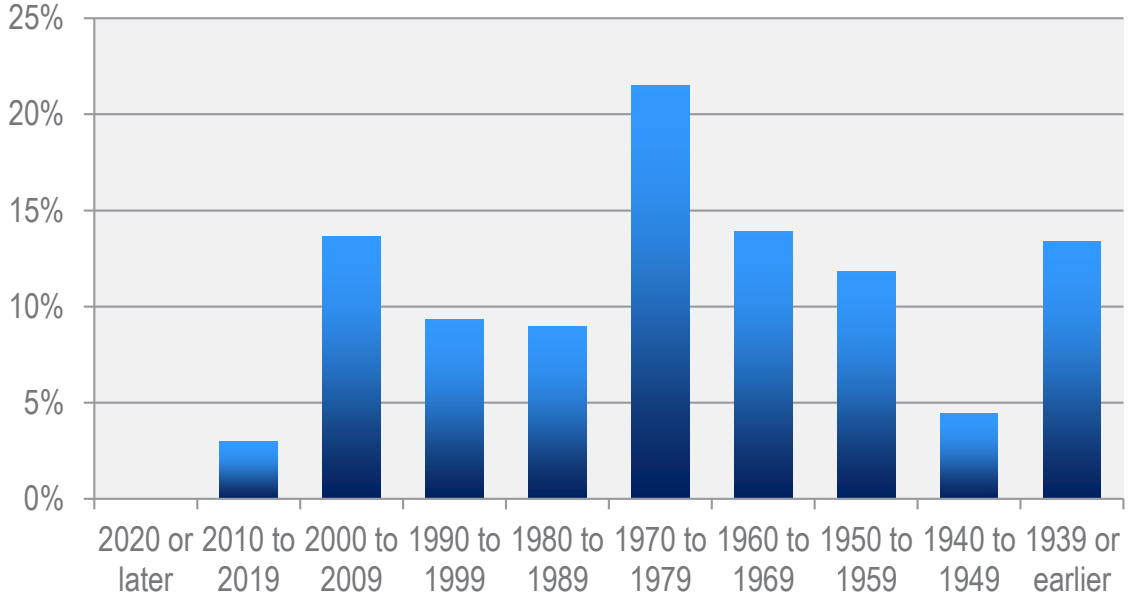
In 2022, the City of Carroll was home to the second largest median value of housing units in Carroll County. The median value of homes within the city is $172,000. This is only 5.3% lower than the State of Iowa median housing value of $181,600. As table D.2 shows, 59% of the housing units in the city were valued over $150,000. Having a lack of economical housing could be a problem with getting new people to move to the city. According to the 2022 American Community Survey Estimates, only 4.7% of the city's homes are valued less than $50,000. A complete breakdown of the value of homes in Carroll can be found in table D.2.

Table D.2: City of Carroll Value of Owner-Occupied Units, 2022

Value of Housing Unit	Percent of Homes
Less than $50,000	4.7%
$50,000 to $99,999	9.7%
$100,000 to $149,999	27.1%
$150,000 to $199,999	22.0%
$200,000 to $299,999	21.4%
$300,000 to $499,999	14.1%
$500,000 to $999,999	1.1%
$1,000,000 or more	0.0%

Figure D.3 showcases the year housing units within the City of Carroll were constructed. The city has a smaller portion (13.4%) of the homes constructed prior 1939 compared to the rest of the state. The city experienced spikes in construction from 1970 to 1979 as well as 2000 to 2009. Building standards of today utilize the most recent construction materials and safety features, ensuring that the new residential structures are as safe as possible. This does not mean that older homes are more unsafe, just that they may be more susceptible to hazard damage.

Figure D.3: City of Carroll Year Housing Units Constructed, 2022



Economics

Household income is an important indicator of the economic base in Carroll County. In Carroll, the median household income is $60,368 which would classify a large number of the households in Carroll as "working" or "middle" class. Table D.3 breaks down the city's households by income. The City of Carroll's household income breakdown is similar to the other rural communities in the area. Educational services, and health care, and social assistance is the largest industry within the City, which is consistent with the county as a whole. Carroll is the county seat and home to many employers, so few Carroll residents travel to neighboring cities to work.

Table D.3: City of Carroll Household Income, 2022

Income and Benefits (2022 Inflation-Adjusted Dollars)	Number of Households	Percent of Households
Less than $10,000	197	4.3%
$10,000 to $14,999	304	6.7%
$15,000 to $24,999	463	10.2%
$25,000 to $34,999	405	8.9%
$35,000 to $49,999	636	14.0%
$50,000 to $74,999	659	14.5%
$75,000 to $99,999	432	9.5%
$100,000 to $149,999	953	21.0%
$150,000 to $199,999	317	7.0%
$200,000 or more	176	3.9%
Median Household Income	$60,368	-
Mean Household Income	$79,528	-

Carroll is by far the leading employment provider in Carroll County and has a strong economic base. The employment by industry statistics is shown in Table D.4. The leading industries in employment were Educational services, and health care and social assistance (24.0%), Manufacturing (16.0%), Retail trade (10.7%), and Transportation and warehousing, and utilities (8.5%). Taking advantage of regional strengths and industries will increase revenue generated in the community, resulting in increased income levels and housing values. These percentages are based on the total number of individuals 16 years and older that are from Carroll and are employed.

Table D.4: City of Carroll Employment by Industry, 2022

Industry	Number	Percent
Total civilian non-farm employment, 16 years and over	5,017	100.0%
Agriculture, Forestry, Fishing, Hunting, Mining	166	3.3%
Construction	211	4.2%
Manufacturing	801	16.0%
Wholesale Trade	255	5.1%
Retail Trade	537	10.7%
Transportation and warehousing and utilities	428	8.5%
Information	120	2.4%
Finance and insurance, and real estate and rental and leasing	415	8.3%
Professional, scientific, management, administrative, and waste management services	209	4.2%
Educational, health care, and social assistance	1,206	24.0%
Arts, entertainment, recreation, accommodation, and food services	297	5.9%
Other services, except public administration	233	4.6%
Public Administration	139	2.8%

Existing Documents & Capabilities

Table D.5 provides a compilation of the current planning and regulatory documents in place for the City of Carroll. The table also shows the last time the documents were last updated. These documents help understand the process the city has already undertaken and what documents can be created to help guide the city. First and foremost is the previous hazard mitigation plan as this document lays out specific strategies to help the city reduce the impact hazards have on the community and those who live in it. Carroll has a comprehensive plan and a zoning code. These two documents work hand-in-hand to guide the future development of the city. The comprehensive plan takes a deep dive into the city's inventory of assets, utilities, and infrastructure. This plan also includes a hazard chapter which addresses some disaster response items as well as mitigation for the future. The city's zoning code was created to keep certain zones away from one another to reduce the risk to humans and structures. The different zones can pose different threats to others, such as some industrial uses having a higher HAZMAT incident probability which if located in a residential zone, could pose large health issues to the overall population. The zoning codes also include information for street and sidewalk regulations which can reduce the number of transportation incidents. The City's housing needs assessment has allowed the city to take inventory of the current housing situation and determine what steps are necessary to reduce the impact hazards have on the housing stock.

The City of Carroll is a proactive community, which benefits them in regards to mitigation of hazards. A capital improvement plan which lays out future projects and necessary funding would help the city budget for, and allow them to be proactive, not reactive to future needs. Expanding conversations with the local COG and engineering firms would allow the city to explore additional options that have worked in similar communities facing similar situations. Outside organizations are also beneficial with finding funding for projects which otherwise may be out of the city's budget. Road, water, and sewer infrastructure continues to need upgrades and pursuing funding opportunities could reduce impacts of hazards on these infrastructure types. Training staff to current requirements would allow for a more thought-out response to a hazard or hazard warning. Cross training staff regardless of responsibility on different departments can better prepare the city and can lead to things being noticed that previously went unnoticed.

Table D.5: City of Carroll Existing Documents

Document	Yes/No	Year
Previous HMP	Yes	2020
Comprehensive Plan	Yes	2013
Building Code	Yes	2015
Zoning Ordinance	Yes	2013
Strategic Plan	Yes	2025
Housing Needs Assessment	Yes	2022
NFIP Participant	Yes	1979
Floodplain Regulations	Yes	2025

NFIP Participation

In the past, there have been instances of flooding within the city limits of Carroll. Carroll started participating in the NFIP in 1979, and the flood map was updated and adopted in 2017. The city's FIRMs can be found in the later in this appendix. The Public Works Director also acts as the Floodplain Administrator for the city. Any development/demolition in the floodplain is required to obtain a permit which regulates the development/demolition and lays out the NFIP regulations that must be followed. Carroll participates in the NFIP and implements substantial improvement / substantial damage provisions in the following manner: Local officials (1) determine the cost of work, (2) determine the market value of buildings, (3) make SI/SD determinations and provide determinations to property owners, and (4) require owners to obtain permits to bring substantially improved and substantially damaged structures into compliance with the floodplain management requirements.

Outlook and Future Development

Since the last plan update, the City of Carroll has seen development throughout the entire city. New housing units have been constructed, increasing the city's housing stock. These have been primarily in grouped locations throughout the city, but some have been sporadic, with some even being constructed on infill lots. These housing units include everything from single family units to condos and apartments. Along with residential development has been residential rehabilitation, which has improved the city's older housing stock. Commercial development/redevelopment along US Highway 30 and branching off to the north and south of the highway has occurred. Other businesses have located within the city's main street district and in other portions of town. Some local businesses have seen such large expansions be necessary that new facilities have been constructed to house their expanded operations. Redevelopment of the city's main street has also occurred with vacant buildings now being habited.

Over the life of this plan, the city anticipates this level of development to continue. Some commercial businesses are in the process of expanding which will finalize within this planning period. It is anticipated that other commercial/industrial businesses will also see some expansion within the planning period. Housing development is on target to continue with lots being sold and contractors having waiting lists. Housing rehabilitation is also expected to continue. In general, the city is likely to see new development and redevelopment throughout the different uses.

Critical Facilities

Critical facilities are facilities that are critical to the health and welfare of the population and are especially important following hazard events. Every jurisdiction is unique in such way that the list of critical facilities can vary widely from community to community. Carroll's critical facilities can be found on map D.2.

Essential Infrastructure

Knowing what services and infrastructure serve the city can be beneficial in a time of disaster so the appropriate companies can be contacted in need of utility shutoff or transportation routes. The city's essential infrastructure and services can be found in Table D.6.

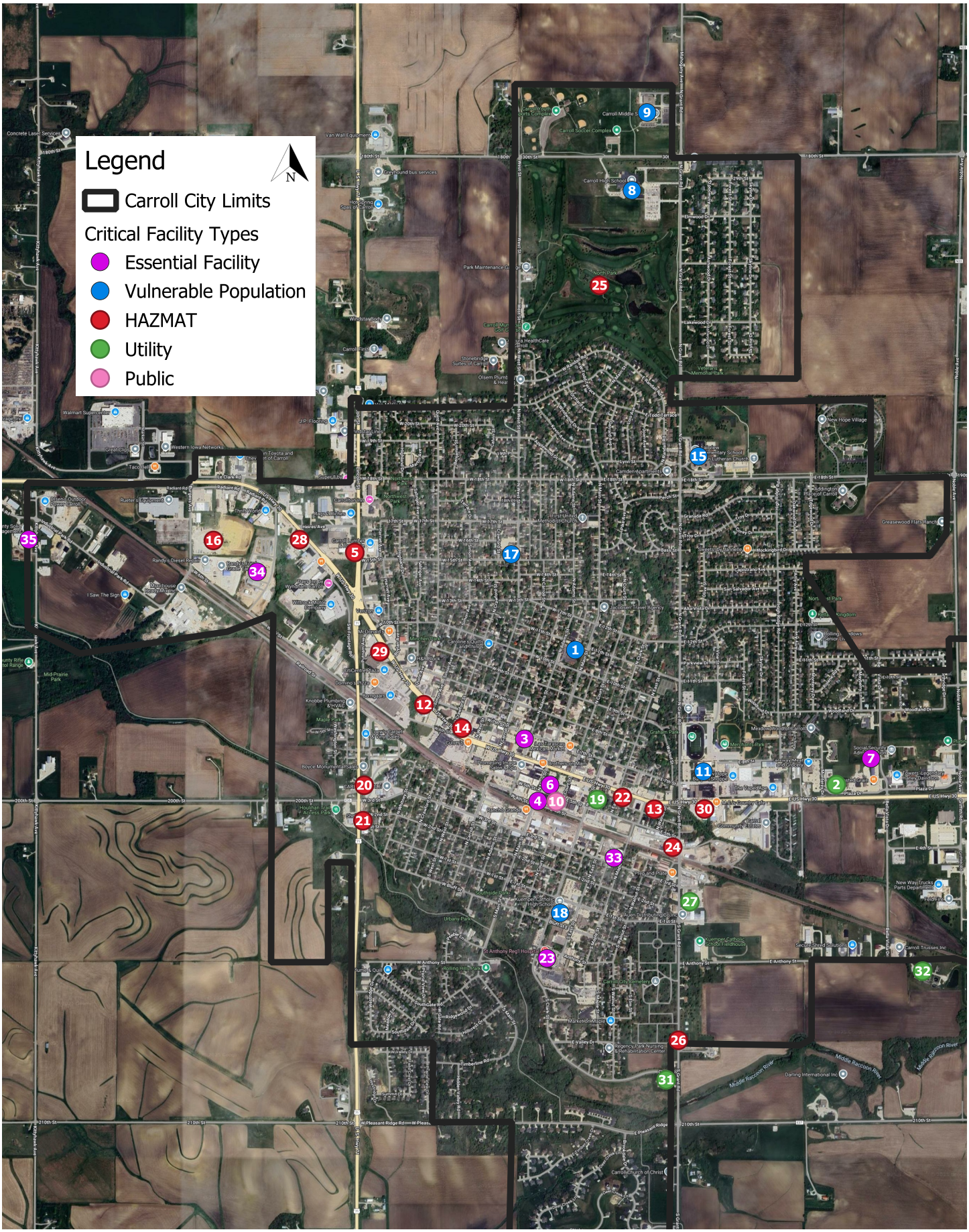
Table D.6: City of Carroll Essential Infrastructure and Services

Major Arterials	U.S. Highways 31 & 71	**Air Service**	Arthur N. Neu Airport
Water Service	City of Carroll	**Sewer Service**	City of Carroll
Electric Service	MidAmerican Energy	**Gas Service**	Alliant Energy
Sanitation/Solid Waste	Local Haulers	**Landfill**	Carroll County Landfill
Phone and Internet	CenturyLink, Mediacom, Western Iowa Networks, Wireless	**Law Enforcement**	Carroll Police Department
Fire Service	Carroll Fire Department	**Ambulance Service**	Carroll County Ambulance Service

Table D.7: City of Carroll Critical Facilities

Number on Map	Name	Address	Type
1	Adam's Elementary School	1026 North Adams Street	Vulnerable Population
2	Carroll Broadcasting Company	1119 Plaza Drive	Utility
3	Carroll City Hall	627 North Adams Street	Essential Facility
4	Carroll City Police Department	112 East 5th Street	Essential Facility
5	Carroll Country Store	1511 US-71	HAZMAT
6	Carroll County Courthouse	114 East 6th Street	Essential Facility
7	Carroll Fire Department	801 Bella Vista Drive	Essential Facility
8	Carroll High School	2809 North Grant Road	Vulnerable Population
9	Carroll Middle School	3203 North Grant Road	Vulnerable Population
10	Carroll Public Library	118 East 5th Street	Public
11	Carroll Recreation Center	716 North Grant Road	Vulnerable Population
12	Casey's	613 Lincoln Highway	HAZMAT
13	Casey's	510 East Lincoln Highway	HAZMAT
14	Country Store	422 West Lincoln Highway	HAZMAT
15	Fairview Elementary School	525 East 18th Street	Vulnerable Population
16	GehlPRO Welding	1610 Burgess Avenue	HAZMAT
17	Kuemper Catholic Middle School	1519 North West Street	Vulnerable Population
18	Kuemper Catholic School	116 South East Street	Vulnerable Population
19	Mediacom Communications Corporation	510 North Clark Street	Utility
20	Murray's Welding & Machine	322 US-71	HAZMAT
21	Shell	112 US-71	HAZMAT
22	Sparky's One Stop	402 East 6th Street	HAZMAT
23	St. Anthony Regional Hospital	311 South Clark Street	Essential Facility
24	Smithfield	401 North Grant Road	HAZMAT
25	Northern Natural Gas Line	North Carroll	HAZMAT
26	Alliant Energy		Utility
27	MidAmerican Energy	206 North Grant Road	Utility
28	Drees Oil	1257 W US-30	HAZMAT
29	Hy-Vee Fast & Fresh	905 US-30	HAZMAT
30	Matheson	734 E US-30	HAZMAT
31	Water Treatment Plant	700 S Grant Road	Utility
32	Sewer Treatment Plant	1400 E Anthony Street	Utility
33	Street Department	423 E 3rd Street	Essential Facility
34	County Secondary Roads	1400 W 6th Street	Essential Facility
35	Carroll County Recycling Center	19111 Kittyhawk Avenue	Essential Facility

Table D.7: City of Carroll Critical Facilities



Carroll Community School District

All of the district's buildings are located within the City of Carroll. The School District has two elementary buildings, Adams Elementary at 1026 N Adams Street and Fairview Elementary at 525 E 18th Street. The Carroll Middle School is located at 3203 N Grant Road and the Carroll High School is located at 2809 N Grant Road. The District's Mission Statement, as found on the District's website, is "inspiring learning and excellence for all". Students and staff participate in drills and educational programs related to hazards and the mitigation of them. The District maintains its own equipment and supplies to maintain roads and walkways on campus.

Table D.8: Carroll Community School District Enrollment

School Year	Facility	Enrollment	Facility	Enrollment	Facility	Enrollment	Total Enrollment
2018-19	Elementary Schools	772	Carroll Middle School	568	Carroll High	489	1,829
2019-20	Elementary Schools	722	Carroll Middle School	558	Carroll High	508	1,788
2020-21	Elementary Schools	696	Carroll Middle School	529	Carroll High	551	1,776
2021-22	Elementary Schools	698	Carroll Middle School	526	Carroll High	537	1,761
2022-23	Elementary Schools	689	Carroll Middle School	489	Carroll High	544	1,722
2023-24	Elementary Schools	671	Carroll Middle School	456	Carroll High	545	1,672

Kuemper Catholic School System

The Kuemper Catholic School System's buildings are all located within the City of Carroll. There are four buildings which make up the system. Holy Spirit Elementary is located at 201 S Clark Street, St. Angela Center is located at 116 S East Street, St. Lawrence Center is located at 1519 N West Street, and the Kuemper High School is located at 109 S Clark Street. The School's Mission, as found on their website, is "to provide excellent Catholic education of mind, body, and soul to empower all students to achieve to the best of their abilities in fulfillment of God's call". Students and staff participate in drills and educational programs related to hazards and the mitigation of them. The School System maintains its own equipment and supplies to maintain roads and walkways on campus.

D.9: Kuemper Catholic School Enrollment

School Year	Facility	Enrollment	Facility	Enrollment	Total Enrollment
2018-19	Kuemper Grade School	771	Kuemper High School	305	1,076
2019-20	Kuemper Grade School	639	Kuemper High School	255	894
2020-21	Kuemper Grade School	755	Kuemper High School	284	1,039
2021-22	Kuemper Grade School	779	Kuemper High School	293	1,072
2022-23	Kuemper Grade School	778	Kuemper High School	280	1,058
2023-24	Kuemper Grade School	664	Kuemper High School	452	1,116

Table D.10: City of Carroll Risk Assessment

Hazard	Comments
Animal/Plant/Crop Disease	The City of Carroll contains a measurable amount of agricultural land. Although this land represents a recognizable portion of the community, there have been minimal reported losses from animal/plant/crop disease within in the community. While this does impact the community, it is normally indirectly impacted.
Drought	Drought occurrences have increased across the state, and the City of Carroll has not been exempt from this hazard. Droughts continue to increase in severity and while there is little warning, this hazard can cause both direct and indirect issues for the City and it's residents.
Earthquake	There have been no instances of earthquake in the City of Carroll, and the committee feels there will be no instances during the life of this plan.
Expansive Soils	There have been no instances of expansive soils in the City of Carroll and the committee feels there will be no instances during the life of this plan.
Extreme Heat	Extreme heat events impact the City of Carroll. Education may be one of the best action tools to combat the effects of extreme heat as individuals need to know the effects of extreme heat and how it can affect the body.
Flash Flood	Since 2020, there have been no reported instances of flash flooding in the City of Carroll. While flash floods have little to no warning time, with no instances within the last planning period, the committee has determined this hazard is not a high priority hazard to address, but will consider mitigation actions to prepare the community for response to an event.
Grass/Wild Land Fire	Grass and wild land fires are most commonly field fires or controlled burns that get out of hand in and immediately surrounding the city. This hazard can pose a large threat to the community as elements out of anyone's control, such as wind direction and speed, can change this hazard from harmless and controlled to out of control in a matter of minutes and can pose a threat to life.
HAZMAT Incident	Within the most recent planning period, there have been fourteen instances of hazardous spills within the City of Carroll. With this number of events over the past five years, the committee feels this hazard is a small threat to the community, but mitigation actions should still be considered and implemented to prevent increased instances in the future.
Human Disease	Iowa and more specifically the City of Carroll are still feeling the effects of the COVID-19 pandemic. The pandemic has reignited the need to plan for future outbreaks and examine the city's current practices. The pandemic also reminded the public the importance of staying informed and staying vigilant to protect themselves.
Infrastructure Failure	Infrastructure failures occur with little to no warning and can cause major disruptions within the community. Planning to respond to this hazard is important to the community to protect lives and property. The most likely infrastructure failure within Carroll would be structural failure of either bridges or roadways. As these instances have no warning time, planning must be completed prior to an event happening to be able to respond in a quick manner.

Levee/Dam Failure	There is one high hazard dam located within Carroll located on a waterway that flows through the city. This dam was last inspected in May 2023 and was found to be in satisfactory condition. It was constructed in 1985. With the recent inspection and satisfactory condition, it is unlikely that levee or dam failure will impact the city, but the committee feels that planning for dam failure should be addressed as it could cause flooding where the community does not normally experience flooding. It is unlikely that the city will experience this hazard during this plan's life.
Radiological	During the previous planning period, there were no instances of Radiological Incident in Carroll and the committee does not anticipate any happening in the next planning period. If an incident were to occur, the committee feels it would be a small, contained situation that would not threaten the community as a whole.
River Flooding	The Middle Raccoon River and various other unnamed creeks and their floodplains run through Carroll in a number of areas. With this large amount of flood zone located within the city, there is a moderate probability of the community experiencing some level of flooding within the planning period. While there have not been reported instances of flooding, there have been instances that locals know of. The probability and likelihood of some form of flooding impacting the community leads the committee to feel planning for river flooding should be addressed through mitigation actions.
Severe Winter Storm	Severe Winter Storms continue to impact the City of Carroll. These storms while historically, have caused little damage, continue to build in strength, threatening property and lives within the city. The warning period of this hazard continues to grow with meteorological advances, but can still pose great risks to the community.
Terrorism	There have been no instances of terrorism in the City of Carroll during the previous plan period and the committee feels there will be no instances during the life of this plan. If an instance were to occur, the committee feels it would be a targeted incident that would not threaten the entire community.
Thunderstorm/ Lightning/Hail	Thunderstorm/lightning/hail instances are frequent within the community. While they are frequent, most storms pose no threat to life, crops, or property. This hazard is prevalent in Carroll but is normally not severe in nature.
Tornado	Carroll County has experienced a number of tornadoes in the recent past, but these have not been within or damaged the city of Carroll. With the number of tornadoes that impact Carroll County growing, it is important for the city to continue to plan for the response to tornadoes as storms within Iowa continue to grow in strength. Preparing the public and community is vital to ensuring there is no loss of life.
Transportation Incident	Speed limits within the City of Carroll are relatively low. While the majority of the roads in Coon Rapids have low speed limits, US. Highways 30 & 71 has a higher speed limits than the residential portions of the community. With most the community having lower speed limits, it is likely that any transportation incident between vehicles is likely to cause little damage to property or humans, but there is a chance (and history) of an incident which can cause extensive damage. The committee anticipates that this hazard will effect the community in varying degrees throughout the planning period.
Windstorm	Recent windstorms have caused reported damage to properties. The City of Carroll has experienced at least six windstorms since 2020. These hazard events continue to build in magnitude, causing increasingly large amounts of damage to property and posing threats to lives. The recent derechos and other windstorms effected Carroll prompting the community to prepare more effectively for these hazards.

Table D.11: Hazards Not Affecting the City of Carroll

Hazard	Reason for Omission
Earthquake	Iowa as a whole has experienced the effects of few earthquakes in the past 175 years. The majority of the earthquakes were along the Mississippi River, therefore the city does not feel this hazard will impact them during this planning period.
Expansive Soils	While Iowa has expansive soils, due to the city's history of no issues in the past, the city felt this will not impact the jurisdiction over the life of this plan.

Loss Estimates

Table D.12: City of Carroll Maximum Building and Population Exposure

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	2	$61,490	10,321
Commercial	417	$186,631,746	
Industrial	16	$16,159,609	
Residential	3,606	$778,833,848	

It is unlikely that a jurisdiction can determine the impact any hazard will have. If a hazard were to impact the entire city, the numbers in table D.12 shows the number of people who would be affected and the maximum number of structures and their value. If this type of event were to occur, a shutdown of some facilities and services could last for at least two weeks and some injuries/illnesses will result in permanent disability or even death.

The following hazards were determine to have a negligible impact on the city, if they were to occur.

Landslide
Radiological
Transportation Incident

If a hazard were to report negligible impacts, it is anticipated that the numbers impacted would be similar to table D.13. If there were any shutdown of facilities or services, it is likely that these shutdowns would be for less than twenty-four hours. If any injuries were to occur, it is anticipated that these would be able to be treated with first aid. A negligible hazard would impact approximately 9% of the city.

Table D.13: City of Carroll Negligible Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	0	$0	929
Commercial	38	$16,796,857	
Industrial	1	$1,454,365	
Residential	325	$70,095,046	

The following hazards were determine to have a limited impact on the city, if they were to occur.

Dam/Levee Failure
Thunderstorm/Lightning/Hail
Severe Winter Storms
Extreme Heat
Flash Flood
Grass/Wild Land Fire
Infrastructure Failure
HAZMAT Incident
River Flooding

If a hazard were to report limited impacts, it is anticipated that the numbers impacted would be similar to table D.14. A shutdown of some facilities and services could last more than a week and any injuries/illnesses would not result in permanent disability. It is estimated that 25% of the city would be impacted.

Table D.14: City of Carroll Limited Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	0	$0	2,580
Commercial	104	$46,657,937	
Industrial	4	$4,039,902	
Residential	902	$194,708,462	

The following hazards were determine to have a limited impact on the city, if they were to occur.

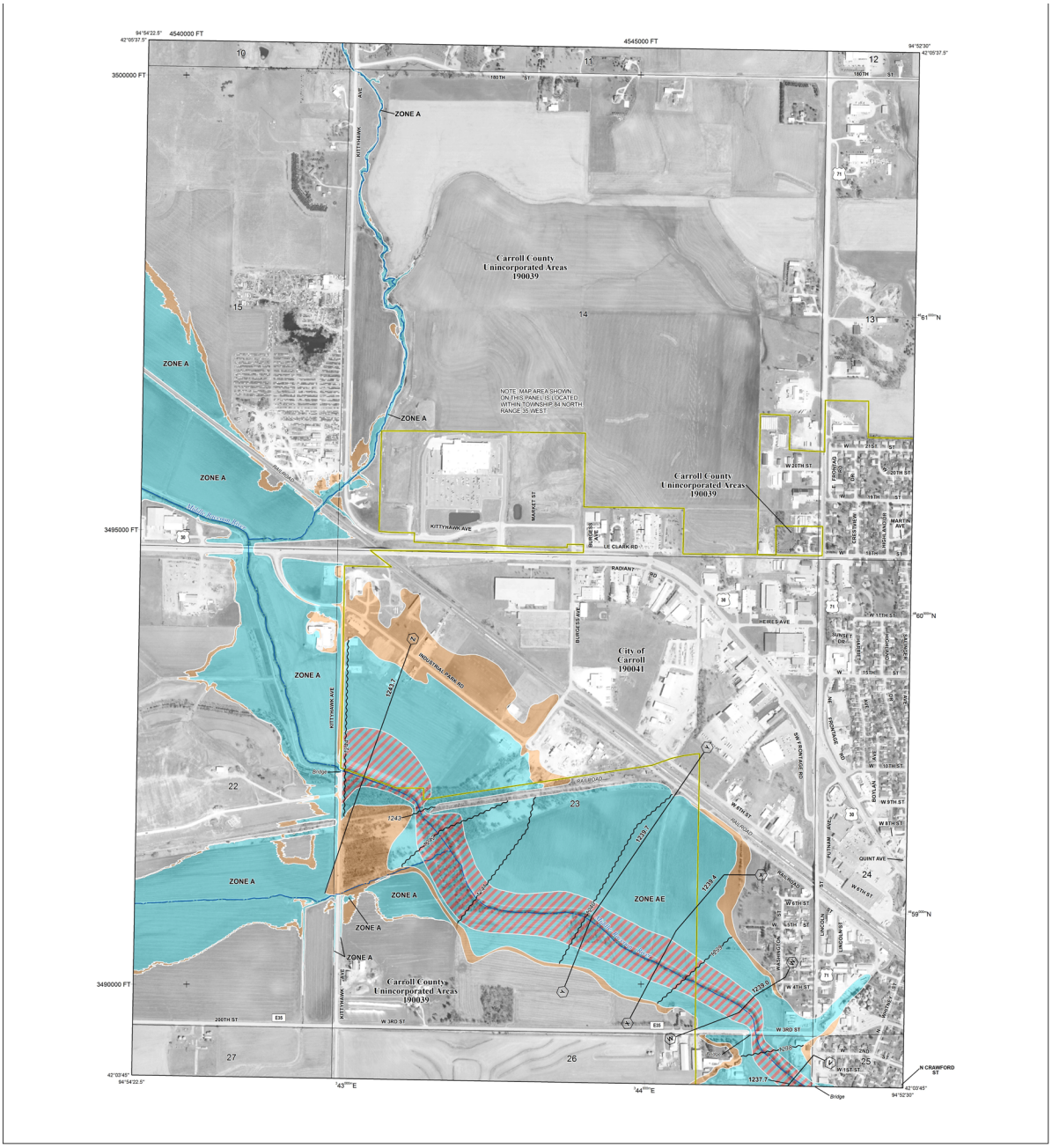
Drought
Animal/Plant/Crop Disease
Human Disease
Windstorm
Tornado

If a hazard were to report critical impacts, it is anticipated that the numbers impacted would be similar to table D.15. A shutdown of some facilities and services could last for at least two weeks and some injuries/illnesses will result in permanent disability. It is estimated 50% of the city would be impacted.

Table D.15: City of Carroll Critical Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	1	$30,745	5,160
Commercial	209	$93,315,873	
Industrial	8	$8,079,805	
Residential	1,803	$389,416,924	

Flood Maps



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS

- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD

- 0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee See Notes *Zone X*

OTHER AREAS

- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES

- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES

- 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

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SCALE

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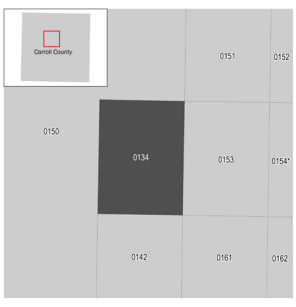
1 inch = 500 feet 1:6,000

0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR



FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA

And Incorporated Areas

PANEL 134 OF 400

FEMA

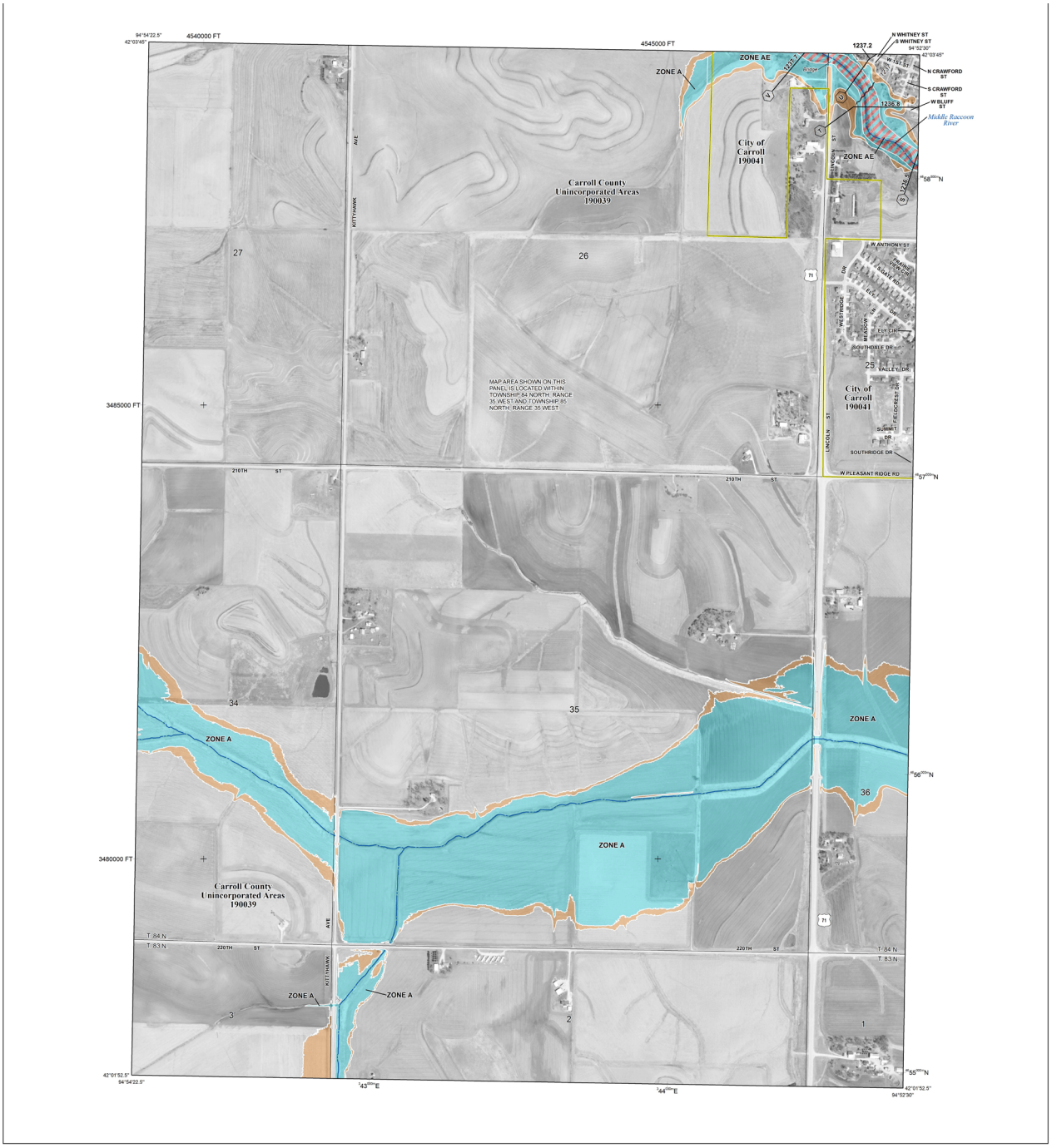
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL, CITY OF	190041	0134	C
CARROLL COUNTY	190039	0134	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0134C

EFFECTIVE DATE
SEPTEMBER 15, 2017



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

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SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
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- Area with Reduced Flood Risk due to Levee See Notes *Zone X*
- NO SCREEN Area of Minimal Flood Hazard *Zone X*

OTHER AREAS
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
- Coastal Transect
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SCALE

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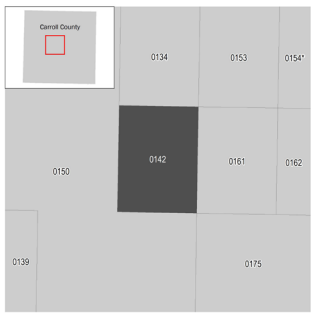
0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR



NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL 142 OF 400

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL, CITY OF	190041	0142	C
CARROLL COUNTY	190039	0142	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0142C

EFFECTIVE DATE
SEPTEMBER 15, 2017

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

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HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) *Zone A, V, A99*
	With BFE or Depth *Zone AE, AO, AH, VE, AR*
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
	Future Conditions 1% Annual Chance Flood Hazard *Zone X*
	Area with Reduced Flood Risk due to Levee See Notes *Zone X*
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard *Zone X*
	Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
	E 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
	8 Coastal Transect
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
	513 Base Flood Elevation Line (BFE)
OTHER FEATURES	Limit of Study
	Jurisdiction Boundary

NOTES TO USERS

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SCALE

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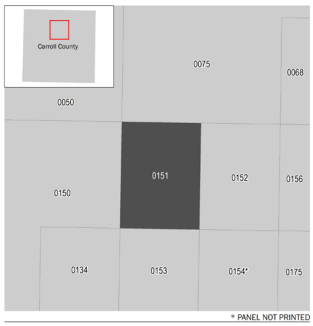
1 inch = 500 feet 1:6,000

0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR



* PANEL NOT PRINTED

FEMA
National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL 151 OF 400

FEMA

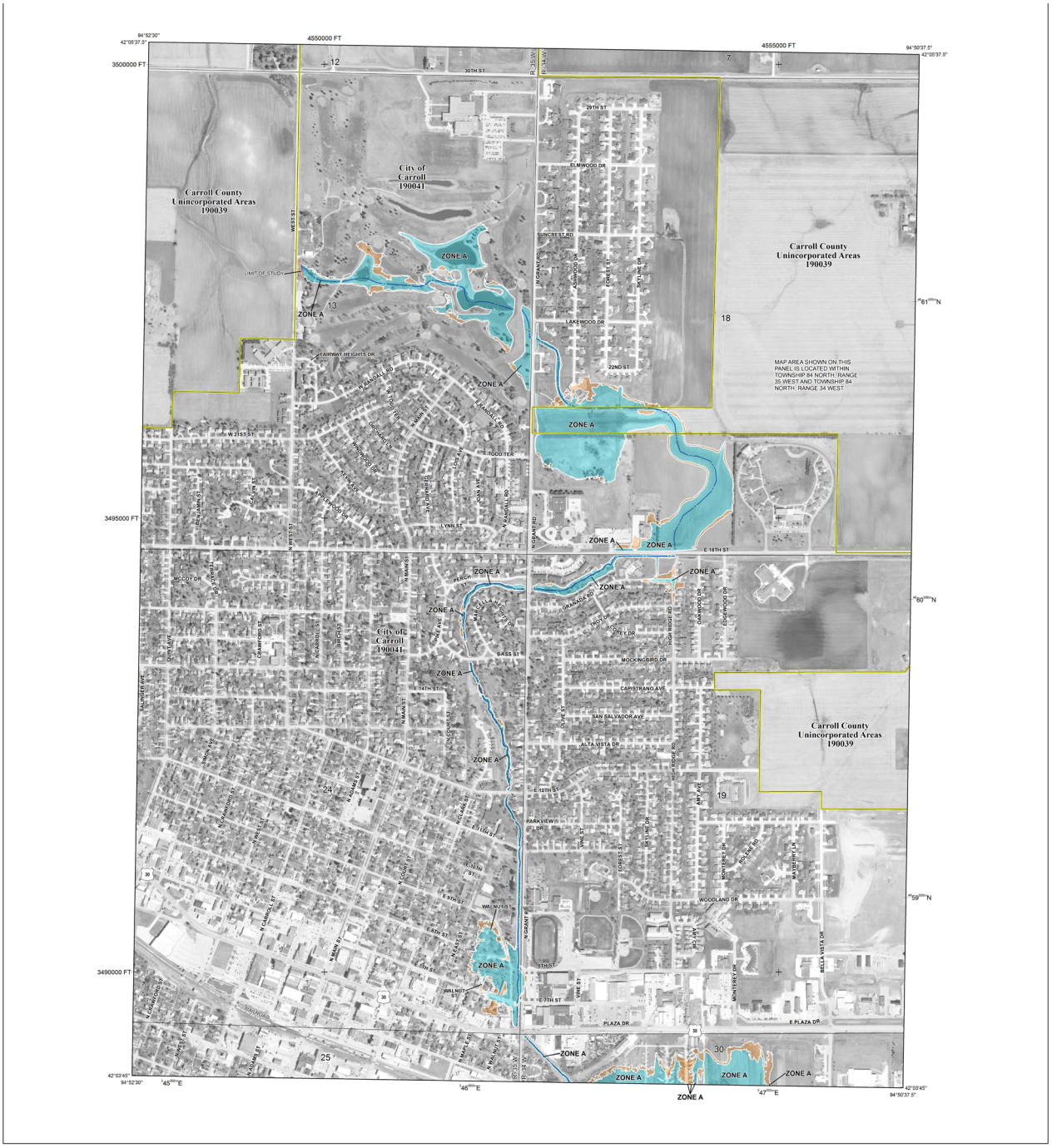
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL, CITY OF	190041	0151	C
CARROLL COUNTY	190039	0151	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0151C

EFFECTIVE DATE
SEPTEMBER 15, 2017



FLOOD HAZARD INFORMATION

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- Regulatory Floodway

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- Area with Reduced Flood Risk due to Levee See Notes *Zone X*

OTHER AREAS
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- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
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- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

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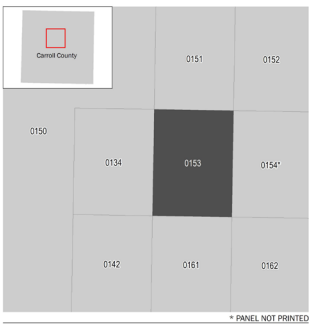
1 inch = 500 feet 1:6,000

0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR



* PANEL NOT PRINTED

FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL 153 OF 400

FEMA

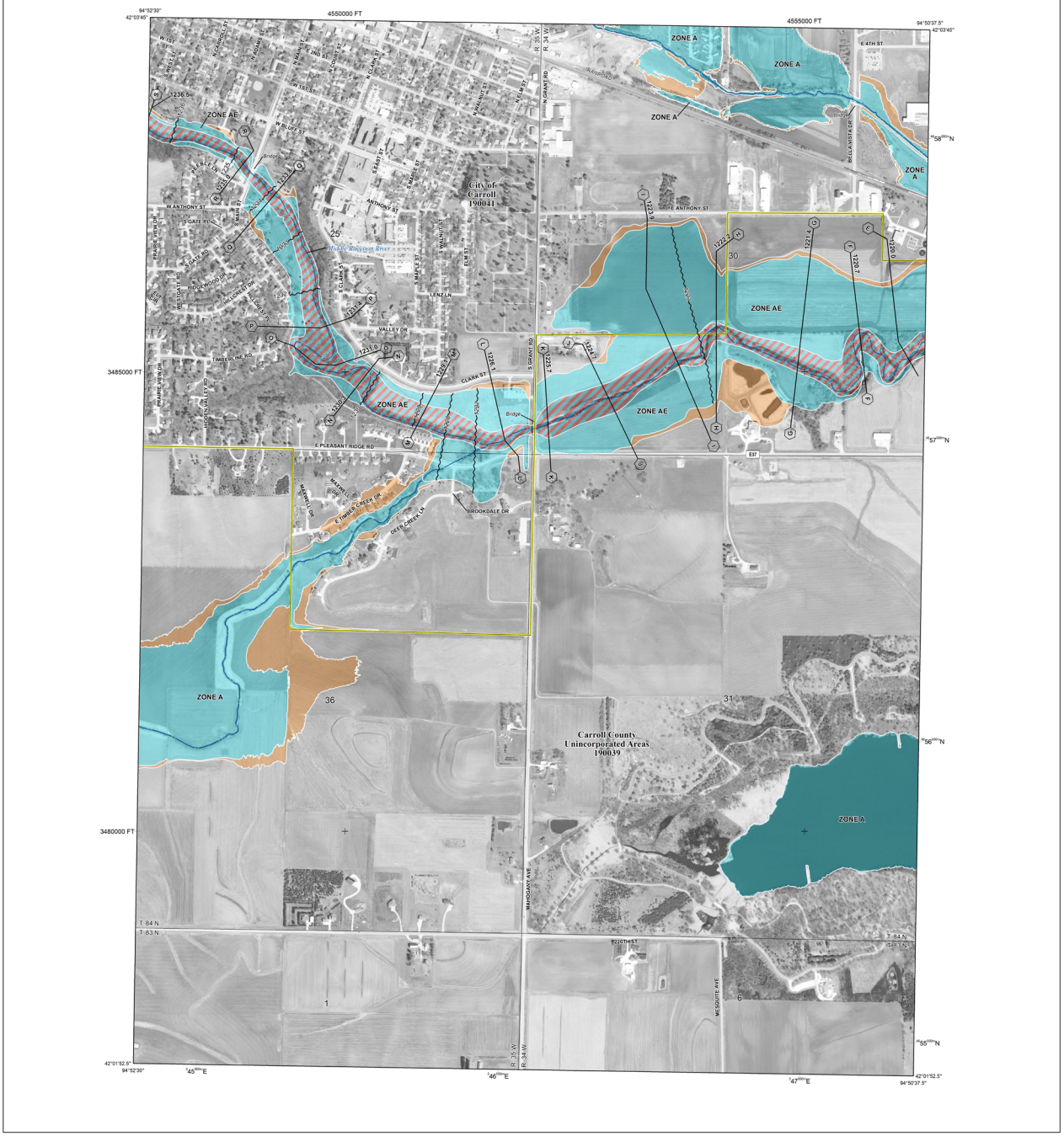
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL, CITY OF	190041	0153	C
CARROLL COUNTY	190039	0153	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0153C

EFFECTIVE DATE
SEPTEMBER 15, 2017


ZONE AE
ZONE A
City of Carroll 190041
Carroll County Unincorporated Areas 190039
Middle Raccoon River
4550000 FT
3485000 FT
3480000 FT
94°52'30"
42°02'45"
94°50'37.5"
42°03'45"
42°01'52.5"
94°52'30"
94°50'37.5"
42°01'52.5"
T 84 N
T 83 N
R 34 W
R 33 W
R 34 W
R 33 W
E 4TH ST
W ANTHONY ST
E ANTHONY ST
E PLEASANT RIDGE RD
CLARK ST
VALLEY DR
TIMBER LINE RD
LENZ LN
E TIMBER CREEK DR
BROOKDALE DR
DEER CREEK LN
MAHOGANY AVE
MS SOUTE AVE
220TH ST
N GRANT RD
BELLA VISTA DR
PRAIRIE VIEW DR
MEADOWLARK DR
MISTY HOLLOW RD
ROLLING HILLS DR
ROCKWOOD DR
MEADOW LN
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1223.1
1223.7
1224.2
1224.7
1225.1
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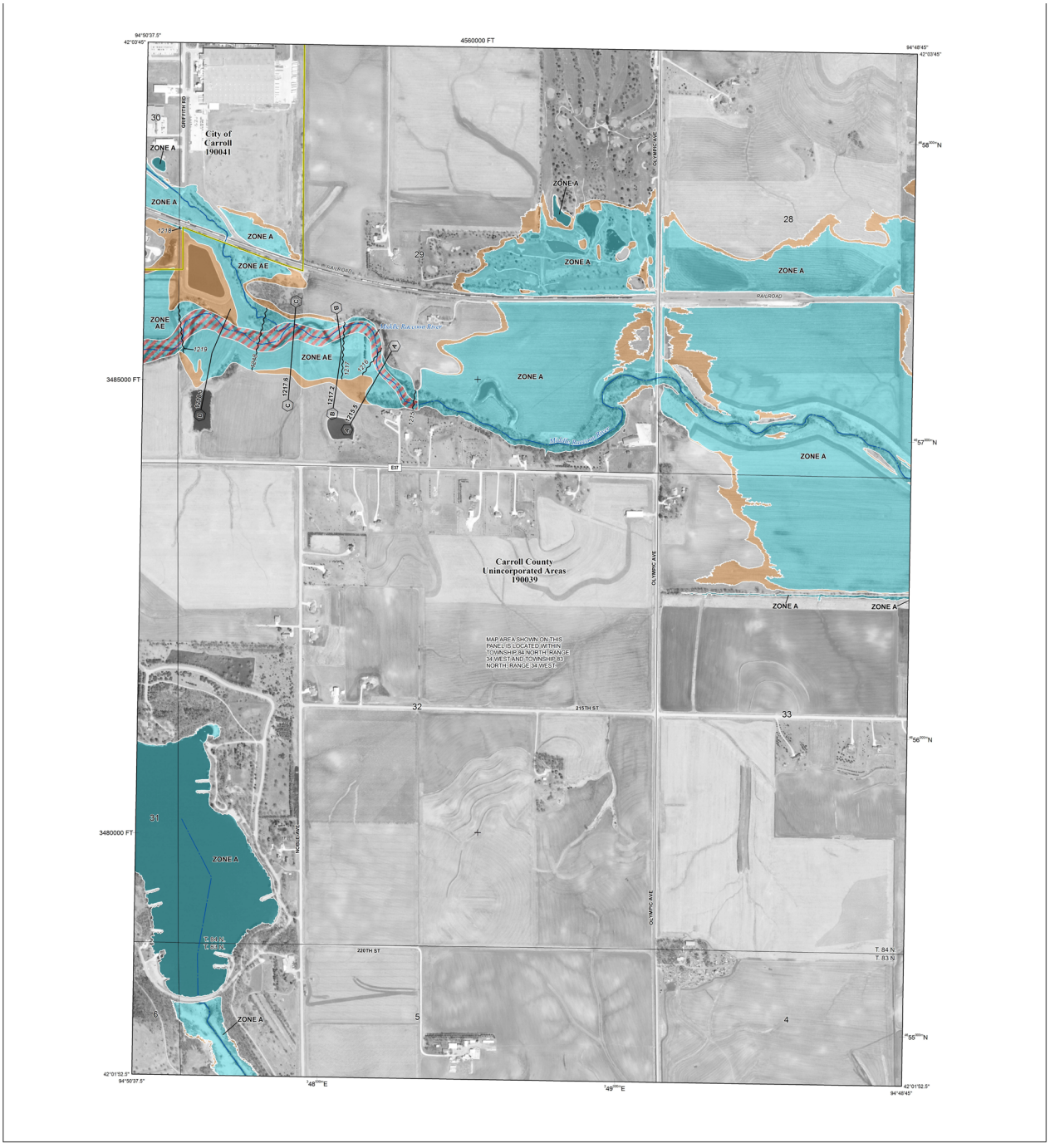

FLOOD HAZARD INFORMATION

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OTHER AREAS	Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer Levee, Dike, or Floodwall
OTHER FEATURES	18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE) Coastal Transect Coastal Transect Baseline Profile Baseline Hydrographic Feature Base Flood Elevation Line (BFE) Limit of Study Jurisdiction Boundary

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SCALE

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0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR

* PANEL NOT PRINTED

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL 162 OF 400

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL, CITY OF	190041	0162	C
CARROLL COUNTY	190039	0162	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0162C

EFFECTIVE DATE
SEPTEMBER 15, 2017

There have been some changes in the plan's project priorities since the last update. Some projects that were prioritized as a high priority have been completed utilizing available grant and local funds. Other projects that were not high priority were implemented as funds were available, and those that either had no funding available or were not a high priority were not implemented during this planning period. The City's Mitigation Actions were developed with the city's new priorities in mind which have shifted from the last planning period due to changes in elected officials and staff. The priorities also have changed due to the city's economic climate and instances of hazards that have impacted the community.

Status of Previous Mitigation Actions

Table D.16: City of Carroll Status of Previous Mitigation Actions

	Status				
Previous Actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not Implemented**
Continue to test indoor and outdoor warning sirens			X		
Educate public on Alert Iowa notification			X		
Complete current plan and make plans to update every five years			X		
Inform public on hazardous materials locations and hazards				X	
Designate shelters	X				
Build safe rooms in all schools			X		
Purchase back-up system for all water and wastewater systems			X		
Upgrade generator at the Carroll Rec Center				X	
Provide funding needed to train personnel (fire, EMS, and police)			X		
Pursue second railroad overpass near fire department to allow EMS, fire, and police protection throughout community					X
Fence area at water treatment plant and provide security at all facilities	X				
Continue to repair and replace wastewater lines that are causing sewer back up problems			X		
Construct or designate a storm shelter for mobile home park residents				X	
Evaluate installing a safe room when making upgrades to the Rec Center	X				
Install generator hook-up in the renovated Rec Center	X				

	Status				
Previous Actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not Implemented**
Upgrade storm warning sirens and self testing			X		
Upgrade fire equipment			X		
Upgrade police equipment			X		
Upgrade Emergency Response Team Equipment and Vehicles			X		
Make upgrades to the city's storm sewer system			X		

Action Plan

Section 201.6 (c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

Section 201.6 (c)(3)(iii): The mitigation strategy shall include an action plan, describing how the action 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 associated costs.

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

Table D.17: City of Carroll Action Plan

Goal 1	**Enhance Community Protection**
Objective 1	Improve Public Warning Capabilities
Objective 2	Maintain Current Hazard Mitigation Plan
Objective 3	Hazardous Materials-tier II sites
Objective 4	Provide Shelter Facilities in case of Disasters
Objective 5	Increase Protection of Public Infrastructure
Goal 2	**Protect Against Power Outage**
Objective 1	Provide Back-Up Systems for Critical Systems and Assets
Goal 3	**Maintain and Support Public Safety, Including Facilities, Equipment, and Training**
Objective 1	Improve First Responder Resources and Capabilities
Goal 4	**Maintain and Protect Public Infrastructure**
Objective 1	Maintain and Improve Roads, Bridges, and Other Transportation
Objective 2	Maintain and Improve Water Mains, Power Lines, Stormwater Systems, and Other Critical Assets

Table D.18: City of Carroll Mitigation Actions

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Continue to test indoor and outdoor warning sirens	Tornado, Windstorm, Thunderstorm/Lightning/ Hail	High	Emergency Services	Low	City Funds	Emergency Services	Ongoing
Educate public on Alert Iowa notification	Extreme Heat, Severe Winter Storms, Tornado, Thunderstorm/Lightning/ Hail, Hazardous Material	Mod	Emergency Services	Low	City Funds	Public Education and Awareness	Mid
Complete current plan and make plans to update every five years	Animal/Plant/Crop Disease, Drought, Earthquake, Expansive Soils, Extreme Heat, Flash Flood, Grass/ Wild Land Fire, HAZMAT Incident, Human Disease, Infrastructure Failure, Levee/ Dam Failure, Radiological, River Flooding, Severe Winter Storm, Terrorism, Thunderstorm/Lightning/ Hail, Tornado, Transportation Incident, Windstorm	Mod	City, County, School District, KCS Board	Low	City Funds, Carroll School, Kuemper School, HMGP Grant, State Match	Public Education and Awareness	Mid
Re-Evaluate and update disaster plan for Carroll CSD and Kuemper	Terrorism	High	School District, KCS Board	Low	Carroll School, Kuemper School	Prevention	Short
Inform public on hazardous materials locations and hazards	Hazardous Material	Mod	City Council	Minimal	City Funds	Public Education and Awareness	Mid
Designate shelters	Tornado, Windstorm	Low	City Council	Minimal	City Funds	Emergency Services	Mid

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Build safe rooms in all schools	Tornado, Terrorism	Mod	Carroll School, Kuemper School	Moderate	City Funds, Carroll School, Kuemper School, HMGP Grant, State Match, Local Foundations	Structural Project	Long
Purchase back-up system for all water and wastewater systems	Infrastructure Failure	Mod	Public Works	Moderate	City Funds, USDA Community Facilities, Iowa SRF, CDBG	Property Protection	Long
Purchase and install upgraded generator at the Carroll Rec Center	Infrastructure Failure, Severe Winter Storm, Tornado, Windstorm	Low	City Council	Moderate	City Funds, HMGP, State Match, Local Foundations	Emergency Services	Long
Continue to repair and replace wastewater lines that are causing sewer back up problems	Infrastructure Failure	Mod	Public Works	High	City Funds, CDBG, USDA Community Facilities, Iowa SRF Grants and Loans	Property Protection	Long
Construct or designate a storm shelter for mobile home park residents	Tornado	Low	City Council	Minimal	City Funds, HMGP, State Match, Local Foundations	Emergency Services	Mid
Upgrade and add as necessary storm warning sirens	Tornado, Windstorm, Thunderstorm/Lightning/ Hail	High	City Council	Moderate	City Funds, HMGP, State Match, USDA Community Facilities	Emergency Services	Short
Make upgrades to the city's storm sewer system	Flash Flood, River Flooding, Severe Winter Storm	High	City Council	High	City Funds, CDBG, USDA Community Facilities, Iowa SRF Grants and Loans	Property Protection	Short
Regularly inspect the high hazard dam located in the northern portion of the city for structural breakdown	Dam/Levee Failure	Mod	City Council, Iowa DNR	Minimal	City Funds	Structural Project	Ongoing

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Improve water system efficiency - active maintenance/digital tools to detect and fix leaks promptly	Drought	High	City Council	High	City Funds, CDBG, Iowa SRF Grants and Loans, USDA Community Facilities	Structural Project	Ongoing
Utilize Conservation Education Program funding to educate the public about their environment	Grass/Wild Land Fire	Mod	City Council, County Conservation	Minimal	City Funds, CEP Funding	Public Education and Awareness	Ongoing
Hold/post educational information about Iowa 511 and its benefits to drivers	Transportation Incident	High	City Council	Minimal	City Funds	Public Education and Awareness	Short
I.T. Backup & Protection	Terrorism	High	City Council	Minimal	City Funds	Prevention	Ongoing

Table D.19: Carroll Community School District Risk Assessment

Hazard	Comments
Extreme Heat	Extreme heat events continue to impact Carroll and the Carroll Community School District. Education may be one of the best action tools to combat the effects of extreme heat as individuals need to know the effects of extreme heat and how it can affect the body.
Flash Flood	Since 2020, there have been no instances of flash flooding in the City of Carroll. While flash floods have little to no warning time, with no instances within the last planning period, the committee has determined this hazard is not a high priority hazard to address, but will consider mitigation actions to prepare the community for response to an event.
Human Disease	Iowa and more specifically the City of Carroll are still feeling the effects of the COVID-19 pandemic. The school district continues to have certain precautions and policies in place to better protect students and faculty. The pandemic has reignited the need to plan for future outbreaks and examine the city and school's current practices. The pandemic also reminded the public the importance of staying informed and staying vigilant to protect themselves.
Infrastructure Failure	Infrastructure failures occur with little to no warning and can cause major disruptions within the community. Planning to respond to this hazard is important to the community to protect lives and property. The most likely infrastructure failure within the Carroll School District would be structural failure of either bridges or roadways. These failures would impact busing primarily. As these instances have no warning time, planning must be completed prior to an event happening to be able to respond in a quick manner.
Severe Winter Storm	Severe Winter Storms continue to impact the City of Carroll and the School District. These storms while historically, have caused little damage, continue to build in strength, threatening property and lives within the city. The warning period of this hazard continues to grow with meteorological advances, but can still pose great risks to the community. These instances can require the school to be able to change schedules and bus routing to ensure the safety of the children.
Terrorism	There have been no instances of terrorism in the City of Carroll or the Carroll Community School District during the previous plan period and the committee feels there will be no instances during the life of this plan. If an instance were to occur, the committee feels it would be a targeted incident that would not threaten the entire community.
Thunderstorm/ Lightning/Hail	Thunderstorm/lightning/hail instances are frequent within the community. While they are frequent, most storms pose no threat to life or property. This hazard is prevalent in Carroll but is normally not severe in nature.
Tornado	Carroll County has experienced a number of tornadoes in the recent past, but the City of Carroll has not been impacted directly. While the city has not experienced any tornadoes within the past planning period, it is important for the city to continue to plan for the response to tornadoes as storms within Iowa continue to grow in strength. Preparing the public and community is vital to ensuring there is no loss of life.

Transportation Incident	Speed limits within the majority of the City of Carroll are relatively low, but portions of the school district have higher speed limits. With a portion of the district having lower speed limits, it is likely that any transportation incident between vehicles is likely to cause little damage to property or humans, but there is a chance of an incident which can cause extensive damage. The committee anticipates that this hazard will effect the district in varying degrees throughout the planning period.
Windstorm	Recent windstorms have caused reported damage to properties. These hazard events continue to build in magnitude, causing increasingly large amounts of damage to property and posing threats to lives. The recent derechos effected Carroll prompting the community to prepare more effectively for these hazards.

Carroll Community School District Action Plan

Section 201.6 (c)(3)(iii): The mitigation strategy shall include an action plan, describing how the action 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 associated costs.

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

Table D.20: Carroll Community School District Action Plan

Goal 1	**Minimize damage to critical facilities, infrastructure, and other school assets from the effects of hazards**
Objective 1	Improve early warning signs
Objective 2	Improve infrastructure
Objective 3	Provide back-up assistance for all critical systems
Goal 2	**Minimize to the greatest possible extent the vulnerability of the students and visitors to the Carroll Community Schools to the impacts of all identified hazards**
Objective 1	Protection of school children and staff
Goal 3	**Improve coordination, communication, and response operations with other relevant organizations**
Objective 1	Provide education and training
Objective 2	Improve first responder resources and capabilities
Goal 4	**Improve public communication, education, and awareness of hazards and their risks to the Carroll Community School District**
Objective 1	Provide education and training

Table D.21: Carroll Community School District Mitigation Actions

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Backup generators at all school buildings	Infrastructure Failure, Extreme Heat, Severe Winter Storm, River Flooding, Flash Flooding, Dam/ Levee Failure	Medium	Superintendent, School Board, Maintenance Position	Moderate	School Funds, FEMA HMGP, Local Foundations	Emergency Services	Mid
Build a safe room(s) in the school	Infrastructure Failure, Tornado, Windstorm	High	School Board, Superintendent, School District's Engineering Firm	High	School Funds, City Funds, FEMA HMGP, Local Foundations	Prevention	Short
Training on bus evacuation	Transportation Incident	High	Transportation Director, Bus Drivers	Low	School Funds, Training Grants	Emergency Services	Ongoing
Continue to train local volunteers as much as feasibly possible	Terrorism, Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado, Flash Flood, Windstorm, Transportation Incident	High	Carroll School District	Minimal	School Funds, FEMA AFG & SAFER	Public Education and Awareness	Ongoing
Install GPS in all school buses	Transportation Incident	Low	Carroll School District	Moderate	School Funds, Iowa Department of Education	Emergency Services	Mid
Continued practice of drills and safety procedures with children at school	Tornado, Infrastructure Failure, Terrorism, Windstorm	High	Carroll School District	Low	City Funds, School Funds	Public Education and Awareness	Ongoing
Create an emergency operations plan with an infections disease section	Human Disease	High	Carroll School District, Carroll County Public Health	Minimal	School Funds	Prevention	Short
Plant trees & other vegetation to manage runoff	River Flooding, Flash Flooding, Dam/Levee Failure	High	Carroll School District	Minimal	School Funds, Local Foundations	Prevention	Short

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Regularly search water lines for leaks to ensure water is not wasted	Drought	Medium	Carroll School District	Minimal	School Funds	Prevention	Ongoing
Create or update comprehensive heat emergency plans, including procedures for modifying activities, providing cool spaces, and communicating with families.	Extreme heat	High	School Board, Teachers, Administration	Minimal	School Funds	Prevention	Short
Regularly prune trees and shrubs, remove dead leaves and debris, and ensure proper irrigation.	Grass/Wild Land Fire	High	Maintenance	Minimal	School Funds	Prevention	Ongoing

Table D.22: Kuemper Catholic School Risk Assessment

Hazard	Comments
Extreme Heat	Extreme heat events continue to impact Carroll and the Kuemper Catholic School. Education may be one of the best action tools to combat the effects of extreme heat as individuals need to know the effects of extreme heat and how it can affect the body.
Flash Flood	Since 2020, there have been no instances of flash flooding in the City of Carroll. While flash floods have little to no warning time, with no instances within the last planning period, the committee has determined this hazard is not a high priority hazard to address, but will consider mitigation actions to prepare the community for response to an event.
Human Disease	Iowa and more specifically the City of Carroll are still feeling the effects of the COVID-19 pandemic. The school district continues to have certain precautions and policies in place to better protect students and faculty. The pandemic has reignited the need to plan for future outbreaks and examine the city and school's current practices. The pandemic also reminded the public the importance of staying informed and staying vigilant to protect themselves.
Infrastructure Failure	Infrastructure failures occur with little to no warning and can cause major disruptions within the community. Planning to respond to this hazard is important to the community to protect lives and property. The most likely infrastructure failure within the Kuemper Catholic School would be structural failure of either bridges or roadways. These failures would impact busing primarily. As these instances have no warning time, planning must be completed prior to an event happening to be able to respond in a quick manner.
Severe Winter Storm	Severe Winter Storms continue to impact the City of Carroll and Kuemper Catholic School. These storms while historically, have caused little damage, continue to build in strength, threatening property and lives within the city. The warning period of this hazard continues to grow with meteorological advances, but can still pose great risks to the community. These instances can require the school to be able to change schedules and bus routing to ensure the safety of the children.
Terrorism	There have been no instances of terrorism in the City of Carroll or the Kuemper Catholic School during the previous plan period and the committee feels there will be no instances during the life of this plan. If an instance were to occur, the committee feels it would be a targeted incident that would not threaten the entire community.
Thunderstorm/ Lightning/Hail	Thunderstorm/lightning/hail instances are frequent within the community. While they are frequent, most storms pose no threat to life or property. This hazard is prevalent in Carroll but is normally not severe in nature.
Tornado	Carroll County has experienced a number of tornadoes in the recent past, but the City of Carroll has not been impacted directly. While the city has not experienced any tornadoes within the past planning period, it is important for the city to continue to plan for the response to tornadoes as storms within Iowa continue to grow in strength. Preparing the public and community is vital to ensuring there is no loss of life.

Transportation Incident	Speed limits within the majority of the City of Carroll are relatively low, but portions of the school system have higher speed limits. With a portion of the district having lower speed limits, it is likely that any transportation incident between vehicles is likely to cause little damage to property or humans, but there is a chance of an incident which can cause extensive damage. The committee anticipates that this hazard will effect the district in varying degrees throughout the planning period.
Windstorm	Recent windstorms have caused reported damage to properties. These hazard events continue to build in magnitude, causing increasingly large amounts of damage to property and posing threats to lives. The recent derechos effected Carroll prompting the community to prepare more effectively for these hazards.

Kuemper Catholic School Action Plan

Section 201.6 (c)(3)(iii): The mitigation strategy shall include an action plan, describing how the action 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 associated costs.

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

Table D.23: Kuemper Catholic School Action Plan

Goal 1	**Minimize damage to critical facilities, infrastructure, and other school assets from the effects of hazards**
Objective 1	Improve early warning signs
Objective 2	Improve infrastructure
Objective 3	Provide back-up assistance for all critical systems
Goal 2	**Minimize to the greatest possible extent the vulnerability of the students and visitors to the Kuemper Catholic School to the impacts of all identified hazards**
Objective 1	Protection of school children and staff
Goal 3	**Improve coordination, communication, and response operations with other relevant organizations**
Objective 1	Provide education and training
Objective 2	Improve first responder resources and capabilities
Goal 4	**Improve public communication, education, and awareness of hazards and their risks to the Kuemper Catholic School**
Objective 1	Provide education and training

Table D.24: Kuemper Catholic School Mitigation Actions

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Backup generators at all school buildings	Infrastructure Failure, Extreme Heat, Severe Winter Storm, River Flooding, Flash Flooding, Dam/ Levee Failure	Medium	President, School Board, Maintenance Position	Moderate	School Funds, FEMA HMGP, Local Foundations	Emergency Services	Mid
Build a safe room(s) in the school	Infrastructure Failure, Tornado, Windstorm	High	School Board, President, School District's Engineering Firm	High	School Funds, City Funds, FEMA HMGP, Local Foundations	Prevention	Short
Training on bus evacuation	Transportation Incident	High	Transportation Director, Bus Drivers	Low	School Funds, Training Grants	Emergency Services	Ongoing
Continue to train local volunteers as much as feasibly possible	Terrorism, Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado, Flash Flood, Windstorm, Transportation Incident	High	Kuemper Catholic Schools	Minimal	School Funds, FEMA AFG & SAFER	Public Education and Awareness	Ongoing
Install GPS in all school buses	Transportation Incident	Low	Kuemper Catholic Schools	Moderate	School Funds, Iowa Department of Education	Emergency Services	Mid
Continued practice of drills and safety procedures with children at school	Tornado, Infrastructure Failure, Terrorism, Windstorm	High	Kuemper Catholic Schools	Low	City Funds, School Funds	Public Education and Awareness	Ongoing
Create an emergency operations plan with an infections disease section	Human Disease	High	Kuemper Catholic Schools, Carroll County Public Health	Minimal	School Funds	Prevention	Short
Plant trees & other vegetation to manage runoff	River Flooding, Flash Flooding, Dam/Levee Failure	High	Kuemper Catholic Schools	Minimal	School Funds, Local Foundations	Prevention	Short

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Regularly search water lines for leaks to ensure water is not wasted	Drought	Medium	Kuemper Catholic Schools	Minimal	School Funds	Prevention	Ongoing
Create or update comprehensive heat emergency plans, including procedures for modifying activities, providing cool spaces, and communicating with families.	Extreme heat	High	School Board, Teachers, Administration	Minimal	School Funds	Prevention	Short
Regularly prune trees and shrubs, remove dead leaves and debris, and ensure proper irrigation.	Grass/Wild Land Fire	High	Maintenance	Minimal	School Funds	Prevention	Ongoing

Incorporation into Other Planning Mechanisms

Where possible, Carroll will consider the findings from this document when updating or creating new planning and operating documents. Information from this plan will be utilized to update and expand the following documents:

- Hazard Mitigation Plan
- Comprehensive Plan
- Zoning Ordinance
- Floodplain Regulations
- Housing Needs Assessment
- Building Code
- Strategic Plan

While the city currently does not have any of the plans listed below, if these plans were to be created during the life of this plan, this plan will be used to guide the development of:

- Water Conservation Plans
- Storm Water Management Plans
- Parks and Recreation Plans

Incorporation in to Other Planning Mechanisms- Carroll Community School District

The update of the mitigation strategy will be provided to the School Superintendent for consideration in the next update cycle of the capital improvement plan. Information will be utilized to expand and improve the school's mitigation to potential hazard events.

Incorporation in to Other Planning Mechanisms- Kuemper Catholic School

The update of the mitigation strategy will be provided to the School President for consideration in the next update cycle of the capital improvement plan. Information will be utilized to expand and improve the school's mitigation to potential hazard events.

Appendix E: City of Coon Rapids

Community Profile

History

In 1855, O.J. Niles, from Western Michigan, located on the land of which Coon Rapids now stands. Three years later, a mail route was established between Panora and Sioux City, attracting more residents to the area. In 1861, a man named Winfred bought five acres of land on the river in which he planned to construct a mill. Completion of the mill was delayed after Winfred's men deserted his service for that of the government. In 1863, Crockett Ribble bought the site and several businesses followed, including a tobacco and necessity store and a blacksmith shop. In 1880, the census credited Coon Rapids with a population of 54 individuals. After the completion of the Chicago, Milwaukee & St. Paul Railroad, the community grew significantly. By 1883, the population was estimated at 729 people. Coon Rapids was officially incorporated in December of 1882. The first bank in Coon Rapids was opened in June of 1882. Other notable businesses emerging during this time included a hotel, general store, drug store, elevator, lumber yard, barber shop, grocery store, meat markets, insurance provider, hardware store, harness shop and a bakery.

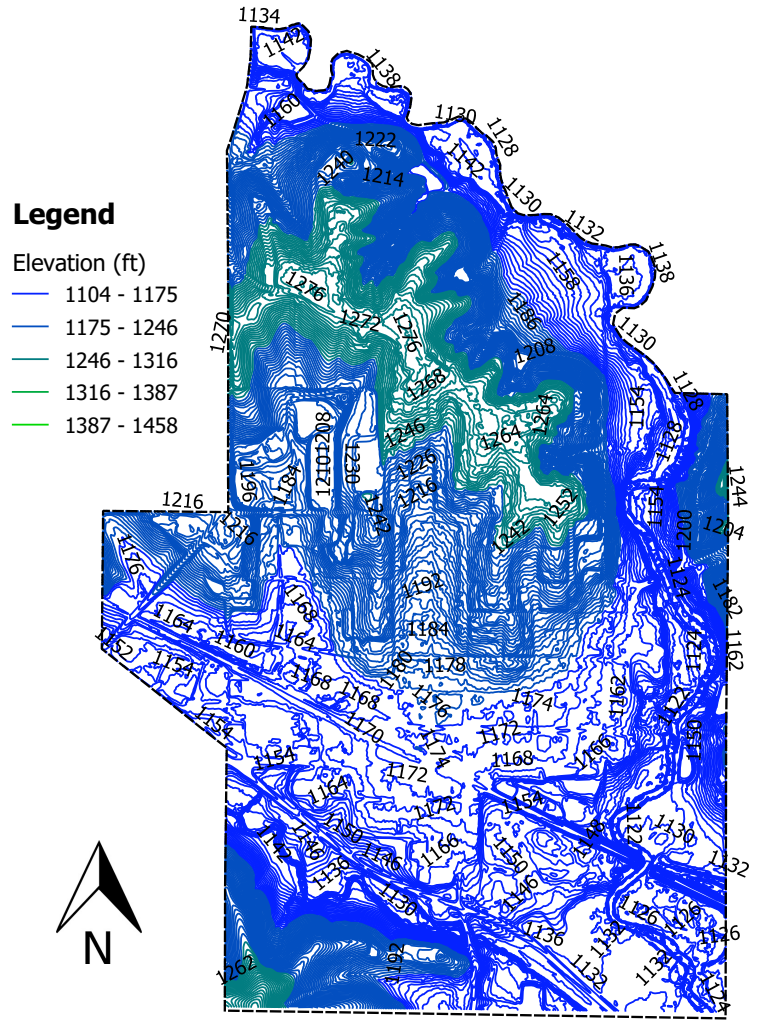
In April of 1886, the City of Coon Rapids was victim to a destructive tornado. Around four p.m. the storm occurred, resulting in the destruction or damage of thirty-two buildings. Only one business was harmed during this storm as the twister mainly affected the residential side of town. The storm also resulted in one casualty and several dwellings and barns destroyed south of town.

Geography and Environment

Coon Rapids is located in the far southeastern corner of Carroll County. Coon Rapids is fortunate to have IA 141 pass through the southern part of town. This provides easy transportation to other places in the region. Coon Rapids is 22.6 miles from Guthrie Center, 24.4 miles from Carroll, 27.9 miles from Audubon, 29.1 miles from Jefferson and 71 miles from Des Moines.

The highest elevation in Carroll County can be found along the eastern side of the county. Here, the elevation can reach as much as 1,550 feet above sea-level. Coon Rapids' elevation reaches a maximum of 1,282 feet and a minimum around 1,122 feet. Map E.1 shows Coon Rapids elevation.

Map E.1: City of Coon Rapids Elevation



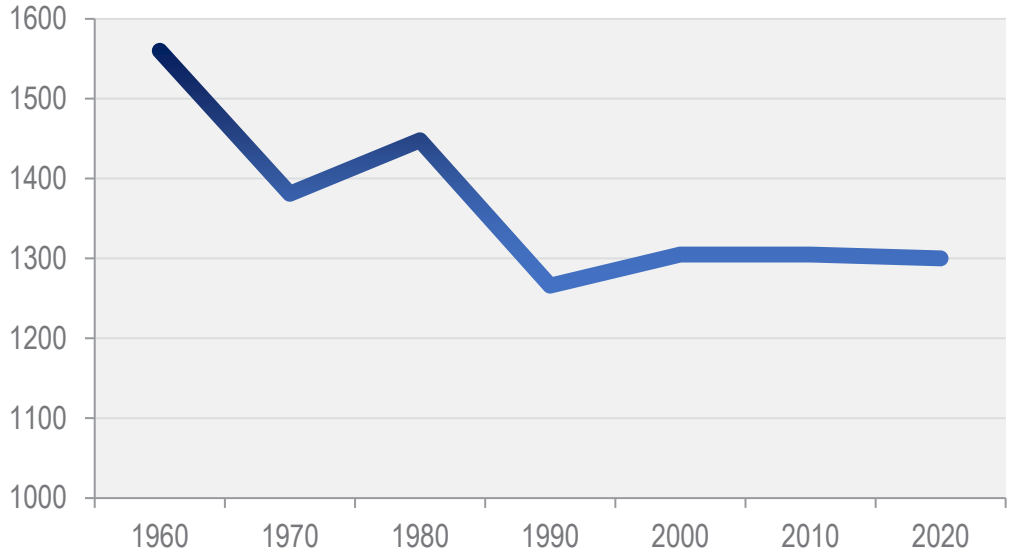
Demographics

The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Coon Rapids' population through past, present, and future trends of the region.

The size and composition of a community's population can exert influence on its development. For instance, population size, composition, and distribution influence the range of businesses a community can support, the pool of workers from which to draw, and the demand for and supply of services. Similarly, the effect people have on the social, economic, and physical environments depends upon the composition, expectations, and distribution of the population. A population's age distribution, income levels, ancestry, and educational attainment are some of the characteristics that mold a community. Population trends give community leaders and elected officials information on what kind of services need to be provided and offers prospective employers an overview of the local labor force.

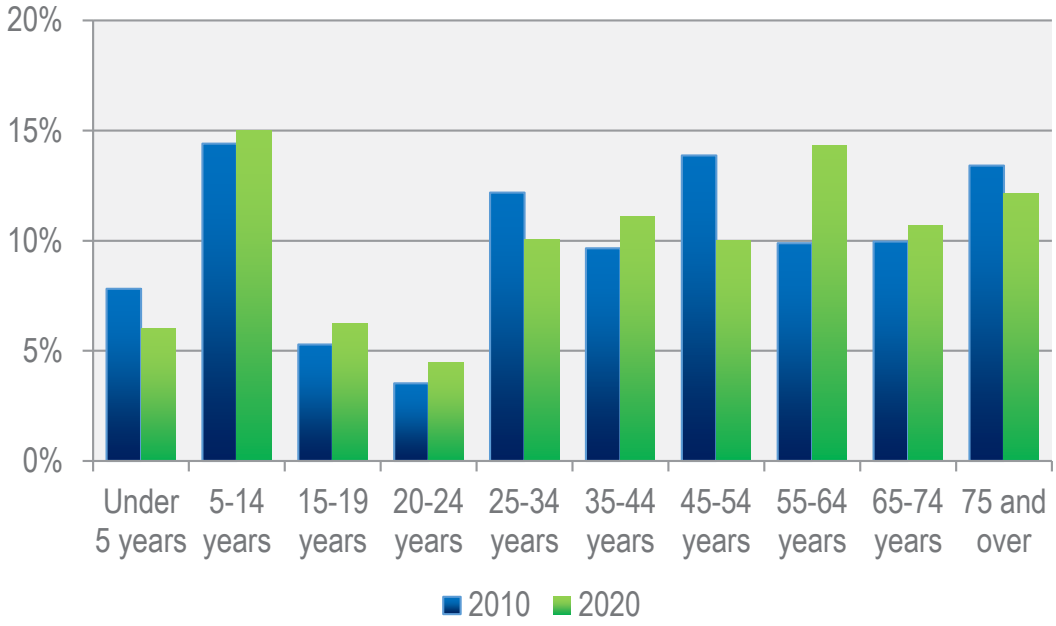
Over the past 50 years, the City of Coon Rapids has experienced a gradual decline in population. In 1960, Coon Rapids had a population of 1,560. Since then, the City's population has declined 16.7% (260 residents) to 1,300 in 2020. The most dramatic change happened between 1980 and 1990 when the city lost 182 residents. Figure E.1 shows the City of Coon Rapid's population trend since 1960.

Figure E.1: City of Coon Rapids Historic Population, 1960-2020



The City's population is not very different from other parts of Carroll County, and even most of the State of Iowa. Population cohorts at age 50 and above have generally higher numbers than other younger cohorts. This information can be found in figure E.2.

Figure E.2: City of Coon Rapids Age Distribution, 2010 & 2020



Housing

A community's ability to attract new residents is important. One of the most important aspects to attracting residents is housing. A community's housing stock, type of households, and housing availability and affordability are determining factors.

Since 2010, the city's housing stock has decreased by 9 units. During this same time, the City saw a 4.8% decrease in vacant properties. Table E.1 shows a breakdown of the city's occupied and vacant housing units.

Table E.1: City of Coon Rapids Housing Units, 2010 & 2022

	2010		2022	
	Number	Percent	Number	Percent
Occupied Housing Units	550	89.7%	544	90.1%
Owner Occupied	402	73.1%	418	76.8%
Renter Occupied	148	26.9%	126	23.2%
Vacant Housing Units	63	10.3%	60	9.9%
Total Housing Units	613	100.0%	604	100.0%

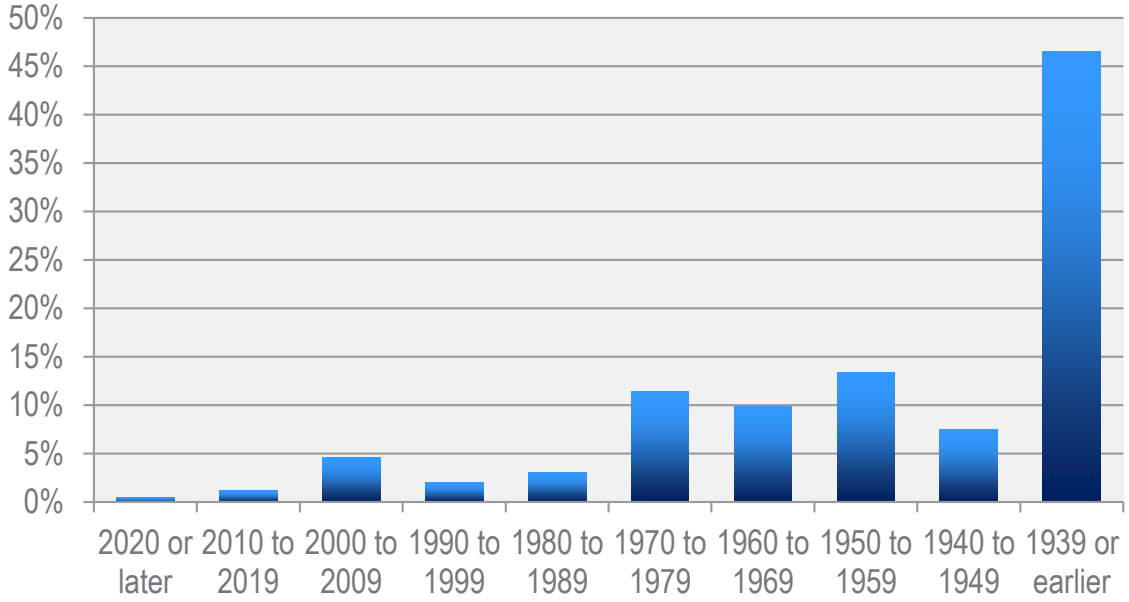
Coon Rapids, like many other small rural towns in Iowa, has a lower median housing value of $116,100. The State of Iowa has a median housing value of $181,600. Coon Rapid's homes can be very affordable and can be used to attract new residents, but they may deteriorate faster and will need a number of repairs and updates. According to the 2022 American Community Survey Estimates, 42.2% of the city's homes are valued less than $100,000. A complete breakdown of the value of homes in Coon Rapids can be found in table E.2. Knowing information about the city's housing stock is useful after a disaster hits to determine how much damage was done, and how it will affect the city moving forward.

Table E.2: City of Coon Rapids Value of Owner-Occupied Units, 2022

Value of Housing Unit	Percent of Homes
Less than $50,000	18.6%
$50,000 to $99,999	23.6%
$100,000 to $149,999	26.6%
$150,000 to $199,999	14.1%
$200,000 to $299,999	14.6%
$300,000 to $499,999	1.7%
$500,000 to $999,999	0.7%
$1,000,000 or more	0.0%

Figure E.3 showcases the year housing units within the City of Coon Rapids were constructed. Like most of the county, Coon Rapids has a large portion (46.5%) of the homes constructed in 1939 or earlier. The city also experienced spikes in construction during 1950-1959 and 1970-1979. The 1950s saw 13.4% of the city's homes being built while the 1970s were the second largest housing construction year with 11.4% of the city's housing being built. Building standards of today utilize the most recent construction materials and safety features, ensuring that the new residential structures are as safe as possible. This does not mean that older homes are more unsafe, just that they may be more susceptible to hazard damage.

Figure E.3: City of Coon Rapids Year Housing Units Constructed, 2022



Economics

An important indicator of the economic base in Coon Rapids is per capita income and median household income. Per capita income is the total income in a geographic area divided by the total population of an area. Median household income arranges all household incomes from the lowest value to the highest value and then finds the value in the middle.

Table E.3 shows that incomes of those living in Coon Rapids are slightly lower than the Carroll County average and also lower than the State of Iowa median income of $70,571. The City of Coon Rapid's household income breakdown is similar to the other rural communities in the area, and the combination of more affordable housing with the current incomes generally provides residents with a decent quality of life. Some residents of Coon Rapids commute to other larger neighboring cities like Carroll, Jefferson, or Audubon where more employment opportunities are present.

Table E.3: City of Coon Rapids Household Income, 2022

Income and Benefits (2022 Inflation-Adjusted Dollars)	Number of Households	Percent of Households
Less than $10,000	9	1.7%
$10,000 to $14,999	16	3.0%
$15,000 to $24,999	48	9.1%
$25,000 to $34,999	63	11.9%
$35,000 to $49,999	64	12.1%
$50,000 to $74,999	129	24.4%
$75,000 to $99,999	94	17.8%
$100,000 to $149,999	84	15.9%
$150,000 to $199,999	19	3.6%
$200,000 or more	3	0.6%
Median Household Income	$61,058	-
Mean Household Income	$67,539	-

Coon Rapids, overall, is a small rural community in a small rural county. Table E.4 breaks down what industry Coon Rapids residents work in. Educational services, and health care and social assistance employ the largest cohort of residents with 19.0% of the city's residents being employed in this industry. Manufacturing is the second leading industry in terms of employing Coon Rapids residents. Manufacturing employs 16.7% of the community.

Table E.4: City of Coon Rapids Employment by Industry, 2022

Industry	Number	Percent
Total civilian non-farm employment, 16 years and over	642	100.0%
Agriculture, Forestry, Fishing, Hunting, Mining	38	5.9%
Construction	71	11.1%
Manufacturing	107	16.7%
Wholesale Trade	24	3.7%
Retail Trade	91	14.2%
Transportation and warehousing and utilities	55	8.6%
Information	3	0.5%
Finance and insurance, and real estate and rental and leasing	42	6.5%
Professional, scientific, management, administrative, and waste management services	37	5.8%
Educational, health care, and social assistance	122	19.0%
Arts, entertainment, recreation, accommodation, and food services	22	3.4%
Other services, except public administration	22	3.4%
Public Administration	8	1.2%

Existing Documents & Capabilities

Table E.5 provides a compilation of the current planning and regulatory documents in place for the City of Coon Rapids. The table also shows the last time the documents were last updated. These documents help understand the process the city has already undertaken and what documents can be created to help guide the city. First and foremost is the previous hazard mitigation plan as this document lays out specific strategies to help the city reduce the impact hazards have on the community and those who live in it. Coon Rapids has a comprehensive plan and a zoning code. These two documents work hand-in-hand to guide the future development of the city. The comprehensive plan takes a deep dive into the city's inventory of assets, utilities, and infrastructure. This plan also includes a hazard chapter which addresses some disaster response items as well as mitigation for the future. The city's zoning code was created to keep certain zones away from one another to reduce the risk to humans and structures. The different zones can pose different threats to others, such as some industrial uses having a higher HAZMAT incident probability which if located in a residential zone, could pose large health issues to the overall population. The zoning codes also include information for street and sidewalk regulations which can reduce the number of transportation incidents. The City's housing needs assessment has allowed the city to take inventory of the current housing situation and determine what steps are necessary to reduce the impact hazards have on the housing stock.

The City of Coon Rapids is a proactive community, which benefits them in regards to mitigation of hazards. A capital improvement plan which lays out future projects and necessary funding would help the city budget for, and allow them to be proactive, not reactive to future needs. Expanding conversations with the local COG and engineering firms would allow the city to explore additional options that have worked in similar communities facing similar situations. Outside organizations are also beneficial with finding funding for projects which otherwise may be out of the city's budget. Road, water, and sewer infrastructure continues to need upgrades and pursuing funding opportunities could reduce impacts of hazards on these infrastructure types. Training staff to current requirements would allow for a more thought-out response to a hazard or hazard warning. Cross training staff regardless of responsibility on different departments can better prepare the city and can lead to things being noticed that previously went unnoticed.

Table E.5: City of Coon Rapids Existing Documents

Document	Yes/No	Year
Previous HMP	Yes	2020
Comprehensive Plan	Yes	2016
Building Code	State	2010
Zoning Ordinance	Yes	2006
Strategic Plan	Yes	2003
Housing Needs Assessment	Yes	2017
NFIP Participant	Yes	1986
Floodplain Regulations	Yes	2017

NFIP Participation

In the past, there have been instances of flooding within the city limits of Coon Rapids. Coon Rapids started participating in the NFIP in 1986, and the flood map was updated and adopted in 2017. The city's FIRMs can be found in the later in this appendix. The Zoning Enforcement Officer also acts as the Floodplain Administrator for the city. Any development/demolition in the floodplain is required to obtain a permit which regulates the development/demolition and lays out the NFIP regulations that must be followed. Coon Rapids participates in the NFIP and implements substantial improvement / substantial damage provisions in the following manner:

Local officials (1) determine the cost of work, (2) determine the market value of buildings, (3) make SI/SD determinations and provide determinations to property owners, and (4) require owners to obtain permits to bring substantially improved and substantially damaged structures into compliance with the floodplain management requirements.

Outlook and Future Development

Since the last plan update, there has been development within Coon Rapids on a moderate level. A few new homes have been constructed, increasing the city's housing stock. These homes have been located throughout town with a few being developed on infill lots. Along with residential development has been residential rehabilitation, which has improved the housing stock. Commercial development/redevelopment along Iowa Highway 141 has occurred with a large energy consumer locating just north of the highway. Other businesses have located within the city's main street district and in other portions of town. The community's downtown saw a large facade rehabilitation program happen which made the participating buildings more structurally sound.

Over the life of this plan, the city anticipates this development to continue. There are commercial and industrial businesses within the community that may expand within the life of this plan. These businesses are spread throughout the community as they all serve different purposes. Some of the commercial businesses, located on the city's main street, may renovate their exterior and some may expand into other buildings if the opportunity presents itself. Residential development on a similar scale is expected to continue as well as residential rehabilitation.

Critical Facilities

Critical facilities are facilities that are critical to the health and welfare of the population and are especially important following hazard events. Every jurisdiction is unique in such way that the list of critical facilities can vary widely from community to community. Coon Rapids' critical facilities can be found on map E.2.

Essential Infrastructure

Knowing what services and infrastructure serve the city can be beneficial in a time of disaster so the appropriate companies can be contacted in need of utility shutoff or transportation routes. The city's essential infrastructure and services can be found in Table E.6.

Table E.6: City of Coon Rapids Essential Infrastructure and Services

Major Arterials	IA Highway 141	**Air Service**	Arthur N. Neu Airport
Water Service	Coon Rapids Municipal	**Sewer Service**	Coon Rapids Municipal
Electric Service	Coon Rapids Municipal	**Gas Service**	Coon Rapids Municipal
Sanitation/Solid Waste	Carroll Refuse	**Landfill**	Carroll County Landfill
Phone and Internet	Coon Rapids Municipal, Wireless	**Law Enforcement**	Coon Rapids Police Department
Fire Service	Coon Rapids Fire Department	**Ambulance Service**	Coon Rapids Ambulance, Carroll County Ambulance Service

Table E.7: City of Coon Rapids Critical Facilities

Number on Map	Name	Address	Type
1	CENEX	1005 Hwy Street	HAZMAT
2	Coon Rapids City Hall	123 South 3rd Avenue	Essential Facility
3	Coon Rapids Country Store	516 IA-141	HAZMAT
4	Coon Rapids Fire Department	613 Velvet Avenue	Essential Facility
5	Coon Rapids Municipal Utilities	123 South 3rd Avenue	Utility
6	Coon Rapids Public Library	123 South 3rd Avenue	Public
7	Coon Rapids-Bayard Schools	905 North Street	Vulnerable Population
8	Mike's Plumbing & Pump	401 Sumpter Avenue	HAZMAT
9	American Legion Community Building	419 Main Street	Vulnerable Population
10	South Station	301 S 5th Avenue	HAZMAT
11	Thomas Rest Haven	217 Main Street	Vulnerable Population

Coon Rapids - Bayard School System

All of the district's buildings are located within the City of Coon Rapids. All of the school's grades are located within one building located at 905 North Street, Coon Rapids. The District's Vision Statement, as found on the District's website is "CR-B fosters individuals who are connected to their communities, confident in themselves, excited about living, learning, and contributing to our world." Students and staff participate in drills and educational programs related to hazards and the mitigation of them. The District maintains its own equipment and supplies to maintain roads and walkways on campus.

Table E.8: Coon Rapids-Bayard Community School District Enrollment

School Year	Facility	Enrollment	Facility	Enrollment	Total Enrollment
2018-19	Elementary	191	Secondary School	236	427
2019-20	Elementary	188	Secondary School	247	435
2020-21	Elementary	219	Secondary School	212	431
2021-22	Elementary	221	Secondary School	208	429
2022-23	Elementary	226	Secondary School	210	436
2023-24	Elementary	216	Secondary School	217	433

Map C.2: City of Coon Rapids Critical Facilities

Table E.9: City of Coon Rapids Risk Assessment

Hazard	Comments
Animal/Plant/Crop Disease	The City of Coon Rapids contains a measurable amount of agricultural land. Although this land represents a recognizable portion of the community, there have been minimal reported losses from animal/plant/crop disease within in the community. While this does impact the community, it is normally indirectly impacted.
Drought	Drought occurrences have increased across the state, and the City of Coon Rapids has not been exempt from this hazard. Droughts continue to increase in severity and while there is little warning, this hazard can cause both direct and indirect issues for the City and it's residents.
Earthquake	There have been no instances of earthquake in the City of Coon Rapids, and the committee feels there will be no instances during the life of this plan.
Expansive Soils	There have been no instances of expansive soils in the City of Coon Rapids and the committee feels there will be no instances during the life of this plan.
Extreme Heat	Extreme heat events impact the City of Coon Rapids. Education may be one of the best action tools to combat the effects of extreme heat as individuals need to know the effects of extreme heat and how it can affect the body.
Flash Flood	Since 2020, there have been no reported instances of flash flooding in the City of Coon Rapids. While flash floods have little to no warning time, with no instances within the last planning period, the committee has determined this hazard is not a high priority hazard to address, but will consider mitigation actions to prepare the community for response to an event.
Grass/Wild Land Fire	Grass and wild land fires are most commonly field fires or controlled burns that get out of hand in and immediately surrounding the city. This hazard can pose a large threat to the community as elements out of anyone's control, such as wind direction and speed, can change this hazard from harmless and controlled to out of control in a matter of minutes and can pose a threat to life.
HAZMAT Incident	Within the most recent planning period, there have been no instances of hazardous spills within the City of Coon Rapids. With events in the past five years, the committee feels this hazard is a small threat to the community, but mitigation actions should still be considered and implemented to prevent any instances in the future.
Human Disease	Iowa and more specifically the City of Coon Rapids are still feeling the effects of the COVID-19 pandemic. The pandemic has reignited the need to plan for future outbreaks and examine the city's current practices. The pandemic also reminded the public the importance of staying informed and staying vigilant to protect themselves.
Infrastructure Failure	Infrastructure failures occur with little to no warning and can cause major disruptions within the community. Planning to respond to this hazard is important to the community to protect lives and property. The most likely infrastructure failure within Coon Rapids would be structural failure of either bridges or roadways. As these instances have no warning time, planning must be completed prior to an event happening to be able to respond in a quick manner.

Levee/Dam Failure	There is one low hazard dam located within Coon Rapids, and there are no high hazard dams on waterways that lead into the city. It is unlikely that levee or dam failure will impact the city, but the committee feels that planning for dam failure should be addressed as it could cause flooding where the community does not normally experience flooding. It is unlikely that the city will experience this hazard during this plan's life.
Radiological	During the previous planning period, there were no instances of Radiological Incident in Coon Rapids and the committee does not anticipate any happening in the next planning period. If an incident were to occur, the committee feels it would be a small, contained situation that would not threaten the community as a whole.
River Flooding	The North Raccoon River and it's floodplain run through Coon Rapids on the west side of the city. There is also a small creek which runs through the south portion of the community that has a floodplain surrounding it. With this large amount of flood zone located within the city, there is a moderate probability of the community experiencing some level of flooding within the planning period. While there have not been reported instances of flooding, there have been instances that locals know of. The probability and likelihood of some form of flooding impacting the community leads the committee to feel planning for river flooding should be addressed through mitigation actions.
Severe Winter Storm	Severe Winter Storms continue to impact the City of Coon Rapids. These storms while historically, have caused little damage, continue to build in strength, threatening property and lives within the city. The warning period of this hazard continues to grow with meteorological advances, but can still pose great risks to the community.
Terrorism	There have been no instances of terrorism in the City of Coon Rapids during the previous plan period and the committee feels there will be no instances during the life of this plan. If an instance were to occur, the committee feels it would be a targeted incident that would not threaten the entire community.
Thunderstorm/ Lightning/Hail	Thunderstorm/lightning/hail instances are frequent within the community. While they are frequent, most storms pose no threat to life, crops, or property. This hazard is prevalent in Coon Rapids but is normally not severe in nature.
Tornado	Carroll County has experienced a number of tornadoes in the recent past, but these have not been within or damaged the city of Coon Rapids. With the number of tornadoes that impact Carroll County growing, it is important for the city to continue to plan for the response to tornadoes as storms within Iowa continue to grow in strength. Preparing the public and community is vital to ensuring there is no loss of life.
Transportation Incident	Speed limits within the City of Coon Rapids are relatively low. While the majority of the roads in Coon Rapids have low speed limits, Highway 141 has a higher speed limit than the residential portions of the community. With most the community having lower speed limits, it is likely that any transportation incident between vehicles is likely to cause little damage to property or humans, but there is a chance of an incident which can cause extensive damage. The committee anticipates that this hazard will effect the community in varying degrees throughout the planning period.

Windstorm	Recent windstorms have caused reported damage to properties. The City of Coon Rapids has experienced at least six windstorms since 2020. These hazard events continue to build in magnitude, causing increasingly large amounts of damage to property and posing threats to lives. The recent derechos and other windstorms effected Coon Rapids prompting the community to prepare more effectively for these hazards.

Table E.10: Hazards Not Affecting the City of Coon Rapids

Hazard	Reason for Omission
Earthquake	Iowa as a whole has experienced the effects of few earthquakes in the past 175 years. The majority of the earthquakes were along the Mississippi River, therefore the city does not feel this hazard will impact them during this planning period.
Expansive Soils	While Iowa has expansive soils, due to the city's history of no issues in the past, the city felt this will not impact the jurisdiction over the life of this plan.

Loss Estimates

Table E.11: City of Coon Rapids Maximum Building and Population Exposure

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	2	$177,400	1,300
Commercial	122	$10,659,468	
Industrial	8	$3,724,729	
Residential	560	$63,453,579	

It is unlikely that a jurisdiction can determine the impact any hazard will have. If a hazard were to impact the entire city, the numbers in table E.11 shows the number of people who would be affected and the maximum number of structures and their value. If this type of event were to occur, a shutdown of some facilities and services could last for at least two weeks and some injuries/illnesses will result in permanent disability or even death.

The following hazards were determine to have a negligible impact on the city, if they were to occur.

Landslide
Radiological
Transportation Incident

If a hazard were to report negligible impacts, it is anticipated that the numbers impacted would be similar to table E.12. If there were any shutdown of facilities or services, it is likely that these shutdowns would be for less than twenty-four hours. If any injuries were to occur, it is anticipated that these would be able to be treated with first aid. A negligible hazard would impact approximately 9% of the city.

Table E.12: City of Coon Rapids Negligible Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	0	$0	117
Commercial	11	$959,352	
Industrial	1	$335,226	
Residential	50	$5,710,822	

The following hazards were determine to have a limited impact on the city, if they were to occur.

Dam/Levee Failure
Thunderstorm/Lightning/Hail
Severe Winter Storms
Extreme Heat
Flash Flood
Grass/Wild Land Fire
Infrastructure Failure
HAZMAT Incident
River Flooding

If a hazard were to report limited impacts, it is anticipated that the numbers impacted would be similar to table E.13. A shutdown of some facilities and services could last more than a week and any injuries/illnesses would not result in permanent disability. It is estimated that 25% of the city would be impacted.

Table E.13: City of Coon Rapids Limited Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	1	$44,350	325
Commercial	31	$2,664,867	
Industrial	2	$931,182	
Residential	140	$15,863,395	

The following hazards were determine to have a limited impact on the city, if they were to occur.

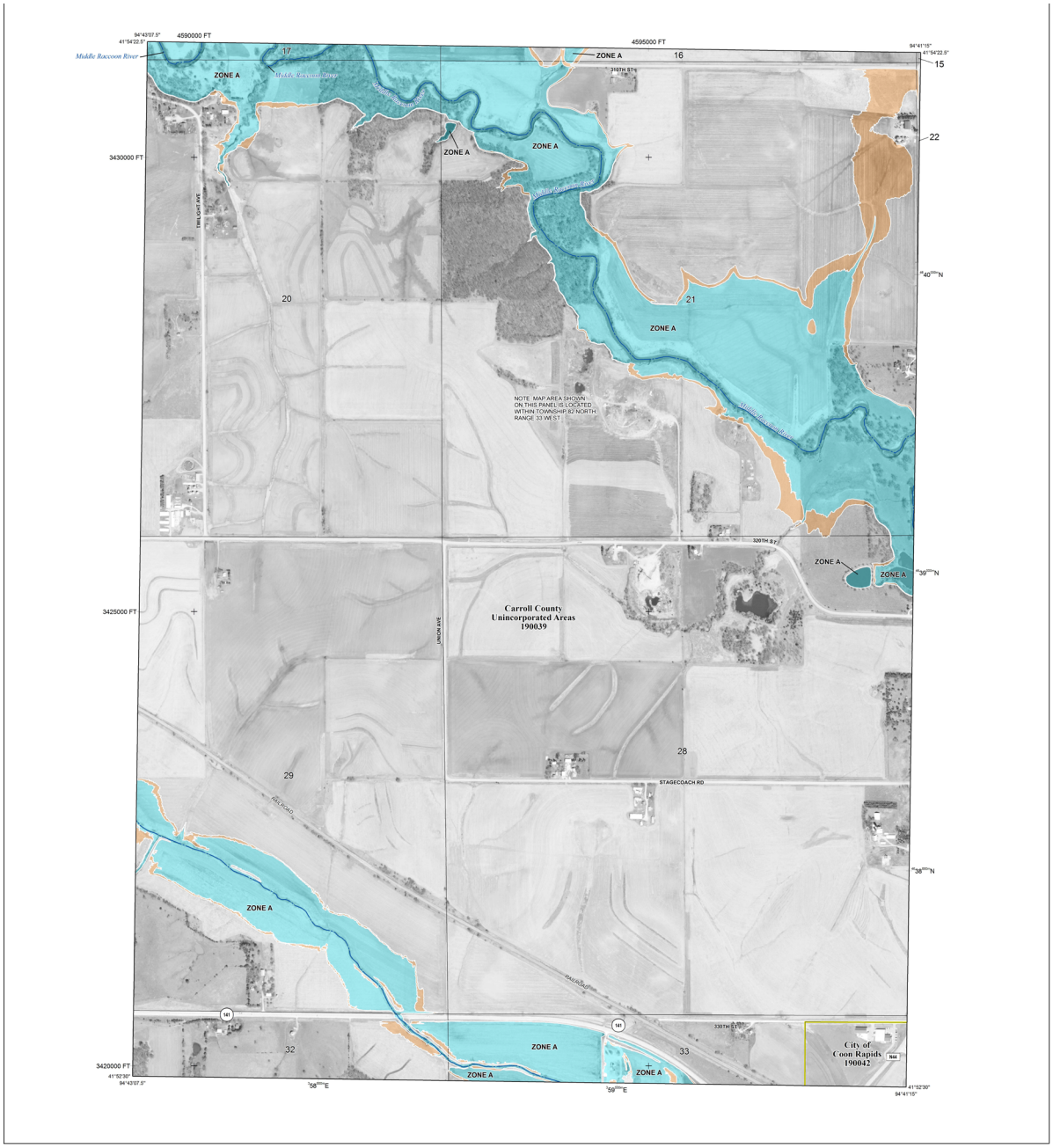
Drought
Animal/Plant/Crop Disease
Human Disease
Windstorm
Tornado

If a hazard were to report critical impacts, it is anticipated that the numbers impacted would be similar to table F.14. A shutdown of some facilities and services could last for at least two weeks and some injuries/illnesses will result in permanent disability. It is estimated 50% of the city would be impacted.

Table E.14: City of Coon Rapids Critical Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	1	$88,700	650
Commercial	61	$5,329,734	
Industrial	4	$1,862,365	
Residential	280	$31,726,790	

Flood Maps



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee See Notes *Zone X*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall
- E 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
- 8 Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- (EL) Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

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SCALE

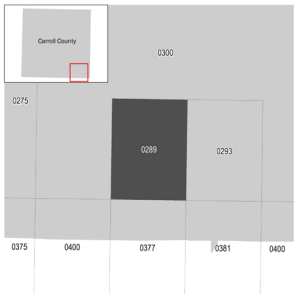
Map Projection:
State Plane Iowa North (FIPS Zone 1401) Coordinate System, Lambert Conformal Conic Projection; North American Datum 1983, GRS 1980 spheroid; North American Vertical Datum of 1988

1 inch = 500 feet 1:6,000

0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR



National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL 289 OF 400

FEMA

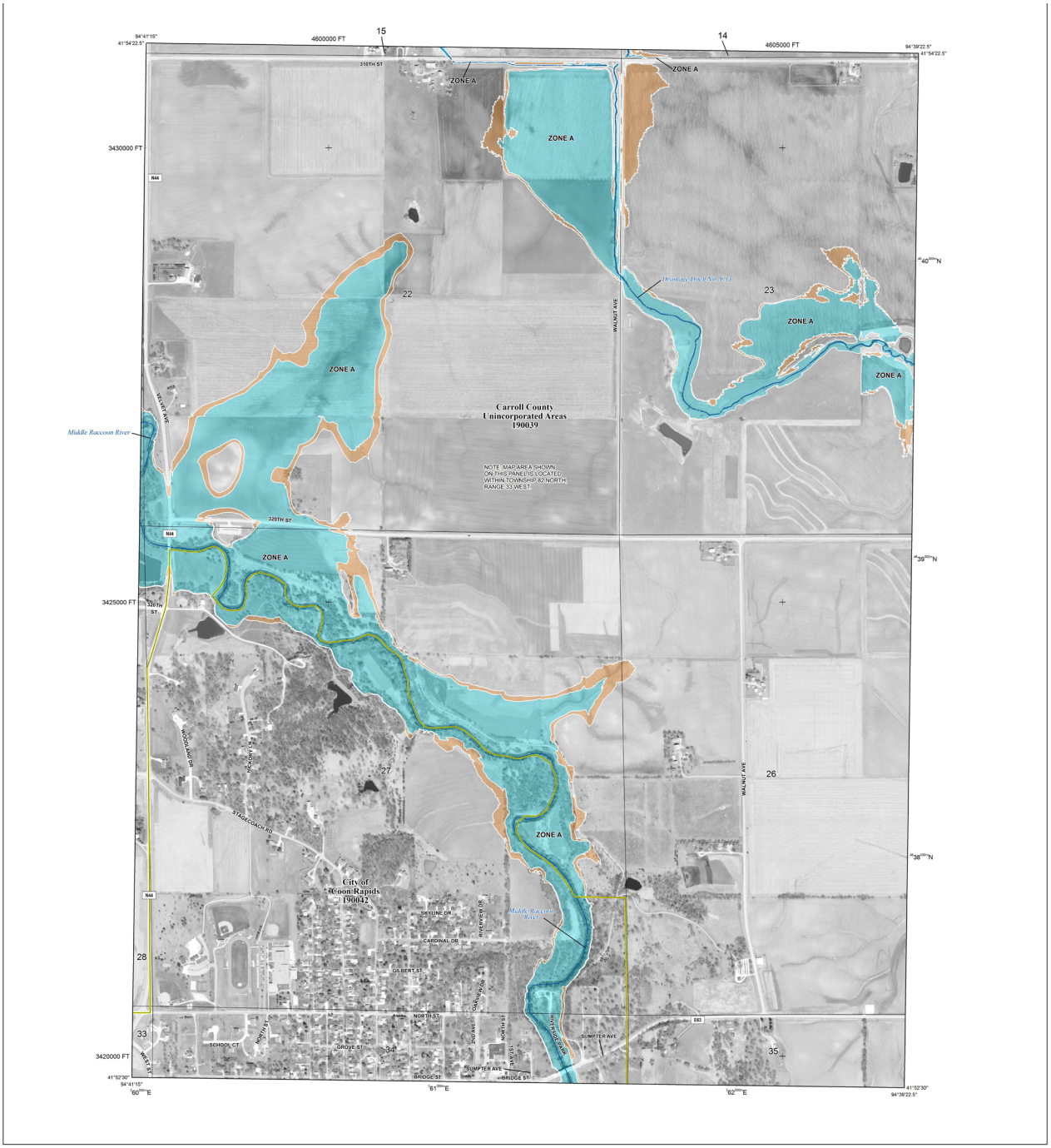
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL COUNTY	190039	0289	C
COON RAPIDS, CITY OF	190042	0289	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0289C

EFFECTIVE DATE
SEPTEMBER 15, 2017



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

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SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) *Zone A, V, A99* With BFE or Depth *Zone AE, AO, AH, VE, AR* Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X* Future Conditions 1% Annual Chance Flood Hazard *Zone X* Area with Reduced Flood Risk due to Levee See Notes *Zone X*
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard *Zone X* Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer Levee, Dike, or Floodwall
OTHER FEATURES	18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE) Coastal Transect Coastal Transect Baseline Profile Baseline Hydrographic Feature 513 Base Flood Elevation Line (BFE) Limit of Study Jurisdiction Boundary

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0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL 293 OF 400

FEMA

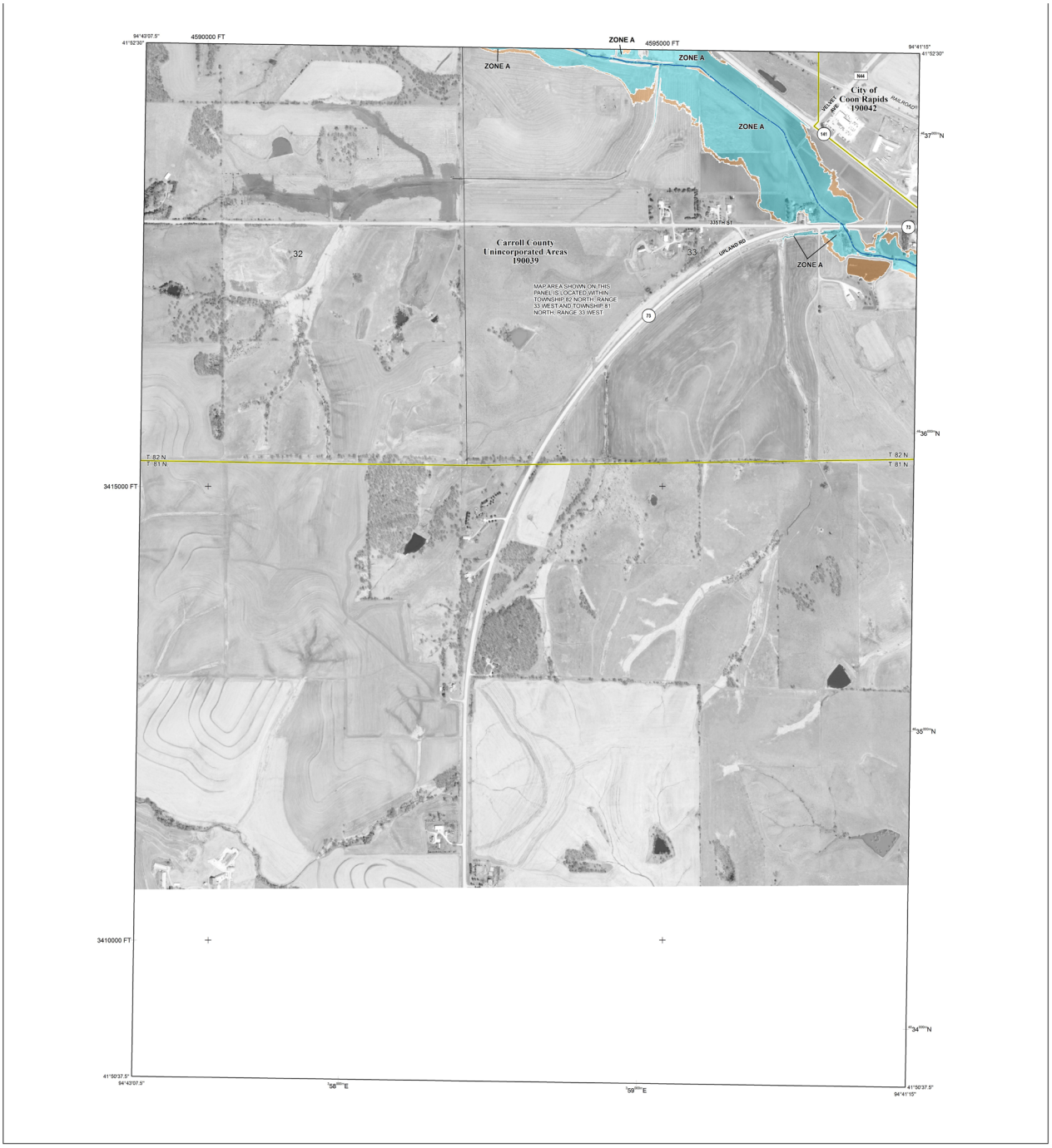
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL COUNTY	190039	0293	C
COON RAPIDS, CITY OF	190042	0293	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0293C

EFFECTIVE DATE
SEPTEMBER 15, 2017



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

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SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) *Zone A, V, A99*
	With BFE or Depth *Zone AE, AO, AH, VE, AR*
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
	Future Conditions 1% Annual Chance Flood Hazard *Zone X*
	Area with Reduced Flood Risk due to Levee See Notes *Zone X*
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	Area of Undetermined Flood Hazard *Zone D*
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	Levee, Dike, or Floodwall
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	Coastal Transect
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
	Base Flood Elevation Line (BFE)
	Limit of Study
	Jurisdiction Boundary

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0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL 377 OF 400

FEMA

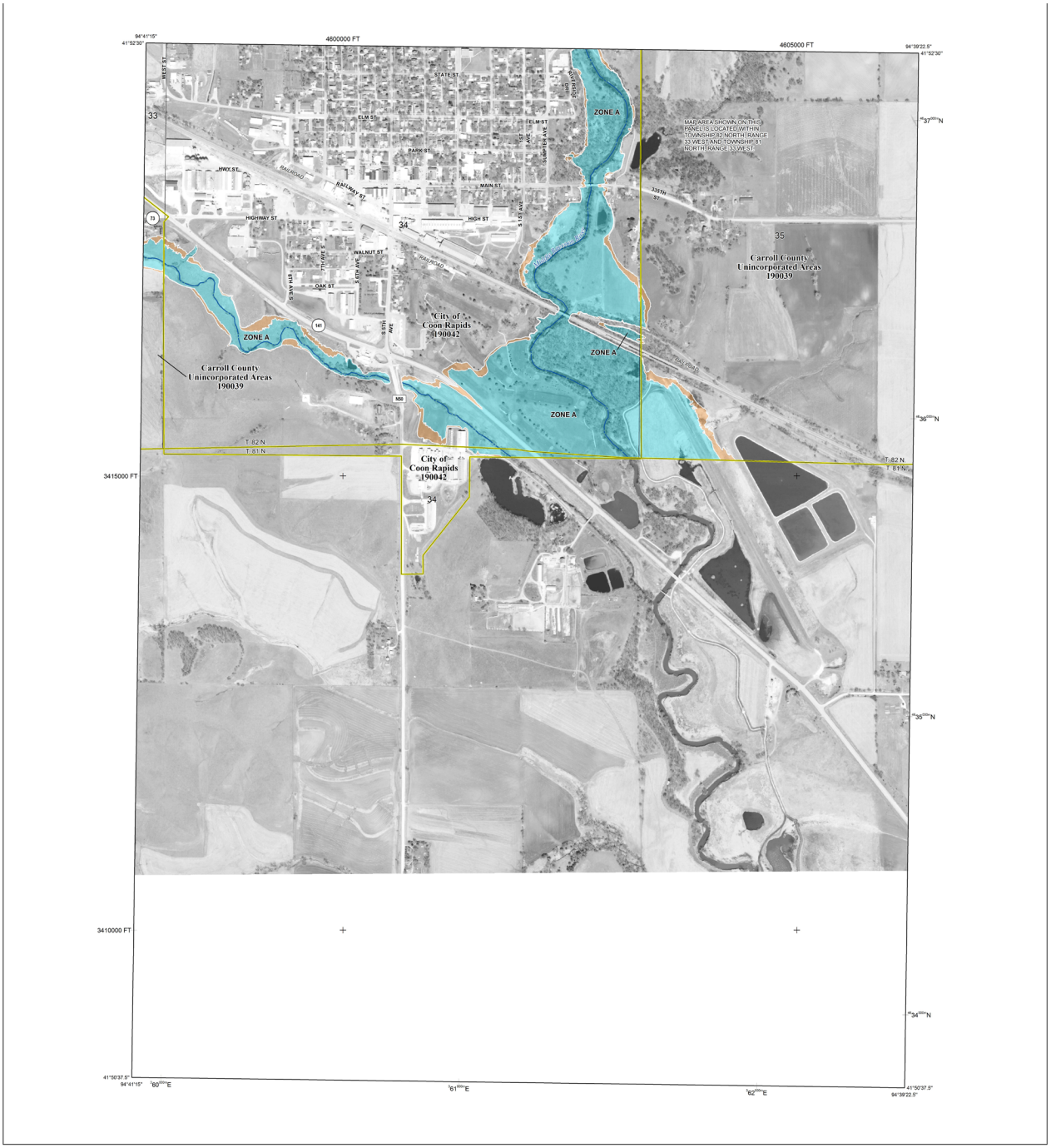
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL COUNTY	190039	0377	C
COON RAPIDS, CITY OF	190042	0377	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0377C

EFFECTIVE DATE
SEPTEMBER 15, 2017



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

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SCALE

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0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA

And Incorporated Areas

PANEL 381 OF 400

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL COUNTY	190039	0381	C
COON RAPIDS, CITY OF	190042	0381	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0381C

EFFECTIVE DATE
SEPTEMBER 15, 2017

There have been some changes in the plan's project priorities since the last update. Some projects that were prioritized as a high priority have been completed utilizing available grant and local funds. Other projects that were not high priority were implemented as funds were available, and those that either had no funding available or were not a high priority were not implemented during this planning period. The City's Mitigation Actions were developed with the city's new priorities in mind which have shifted from the last planning period due to changes in elected officials and staff. The priorities also have changed due to the city's economic climate and instances of hazards that have impacted the community.

Status of Previous Mitigation Actions

Table E.15: City of Coon Rapids Status of Previous Mitigation Actions

	Status				
Previous Actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not Implemented**
Additional warning sirens		X			
Educate public on hyper reach notification					X
Promote NOAA radios to the public					X
Complete current plan and make plans to update every five years		X			
Re-evaluate and update disaster plan		X			
Inform public on hazardous materials locations and hazards				X	
Designate shelters		X			
Build safe room in all schools					X
Enforce building codes, city codes, and zoning codes			X		
Encourage use of one call to avoid damage to utilities			X		
Work with electric companies to bury overhead power lines	X				
Continue tree-trimming, enforcing ordinances when needed			X		
Provide funding needed to train personnel (fire, EMS, and police)			X		
Continue training programs for fire personnel			X		
Make sure EMS volunteers trained to EMT-B or I			X		
Make sure fire volunteers trained to FF levels			X		
Continue fire safety education			X		
Recruit and train new members whenever possible			X		

	Status				
Previous Actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not Implemented**
Keep updating and upgrading ambulance fleet, snow plow equipment, sand trucks, etc			X		
Purchase ladder type fire fighting vehicle					X
Continue to budget for and fund street repairs			X		
Schedule bridge improvements and inspections			X		
Keep fire hydrants updated and working, replacing as needed			X		
Post signs and increase police surveillance around critical facilities			X		
Construct a new West circuit out of the Main Substation				X	
Install switching equipment at select locations on the distribution system				X	
Conduct Sanitary Sewer System Study	X				
Continue participation in National Flood Insurance Program			X		
Maintain existing drainage ways and storm sewer intake			X		
Provide curbside brush pick up services each spring and fall		X			
Upgrade fire equipment			X		
Install additional storm sirens/upgrade storm sirens as needed		X			
Update Safe Routes to School Plan			X		
Apply for Safe Routes to School funding				X	

Action Plan

Section 201.6 (c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

Section 201.6 (c)(3)(iii): The mitigation strategy shall include an action plan, describing how the action 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 associated costs.

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

Table E.16: City of Coon Rapids Action Plan

Goal 1	**Enhance Community Protection**
Objective 1	Improve Public Warning Capabilities
Objective 2	Maintain Current Hazard Mitigation Plan
Objective 3	Hazardous Materials-tier II sites
Objective 4	Protect and Enforce Regulatory Measures in Existing and New Development Areas
Objective 5	Provide Shelter Facilities in case of Disasters
Goal 2	**Protect Against Power Outage**
Objective 1	Use Prevention Techniques to Minimize Disruption in Services
Goal 3	**Maintain and Support Public Safety, Including Facilities, Equipment, and Training**
Objective 1	Improve First Responder Resources and Capabilities
Objective 2	Provide Education and Training Programs to Increase Public and Responder Awareness
Objective 3	Maintain needed personnel for fire and EMS
Objective 4	Provide Needed Equipment and Facilities
Goal 4	**Update Communications Systems**
Objective 1	Improve public warning capabilities
Goal 5	**Maintain and Protect Public Infrastructure**
Objective 1	Maintain and Improve Roads, Bridges, and Other Transportation
Objective 2	Maintain and Improve Water Mains, Power Lines, Stormwater Systems, and Other Critical Assets

Table E.17: City of Coon Rapids Mitigation Actions

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Additional warning sirens	Tornado, Windstorm, Thunderstorm/ Lightning/Hail	Low	Emergency Services, City Council	Low	City Funds, HMGP, State Match, USDA Community Facilities Grant	Emergency Services	Mid
Educate public on hyper reach notification	Tornado	Mod	Emergency Services	Minimal	City Funds	Public Education and Awareness	Mid
Promote NOAA radios to the public	Flash Flood, Tornado, Windstorm, River Flooding, Severe Winter Storms, Thunderstorm/ Lightning/Hail, Levee/ Dam Failure	Mod	Emergency Services	Low	City Funds, Fire Department, Local Foundations	Public Education and Awareness	Mid
Complete current hazard mitigation plan and make plans to update every five years	Animal/Plant/Crop Disease, Drought, Earthquake, Expansive Soils, Extreme Heat, Flash Flood, Grass/Wild Land Fire, HAZMAT Incident, Human Disease, Infrastructure Failure, Levee/Dam Failure, Radiological, River Flooding, Severe Winter Storm, Terrorism, Thunderstorm/ Lightning/Hail, Tornado, Transportation Incident, Windstorm	Mod	City Council	Low	City Funds, Planning Grants through FEMA or ISHEMD	Emergency Services	Ongoing

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Re-evaluate and update disaster plan	Animal/Plant/Crop Disease, Drought, Earthquake, Expansive Soils, Extreme Heat, Flash Flood, Grass/Wild Land Fire, HAZMAT Incident, Human Disease, Infrastructure Failure, Levee/Dam Failure, Radiological, River Flooding, Severe Winter Storm, Terrorism, Thunderstorm/ Lightning/Hail, Tornado, Transportation Incident, Windstorm	High	City Council	Low	City Funds	Emergency Services	Mid
Inform public on hazardous materials locations and hazards	Hazardous Material	Low	Public Works	Minimal	City Funds	Public Education and Awareness	Ongoing
Designate shelters	Tornado	Low	Emergency Services	Minimal	City Funds	Prevention	Mid
Build safe room in all schools	Tornado	Low	School District	Minimal	School Funds, City Funds, Donations, HMGP, State Match, Local Foundations	Structural Project	Mid
Enforce building codes, city codes, and zoning codes	Tornado, Windstorm	Low	Planning and Zoning	Minimal	City Funds	Property Protection	Ongoing
Encourage use of one call to avoid damage to utilities	Infrastructure Failure	Mod	Public Works	High	City Funds, Private Utilities, Public Utilities	Public Education and Awareness	Ongoing

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Continue tree-trimming, enforcing ordinances when needed	Tornado, Windstorm	Mod	Public Works	Minimal	City Funds	Property Protection	Ongoing
Continue fire safety education	Infrastructure Failure	Mod	Emergency Services	Minimal	City Funds, Local Foundations	Emergency Services	Ongoing
Continue to budget for and fund street repairs	Infrastructure Failure	Mod	Public Works	Low	City Funds, Carroll County, IDOT	Structural Project	Ongoing
Schedule bridge improvements and inspections	Infrastructure Failure	Mod	City Council	Low	City Funds, Carroll County, IDOT	Structural Project	Ongoing
Schedule dam inspections and make necessary improvements	Dam/Levee Failure	Mod	City Council, Carroll County	Low	City Funds, Carroll County, IDNR	Structural Project	Ongoing
Keep fire hydrants updated and working, replacing as needed	Infrastructure Failure	Mod	Public Works	Minimal	City Funds, Coon Rapids Municipal Utilities	Emergency Services	Ongoing
Post signs and increase police surveillance around critical facilities	Terrorism	Low	Police Department	Moderate	City Funds	Prevention	Long
Construct a new West circuit out of the Main Substation	Infrastructure Failure	High	Public Works	High	City Funds, GRID Grant, Iowa Energy RLF, Public Utility, Private Utility	Property Protection	Short
Install switching equipment at select locations on the distribution system	Infrastructure Failure	High	Public Works	High	City Funds, GRID Grant, Iowa Energy RLF, Public Utility, Private Utility	Property Protection	Short
Continue participation in National Flood Insurance Program & inform public of program and it's benefits	River Flooding	Low	City Council	Low	City Funds	Property Protection	Ongoing
Maintain existing drainage ways and storm sewer intake	Flash Flood, River Flooding	Mod	Public Works	Moderate	City Funds	Natural Resource Protection	Mid

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Provide curbside brush pick up services each spring and fall	Grass or Wild Land Fire, Infrastructure Failure	Mod	City Council	Minimal	City Funds	Property Protection	Ongoing
Update Safe Routes to School Plan	Transportation incident	High	City Council	Moderate	School Funds	Structural Project	Short
Apply for Safe Routes to School funding	Transportation Incident	High	City Council, School Board	Moderate	School Funds, Safe Routes to School Grant Local Foundations	Structural Project	Ongoing

Table E.18: Coon Rapids - Bayard Community School District Risk Assessment

Hazard	Comments
Extreme Heat	Extreme heat events continue to impact Coon Rapids and the Coon Rapids - Bayard Community School District. Education may be one of the best action tools to combat the effects of extreme heat as individuals need to know the effects of extreme heat and how it can affect the body.
Flash Flood	Since 2020, there have been no instances of flash flooding in the City of Coon Rapids. While flash floods have little to no warning time, with no instances within the last planning period, the committee has determined this hazard is not a high priority hazard to address, but will consider mitigation actions to prepare the community for response to an event.
Human Disease	Iowa and more specifically the City of Coon Rapids are still feeling the effects of the COVID-19 pandemic. The school district continues to have certain precautions and policies in place to better protect students and faculty. The pandemic has reignited the need to plan for future outbreaks and examine the city and school's current practices. The pandemic also reminded the public the importance of staying informed and staying vigilant to protect themselves.
Infrastructure Failure	Infrastructure failures occur with little to no warning and can cause major disruptions within the community. Planning to respond to this hazard is important to the community to protect lives and property. The most likely infrastructure failure within the Coon Rapids - Bayard School District would be structural failure of either bridges or roadways. These failures would impact busing primarily. As these instances have no warning time, planning must be completed prior to an event happening to be able to respond in a quick manner.
Severe Winter Storm	Severe Winter Storms continue to impact the City of Coon Rapids and the School District. These storms while historically, have caused little damage, continue to build in strength, threatening property and lives within the city. The warning period of this hazard continues to grow with meteorological advances, but can still pose great risks to the community. These instances can require the school to be able to change schedules and bus routing to ensure the safety of the children.
Terrorism	There have been no instances of terrorism in the City of Coon Rapids or the Coon Rapids - Bayard Community School District during the previous plan period and the committee feels there will be no instances during the life of this plan. If an instance were to occur, the committee feels it would be a targeted incident that would not threaten the entire community.
Thunderstorm/ Lightning/Hail	Thunderstorm/lightning/hail instances are frequent within the community. While they are frequent, most storms pose no threat to life or property. This hazard is prevalent in Coon Rapids but is normally not severe in nature.
Tornado	Carroll County has experienced a number of tornadoes in the recent past, but the City of Coon Rapids has not been impacted directly. While the city has not experienced any tornadoes within the past planning period, it is important for the city to continue to plan for the response to tornadoes as storms within Iowa continue to grow in strength. Preparing the public and community is vital to ensuring there is no loss of life.

Transportation Incident	Speed limits within the majority of the City of Coon Rapids are relatively low, but portions of the school district have higher speed limits. With a portion of the district having lower speed limits, it is likely that any transportation incident between vehicles is likely to cause little damage to property or humans, but there is a chance of an incident which can cause extensive damage. The committee anticipates that this hazard will effect the district in varying degrees throughout the planning period.
Windstorm	Recent windstorms have caused reported damage to properties. These hazard events continue to build in magnitude, causing increasingly large amounts of damage to property and posing threats to lives. The recent derechos effected Coon Rapids prompting the community to prepare more effectively for these hazards.

Coon Rapids - Bayard Community Schools Action Plan

Section 201.6 (c)(3)(iii): The mitigation strategy shall include an action plan, describing how the action 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 associated costs.

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

Table E.19: Coon Rapids - Bayard Community Schools Action Plan

Goal 1	**Minimize damage to critical facilities, infrastructure, and other school assets from the effects of hazards**
Objective 1	Improve early warning signs
Objective 2	Improve infrastructure
Objective 3	Provide back-up assistance for all critical systems
Goal 2	**Minimize to the greatest possible extent the vulnerability of the students and visitors to the Coon Rapids - Bayard Community Schools to the impacts of all identified hazards**
Objective 1	Protection of school children and staff
Goal 3	**Improve coordination, communication, and response operations with other relevant organizations**
Objective 1	Provide education and training
Objective 2	Improve first responder resources and capabilities
Goal 4	**Improve public communication, education, and awareness of hazards and their risks to the Coon Rapids - Bayard Community School District**
Objective 1	Provide education and training

Table E.20: Coon Rapids - Bayard Community Schools Mitigation Actions

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Backup generators at the school	Infrastructure Failure, Extreme Heat, Severe Winter Storm, River Flooding, Flash Flooding	Medium	Superintendent, School Board, Maintenance Position	Moderate	School Funds, FEMA HMGP, Local Foundations	Emergency Services	Mid
Build a safe room(s) in the school	Infrastructure Failure, Tornado, Windstorm	High	School Board, Superintendent, School District's Engineering Firm	High	School Funds, City Funds, FEMA HMGP, Local Foundations	Prevention	Short
Training on bus evacuation	Transportation Incident	High	Transportation Director, Bus Drivers	Low	School Funds, Training Grants	Emergency Services	Ongoing
Continue to train local volunteers as much as feasibly possible	Terrorism, Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado, Flash Flood, Windstorm, Transportation Incident	High	Coon Rapids - Bayard School District	Minimal	School Funds, FEMA AFG & SAFER	Public Education and Awareness	Ongoing
Install GPS in all school buses	Transportation Incident	Low	Coon Rapids - Bayard School District	Moderate	School Funds, Iowa Department of Education	Emergency Services	Mid
Continued practice of drills and safety procedures with children at school	Tornado, Infrastructure Failure, Terrorism	High	Coon Rapids - Bayard School District	Low	City Funds, School Funds	Public Education and Awareness	Ongoing
Create an emergency operations plan with an infections disease section	Human Disease	High	Coon Rapids - Bayard School District Carroll County Public Health	Minimal	School Funds	Prevention	Short
Plant trees & other vegetation to manage runoff	River Flooding, Flash Flooding	High	Coon Rapids - Bayard School District	Minimal	School Funds, Local Foundations	Prevention	Short

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Regularly search water lines for leaks to ensure water is not wasted	Drought	Medium	Coon Rapids - Bayard School District	Minimal	School Funds	Prevention	Ongoing
Create or update comprehensive heat emergency plans, including procedures for modifying activities, providing cool spaces, and communicating with families.	Extreme heat	High	School Board, Teachers, Administration	Minimal	School Funds	Prevention	Short
Regularly prune trees and shrubs, remove dead leaves and debris, and ensure proper irrigation.	Grass/Wild Land Fire	High	Maintenance	Minimal	School Funds	Prevention	Ongoing

Incorporation into Other Planning Mechanisms

Where possible, Coon Rapids will consider the findings from this document when updating or creating new planning and operating documents. Information from this plan will be utilized to update and expand the following documents:

- Hazard Mitigation Plan
- Comprehensive Plan
- Zoning Ordinance
- Floodplain Regulations
- Housing Needs Assessment
- Building Code
- Strategic Plan

While the city currently does not have any of the plans listed below, if these plans were to be created during the life of this plan, this plan will be used to guide the development of:

- Water Conservation Plans
- Storm Water Management Plans
- Parks and Recreation Plans

Incorporation in to Other Planning Mechanisms- Coon Rapids - Bayard Community Schools

The update of the mitigation strategy will be provided to the School Superintendent for consideration in the next update cycle of the capital improvement plan. Information will be utilized to expand and improve the school's mitigation to potential hazard events.

Appendix F: City of Dedham

Community Profile

History

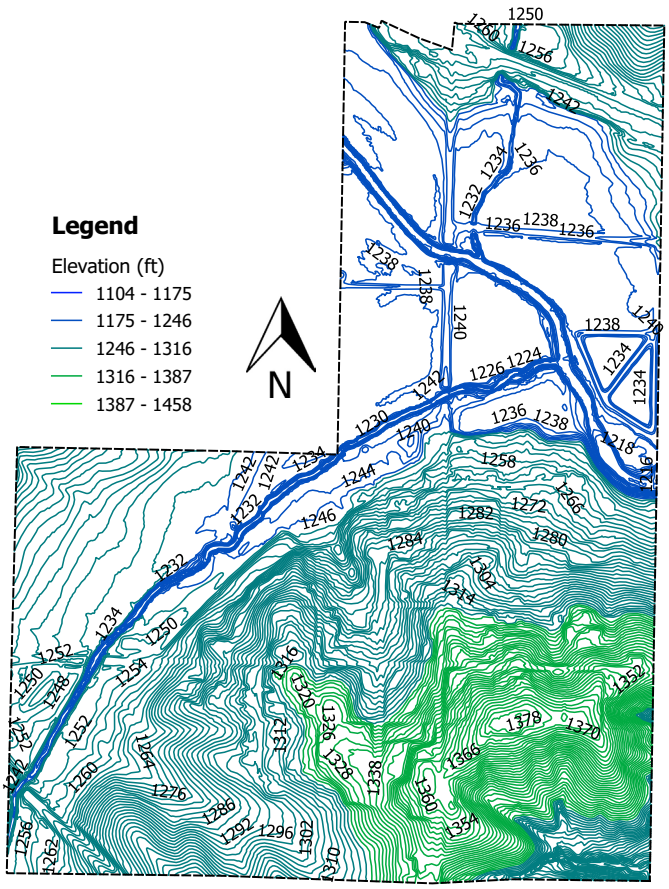
Dedham, like many other communities in Iowa, was the result of the Chicago, Milwaukee, and St. Paul Railroad. Established in the late 1800's, Dedham was named after a railroad surveyor from Dedham, Massachusetts, which in turn was named after Dedham, England. Some of the first businesses that opened in Dedham include a general store and post office owned by Charles Walterscheit, another general store owned by A. Hoelker, and a hardware store owned by John Barks. Dedham celebrated its Quasquicentennial celebration in 2008.

Geography and Environment

Dedham is located in the south-central portion of Carroll County. Dedham is fortunate to have IA 141 pass through the southern part of town. Additionally, Highway 71 is located a couple miles to the east of town. Dedham is located 9.3 miles from Coon Rapids, 15.4 miles from Carroll, 19 miles from Audubon, 37.3 miles from Jefferson and 79.2 miles from Des Moines.

The highest elevation in Carroll County can be found along the eastern side of the county. Here, the elevation can reach as much as 1,550 feet above sea-level. Dedham's elevation reaches a height of roughly 1,374 feet and decreases to a height around 1,224 feet. Map F.1 displays the City of Dedham's elevation.

Map F.1: City of Dedham Elevation

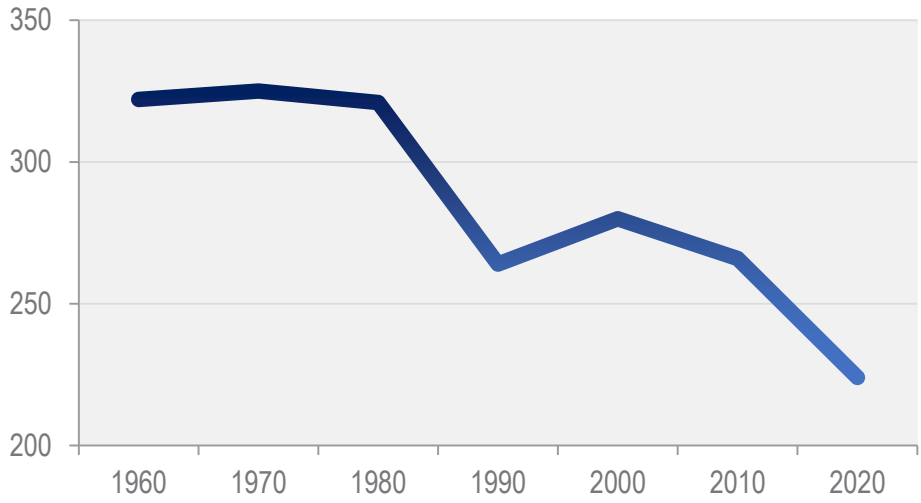


Demographics

The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Dedham's population through past, present, and future trends of the region.

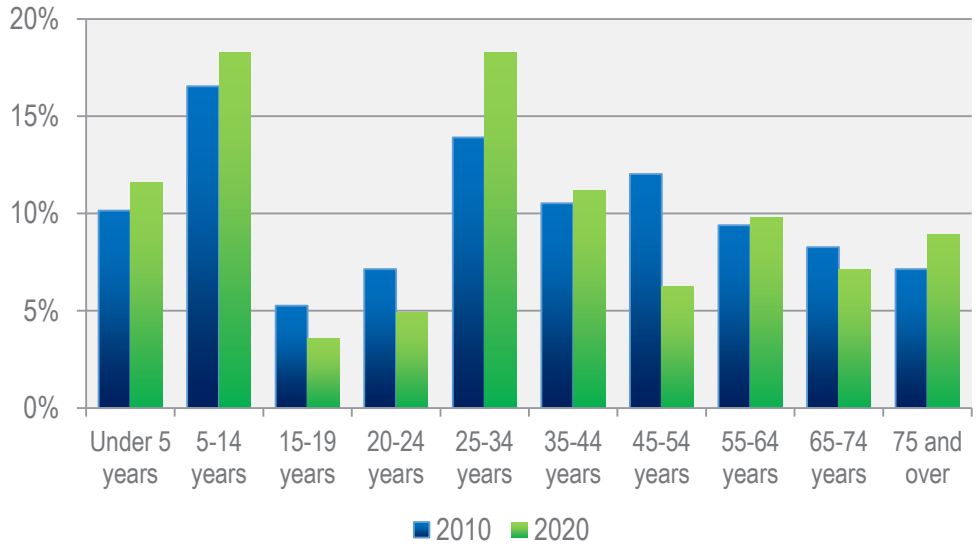
Since 1960, the City of Dedham's population has decreased by 98 residents, from 322 in 1960 to 224 in 2020. The most drastic decrease during this period happened from 1980-1990 when the city lost 57 residents. The city saw a slight increase in residents from 1990-200. Figure F.1 shows the City of Dedham's population trend since 1960.

Figure F.1: City of Dedham Historic Population, 1960-2020



Dedham's population is slightly different from the county's as there is not the large spike in older residents as seen in other parts of the county. The largest age groups are 5-14 and 25-34 years old. Figure F.2 displays the age of the city's population in 2020 compared to 2010.

Figure F.2: City of Dedham Age Distribution, 2010 & 2020



Housing

A community's ability to attract new residents is important. One of the most important aspects to attracting residents is housing. A community's housing stock, type of households, and housing availability and affordability are determining factors.

Since 2010, the city's housing stock has decreased by 7 units. Renter-occupied units decreased by three and owner-occupied units decreased by fifteen. During the same time period, the number of vacant units increased by eleven. Table F.1 shows a breakdown of the city's occupied and vacant housing units.

Table F.1: City of Dedham Housing Units, 2010 & 2022

	2010		2022	
	Number	**Percent**	**Number**	**Percent**
Occupied Housing Units	101	94.4%	83	83.0%
Owner Occupied	93	92.1%	78	94.0%
Renter Occupied	8	7.9%	5	6.0%
Vacant Housing Units	6	5.6%	17	17.0%
Total Housing Units	107	100.0%	100	100.0%

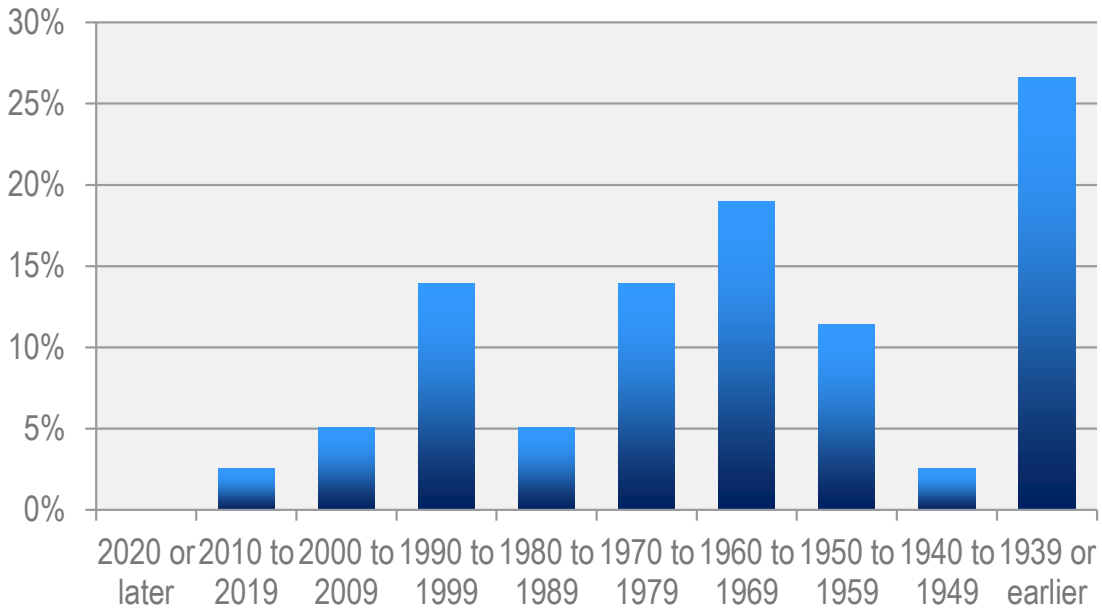
Dedham, like many other rural Iowa towns, has a lower median housing value of $128,100. This is $53,500 less than the State's median housing value of $181,600. The city's homes can be very affordable, and the city is located within driving distance to larger employment centers which can be used to attract new residents, but they may deteriorate faster and will need a number of repairs and updates. According to the 2022 American Community Survey Estimates, 17.9% of the city's homes are valued less than $100,000, while 50.0% are valued between $100,000 and $199,999. The complete breakdown is found in table F.2.

Table F.2: City of Dedham Value of Owner-Occupied Units, 2022

Value of Housing Unit	Percent of Homes
Less than $50,000	6.4%
$50,000 to $99,999	11.5%
$100,000 to $149,999	50.0%
$150,000 to $199,999	5.1%
$200,000 to $299,999	25.6%
$300,000 to $499,999	1.3%
$500,000 to $999,999	0.0%
$1,000,000 or more	0.0%

Figure F.3 showcases the year housing units within the City of Dedham were constructed. Like most of the county, Dedham has a large portion (26.6%) of the homes constructed in 1939 or earlier. The city also experienced spikes in construction during 1960-1979 and 1990-1999. The 1960s saw 19.0% of the city's homes being built, while the 1970s and 1990s saw 13.9% of the city's homes being built. Building standards of today utilize the most recent construction materials and safety features, ensuring that the new residential structures are as safe as possible. This does not mean that older homes are more unsafe, just that they may be more susceptible to hazard damage.

Figure F.3: City of Dedham Year Housing Units Constructed, 2022



Economics

Household income is an important indicator of the economic base in Carroll County. In Dedham, the median household income is $85,417 which would classify a large number of the households in Dedham as "working" or "middle" class. Table F.3 breaks down the city's households by income. The City of Dedham's household income breakdown is similar to the other rural communities in the area, and the combination of more affordable housing with the current incomes generally provides residents with a decent quality of life. Many employees commute to other large neighboring cities like Carroll and Jefferson where more employment opportunities are present.

Table F.3: City of Dedham Household Income, 2022

Income and Benefits (2022 Inflation-Adjusted Dollars)	Number of Households	Percent of Households
Less than $10,000	2	2.5%
$10,000 to $14,999	0	0.0%
$15,000 to $24,999	6	7.6%
$25,000 to $34,999	6	7.6%
$35,000 to $49,999	4	5.1%
$50,000 to $74,999	14	17.7%
$75,000 to $99,999	23	29.1%
$100,000 to $149,999	21	26.6%
$150,000 to $199,999	2	2.5%
$200,000 or more	1	1.3%
Median Household Income	$85,417	-
Mean Household Income	$84,368	-

Dedham, overall, is a small community in a small rural county. A large percent of the businesses within the county the largely agricultural economy. Table F.4 breaks down what industry Dedham residents work in. Educational services, and health care and social assistance employ the largest cohort of residents, with 21.1% of the community being employed in this industry. Construction and retail trade both employ 12.8% of the city's population.

Table F.4: City of Dedham Employment by Industry, 2022

Industry	Number	Percent
Total civilian non-farm employment, 16 years and over	133	100%
Agriculture, Forestry, Fishing, Hunting, Mining	11	8.3%
Construction	17	12.8%
Manufacturing	15	11.3%
Wholesale Trade	9	6.8%
Retail Trade	17	12.8%
Transportation and warehousing and utilities	1	0.8%
Information	0	0.0%
Finance and insurance, and real estate and rental and leasing	9	6.8%
Professional, scientific, management, administrative, and waste management services	9	6.8%
Educational, health care, and social assistance	28	21.1%
Arts, entertainment, recreation, accommodation, and food services	12	9.0%
Other services, except public administration	5	3.8%
Public Administration	0	0.0%

Existing Documents & Capabilities

Table F.5 provides a compilation of the current planning and regulatory documents in place for the City of Dedham. The table also shows the last time the documents were last updated. These documents help understand the process the city has already undertaken and what documents can be created to help guide the city. First and foremost is the previous hazard mitigation plan as this document lays out specific strategies to help the city reduce the impact hazards have on the community and those who live in it. The city's zoning code was created to keep certain zones away from one another to reduce the risk to humans and structures. The different zones can pose different threats to others, such as some industrial uses having a higher HAZMAT incident probability which if located in a residential zone, could pose large health issues to the overall population. The zoning codes also include information for street and sidewalk regulations which can reduce the number of transportation incidents.

The City of Dedham is working to be a more proactive community, which will only benefit them in regards to mitigation of hazards. The city does not have a current comprehensive plan, so creating this plan and really take inventory of the city's assets, utilities, and infrastructure would benefit the community. Creating the plan to include a comprehensive disaster response section would also be a benefit. A capital improvement plan which lays out future projects and necessary funding would help the city budget for, and allow them to be proactive, not reactive to future needs. Expanding conversations with the local COG and engineering firms would allow the city to explore additional options that have worked in similar communities facing similar situations. Outside organizations are also beneficial with finding funding for projects which otherwise may be out of the city's budget. Road, water, and sewer infrastructure continues to need upgrades and pursuing funding opportunities could reduce impacts of hazards on these infrastructure types. Training staff to current requirements would allow for a more thought-out response to a hazard or hazard warning. Training staff regardless of responsibility on different departments can better prepare the city and can lead to things being noticed that previously went unnoticed.

Table F.5: City of Dedham Existing Documents

Document	Yes/No	Year
Previous HMP	Yes	2020
Comprehensive Plan	No	-
Building Code	Yes	2025
Zoning Ordinance	Yes	2024
Strategic Plan	Yes	2002
Housing Needs Assessment	Yes	2017
NFIP Participant	Yes	1986
Floodplain Regulations	Yes	2025

NFIP Participation

In the past, there have been instances of flooding within the city limits of Dedham. Dedham started participating in the NFIP in 1986, and the flood map was updated and adopted in 2017. The city's FIRMs can be found in the later in this appendix. The Zoning Administrator also acts as the Floodplain Administrator for the city. Any development/demolition in the floodplain is required to obtain a permit which regulates the development/demolition and lays out the NFIP regulations that must be followed. Dedham participates in the NFIP and implements substantial improvement / substantial damage provisions in the following manner: Local officials (1) determine the cost of work, (2) determine the market value of buildings, (3) make SI/SD

determinations and provide determinations to property owners, and (4) require owners to obtain permits to bring substantially improved and substantially damaged structures into compliance with the floodplain management requirements.

Outlook and Future Development

Dedham has seen limited development since the last plan update. There have been some residential structures built since the last plan update and some residential structures have seen rehabilitation efforts. There have been some commercial buildings that have seen rehabilitation as well.

Throughout the life of this plan, the city anticipates housing development to continue on the limited scale and that other rehabilitation/revitalization efforts will continue as well on a limited scale.

Critical Facilities

Critical facilities are facilities that are critical to the health and welfare of the population and are especially important following hazard events. Every jurisdiction is unique in such way that the list of critical facilities can vary widely from community to community. Dedham's critical facilities can be found on Map F.2.

Essential Infrastructure and Services

Knowing what services and infrastructure serve the city can be beneficial in a time of disaster so the appropriate companies can be contacted in need of utility shutoff or transportation routes. The city's essential infrastructure and services can be found in Table F.6.

Table F.6: City of Dedham Essential Infrastructure and Services

Major Arterials	N33	**Air Service**	Arthur N. Neu Airport
Water Service	Xenia Rural Water	**Sewer Service**	City of Dedham
Electric Service	MidAmerican Energy	**Gas Service**	MidAmerican Energy
Sanitation/Solid Waste	Local Haulers	**Landfill**	Carroll County Landfill
Phone and Internet	Wireless	**Law Enforcement**	Carroll County Sheriff
Fire Service	Dedham Fire Department	**Ambulance Service**	Carroll County Ambulance Service

Table F.7: City of Dedham Critical Facilities

Number on Map	Name	Address	Type
1	St. Joseph Catholic Church	502 Main Street	Vulnerable Population
2	Dedham City Hall	210 Main Street	Essential Facility
3	Dedham Fire Department	401 2nd Street	Essential Facility
4	Water Tower	5th Avenue	Utility
5	Cenex	4th Avenue	HAZMAT
6	Dedham Legion	302 Main Street	Vulnerable Population

Map F.2: City of Dedham Critical Facilities

Table F.8: City of Dedham Risk Assessment

Hazard	Comments
Animal/Plant/Crop Disease	The City of Dedham contains a measurable amount of agricultural land. Although this land represents a recognizable portion of the community, there have been minimal reported losses from animal/plant/crop disease within in the community. While this does impact the community, it is normally indirectly impacted.
Drought	Drought occurrences have increased across the state, and the City of Dedham has not been exempt from this hazard. Droughts continue to increase in severity and while there is little warning, this hazard can cause both direct and indirect issues for the City and it's residents.
Earthquake	There have been no instances of earthquake in the City of Dedham, and the committee feels there will be no instances during the life of this plan.
Expansive Soils	There have been no instances of expansive soils in the City of Dedham, and the committee feels there will be no instances during the life of this plan.
Extreme Heat	Extreme heat events impact the City of Dedham. Education may be one of the best action tools to combat the effects of extreme heat as individuals need to know the effects of extreme heat and how it can affect the body.
Flash Flood	Since 2020, there have been no reported instances of flash flooding in the City of Dedham. Looking further back, there hasn't been any reported flash flooding in Dedham since 2015. While flash floods have little to no warning time, with no instances within the last planning period, the committee has determined this hazard is not a high priority hazard to address, but will consider mitigation actions to prepare the community for response to an event.
Grass/Wild Land Fire	Grass and wild land fires are most commonly field fires or controlled burns that get out of hand in and immediately surrounding the city. This hazard can pose a large threat to the community as elements out of anyone's control, such as wind direction and speed, can change this hazard from harmless and controlled to out of control in a matter of minutes and can pose a threat to life.
HAZMAT Incident	Within the most recent planning period, there have been no instances of hazardous spills within the City of Dedham. With events in the past five years, the committee feels this hazard is a small threat to the community, but mitigation actions should still be considered and implemented to prevent any instances in the future.
Human Disease	Iowa and more specifically the City of Dedham are still feeling the effects of the COVID-19 pandemic. The pandemic has reignited the need to plan for future outbreaks and examine the city's current practices. The pandemic also reminded the public the importance of staying informed and staying vigilant to protect themselves.
Infrastructure Failure	Infrastructure failures occur with little to no warning and can cause major disruptions within the community. Planning to respond to this hazard is important to the community to protect lives and property. The most likely infrastructure failure within Dedham would be structural failure of either bridges or roadways. As these instances have no warning time, planning must be completed prior to an event happening to be able to respond in a quick manner.

Levee/Dam Failure	There are no levees or dams located in the City of Dedham, and there are no high hazard dams on waterways that lead into the city. It is unlikely that levee or dam failure will impact the city, although the city feels that planning for river flooding and planning for dam/levee failure are similar in nature.
Radiological	During the previous planning period, there were no instances of Radiological Incident in Dedham and the committee does not anticipate any happening in the next planning period. If an incident were to occur, the committee feels it would be a small, contained situation that would not threaten the community as a whole.
River Flooding	The northern portion of Dedham is located within the floodplain. There is also a small creek which runs through the community that has a floodplain surrounding it. With this large amount of flood zone located within the city, there is a moderate probability of the community experiencing some level of flooding within the planning period. While there have not been reported instances of flooding, there have been instances that locals know of. The probability and likelihood of some form of flooding impacting the community leads the committee to feel planning for river flooding should be addressed through mitigation actions.
Severe Winter Storm	Severe Winter Storms continue to impact the City of Dedham. These storms while historically, have caused little damage, continue to build in strength, threatening property and lives within the city. The warning period of this hazard continues to grow with meteorological advances, but can still pose great risks to the community.
Terrorism	There have been no instances of terrorism in the City of Dedham during the previous plan period and the committee feels there will be no instances during the life of this plan. If an instance were to occur, the committee feels it would be a targeted incident that would not threaten the entire community.
Thunderstorm/ Lightning/Hail	Thunderstorm/lightning/hail instances are frequent within the community. While they are frequent, most storms pose no threat to life, crops, or property. This hazard is prevalent in Dedham but is normally not severe in nature.
Tornado	Carroll County has experienced a number of tornadoes in the recent past, but these have not been within or damaged the city of Dedham. With the number of tornadoes that impact Carroll County growing, it is important for the city to continue to plan for the response to tornadoes as storms within Iowa continue to grow in strength. Preparing the public and community is vital to ensuring there is no loss of life.
Transportation Incident	Speed limits within the City of Dedham are relatively low. With the community having lower speed limits, it is likely that any transportation incident between vehicles is likely to cause little damage to property or humans, but there is a chance of an incident which can cause extensive damage. The committee anticipates that this hazard will effect the community in varying degrees throughout the planning period.
Windstorm	Recent windstorms have caused reported damage to properties. The City of Dedham has experienced at least six windstorms since 2020. These hazard events continue to build in magnitude, causing increasingly large amounts of damage to property and posing threats to lives. The recent derechos and other windstorms effected Dedham prompting the community to prepare more effectively for these hazards.

Table F.9: Hazards Not Affecting the City of Dedham

Hazard	Reason for Omission
Earthquake	Iowa as a whole has experienced the effects of few earthquakes in the past 175 years. The majority of the earthquakes were along the Mississippi River, therefore the city does not feel this hazard will impact them during this planning period.
Expansive Soils	While Iowa has expansive soils, due to the city's history of no issues in the past, the city felt this will not impact the jurisdiction over the life of this plan.

Loss Estimates

Table F.10: City of Dedham Maximum Building and Population Exposure

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	32	$563,410	224
Commercial	27	$1,253,340	
Industrial	0	$0	
Residential	117	$14,507,300	

It is unlikely that a jurisdiction can determine the impact any hazard will have. If a hazard were to impact the entire city, the numbers in table F.10 shows the number of people who would be affected and the maximum number of structures and their value. If this type of event were to occur, a shutdown of some facilities and services could last for at least two weeks and some injuries/illnesses will result in permanent disability or even death.

The following hazards were determine to have a negligible impact on the city, if they were to occur.

Dam/Levee Failure
Landslide
Radiological
Transportation Incident

If a hazard were to report negligible impacts, it is anticipated that the numbers impacted would be similar to table F.11. If there were any shutdown of facilities or services, it is likely that these shutdowns would be for less than twenty-four hours. If any injuries were to occur, it is anticipated that these would be able to be treated with first aid. A negligible hazard would impact approximately 9% of the city.

Table F.11: City of Dedham Negligible Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	3	$50,707	20
Commercial	2	$112,801	
Industrial	0	$0	
Residential	11	$1,305,657	

The following hazards were determine to have a limited impact on the city, if they were to occur.

Thunderstorm/Lightning/Hail
Severe Winter Storms
Extreme Heat
Flash Flood
Grass/Wild Land Fire
Infrastructure Failure
HAZMAT Incident
River Flooding

If a hazard were to report limited impacts, it is anticipated that the numbers impacted would be similar to table F.12. A shutdown of some facilities and services could last more than a week and any injuries/illnesses would not result in permanent disability. It is estimated that 25% of the city would be impacted.

Table F.12: City of Dedham Limited Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	8	$140,853	56
Commercial	7	$313,335	
Industrial	0	$0	
Residential	29	$3,626,825	

The following hazards were determine to have a limited impact on the city, if they were to occur.

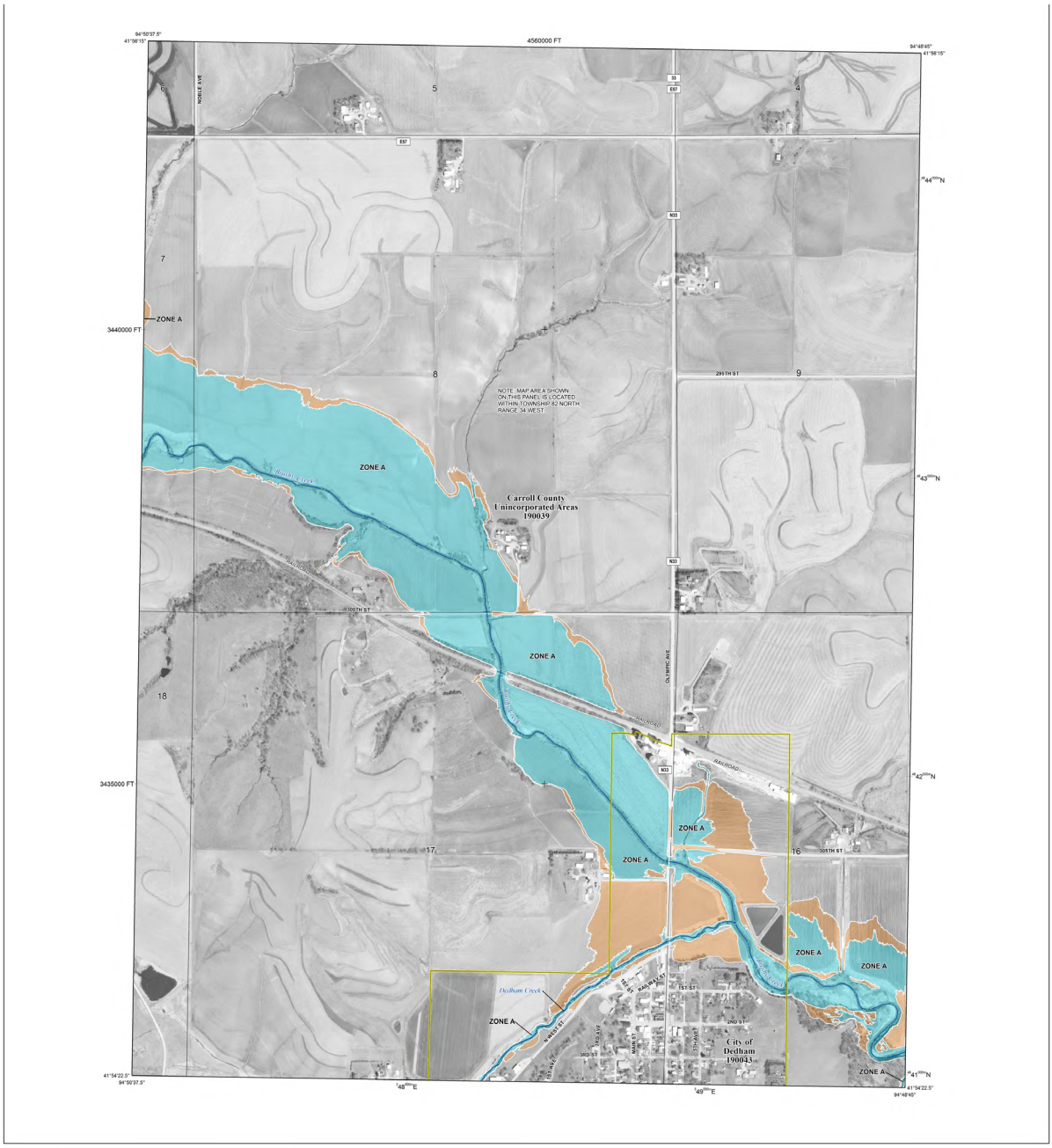
Drought
Animal/Plant/Crop Disease
Human Disease
Windstorm
Tornado

If a hazard were to report critical impacts, it is anticipated that the numbers impacted would be similar to table F.13. A shutdown of some facilities and services could last for at least two weeks and some injuries/illnesses will result in permanent disability. It is estimated 50% of the city would be impacted.

Table F.13: City of Dedham Critical Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	16	$281,705	112
Commercial	14	$626,670	
Industrial	0	$0	
Residential	59	$7,253,650	

Flood Maps



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A,V, A99 With BFE or Depth Zone AE, AO, AH, VE, AR Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with average depth less than one foot or with drainage areas of less than one square mile Zone X Future Conditions 1% Annual Chance Flood Hazard Zone X Area with Reduced Flood Risk due to Levee See Notes Zone X
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard Zone X Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer Levee, Dike, or Floodwall
OTHER FEATURES	18.2 / 17.6 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE) Coastal Transect Coastal Transect Baseline Profile Baseline Hydrographic Feature 513 Base Flood Elevation Line (BFE) Limit of Study Jurisdiction Boundary

NOTES TO USERS

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was provided in digital format by the Iowa Department of Natural Resources. This information was derived from digital orthophotography at a 2-foot ground resolution from imagery flown in April 2009.

SCALE

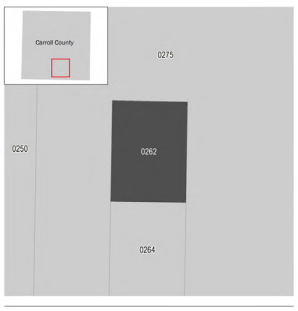
Map Projection:
State Plane Iowa North (FIPS Zone 1401) Coordinate System, Lambert Conformal Conic Projection; North American Datum 1983, GRS 1980 spheroid; North American Vertical Datum of 1988

1 inch = 500 feet 1:6,000

0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR



FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL 262 OF 400

FEMA

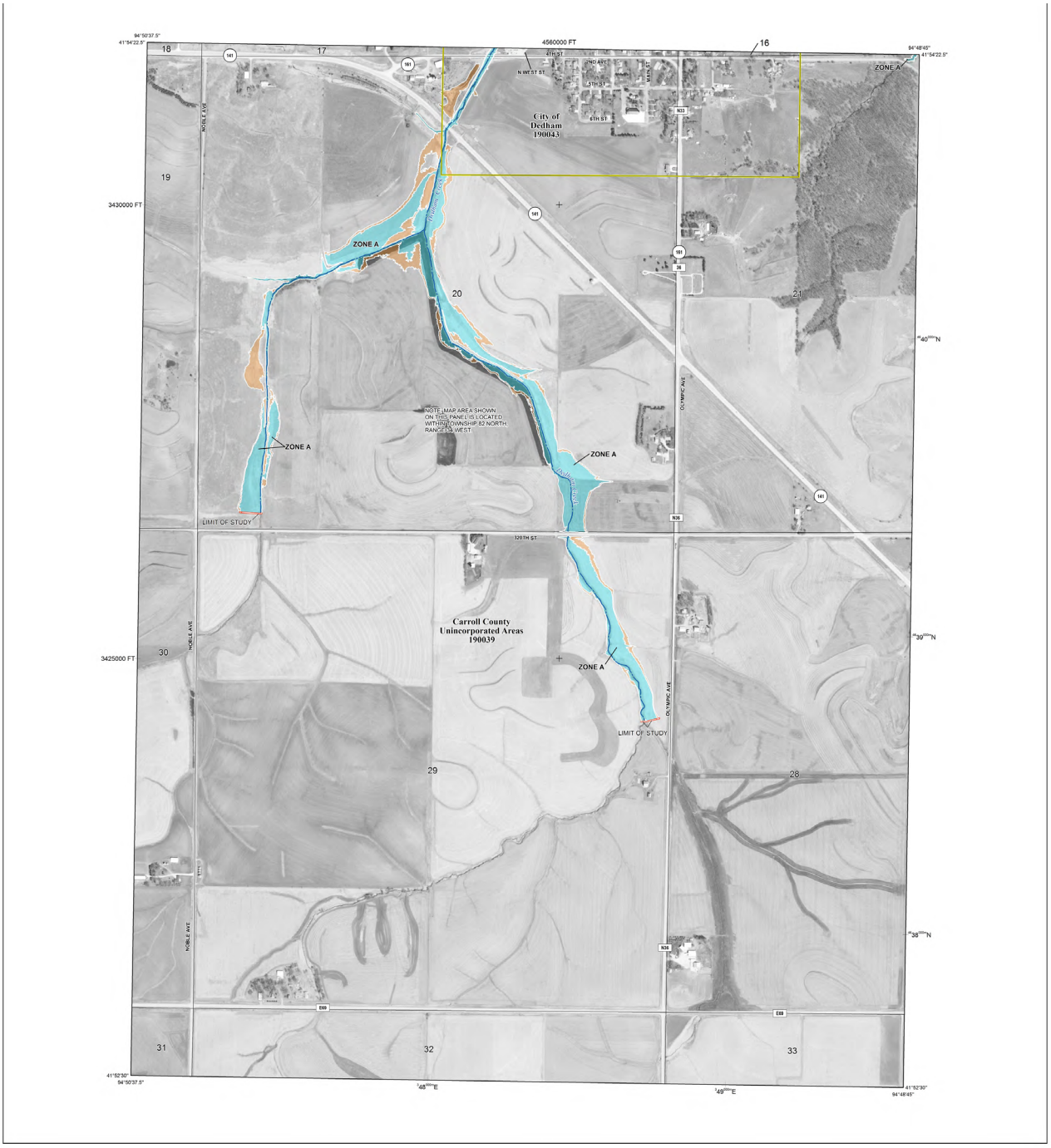
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL COUNTY	190039	0262	C
DEDHAM, CITY OF	190043	0262	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0262C

EFFECTIVE DATE
SEPTEMBER 15, 2017



FLOOD HAZARD INFORMATION

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SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) *Zone A, V, A99* With BFE or Depth *Zone AE, AO, AH, VE, AR* Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X* Future Conditions 1% Annual Chance Flood Hazard *Zone X* Area with Reduced Flood Risk due to Levee See Notes *Zone X*
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard *Zone X* Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer Levee, Dike, or Floodwall
	18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE) Coastal Transect Coastal Transect Baseline Profile Baseline Hydrographic Feature 513 Base Flood Elevation Line (BFE)
OTHER FEATURES	Limit of Study Jurisdiction Boundary

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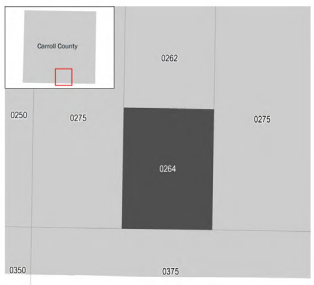
1 inch = 500 feet 1:6,000

0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR



FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL **264** OF **400**

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL COUNTY	190039	0264	C
DEDHAM, CITY OF	190043	0264	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0264C

EFFECTIVE DATE
SEPTEMBER 15, 2017

Table F.14: City of Dedham Status of Previous Mitigation Actions

	Status				
Previous Actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not Implemented**
Update siren control panel & purchase a new siren				X	
Inform public on hazardous materials locations and hazards	X				
Purchase generator for the Legion				X	
Encourage use of one call to avoid damage to utilities			X		
Work with electric companies to bury overhead power lines			X		
Provide funding needed to train personnel (fire, EMS, and police)			X		
Continue training programs for fire personnel			X		
Make sure EMS volunteers trained to EMT-B or I			X		
Make sure fire volunteers trained to FF levels			X		
Continue fire safety education			X		
Recruit and train new members whenever possible			X		
Keep updating and upgrading ambulance fleet, snow plow equipment, sand trucks, etc			X		
Purchase new fire truck				X	
Update first responder notification equipment		X			
Set-up and test back-up communication center			X		
Continue to budget for and fund street repairs			X		
Keep fire hydrants updated and working, replacing as needed			X		
Post signs and increase police surveillance around critical facilities			X		
Update Water Lines	X				
Continue current procedures for storm watching			X		

	Status				
Previous Actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not Implemented**
Replace the county tile so that it is uniform and large enough to handle heavy rain				X	
Regularly check the recondition well to make sure that it is working properly			X		
Connect to West Central Iowa Rural Water Association	X				

Action Plan

Section 201.6 (c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

Section 201.6 (c)(3)(iii): The mitigation strategy shall include an action plan, describing how the action 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 associated costs.

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

Table F.14: City of Dedham Action Plan

Goal 1	**Enhance Community Protection**
Objective 1	Improve Public Warning Capabilities
Objective 2	Hazardous Materials-tier II sites
Goal 2	**Protect Against Power Outage**
Objective 1	Provide Back-Up Systems for Critical Systems and Assets
Objective 2	Use Prevention Techniques to Minimize Disruption in Services
Goal 3	**Maintain and Support Public Safety, Including Facilities, Equipment, and Training**
Objective 1	Improve First Responder Resources and Capabilities
Objective 2	Provide Education and Training Programs to Increase Public and Responder Awareness
Objective 3	Maintain needed personnel for fire and EMS
Objective 4	Provide Needed Equipment and Facilities
Goal 4	**Update Communications Systems**
Objective 1	Improve public warning capabilities
Goal 5	**Maintain and Protect Public Infrastructure**
Objective 1	Maintain and Improve Roads, Bridges, and Other Transportation
Objective 2	Maintain and Improve Water Mains, Power Lines, Stormwater Systems, and Other Critical Assets

Table F.15: City of Dedham Mitigation Actions

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Update siren control panel & purchase a new siren	Tornado, Windstorm, Thunderstorm/ Lightning/Hail	Mod	Fire Department	Low	City Funds, HGMP Grant, State Match, USDA Community Facilities Grant	Emergency Services	Long
Inform public on hazardous materials locations and hazards	All	Mod	Fire Department	Low	City Funds	Public Education and Awareness	Short
Purchase generator for the Legion (shelter)	Infrastructure Failure	Mod	Fire Department	Moderate	City Funds, HGMP Grant, State Match, USDA Community Facilities Grant, Local Foundations	Emergency Services	Mid
Encourage use of one call to avoid damage to utilities	Infrastructure Failure	Low	Fire Department	Minimal	City Funds	Prevention	Short
Work with electric companies to bury overhead power lines	Tornado, Windstorm, Severe Winter Storms, Infrastructure Failure	Low	Fire Department	Minimal	City Funds, Electric Companies, GRID Grants, Iowa Energy Revolving Loan	Property Protection	Mid
Provide funding needed to train personnel to respond to hazard events (fire, EMS, and police)	Flash Flood, River Flood, Tornado, Infrastructure Failure, Thunderstorm/ Lightning/Hail, Grass/Wild Land Fire	Mod	Fire Department	Minimal	Local Funds, FEMA AFG	Emergency Services	Short

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Continue training programs for fire personnel	All	Low	Fire Department	Minimal	Fire Department Budget Funds	Emergency Services	Short
Make sure EMS volunteers trained to EMT-B or I	All	Low	Fire Department	Minimal	Carroll County EMS, City Funds	Emergency Services	Short
Make sure fire volunteers trained to FF levels	All	Low	Fire Department	Minimal	Fire Department Budget Funds	Emergency Services	Short
Continue fire safety education	Grass or Wild Land Fire, Infrastructure Failure	Mod	Fire Department	Minimal	City Funds, Fire Department, Local Foundations	Emergency Services	Short
Recruit and train new members whenever possible	All	Mod	Fire Department	Minimal	City Funds, Fire Department, Local Foundations, FEMA SAFER	Emergency Services	Ongoing
Designate a community shelter/ cooling station and publicize it's location	Extreme Heat, Severe Winter Storm, Infrastructure Failure	High	City Council, Fire Department	Minimal	City Funds, Fire Department	Emergency Services	Ongoing
Stock community shelter/cooling station with necessary provisions to serve the community if the shelter is required	Extreme Heat, Severe Winter Storm, Infrastructure Failure	High	City Council, Fire Department	Minimal	Local Funds, Donations	Emergency Services	Mid
Update first responder notification equipment	All	Low	Fire Department	Minimal	City Funds, Fire Department, Local Foundations	Emergency Services	Mid
Set-up and test back-up communication center	Infrastructure Failure	Mod	Fire Department	Minimal	City Funds, Fire Department, County Comm Center	Emergency Services	Long

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Continue to budget for and fund street repairs	Infrastructure Failure, Transportation Incident	Mod	City Council	Moderate	City Funds, IDOT	Structural Project	Ongoing
Keep fire hydrants updated and working, replacing as needed	Infrastructure Failure	Mod	Public Works	Low	City Funds, CDBG	Property Protection	Ongoing
Post signs around critical facilities	Hazardous Material	Low	City Council	Minimal	City Funds	Property Protection	Short
Update Water Lines	Infrastructure Failure	Mod	Public Works	Moderate	City Funds, Iowa SRF, CDBG, USDA Grants/Loans	Structural Project	Mid
Continue current procedures for storm watching	Tornado, Windstorm, Thunderstorm/ Lightning Hail	Mod	Fire Department	Low	Fire Department	Emergency Services	Ongoing
Replace the county tile so that it is uniform and large enough to handle heavy rain	Infrastructure Failure, River Flood, Flash Flood	Low	City Council	Low	City Funds, Carroll County	Structural Project	Long
Regularly check the recondition well to make sure that it is working properly	Infrastructure Failure, Drought	High	Public Works	Minimal	City Funds	Structural Project	Short
Connect to West Central Iowa Rural Water Association	Infrastructure Failure	High	Public Works	Moderate	City Funds, Iowa SRF, CDBG, USDA Grants/Loans	Structural Project	Short
Implement stormwater management land use practices to reduce the impacts of flooding	River Flooding, Flash Flood, Levee/ Dam Failure	Mod	City Council	Low	City Funds	Structural Project	Long

Incorporation into Other Planning Mechanisms

Where possible, Dedham will consider the findings from this document when updating or creating new planning and operating documents. Information from this plan will be utilized to update and expand the following documents:

- Hazard Mitigation Plan
- Building Code
- Zoning Ordinance
- Housing Needs Assessment
- Strategic Plan

While the city currently does not have any of the plans listed below, if these plans were to be created during the life of this plan, this plan will be used to guide the development of:

- Comprehensive Plan
- Water Conservation Plans
- Storm Water Management Plans
- Parks and Recreation Plans
- Floodplain Regulations

Appendix G: City of Glidden

Community Profile

History

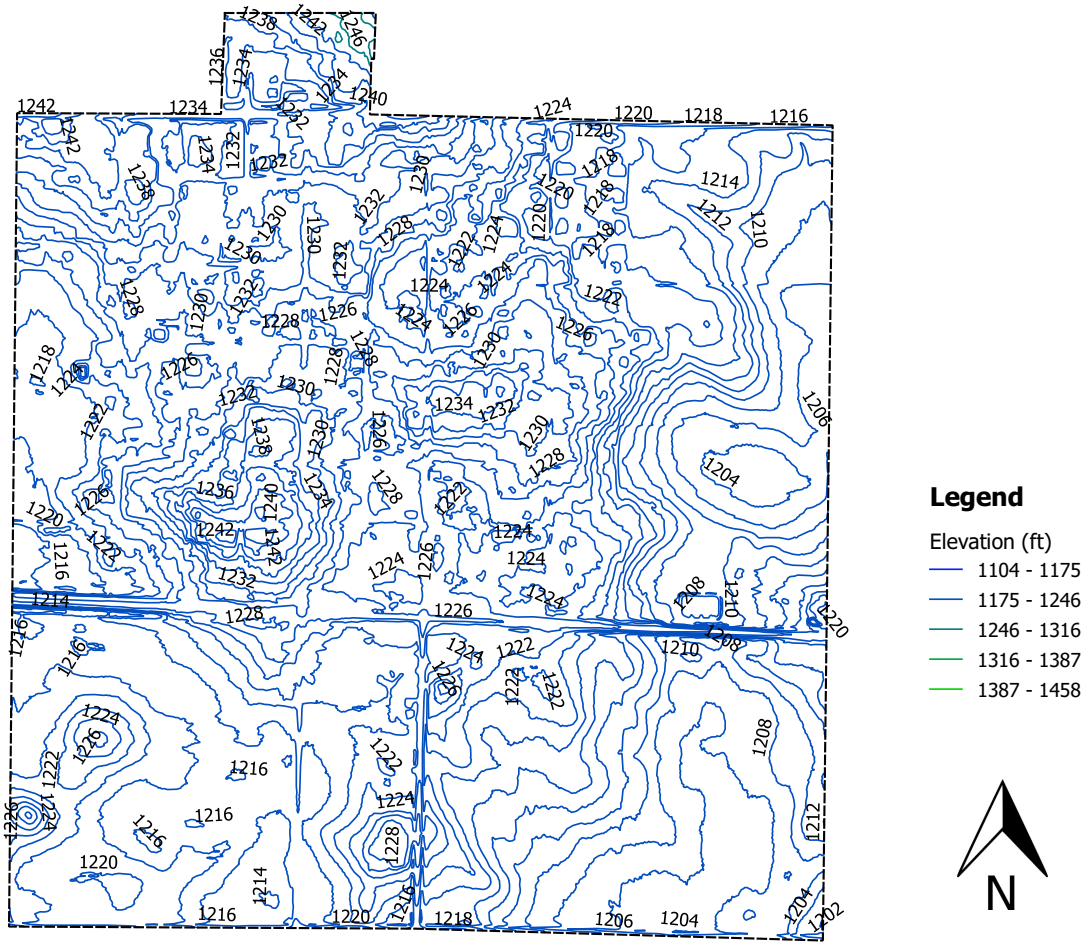
The first settler of the Glidden area was Enos Buttrick in the late 1840's. With the addition of the Chicago and Northwestern railroad lines from Clinton to Council Bluffs in 1867, Glidden was officially platted. Though, it wasn't until October of 1873 that the village of Glidden was incorporated. Glidden is named after Joseph Farwell Glidden, one of the Northwestern Railroad Directors. Mr. Glidden was also credited with inventing barbed wire in 1873. A depot was built in 1868, followed by a general store, post office, fire station and a two-story school. By 1870, the community consisted of eight brick businesses located on Main Street and a population of 177. Other businesses soon to locate consisted of jewelry and gunsmith, hardware store, an elevator, a blacksmith and wagon shop, furniture store, and a creamery. The first local newspaper "the Express" was established in 1877 while the First National Bank of Glidden also opened that year. Over the years Glidden continued to grow and currently sits at a population of 1,151.

Geography and Environment

Glidden is located on the eastern part of Carroll County. Glidden is fortunate to have Highway 30 pass through the northern part of town. Highway 30 provides convenient and safe travel to many parts of the region. Glidden is 7.9 miles from Carroll, 15.5 miles from Coon Rapids, 20.5 miles from Jefferson, 38.4 miles from Guthrie Center and 86.9 miles from Des Moines.

The highest elevation in Carroll County can be found along the eastern side of the county. Here, the elevation can reach as much as 1,550 feet above sea-level. The elevation of Glidden ranges from approximately 1,206 feet to 1,258, a relatively flat community. Map G.1 displays Glidden's elevation.

Map G.1: City of Glidden Elevation

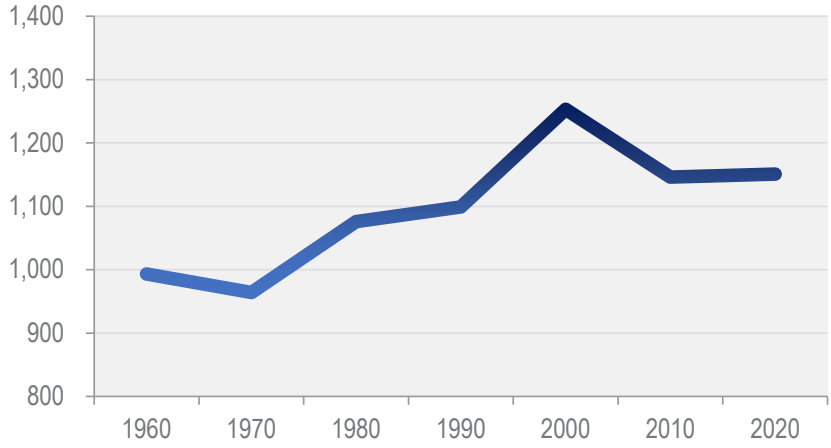


Demographics

The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Glidden's population through past, present, and future trends of the region.

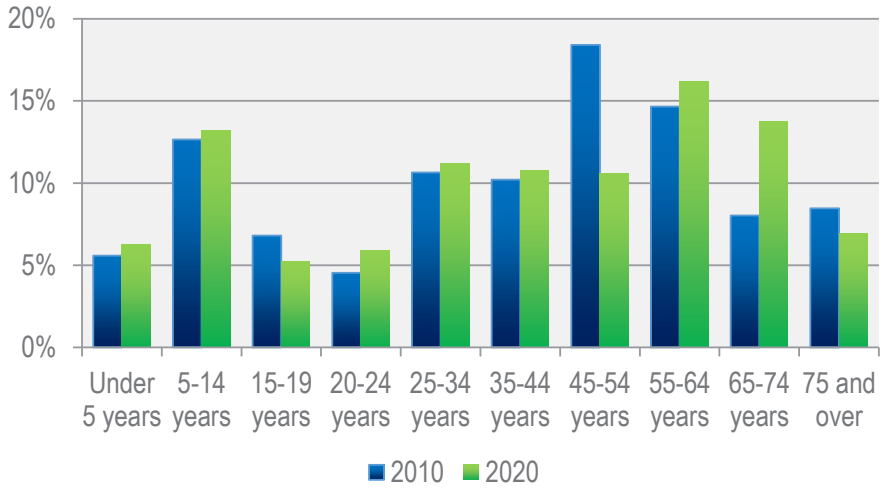
Since 1960, the City of Glidden has experienced a gradual increase in population. In 1960, Glidden had a population of 993. Since then, the City's population has grown 16% (158 residents) to 1,151 in 2020. The most dramatic change happed between 1990 and 2000 when the city gained 154 residents. Figure G.1 shows the City of Glidden's population trend since 1960.

Figure G.1: City of Glidden Historic Population, 1960-2020



The City's population is not very different from other parts of Carroll County, and even most of the State of Iowa. Population cohorts at age 50 and above have generally higher numbers than other younger cohorts. Figure G.2 displays the age of the city's population in 2020 compared to 2010.

Figure G.2: City of Glidden Age Distribution, 2010 & 2020



Housing

A community's ability to attract new residents is important. One of the most important aspects to attracting residents is housing. A community's housing stock, type of households, and housing availability and affordability are determining factors.

Since 2010, the city's housing stock has decreased by 5 units. During this same time, the City saw a 47.6% increase in vacant properties. Table G.1 shows a breakdown of the city's occupied and vacant housing units.

Table G.1: City of Glidden Housing Units, 2010 & 2020

	2010		2022	
	Number	**Percent**	**Number**	**Percent**
Occupied Housing Units	502	96.0%	487	94.0%
Owner Occupied	396	78.9%	384	78.9%
Renter Occupied	106	21.1%	103	21.1%
Vacant Housing Units	21	4.0%	31	6.0%
Total Housing Units	523	100.0%	518	100.0%

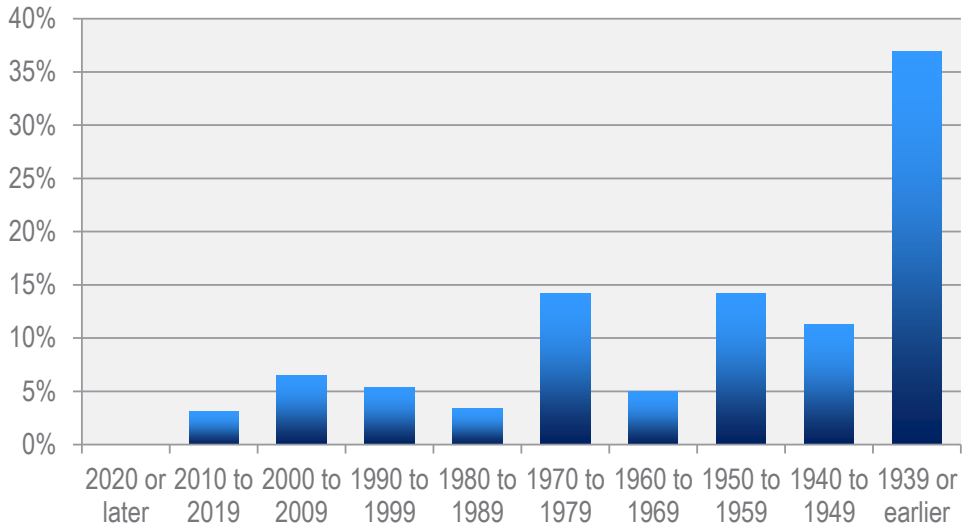
Glidden, like many other small rural towns in Iowa, has a lower median housing value of $145,200. The State of Iowa has a median housing value of $181,600. Coon Rapid's homes can be very affordable and can be used to attract new residents, but they may deteriorate faster and will need a number of repairs and updates. According to the 2022 American Community Survey Estimates, 32.4% of the city's homes are valued less than $100,000. A complete breakdown of the value of homes in Glidden can be found in table G.2. Knowing information about the city's housing stock is useful after a disaster hits to determine how much damage was done, and how it will affect the city moving forward.

Table G.2: City of Glidden Value of Owner-Occupied Units, 2022

Value of Housing Unit	Percent of Homes
Less than $50,000	8.6%
$50,000 to $99,999	23.8%
$100,000 to $149,999	19.4%
$150,000 to $199,999	22.8%
$200,000 to $299,999	21.0%
$300,000 to $499,999	4.3%
$500,000 to $999,999	0.0%
$1,000,000 or more	0.0%

Figure G.3 showcases the year housing units within the City of Glidden were constructed. Like most of the county, Glidden has a large portion (36.9%) of the homes constructed in 1939 or earlier. The city also experienced spikes in construction during 1950-1959 and 1970-1979. The 1950s and 1970s saw 14.2% of the city's homes being built. Building standards of today utilize the most recent construction materials and safety features, ensuring that the new residential structures are as safe as possible. This does not mean that older homes are more unsafe, just that they may be more susceptible to hazard damage.

Figure G.3: City of Glidden Year Housing Units Constructed, 2022



Economics

Household income is an important indicator of the economic base in Carroll County. In Glidden, the median household income is $67,361 which would classify a large number of the households in Glidden as "working" or "middle" class. Table G.3 breaks down the city's households by income. The City of Glidden's household income breakdown is similar to the other rural communities in the area, and the combination of more affordable housing with the current incomes generally provides residents with a decent quality of life. Educational services, and health care, and social assistance is the largest industry within the City. Many Glidden residents travel to other larger neighboring cities like Carroll and Jefferson where more employment opportunities are present.

Table G.3: City of Glidden Household Income, 2022

Income and Benefits (2022 Inflation-Adjusted Dollars)	Number of Households	Percent of Households
Less than $10,000	31	7.8%
$10,000 to $14,999	21	5.3%
$15,000 to $24,999	19	4.8%
$25,000 to $34,999	32	8.1%
$35,000 to $49,999	38	9.6%
$50,000 to $74,999	76	19.2%
$75,000 to $99,999	74	18.7%
$100,000 to $149,999	82	20.8%
$150,000 to $199,999	11	2.8%
$200,000 or more	11	2.8%
Median Household Income	$67,361	-
Mean Household Income	$71,845	-

Glidden, overall, is a small rural community in a small rural county. A large percent of the businesses within the county serves the largely agricultural economy. Table G.4 breaks down what industry Glidden residents work in. Educational services, and health care, and social assistance employ the largest cohort of residents with 26.6% of the city's residents being employed in this industry. Manufacturing is the second largest industry employing 18.6% of the population, while retail trade is the third largest industry employing 14.6% of the population.

Table G.4: City of Glidden Employment by Industry, 2022

Industry	Number	Percent
Total civilian non-farm employment, 16 years and over	548	100.0%
Agriculture, Forestry, Fishing, Hunting, Mining	11	2.0%
Construction	42	7.7%
Manufacturing	102	18.6%
Wholesale Trade	19	3.5%
Retail Trade	80	14.6%
Transportation and warehousing and utilities	46	8.4%
Information	3	0.5%
Finance and insurance, and real estate and rental and leasing	28	5.1%
Professional, scientific, management, administrative, and waste management services	17	3.1%
Educational, health care, and social assistance	146	26.6%
Arts, entertainment, recreation, accommodation, and food services	11	2.0%
Other services, except public administration	23	4.2%
Public Administration	20	3.6%

Existing Documents & Capabilities

Table G.5 provides a compilation of the current planning and regulatory documents in place for the City of Glidden. The table also shows the last time the documents were last updated. These documents help understand the process the city has already undertaken and what documents can be created to help guide the city. First and foremost is the previous hazard mitigation plan as this document lays out specific strategies to help the city reduce the impact hazards have on the community and those who live in it. The city's zoning code was created to keep certain zones away from one another to reduce the risk to humans and structures. The different zones can pose different threats to others, such as some industrial uses having a higher HAZMAT incident probability which if located in a residential zone, could pose large health issues to the overall population. The zoning codes also include information for street and sidewalk regulations which can reduce the number of transportation incidents. The City's housing needs assessment has evaluated the condition of the housing stock and the needs it may have. It has allowed the city to take a deeper dive into the types of housing and age of the housing to better understand how hazards may impact these structures.

The City of Glidden is overall a proactive community, which benefits them in regards to mitigation of hazards. A comprehensive plan would allow the city to take inventory of their assets and understand their current conditions. It could also include a hazard section which would allow them to take an additional deep dive into how these hazards can impact the city and what can be done to mitigate them. The comprehensive plan could be coupled with a capital improvement plan which lays out future projects and necessary funding would help the city budget for, and allow them to be proactive, not reactive to future needs. Expanding conversations with the local COG and engineering firms would allow the city to explore additional options that have worked in similar communities facing similar situations. Outside organizations are also beneficial with finding funding for projects which otherwise may be out of the city's budget. Road, water, and sewer infrastructure continues to need upgrades and pursuing funding opportunities could reduce impacts of hazards on these infrastructure types. Training staff to current requirements would allow for a more thought-out response to a hazard or hazard warning. Cross training staff regardless of responsibility on different departments can better prepare the city and can lead to things being noticed that previously went unnoticed.

Table G.5: City of Glidden Existing Documents

Document	Yes/No	Year
Previous HMP	Yes	2020
Comprehensive Plan	No	-
Building Code	No	-
Zoning Ordinance	Yes	2012
Strategic Plan	Yes	1992
Housing Needs Assessment	Yes	2017
NFIP Participant	Yes	1974
Floodplain Regulations	No	-

NFIP Participation

The City of Glidden has not been mapped according to the FEMA flood mapping center. This means that either a very limited flood area or no special flood hazard areas exist within the city limits. While the city is not mapped, it did start participating in the NFIP in 1974. The FIRMs for the rural Carroll County area surrounding Glidden can be found later in this appendix. Since the City has not been mapped, and no special flood hazard areas exist, the city does not have any floodplain regulation ordinances adopted.

Outlook and Future Development

Since the last plan update, the City of Glidden has seen recognizable development within the city limits. On US Highway 30, a new car dealership was constructed, and there has been some cleanup of residential properties along the US Highway as well. Throughout the community, there has been some housing development occurring on infill lots, as well as housing rehabilitation. A new daycare was constructed and has since opened. Within the city's downtown district, there has been some redevelopment of vacant buildings being undertaken.

Over the life of this plan, the city anticipates similar growth. Residential rehabilitation and new development on infill is likely to continue on a similar basis. The city anticipates vacant buildings on Main Street to fill with new businesses. Business expansion of current businesses is also likely within the next five years. Overall, growth and development on a similar scale should continue throughout the five year life span of this plan.

Essential Infrastructure and Services

Knowing what services and infrastructure serve the city can be beneficial in a time of disaster so the appropriate companies can be contacted in need of utility shutoff or transportation routes. The City's essential infrastructure and services can be found in Table G.6.

Table G.6: City of Glidden Essential Infrastructure and Services

Major Arterials	US Highway 30	**Air Service**	Arthur N. Neu Airport
Water Service	City of Glidden	**Sewer Service**	City of Glidden
Electric Service	City of Glidden	**Gas Service**	Black Hills Energy
Sanitation/Solid Waste	Local Haulers	**Landfill**	Carroll County Landfill
Phone and Internet	Western Iowa Networks, Mediacom, Windstream	**Law Enforcement**	Carroll County Sheriff
Fire Service	Glidden Fire Department	**Ambulance Service**	Carroll County Ambulance Service

Table G.7: City of Glidden Critical Facilities

Number on Map	Name	Address	Type
1	BP	126 West 9th Street	HAZMAT
2	Caseys	705 Idaho Street	HAZMAT
3	First Presbyterian Church	309 Idaho Street	Vulnerable Population
4	Glidden City Hall	108 Idaho Street	Essential Facility
5	Raccoon Valley Electric Co-op	28725 Lincoln Highway	Utility
6	Glidden Fire Station	218 Idaho Street	Essential Facility
7	Glidden Oil Co-Bulk Services	100 Arizona Street	HAZMAT
8	Glidden Public Library	110 Idaho Street	Public
9	Glidden-Ralston High School	602 Idaho Street	Vulnerable Population
10	Grace Baptist Church	329 East 7th Street	Vulnerable Population
11	NEW Cooperative	135 East 1st Street	HAZMAT
12	St. Elizabeth Seton Church	602 Dakota Street	Vulnerable Population
13	United Methodist Church	110 Lincoln Highway	Vulnerable Population
14	Water Tower	Arizona Street and West 4th Street	Utility
15	Sewer Plant	Utah Street	Utility
16	Storm Siren	129 East 3rd Street	Essential Facility
17	Storm Siren	East 6th & Utah	Essential Facility
18	Storm Siren	Arizona Street & W 6th Street	Essential Facility
19	Nutrien	209 South Colorado Street	HAZMAT

Glidden-Ralston Community School District

All of the district's buildings are located within the City of Glidden. All of the school's grades are located within one building located at 602 Idaho Street, Glidden. Students and staff participate in drills and educational programs related to hazards and the mitigation of them. The District maintains its own equipment and supplies to maintain roads and walkways on campus. Recently, the school district has installed a dry standpipe to make firefighting easier on the third floor. This allows the department to not have to carry hose up three flights of stairs before being able to fight the fire. Installing this standpipe was necessary as the building is older and the science lab is located on the third floor.

Table G.8: Glidden Ralston Community School District Enrollment

School Year	Facility	Enrollment	Facility	Enrollment	Total Enrollment
2018-19	PreK-5	205	6-12	131	336
2019-20	PreK-5	214	6-12	131	345
2020-21	PreK-5	224	6-12	132	356
2021-22	PreK-5	229	6-12	138	367
2022-23	PreK-5	248	6-12	138	386
2023-24	PreK-5	237	6-12	156	393

Map G.2: City of Glidden Critical Facilities Map

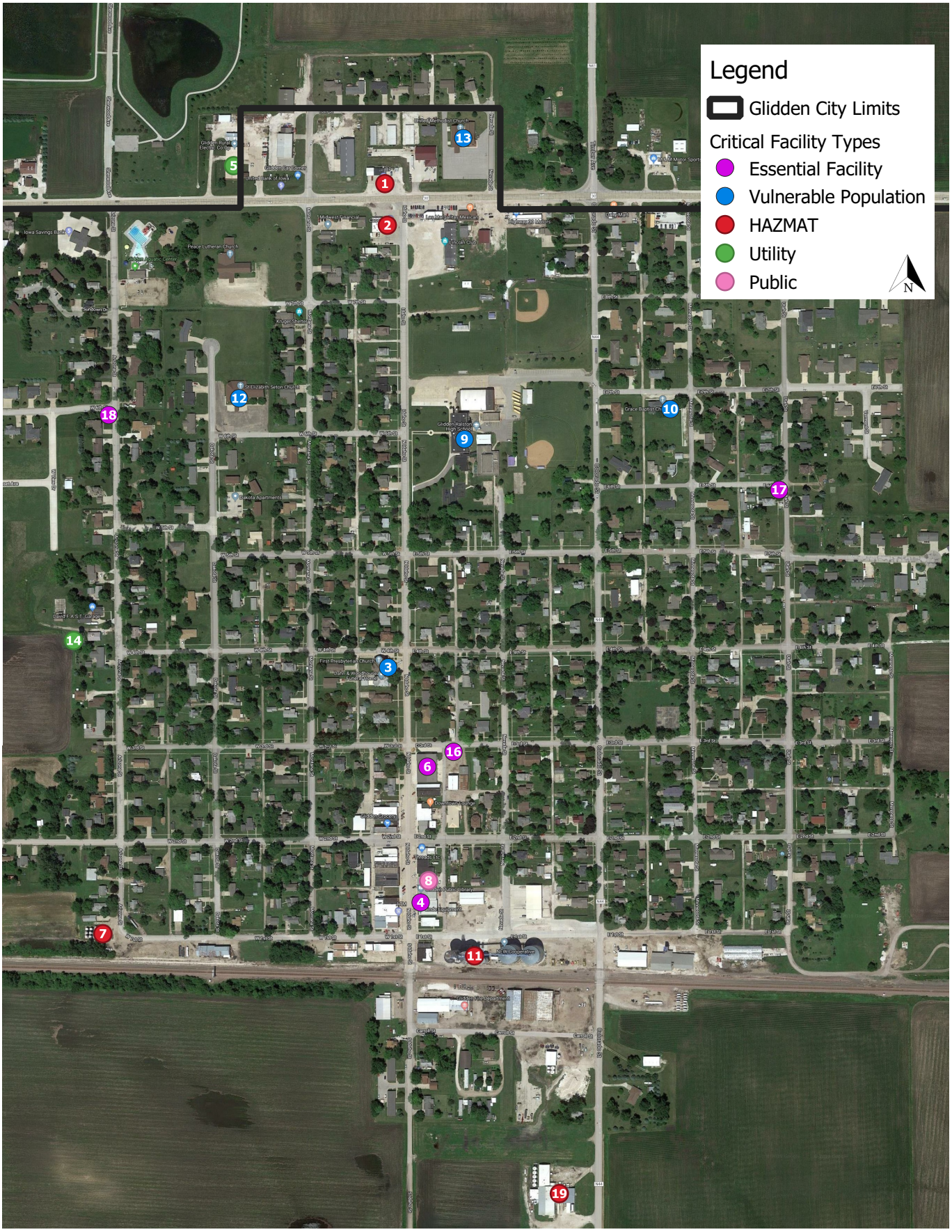


Table G.9: City of Glidden Risk Assessment

Hazard	Comments
Animal/Plant/Crop Disease	The City of Glidden contains a large amount of agricultural land. Although this land represents a large portion of the community, there have been minimal reported losses from animal/plant/crop disease within in the community. While this does impact the community, it is normally indirectly impacted.
Drought	Drought occurrences have increased across the state, and the City of Glidden has not been exempt from this hazard. Droughts continue to increase in severity and while there is little warning, this hazard can cause both direct and indirect issues for the City and it's residents.
Earthquake	There have been no instances of earthquake in the City of Glidden, and the committee feels there will be no instances during the life of this plan.
Expansive Soils	There have been no instances of expansive soils in the City of Glidden, and the committee feels there will be no instances during the life of this plan.
Extreme Heat	Extreme heat events impact the City of Glidden. Education may be one of the best action tools to combat the effects of extreme heat as individuals need to know the effects of extreme heat and how it can affect the body.
Flash Flood	Since 2020, there have been no instances of flash flooding in the City of Glidden. While flash floods have little to no warning time, with no instances within the last planning period, the committee has determined this hazard is not a high priority hazard to address, but will consider mitigation actions to prepare the community for response to an event.
Grass/Wild Land Fire	Grass and wild land fires are most commonly field fires or controlled burns that get out of hand in and immediately surrounding the city. This hazard can pose a large threat to the community as elements out of anyone's control, such as wind direction and speed, can change this hazard from harmless and controlled to out of control in a matter of minutes and can pose a threat to life.
HAZMAT Incident	Within the most recent planning period, there was one instance of hazardous spills within the City of Glidden. The spill that occurred within city limits, but it did not casue negative impacts within the community. With only one instance within city limits in the last five years, the committee feels this hazard is a minimal threat to the community and mitigation actions should be considered and implemented to prevent any instances.
Human Disease	Iowa and more specifically the City of Glidden are still feeling the effects of the COVID-19 pandemic. The pandemic has reignited the need to plan for future outbreaks and examine the city's current practices. The pandemic also reminded the public the importance of staying informed and staying vigilant to protect themselves.
Infrastructure Failure	Infrastructure failures occur with little to no warning and can cause major disruptions within the community. Planning to respond to this hazard is important to the community to protect lives and property. The most likely infrastructure failure within Glidden would be structural failure of either bridges or roadways. As these instances have no warning time, planning must be completed prior to an event happening to be able to respond in a quick manner.

Levee/Dam Failure	There are no levees or dams located in the City of Glidden, and there are no high hazard dams on waterways that lead into the city. It is unlikely that levee or dam failure will impact the city, although the city feels that planning for river flooding and planning for dam/levee failure are similar in nature.
Radiological	During the previous planning period, there were no instances of Radiological Incident in Glidden and the committee does not anticipate any happening in the next planning period. If an incident were to occur, the committee feels it would be a small, contained situation that would not threaten the community as a whole.
River Flooding	River flooding has not been reported in Glidden. The most recent FIRM maps, adopted in 2017 show that Glidden has not been mapped, meaning it has a minimal flood hazard or no special flood hazard area exists. Because there is no past history of flooding and current maps do not show hazard areas in the city, the committee determined the risk of this hazard is very low. The low risk translates to the city not experiencing any instances of river flooding throughout the planning period.
Severe Winter Storm	Severe Winter Storms continue to impact the City of Glidden. These storms while historically, have caused little damage, continue to build in strength, threatening property and lives within the city. The warning period of this hazard continues to grow with meteorological advances, but can still pose great risks to the community.
Terrorism	There have been no instances of terrorism in the City of Glidden during the previous plan period and the committee feels there will be no instances during the life of this plan. If an instance were to occur, the committee feels it would be a targeted incident that would not threaten the entire community.
Thunderstorm/ Lightning/Hail	Thunderstorm/lightning/hail instances are frequent within the community. While they are frequent, most storms pose no threat to life, crops, or property. This hazard is prevalent in Glidden but is normally not severe in nature.
Tornado	Carroll County has experienced a number of tornadoes in the recent past, but these have not caused large damage within the city. With the number of tornadoes that impact Carroll County growing, it is important for the city to continue to plan for the response to tornadoes as storms within Iowa continue to grow in strength. Preparing the public and community is vital to ensuring there is no loss of life.
Transportation Incident	Speed limits within the City of Glidden are relatively low, but increase on the edges of the community. While the speed limits are lower throughout the community, US Highway 30 runs through town, and not all vehicles slow to the appropriate speed limit. With the community having mostly lower speed limits, it is likely that any transportation incident between vehicles is likely to cause little damage to property or humans, but there is a chance of an incident which can cause extensive damage. The committee anticipates that this hazard will effect the community in varying degrees throughout the planning period.
Windstorm	Recent windstorms have caused reported damage to properties. These hazard events continue to build in magnitude, causing increasingly large amounts of damage to property and posing threats to lives. The recent derechos effected Glidden prompting the community to prepare more effectively for these hazards.

Table G.10: Hazards Not Affecting the City of Glidden

Hazard	Reason for Omission
Earthquake	Iowa as a whole has experienced the effects of few earthquakes in the past 175 years. The majority of the earthquakes were along the Mississippi River, therefore the city does not feel this hazard will impact them during this planning period.
Expansive Soils	While Iowa has expansive soils, due to the city's history of no issues in the past, the city felt this will not impact the jurisdiction over the life of this plan.

Loss Estimates

Table G.11: City of Glidden Maximum Building and Population Exposure

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	107	$668,780	1,151
Commercial	72	$11,076,645	
Industrial	0	$0	
Residential	487	$62,097,900	

It is unlikely that a jurisdiction can determine the impact any hazard will have. If a hazard were to impact the entire city, the numbers in table G.11 shows the number of people who would be affected and the maximum number of structures and their value. If this type of event were to occur, a shutdown of some facilities and services could last for at least two weeks and some injuries/illnesses will result in permanent disability or even death.

The following hazards were determine to have a negligible impact on the city, if they were to occur.

Dam/Levee Failure
Landslide
Radiological
Transportation Incident
Drought
River Flooding

If a hazard were to report negligible impacts, it is anticipated that the numbers impacted would be similar to table G.12. If there were any shutdown of facilities or services, it is likely that these shutdowns would be for less than twenty-four hours. If any injuries were to occur, it is anticipated that these would be able to be treated with first aid. A negligible hazard would impact approximately 9% of the city.

Table G.12: City of Glidden Negligible Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	10	$60,190	104
Commercial	6	$996,898	
Industrial	0	$0	
Residential	44	$5,588,811	

The following hazards were determine to have a limited impact on the city, if they were to occur.

Thunderstorm/Lightning/Hail	Flash Flood
Windstorm	Grass/Wild Land Fire
Severe Winter Storms	Infrastructure Failure
Extreme Heat	HAZMAT Incident

If a hazard were to report limited impacts, it is anticipated that the numbers impacted would be similar to table G.13. A shutdown of some facilities and services could last more than a week and any injuries/illnesses would not result in permanent disability. It is estimated that 25% of the city would be impacted.

Table G.13: City of Glidden Limited Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	27	$167,195	288
Commercial	18	$2,769,161	
Industrial	0	$0	
Residential	122	$15,524,475	

The following hazards were determine to have a limited impact on the city, if they were to occur.

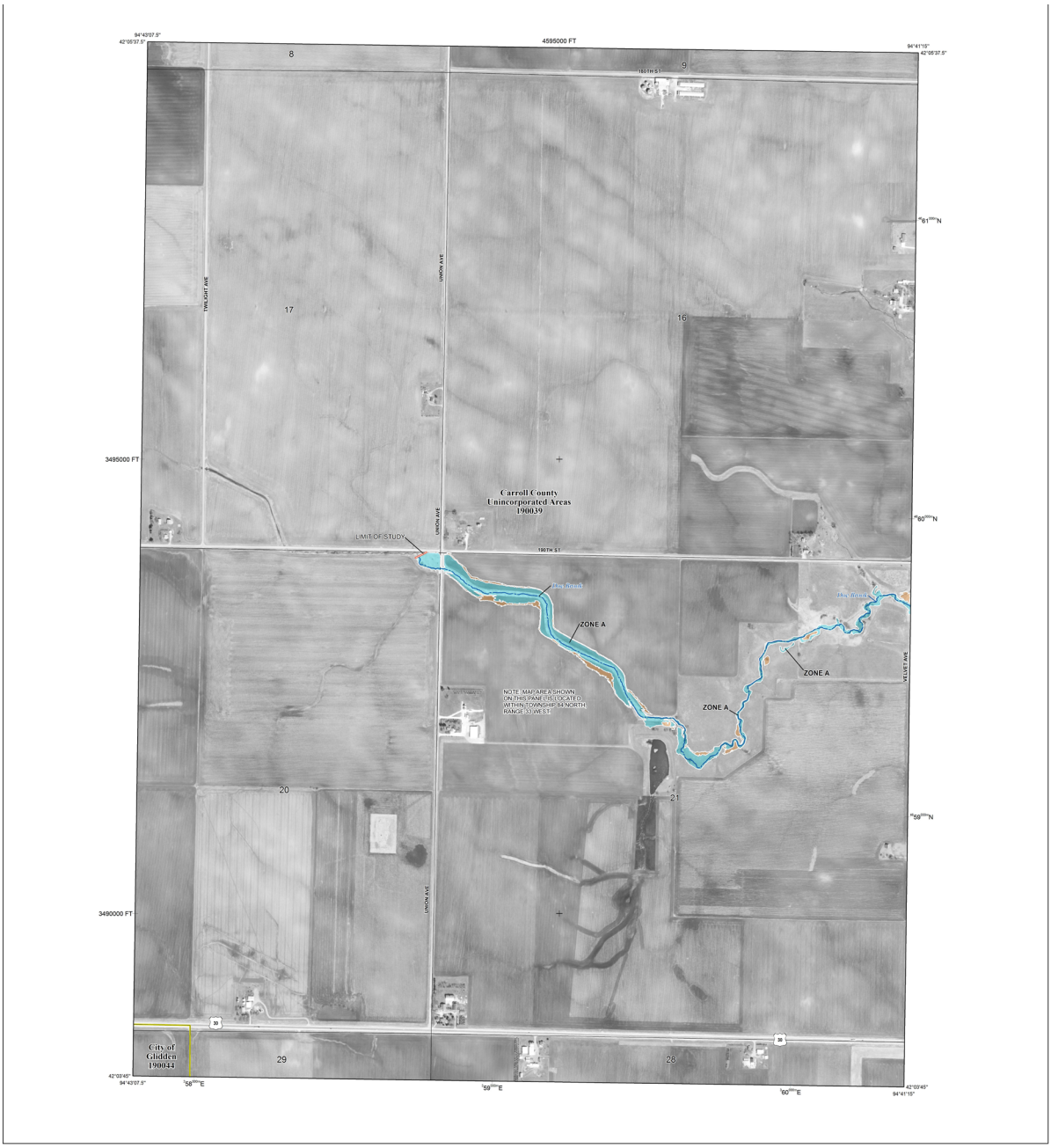
Animal/Plant/Crop Disease
Human Disease
Tornado

If a hazard were to report critical impacts, it is anticipated that the numbers impacted would be similar to table G.14. A shutdown of some facilities and services could last for at least two weeks and some injuries/illnesses will result in permanent disability. It is estimated 50% of the city would be impacted.

Table G.14: City of Glidden Critical Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	54	$334,390	576
Commercial	36	$5,538,323	
Industrial	0	$0	
Residential	244	$31,048,950	

Flood Maps



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A,V, A99
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee See Notes Zone X

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard Zone X
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

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SCALE

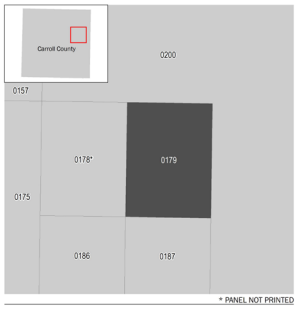
Map Projection:
State Plane Iowa North (FIPS Zone 1401) Coordinate System, Lambert Conformal Conic Projection; North American Datum 1983, GRS 1980 spheroid; North American Vertical Datum of 1988

1 inch = 500 feet 1:6,000

0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR



* PANEL NOT PRINTED

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL 179 OF 400

FEMA

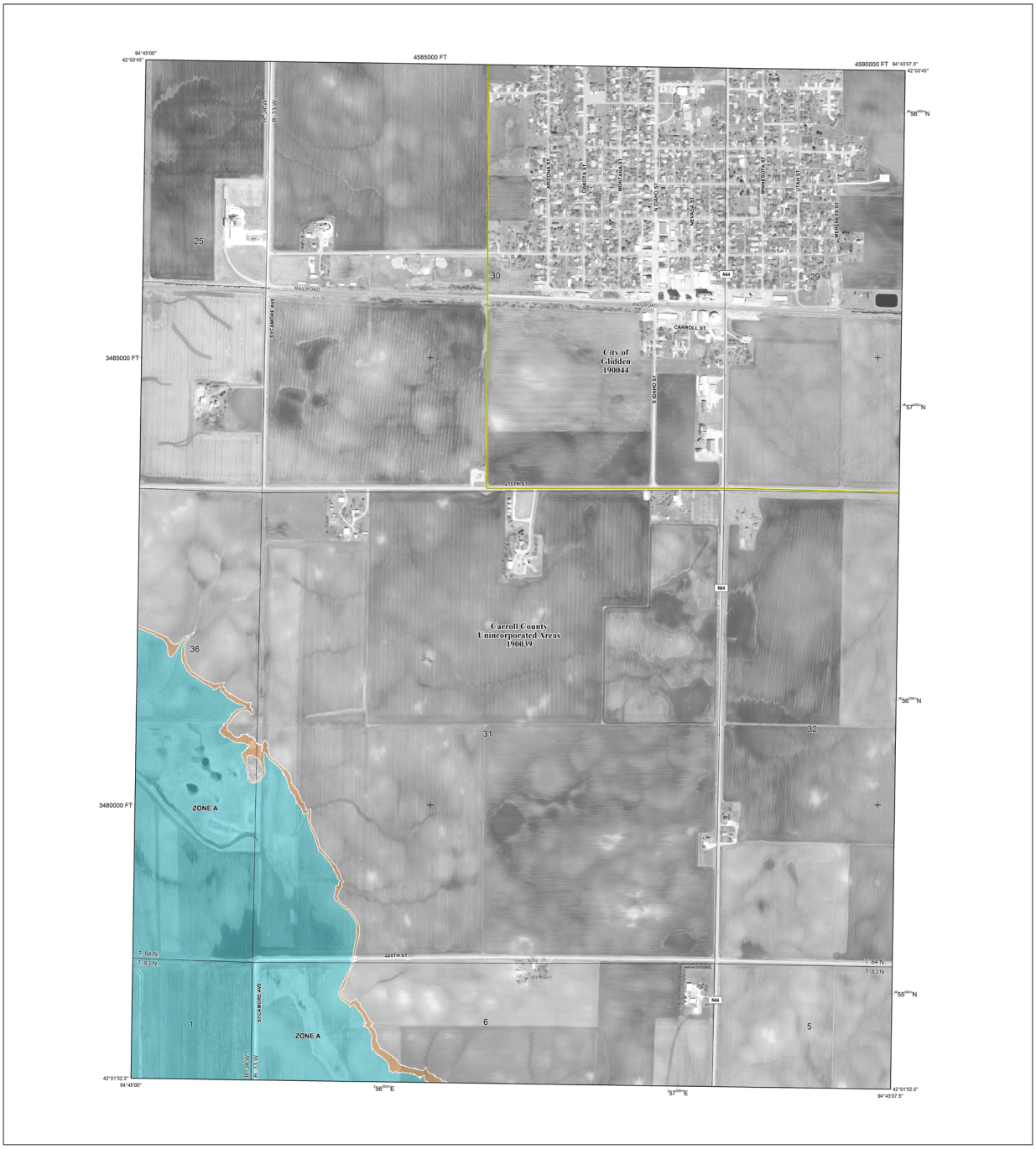
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL COUNTY	190039	0179	C
GLIDDEN, CITY OF	190044	0179	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0179C

EFFECTIVE DATE
SEPTEMBER 15, 2017



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- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

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- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee See Notes *Zone X*
- NO SCREEN Area of Minimal Flood Hazard *Zone X*

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1 inch = 500 feet 1:6,000

0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR

* PANEL NOT PRINTED

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL 186 OF 400

FEMA

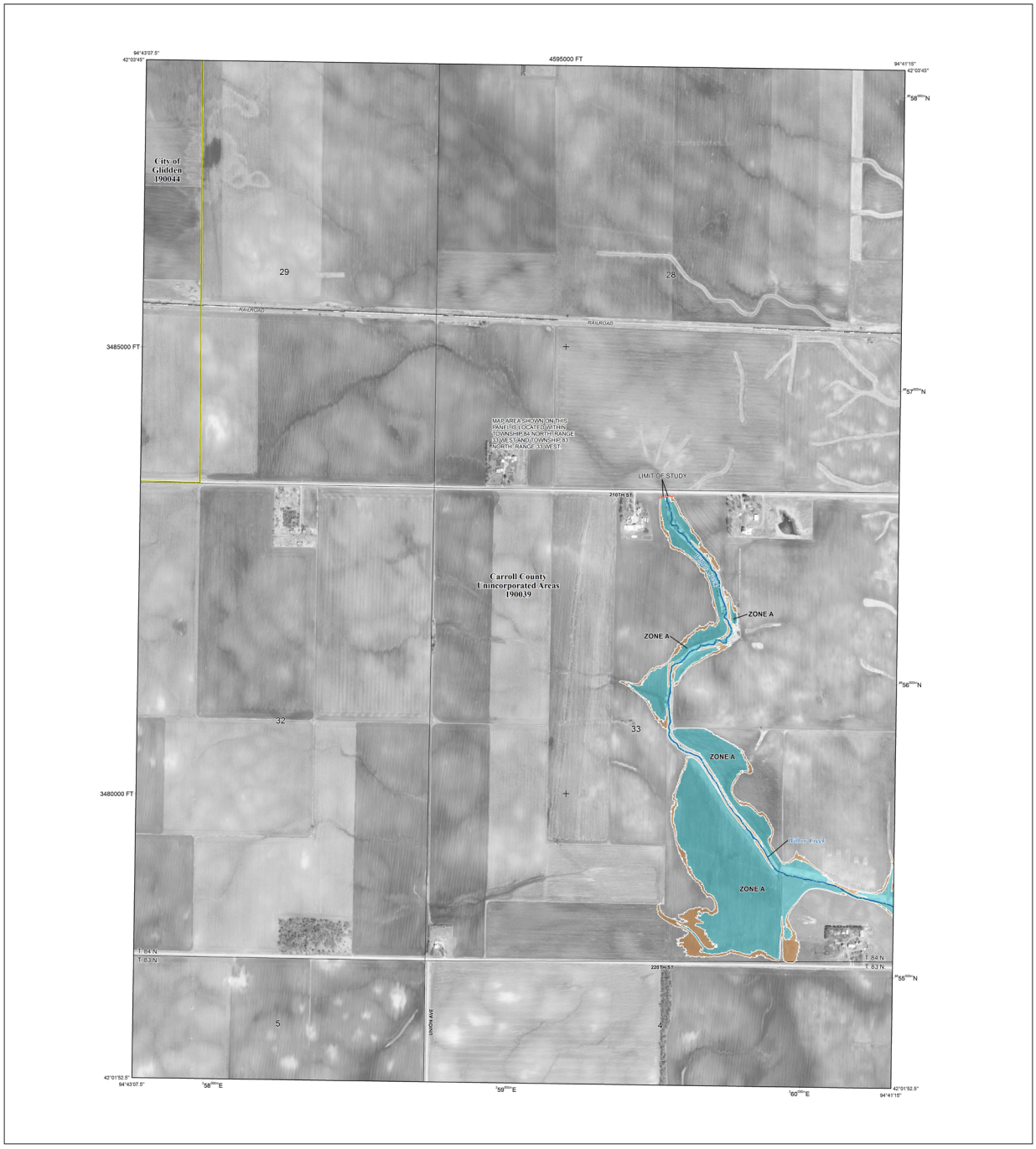
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL COUNTY	190039	0186	C
GLIDDEN, CITY OF	190044	0186	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0186C

EFFECTIVE DATE
SEPTEMBER 15, 2017



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	With BFE or Depth *Zone AE, AO, AH, VE, AR*
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
	Future Conditions 1% Annual Chance Flood Hazard *Zone X*
	Area with Reduced Flood Risk due to Levee See Notes *Zone X*
	NO SCREEN Area of Minimal Flood Hazard *Zone X*
OTHER AREAS	Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
	18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
	Coastal Transect
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
	513 Base Flood Elevation Line (BFE)
OTHER FEATURES	Limit of Study
	Jurisdiction Boundary

NOTES TO USERS

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM index. These may be ordered directly from the Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was provided in digital format by the Iowa Department of Natural Resources. This information was derived from digital orthophotography at a 2-foot ground resolution from imagery flown in April 2009.

SCALE

Map Projection:
State Plane Iowa North (FIPS Zone 1401) Coordinate System, Lambert Conformal Conic Projection; North American Datum 1983, GRS 1980 spheroid; North American Vertical Datum of 1988

1 inch = 500 feet 1:6,000

0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR

* PANEL NOT PRINTED

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL 187 OF 400

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL COUNTY	190039	0187	C
GLIDDEN, CITY OF	190044	0187	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0187C

EFFECTIVE DATE
SEPTEMBER 15, 2017

Table G.15: City of Glidden Status of Previous Mitigation Actions

	Status				
Previous Actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not Implemented**
Directional siren on north end of town				X	
Regularly monitor and maintain existing outdoor warning sirens			X		
Educate public on hyper reach notification			X		
Encourage use of NOAA weather radios at local businesses and residences			X		
Complete current plan and make plans to update every five years		X			
Inform public on hazardous materials locations and hazards	X				
Designate shelters			X		
Add chain link fence or surveillance camera at critical assets	X				
Enforce building codes, city codes, and zoning codes, rental inspections			X		
Ensure that backup generation at water and wastewater facilities are in working condition and maintained			X		
Encourage use of one call to avoid damage to utilities			X		
Work with electric companies to bury overhead power lines			X		
Continue to enforce tree trimming policy			X		
Purchase new pumper truck		X			
Provide funding needed to train personnel (fire, EMS, and police)			X		
Continue to conduct training exercises			X		
Continue training programs for fire personnel			X		
Make sure EMS volunteers trained to EMT-B or I	X				
Require all firefighters to be trained to FF1	X				
Continue fire safety education			X		
Keep updating and upgrading snow plow equipment, sand trucks, etc			X		
Utilize specific radio station for hazard updates			X		

	Status				
Previous Actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not Implemented**
Increase communication for key people (mayor, fire chief, school principal, utility managers, etc)			X		
Update first responder notification equipment			X		
Continue to budget for and fund street repairs			X		
Schedule bridge improvements and inspections					X
Complete water main improvements			X		
Check water and sewer lines for leaks			X		
Keep fire hydrants updated and working, replacing as needed			X		
Continue surveillance and protection of public facilities			X		
Regularly maintain and inspect the water tower and treatment plant			X		
Assess the needs of the emergency response department on an annual basis			X		
Install an additional dry hydrant	X				
Dig well					X
Code enforcement education for the public and City officials			X		
Hire code enforcement officer					X
Pedestrian bridge across Highway 30					X
Create a turning lane from Highway 30 to Idaho Street				X	
New fire fighting equipment for the Fire Department			X		
New bunker gear for the Fire Department			X		
Upgrade the Fire Department's fleet as trucks become obsolete or damaged			X		
Upgrade the city's snow removal equipment			X		

Action Plan

Section 201.6 (c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

Section 201.6 (c)(3)(iii): The mitigation strategy shall include an action plan, describing how the action 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 associated costs.

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

Table G.16: City of Glidden Action Plan

Goal 1	**Enhance Community Protection**
Objective 1	Improve Public Warning Capabilities
Objective 2	Maintain Current Hazard Mitigation Plan
Objective 3	Hazardous Materials-tier II sites
Objective 4	Protect and Enforce Regulatory Measures in Existing and New Development Areas
Objective 5	Provide Shelter Facilities in case of Disasters
Objective 6	Increase Protection of Public Infrastructure
Goal 2	**Protect Against Power Outage**
Objective 1	Provide Back-Up Systems for Critical Systems and Assets
Objective 2	Use Prevention Techniques to Minimize Disruption in Services
Goal 3	**Maintain and Support Public Safety, Including Facilities, Equipment, and Training**
Objective 1	Improve First Responder Resources and Capabilities
Objective 2	Provide Education and Training Programs to Increase Public and Responder Awareness
Objective 3	Provide Needed Equipment and Facilities
Goal 4	**Update Communications Systems**
Objective 1	Improve Public Warning Capabilities
Goal 5	**Maintain and Protect Public Infrastructure**
Objective 1	Maintain and Improve Roads, Bridges, and Other Transportation
Objective 2	Maintain and Improve Water Mains, Power Lines, Stormwater Systems, and Other Critical Assets
Objective 1	Maintain and Improve Roads, Bridges, and Other Transportation
Objective 2	Maintain and Improve Water Mains, Power Lines, Stormwater Systems, and Other Critical Assets

Table G.17: City of Glidden Mitigation Actions

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Directional siren on north end of town	Tornado, Windstorm, Severe Winter Storms, Thunderstorm/Lightning/ Hail	Low	City Council	Minimal	City Funds, HMGP, State Match, Local Foundations, USDA Community Facilities	Emergency Services	Mid
Regularly monitor and maintain existing outdoor warning sirens to reduce failure during hazard events	Tornado, Windstorm, Thunderstorm/Lightning/ Hail	Mod	Public Works, City Council	Minimal	City Funds	Emergency Services	Ongoing
Educate public on Alert Iowa	Tornado, Windstorm, Thunderstorm/Lightning/ Hail, Severe Winter Storm, Flash Flood, River Flood	Low	Emergency Services	Minimal	City Funds	Public Education and Awareness	Ongoing
Encourage use of NOAA weather radios at local businesses and residences	Tornado, Windstorms, Thunderstorm/Lightning/ Hail, Severe Winter Storm, Flash Flood	Mod	City Council	Minimal	City Funds, Fire Department, Local Foundations, Donations	Public Education and Awareness	Ongoing
Complete current plan and make plans to update every five years	Animal/Plant/Crop Disease, Drought, Earthquake, Expansive Soils, Extreme Heat, Flash Flood, Grass/ Wild Land Fire, HAZMAT Incident, Human Disease, Infrastructure Failure, Levee/ Dam Failure, Radiological, River Flooding, Severe Winter Storm, Terrorism, Thunderstorm/Lightning/ Hail, Tornado, Transportation Incident, Windstorm	Low	City Council, Fire Department, School District	Minimal	City Funds, HMGP Planning Funds, State Match	Prevention	Ongoing

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Inform public on hazardous materials locations and hazards	HAZMAT Incident	Mod	City Council	Minimal	City Funds	Public Education and Awareness	Ongoing
Designate shelters	Extreme Heat, Human Disease, Tornado, Terrorism, Infrastructure Failure	Mod	City Council	Minimal	City Funds	Public Education and Awareness	Short
Add chain link fence or surveillance camera at critical assets	HAZMAT Incident, Terrorism	Mod	City Council	Minimal	City Funds, Local Foundations	Prevention	Mid
Enforce building codes, city codes, and zoning codes, rental inspections	Infrastructure Failure, HAZMAT Incident, Windstorm, Tornado, Thunderstorm/Lightning/ Hail, Severe Winter Storm	Mod	City Council	Minimal	City Funds	Prevention	Ongoing
Ensure that back-up generation at water and wastewater facilities are in working condition and maintained	Infrastructure Failure, Human Disease, Terrorism	High	Public Works, City Council	Minimal	City Funds	Emergency Services	Ongoing
Encourage use of one call to avoid damage to utilities	Infrastructure Failure, HAZMAT Incident	Mod	Public Works	Minimal	City Funds, Private Utilities	Prevention	Ongoing
Work with electric companies to bury overhead power lines	Infrastructure Failure, Tornado, Windstorm, Severe Winter Storms	Low	Public Works, City Council	Minimal	City Funds, Private Utility Funds, GRID Grants, Iowa Energy RLF	Prevention	Mid
Continue to enforce tree trimming policy	Infrastructure Failure, Tornado, Windstorm, Severe Winter Storms	Low	City Council	Minimal	City Funds	Prevention	Ongoing

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Continue fire safety education	Grass/Wild Land Fire, Infrastructure Failure	Mod	Fire Department, Emergency Services	Minimal	Fire Department, Local Grants	Emergency Services	Ongoing
Utilize specific radio station for hazard updates/ notifications	Animal/Plant/Crop Disease, Drought, Earthquake, Expansive Soils, Extreme Heat, Flash Flood, Grass/ Wild Land Fire, HAZMAT Incident, Human Disease, Infrastructure Failure, Levee/ Dam Failure, Radiological, River Flooding, Severe Winter Storm, Terrorism, Thunderstorm/Lightning/ Hail, Tornado, Transportation Incident, Windstorm	Mod	Emergency Services	Minimal	City Funds	Emergency Services	Ongoing
Increase communication for key people (mayor, fire chief, school principal, utility managers, etc)	Animal/Plant/Crop Disease, Drought, Earthquake, Expansive Soils, Extreme Heat, Flash Flood, Grass/ Wild Land Fire, HAZMAT Incident, Human Disease, Infrastructure Failure, Levee/ Dam Failure, Radiological, River Flooding, Severe Winter Storm, Terrorism, Thunderstorm/Lightning/ Hail, Tornado, Transportation Incident, Windstorm	Mod	City Council, Emergency Services	Minimal	City Funds	Emergency Services	Ongoing

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Update first responder notification equipment	Animal/Plant/Crop Disease, Drought, Earthquake, Expansive Soils, Extreme Heat, Flash Flood, Grass/ Wild Land Fire, HAZMAT Incident, Human Disease, Infrastructure Failure, Levee/ Dam Failure, Radiological, River Flooding, Severe Winter Storm, Terrorism, Thunderstorm/Lightning/ Hail, Tornado, Transportation Incident, Windstorm	Mod	Fire Department	Minimal	City Funds, Local Foundations	Emergency Services	Ongoing
Continue to budget for and fund street repairs	Transportation Incident, River Flooding, Flash Flood, Infrastructure Failure	Mod	City Council	Moderate	City Funds, Carroll County, Iowa DOT	Property Protection	Ongoing
Complete water main improvements	Infrastructure Failure	High	City Council	Moderate	City Funds, CDBG, Iowa SRF, USDA grants and loans	Property Protection	Mid
Check water and sewer lines for leaks and fix as necessary. Complete improvements as needed	Infrastructure Failure, Human Disease	High	City Council	Low	City Funds, CDBG, Iowa SRF, USDA grants and loans	Property Protection	Ongoing
Keep fire hydrants updated and working, replacing as needed	Infrastructure Failure, Transportation Incident, HAZMAT Incident	Mod	Public Works, City Council	Minimal	City Funds, CDBG, Iowa SRF, USDA grants and loans	Property Protection	Ongoing
Continue surveillance and protection of public facilities	Infrastructure Failure, Terrorism	Mod	City Council	Minimal	City Funds	Prevention	Ongoing
Regularly maintain and inspect the water tower and treatment plant	Infrastructure Failure, HAZMAT Incident, Windstorm, Terrorism, Tornado	Low	City Council	Minimal	City Funds	Prevention	Ongoing

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Assess the needs of the emergency response department on an annual basis	Animal/Plant/Crop Disease, Drought, Earthquake, Expansive Soils, Extreme Heat, Flash Flood, Grass/ Wild Land Fire, HAZMAT Incident, Human Disease, Infrastructure Failure, Levee/ Dam Failure, Radiological, River Flooding, Severe Winter Storm, Terrorism, Thunderstorm/Lightning/ Hail, Tornado, Transportation Incident, Windstorm	Mod	Fire Department	Minimal	City Funds	Emergency Services	Ongoing
Install an additional dry hydrant	HAZMAT Incident, Infrastructure Failure, Extreme Heat, Drought	Mod	Fire Department	Minimal	City Funds	Emergency Services	Ongoing
Dig well	Drought, HAZMAT Incident, Infrastructure Failure	Mod	City Council	Moderate	City Funds, CDBG, Iowa SRF, USDA grants and loans	Structural Project	Long
Code enforcement education for the public and City officials	Tornado, Windstorm, Thunderstorm/Lightning/ Hail, Severe Winter Storm, Infrastructure Failure, Flash Flood, Grass/Wild Land Fire, Drought	High	City Council	Minimal	City Funds	Prevention	Ongoing
Hire code enforcement officer	Tornado, Windstorm, Thunderstorm/Lightning/ Hail, Severe Winter Storm, Infrastructure Failure, Flash Flood, Grass/Wild Land Fire, Drought	High	City Council	Low	City Funds	Prevention	Short
Create a turning lane from Highway 30 to Idaho Street	Transportation Incident	High	City Council	Moderate	City Funds, Carroll County, Iowa DOT	Prevention	Mid

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Complete storm sewer upgrades and/or replacement if necessary	Severe Winter Storm, Drought, Thunderstorm/ Lightning/Hail, River Flooding, Dam/Levee Failure	High	City Council	High	City Funds, CDBG, USDA Community Facilities	Structrual Project	Mid
Purchase and install generators at the lift stations	Infrastructure Failure, Severe Winter Storm, River Flood, Dam/Levee Failure	High	City Council	Low	City Funds, HMGP with State Match, USDA Community Facilities, Local Foundations	Prevention	Short
Convert lift stations to dry pumps	Infrastructure Failure	High	City Council	Mod	City Funds, Local Foundations, USDA Community Facilities	Structural Project	Short
Plan for and complete upgrades and updates at the water treatment facility	Drought, Infrastructure Failure, Terrorism	High	City Council	High	City Funds, CDBG, Iowa SRF, USDA Community Facilities, Local Foundations	Structural Project	Mid

Table G.18:Glidden-Ralston Community Schools Risk Assessment

Hazard	Comments
Extreme Heat	Extreme heat events continue to impact Glidden and the Glidden-Ralston Community School District. Education may be one of the best action tools to combat the effects of extreme heat as individuals need to know the effects of extreme heat and how it can affect the body.
Flash Flood	Since 2020, there have been no instances of flash flooding in the City of Glidden. While flash floods have little to no warning time, with no instances within the last planning period, the committee has determined this hazard is not a high priority hazard to address, but will consider mitigation actions to prepare the community for response to an event.
Human Disease	Iowa and more specifically the City of Glidden are still feeling the effects of the COVID-19 pandemic. The school district continues to have certain precautions and policies in place to better protect students and faculty. The pandemic has reignited the need to plan for future outbreaks and examine the city and school's current practices. The pandemic also reminded the public the importance of staying informed and staying vigilant to protect themselves.
Infrastructure Failure	Infrastructure failures occur with little to no warning and can cause major disruptions within the community. Planning to respond to this hazard is important to the community to protect lives and property. The most likely infrastructure failure within the Glidden-Ralston School District would be structural failure of either bridges or roadways. These failures would impact busing primarily. As these instances have no warning time, planning must be completed prior to an event happening to be able to respond in a quick manner.
Severe Winter Storm	Severe Winter Storms continue to impact the City of Glidden and the School District. These storms while historically, have caused little damage, continue to build in strength, threatening property and lives within the city. The warning period of this hazard continues to grow with meteorological advances, but can still pose great risks to the community. These instances can require the school to be able to change schedules and bus routing to ensure the safety of the children.
Terrorism	There have been no instances of terrorism in the City of Glidden or the Glidden-Ralston Community School District during the previous plan period and the committee feels there will be no instances during the life of this plan. If an instance were to occur, the committee feels it would be a targeted incident that would not threaten the entire community.
Thunderstorm/ Lightning/Hail	Thunderstorm/lightning/hail instances are frequent within the community. While they are frequent, most storms pose no threat to life or property. This hazard is prevalent in Glidden but is normally not severe in nature.
Tornado	Carroll County has experienced a number of tornadoes in the recent past, but the City of Glidden has not been impacted directly. While the city has not experienced any tornadoes within the past planning period, it is important for the city to continue to plan for the response to tornadoes as storms within Iowa continue to grow in strength. Preparing the public and community is vital to ensuring there is no loss of life.

Transportation Incident	Speed limits within the majority of the City of Glidden are relatively low, but portions of the school district have higher speed limits. With a portion of the district having lower speed limits, it is likely that any transportation incident between vehicles is likely to cause little damage to property or humans, but there is a chance of an incident which can cause extensive damage. The committee anticipates that this hazard will effect the district in varying degrees throughout the planning period.
Windstorm	Recent windstorms have caused reported damage to properties. These hazard events continue to build in magnitude, causing increasingly large amounts of damage to property and posing threats to lives. The recent derechos effected Glidden prompting the community to prepare more effectively for these hazards.

Glidden-Ralston Community Schools Action Plan

Section 201.6 (c)(3)(iii): The mitigation strategy shall include an action plan, describing how the action 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 associated costs.

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

Table G.19: Glidden-Ralston Community Schools Action Plan

Goal 1	**Minimize damage to critical facilities, infrastructure, and other school assets from the effects of hazards**
Objective 1	Improve early warning signs
Objective 2	Improve infrastructure
Objective 3	Provide back-up assistance for all critical systems
Goal 2	**Minimize to the greatest possible extent the vulnerability of the students and visitors to the Glidden-Ralston Community Schools to the impacts of all identified hazards**
Objective 1	Protection of school children and staff
Goal 3	**Improve coordination, communication, and response operations with other relevant organizations**
Objective 1	Provide education and training
Objective 2	Improve first responder resources and capabilities
Goal 4	**Improve public communication, education, and awareness of hazards and their risks to the Glidden-Ralston Community School District**
Objective 1	Provide education and training

Table G.20: Glidden-Ralston Community Schools Mitigation Actions

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Backup generator at the school	Infrastructure Failure, Extreme Heat, Severe Winter Storm, Levee/ Dam Failure, Thunderstorm/ Lightning/Hail, Tornado, Windstorm	Medium	Superintendent, School Board, Maintenance Position	Moderate	School Funds, FEMA HMGP, Local Foundations	Emergency Services	Mid
Build a safe room at both schools	Infrastructure Failure, Tornado, Windstorm	High	School Board, Superintendent, School District's Engineering Firm	High	School Funds, City Funds, FEMA HMGP, Local Foundations	Prevention	Short
Training on bus evacuation	Transportation Incident	High	Transportation Director, Bus Drivers	Low	School Funds, Training Grants	Emergency Services	Ongoing
Continue to train local volunteers as much as feasibly possible	Terrorism, Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado, Flash Flood, Windstorm, Transportation Incident	High	Glidden-Ralston School District	Minimal	School Funds, FEMA AFG & SAFER	Public Education and Awareness	Ongoing
Install GPS in all school buses	Transportation Incident	Low	Glidden-Ralston School District	Moderate	School Funds, Iowa Department of Education	Emergency Services	Mid
Continued practice of drills and safety procedures with children at school	Tornado, Infrastructure Failure, Terrorism, River Flooding, Flash Flooding	High	Glidden-Ralston School District	Low	City Funds, School Funds	Public Education and Awareness	Ongoing
Create an emergency operations plan with an infections disease section	Human Disease	High	Glidden-Ralston School District, Carroll County Public Health	Minimal	School Funds	Prevention	Short
Regularly search water lines for leaks to ensure water is not wasted	Drought	Medium	Glidden-Ralston School District	Minimal	School Funds	Prevention	Ongoing

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Create or update comprehensive heat emergency plans, including procedures for modifying activities, providing cool spaces, and communicating with families.	Extreme heat	High	School Board, Teachers, Administration	Minimal	School Funds	Prevention	Short
Regularly prune trees and shrubs, remove dead leaves and debris, and ensure proper irrigation.	Grass/Wild Land Fire	High	Maintenance	Minimal	School Funds	Prevention	Ongoing

Incorporation into Other Planning Mechanisms

Where possible, Glidden will consider the findings from this document when updating or creating new planning and operating documents. Information from this plan will be utilized to update and expand the following documents:

- Hazard Mitigation Plan
- Zoning Ordinance
- Housing Needs Assessment
- Strategic Plan

While the city currently does not have any of the plans listed below, if these plans were to be created during the life of this plan, this plan will be used to guide the development of:

- Water Conservation Plans
- Storm Water Management Plans
- Parks and Recreation Plans
- Comprehensive Plan
- Building Code
- Floodplain Regulations

Incorporation in to Other Planning Mechanisms- Glidden-Ralston Community Schools

The update of the mitigation strategy will be provided to the School Superintendent for consideration in the next update cycle of the capital improvement plan. Information will be utilized to expand and improve the school's mitigation to potential hazard events.

Appendix H: City of Halbur

Community Profile

History

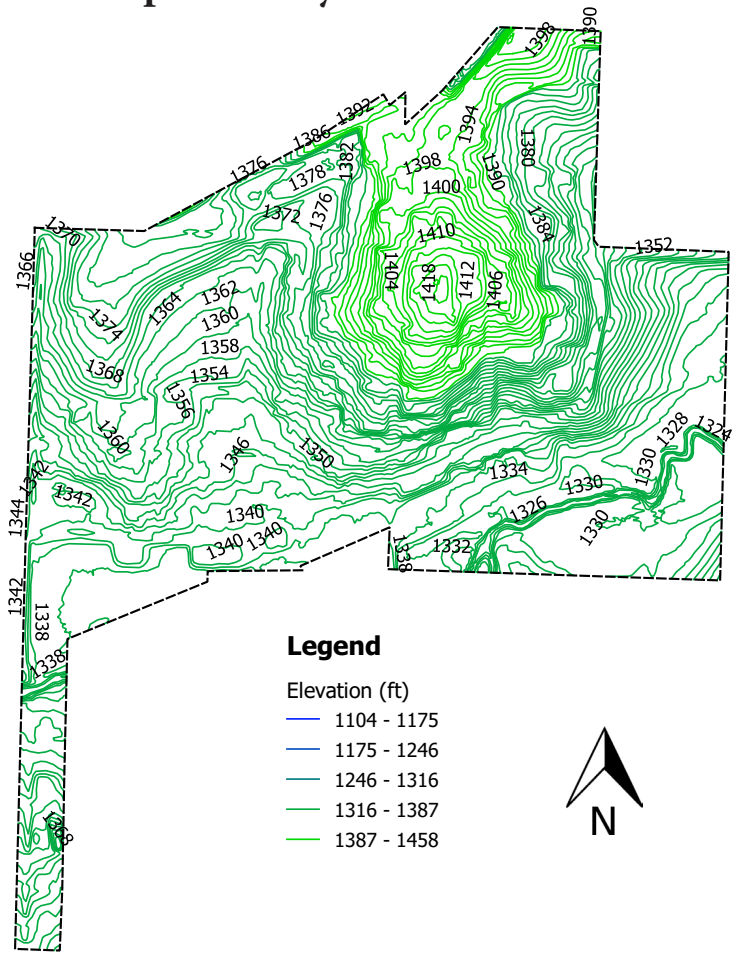
The town of Halbur, Iowa was named after Anton Halbur, who donated the forty acres of land for the town site. Anton Halbur purchased the land in 1880 for $1.00 an acre from a resident of Old Carrollton. He made a satisfactory profit at this price on his government bought land. Anton Halbur's farm was crossed by the Iowa Southwestern Railroad in 1881-1882. In the latter year, Halbur was located and plotted on the north half of the northwest quarter of section 18'33'35 in Roselle Township. Part of this was the Halbur farm, so Anton donated the land for the railroad station and the town which grew rapidly after trains came. Halbur, being located between Manning and Carroll became a great trading territory and continues to flourish as a trading center to this day.

Geography and Environment

Halbur is located in the southwestern quadrant of Carroll County. Halbur is located roughly five miles south of Highway 30 and approximately eight miles north of Highway 141. These two routes provide easy travel throughout the region for residents of Halbur. The community is 11.2 miles from Carroll, 12.2 miles from Manning, and 22.3 miles from Audubon and 23.5 miles from Coon Rapids.

The highest elevation in Carroll County can be found along the eastern side of the county. Here, the elevation can reach as much as 1,550 feet above sea-level. Elevations in Halbur range from 1,330 feet in the southeast corner to roughly 1,414 feet in the center of town. The following map displays Halbur's elevation in relation to the rest of Carroll County.

Map H.1: City of Halbur Elevation

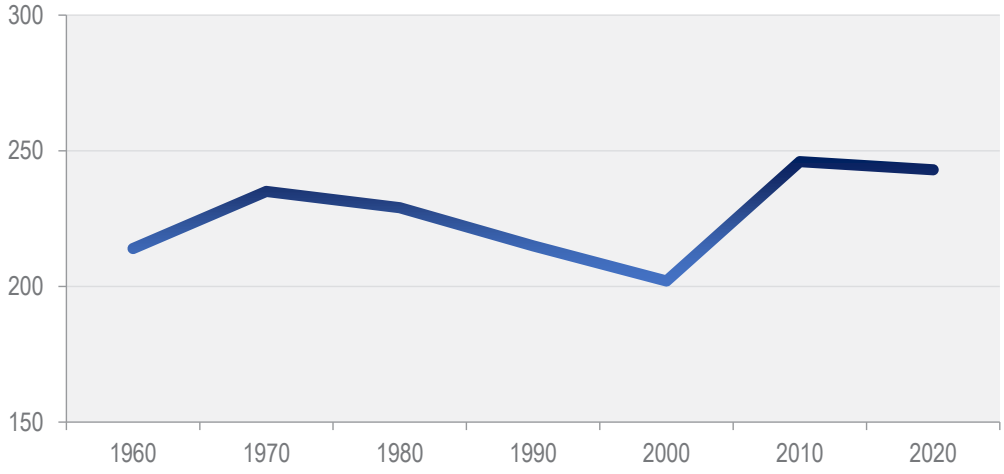


Demographics

The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Halbur's population through past, present, and future trends of the region.

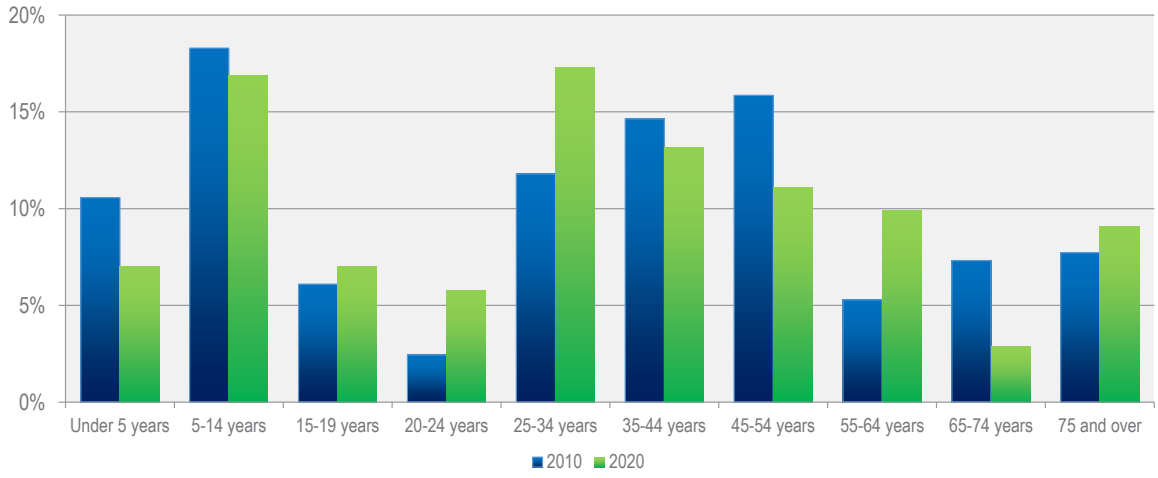
Over the past 50 years, the City of Halbur has experienced a slight increase in population. In 1960, Halbur had a population of 214. Since then, the City's population has grown 14% (29 residents) to 243 in 2020. The most dramatic change happened between 2000 and 2010 when the city gained 44 residents. Figure H.1 shows the City of Halbur's population trend since 1960.

Figure H.1: City of Halbur Historic Population, 1960-2020



The City's population is slightly different from the county's as there is not the large spike in older residents as seen in other parts of the county. In 2020, the largest age group was 25-34 years (17.3%), closely followed by the 5-14 age group (16.9%). Figure H.2 displays the age of the city's population in 2020 compared to 2010.

Figure H.2: City of Halbur Age Distribution, 2010 & 2020



Housing

A community's ability to attract new residents is important. One of the most important aspects to attracting residents is housing. A community's housing stock, type of households, and housing availability and affordability are determining factors.

Since 2010, the city's housing stock has decreased by 3 units. Renter-occupied units increased by six and owner-occupied units decreased by eight. In this same time period, the city saw its vacant housing units decrease by one, from 4 to 3 units. Table H.1 shows a breakdown of the city's occupied and vacant housing units.

Table H.1: City of Halbur Housing Units, 2010 & 2022

	2010		2022	
	Number	**Percent**	**Number**	**Percent**
Occupied Housing Units	94	95.9%	92	96.8%
Owner Occupied	86	91.5%	78	84.8%
Renter Occupied	8	8.5%	14	15.2%
Vacant Housing Units	4	4.1%	3	3.2%
Total Housing Units	98	100.0%	95	100.0%

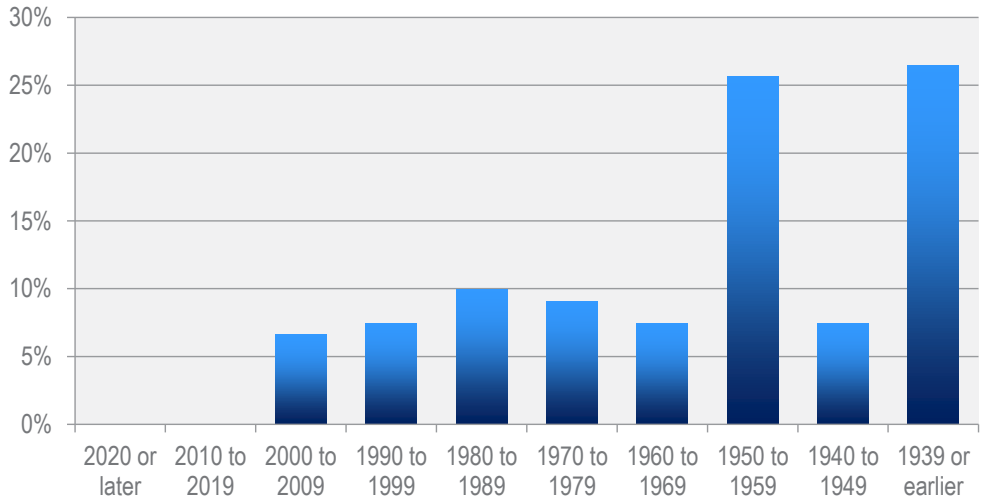
In 2022, the estimated median value of owner-occupied housing units in Halbur was $140,300. The State of Iowa has a median housing value of $181,600. The city's homes can be very affordable and can be used to attract new residents, but they may deteriorate faster and will need a number of repairs and updates. According to the 2022 American Community Survey Estimates, 29.1% of the city's homes are valued less than $100,000. A complete breakdown of the value of homes in Halbur can be found in table H.2. Knowing information about the city's housing stock is useful after a disaster hits to determine how much damage was done, and how it will affect the city moving forward.

Table H.2: City of Halbur Value of Owner-Occupied Units, 2022

Value of Housing Unit	Percent of Homes
Less than $50,000	3.9%
$50,000 to $99,999	25.2%
$100,000 to $149,999	27.6%
$150,000 to $199,999	4.7%
$200,000 to $299,999	22.8%
$300,000 to $499,999	15.7%
$500,000 to $999,999	0.0%
$1,000,000 or more	0.0%

Figure H.3 showcases the year housing units within the City of Halbur were constructed. Like most of the county, Halbur has a large portion (26.4%) of the homes constructed in 1939 or earlier. The city also experienced spikes in construction during 1950-1959. The 1950s saw 25.6% of the city's homes being built. Building standards of today utilize the most recent construction materials and safety features, ensuring that the new residential structures are as safe as possible. This does not mean that older homes are more unsafe, just that they may be more susceptible to hazard damage.

Figure H.3: City of Halbur Year Housing Units Constructed, 2022



Economics

Household income is an important indicator of the economic base in Carroll County. In Halbur, the median household income is $80,536 which would classify a large number of the households in Halbur as "working" or "middle" class. Table H.3 breaks down the city's households by income. The City of Halbur's household income breakdown is similar to the other rural communities in the area, and the combination of more affordable housing with the current incomes generally provides residents with a decent quality of life. Many residents of Halbur travel to other larger neighboring cities like Carroll or Denison where more employment opportunities are present.

Table H.3: City of Halbur Household Income, 2022

Income and Benefits (2022 Inflation-Adjusted Dollars)	Number of Households	Percent of Households
Less than $10,000	1	0.8%
$10,000 to $14,999	1	0.8%
$15,000 to $24,999	2	1.6%
$25,000 to $34,999	4	3.1%
$35,000 to $49,999	24	18.6%
$50,000 to $74,999	24	18.6%
$75,000 to $99,999	37	28.7%
$100,000 to $149,999	31	24.0%
$150,000 to $199,999	4	3.1%
$200,000 or more	1	0.8%
Median Household Income	$80,536	-
Mean Household Income	$88,160	-

Halbur, overall, is a small rural community in a small rural county. A large percent of the businesses within the county serves the largely agricultural economy. Table H.4 breaks down what industry Halbur residents work in. Retail trade employs the largest cohort of residents with 15.4% employed in this industry. The second largest is educational services, and health care and social assistance, with 13.4% of the residents employed in this industry.

Table H.4: City of Halbur Employment by Industry, 2022

Industry	Number	Percent
Total civilian non-farm employment, 16 years and over	201	100%
Agriculture, Forestry, Fishing, Hunting, Mining	3	1.5%
Construction	18	9.0%
Manufacturing	22	10.9%
Wholesale Trade	22	10.9%
Retail Trade	31	15.4%
Transportation and warehousing and utilities	11	5.5%
Information	2	1.0%
Finance and insurance, and real estate and rental and leasing	17	8.5%
Professional, scientific, management, administrative, and waste management services	1	0.5%
Educational, health care, and social assistance	27	13.4%
Arts, entertainment, recreation, accommodation, and food services	12	6.0%
Other services, except public administration	25	12.4%
Public Administration	10	5.0%

Existing Documents & Capabilities

Table H.5 provides a compilation of the current planning and regulatory documents in place for the City of Halbur. The table also shows the last time the documents were last updated. These documents help understand the process the city has already undertaken and what documents can be created to help guide the city. First and foremost is the previous hazard mitigation plan as this document lays out specific strategies to help the city reduce the impact hazards have on the community and those who live in it. Halbur has a comprehensive plan and a zoning code. These two documents work hand-in-hand to guide the future development of the city. The comprehensive plan takes a deep dive into the city's inventory of assets, utilities, and infrastructure. This plan also includes a hazard chapter which addresses some disaster response items as well as mitigation for the future. The city's zoning code was created to keep certain zones away from one another to reduce the risk to humans and structures. The different zones can pose different threats to others, such as some industrial uses having a higher HAZMAT incident probability which if located in a residential zone, could pose large health issues to the overall population. The zoning codes also include information for street and sidewalk regulations which can reduce the number of transportation incidents.

The City of Halbur is overall proactive community, which benefits them in regards to mitigation of hazards. A capital improvement plan which lays out future projects and necessary funding would help the city budget for, and allow them to be proactive, not reactive to future needs. Expanding conversations with the local COG and engineering firms would allow the city to explore additional options that have worked in similar communities facing similar situations. Outside organizations are also beneficial with finding funding for projects which otherwise may be out of the city's budget. Road, water, and sewer infrastructure continues to need upgrades and pursuing funding opportunities could reduce impacts of hazards on these infrastructure types. Training staff to current requirements would allow for a more thought-out response to a hazard or hazard warning. Cross training staff regardless of responsibility on different departments can better prepare the city and can lead to things being noticed that previously went unnoticed.

Table H.5: City of Halbur Existing Documents

Document	Yes/No	Year
Previous HMP	Yes	2020
Comprehensive Plan	Yes	2008
Building Code	Yes	2014
Zoning Ordinance	Yes	2008
Strategic Plan	Yes	1997
Housing Needs Assessment	Yes	2015
NFIP Participant	No	-
Floodplain Regulations	Yes	2024

NFIP Participation

In the past, there have been instances of flooding within the city limits of Halbur. Halbur just recently started participatin in the NFIP in 2024 after flood maps were updated and adopted in 2017. The city's FIRMs can be found in the later in this appendix. The City Clerk also acts as the Floodplain Administrator for the city. Any development/demolition in the floodplain is required to obtain a permit which regulates the development/ demolition and lays out the NFIP regulations that must be followed. Manning participates in the NFIP and implements substantial improvement / substantial damage provisions in the following manner: Local officials (1) determine the cost of work, (2) determine the market value of buildings, (3) make SI/SD determinations and

provide determinations to property owners, and (4) require owners to obtain permits to bring substantially improved and substantially damaged structures into compliance with the floodplain management requirements.

Outlook and Future Development

Since the last plan update, the City of Halbur has seen some limited development. On a regular basis, there are new homes constructed within the City limits. A large number of these homes are constructed in the northern portion of the community. In addition to the new construction, home have been rehabilitated on an annual basis. The City itself continues to expand the services it provides to its citizens, and it continues to improve the amenities that have been offered within the City for a number of years.

Over the life of this plan, the city does not anticipate this growth to slow. The city anticipates homes to continue to be built in the northern portion of the community and rehabilitation of homes throughout town to continue as well. While new businesses may not locate into the city, it is anticipated that the current businesses will expand to some extent. Overall, growth and development on a similar scale should continue throughout the five year life span of this plan.

Essential Infrastructure and Services

Knowing what services and infrastructure serve the city can be beneficial in a time of disaster so the appropriate companies can be contacted in need of utility shutoff or transportation routes. The City's essential infrastructure and services can be found in Table H.6.

Table H.6: City of Halbur Essential Infrastructure and Services

Major Arterials	N14 & E46	**Air Service**	Arthur N. Neu Airport
Water Service	WCIRWA	**Sewer Service**	WCIRWA
Electric Service	MidAmerican Energy	**Gas Service**	Individual Households Determine Provider
Sanitation/Solid Waste	Local Haulers	**Landfill**	Carroll County Landfill
Phone and Internet	Western Iowa Networks, Windstream, Wireless	**Law Enforcement**	Carroll County Sheriff
Fire Service	Halbur Fire Department	**Ambulance Service**	Carroll County Ambulance Service

Table H.7: City of Halbur Critical Facilities

Number on Map	Name	Address	Type
1	Halbur Community Center	105 West 2nd Street	Essential Facility
2	Halbur City Hall, Fire Station, & Storm Siren	4th Street	Essential Facility
3	Halbur Water Tower	North Main & East 3rd	Utility
4	St. Augustine	324 W 2nd Street	Vulnerable Population
5	Park Shelter House	205 Seymour Street	Vulnerable Population

Map H.2: City of Halbur Critical Facilities

Table H.9: City of Halbur Risk Assessment

Hazard	Comments
Animal/Plant/Crop Disease	The City of Halbur contains some agricultural land. Although this land represents a noticeable portion of the community, there have been minimal reported losses from animal/plant/crop disease within in the community. While this does impact the community, it is normally indirectly impacted.
Drought	Drought occurrences have increased across the state, and the City of Halbur has not been exempt from this hazard. Droughts continue to increase in severity and while there is little warning, this hazard can cause both direct and indirect issues for the City and it's residents.
Earthquake	There have been no instances of earthquake in the City of Halbur, and the committee feels there will be no instances during the life of this plan.
Expansive Soils	There have been no instances of expansive soils in the City of Halbur, and the committee feels there will be no instances during the life of this plan.
Extreme Heat	Extreme heat events impact the City of Halbur. Education may be one of the best action tools to combat the effects of extreme heat as individuals need to know the effects of extreme heat and how it can affect the body.
Flash Flood	Since 2020, there have been no instances of flash flooding in the City of Halbur. While flash floods have little to no warning time, with no instances within the last planning period, the committee has determined this hazard is not a high priority hazard to address, but will consider mitigation actions to prepare the community for response to an event.
Grass/Wild Land Fire	Grass and wild land fires are most commonly field fires or controlled burns that get out of hand in and immediately surrounding the city. This hazard can pose a large threat to the community as elements out of anyone's control, such as wind direction and speed, can change this hazard from harmless and controlled to out of control in a matter of minutes and can pose a threat to life.
HAZMAT Incident	Within the most recent planning period, there have been no instances of hazardous spills within the City of Halbur. With no instances within city limits in the last five years, the committee feels this hazard is a minimal threat to the community and mitigation actions should be considered and implemented to prevent any instances.
Human Disease	Iowa and more specifically the City of Halbur are still feeling the effects of the COVID-19 pandemic. The pandemic has reignited the need to plan for future outbreaks and examine the city's current practices. The pandemic also reminded the public the importance of staying informed and staying vigilant to protect themselves.
Infrastructure Failure	Infrastructure failures occur with little to no warning and can cause major disruptions within the community. Planning to respond to this hazard is important to the community to protect lives and property. The most likely infrastructure failure within Halbur would be structural failure of either bridges or roadways. As these instances have no warning time, planning must be completed prior to an event happening to be able to respond in a quick manner.

Levee/Dam Failure	There are no levees or dams located in the City of Halbur, and there are no high hazard dams on waterways that lead into the city. It is unlikely that levee or dam failure will impact the city, although the city feels that planning for river flooding and planning for dam/levee failure are similar in nature.
Radiological	During the previous planning period, there were no instances of Radiological Incident in Halbur and the committee does not anticipate any happening in the next planning period. If an incident were to occur, the committee feels it would be a small, contained situation that would not threaten the community as a whole.
River Flooding	Within Halbur, approximately 10% of the city's land is located in the flood zone. Since 2020, there have been no reported instances of river flooding in Halbur. This hazard has a medium probability of effecting the community, and has historically not caused significant reportable damage within the community. Primary mitigation actions for this hazard would include limitations on construction in the flood zone.
Severe Winter Storm	Severe Winter Storms continue to impact the City of Halbur. These storms while historically, have caused little damage, continue to build in strength, threatening property and lives within the city. The warning period of this hazard continues to grow with meteorological advances, but can still pose great risks to the community.
Terrorism	There have been no instances of terrorism in the City of Halbur during the previous plan period and the committee feels there will be no instances during the life of this plan. If an instance were to occur, the committee feels it would be a targeted incident that would not threaten the entire community.
Thunderstorm/ Lightning/Hail	Thunderstorm/lightning/hail instances are frequent within the community. While they are frequent, most storms pose no threat to life, crops, or property. This hazard is prevalent in Halbur but is normally not severe in nature.
Tornado	Carroll County has experienced a number of tornadoes in the recent past, but these have not caused large damage within the city. With the number of tornadoes that impact Carroll County growing, it is important for the city to continue to plan for the response to tornadoes as storms within Iowa continue to grow in strength. Preparing the public and community is vital to ensuring there is no loss of life.
Transportation Incident	Speed limits within the City of Halbur are relatively low, but increase on the edges of the community. While the speed limits are lower throughout the community, not all vehicles slow to the appropriate speed limit. With the community having mostly lower speed limits, it is likely that any transportation incident between vehicles is likely to cause little damage to property or humans, but there is a chance of an incident which can cause extensive damage. The committee anticipates that this hazard will effect the community in varying degrees throughout the planning period.
Windstorm	Recent windstorms have caused reported damage to properties. These hazard events continue to build in magnitude, causing increasingly large amounts of damage to property and posing threats to lives. The recent derechos effected Halbur prompting the community to prepare more effectively for these hazards.

Table H.11: City of Halbur Maximum Building and Population Exposure

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	3	$162,700	243
Commercial	22	$1,912,364	
Industrial	0	$0	
Residential	103	$15,329,100	

It is unlikely that a jurisdiction can determine the impact any hazard will have. If a hazard were to impact the entire city, the numbers in table H.11 shows the number of people who would be affected and the maximum number of structures and their value. If this type of event were to occur, a shutdown of some facilities and services could last for at least two weeks and some injuries/illnesses will result in permanent disability or even death.

The following hazards were determine to have a negligible impact on the city, if they were to occur.

Dam/Levee Failure
Landslide
Radiological
Transportation Incident
Drought

If a hazard were to report negligible impacts, it is anticipated that the numbers impacted would be similar to table H.12. If there were any shutdown of facilities or services, it is likely that these shutdowns would be for less than twenty-four hours. If any injuries were to occur, it is anticipated that these would be able to be treated with first aid. A negligible hazard would impact approximately 9% of the city.

Table H.12: City of Halbur Negligible Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	0	$0	22
Commercial	2	$172,113	
Industrial	0	$0	
Residential	9	$1,379,619	

The following hazards were determine to have a limited impact on the city, if they were to occur.

Thunderstorm/Lightning/Hail
Windstorm
Severe Winter Storms
Extreme Heat
Flash Flood
Grass/Wild Land Fire
Infrastructure Failure
HAZMAT Incident
River Flooding

If a hazard were to report limited impacts, it is anticipated that the numbers impacted would be similar to table K.13. A shutdown of some facilities and services could last more than a week and any injuries/illnesses would not result in permanent disability. It is estimated that 25% of the city would be impacted.

Table H.13: City of Halbur Limited Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	0	$0	61
Commercial	6	$478,091	
Industrial	0	$0	
Residential	26	$3,832,275	

The following hazards were determine to have a limited impact on the city, if they were to occur.

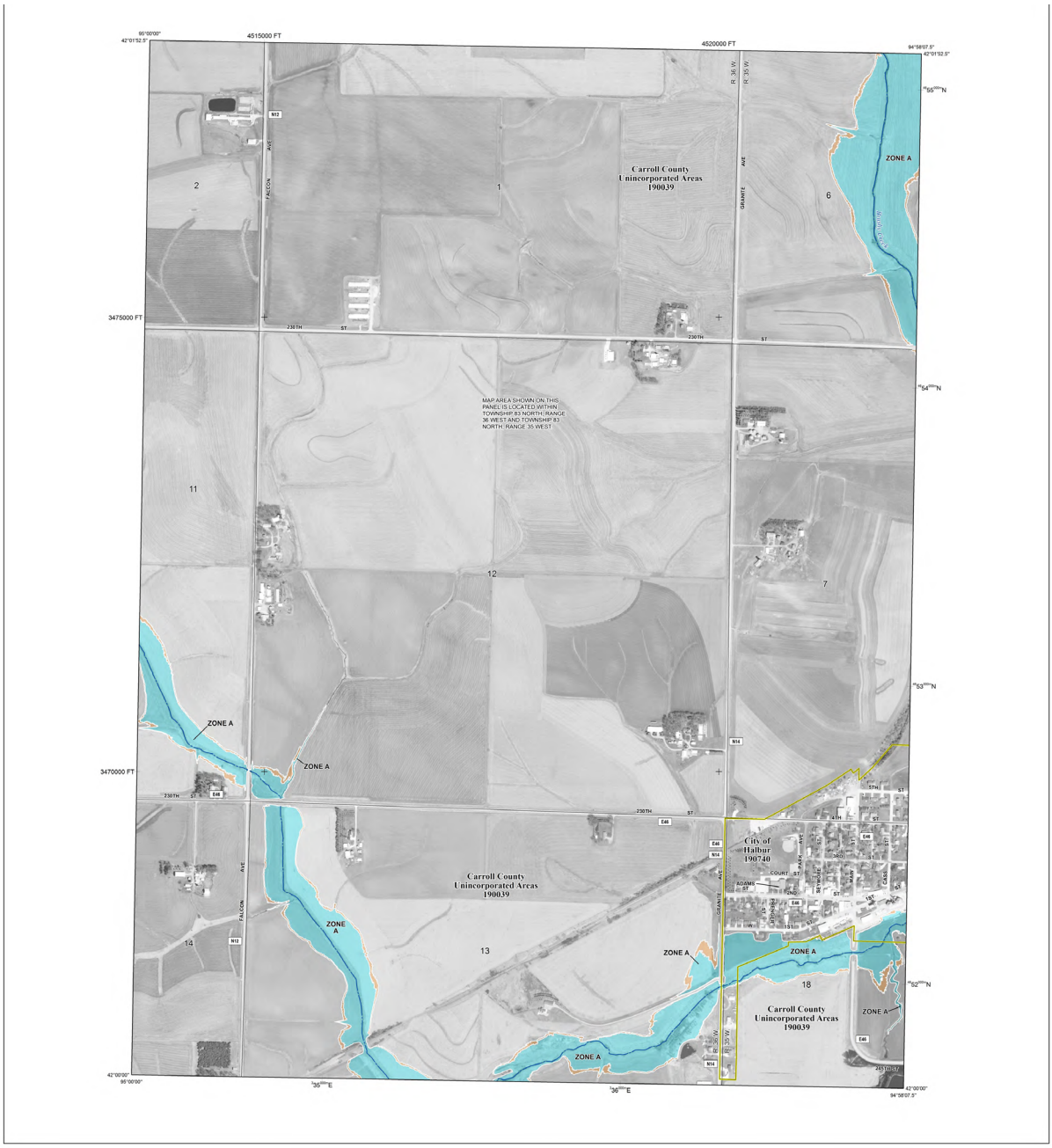
Animal/Plant/Crop Disease
Human Disease
Tornado

If a hazard were to report critical impacts, it is anticipated that the numbers impacted would be similar to table H.14. A shutdown of some facilities and services could last for at least two weeks and some injuries/illnesses will result in permanent disability. It is estimated 50% of the city would be impacted.

Table H.14: City of Halbur Critical Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	2	$81,350	122
Commercial	54	$8,353,435	
Industrial	0	$0	
Residential	52	$7,664,550	

Flood Maps



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A, V, A99 With BFE or Depth Zone AE, AO, AH, VE, AR Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with average depth less than one foot or with drainage areas of less than one square mile Zone X Future Conditions 1% Annual Chance Flood Hazard Zone X Area with Reduced Flood Risk due to Levee See Notes Zone X
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard Zone X Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer Levee, Dike, or Floodwall
OTHER FEATURES	18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE) Coastal Transect Coastal Transect Baseline Profile Baseline Hydrographic Feature 513 Base Flood Elevation Line (BFE) Limit of Study Jurisdiction Boundary

NOTES TO USERS

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

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For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was provided in digital format by the Iowa Department of Natural Resources. This information was derived from digital orthophotography at a 2-foot ground resolution from imagery flown in April 2009.

SCALE

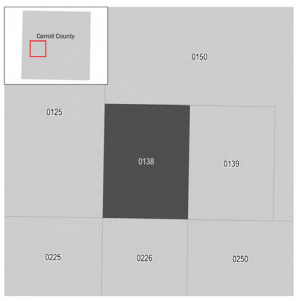
Map Projection:
State Plane Iowa North (FIPS Zone 1401) Coordinate System, Lambert Conformal Conic Projection; North American Datum 1983, GRS 1980 spheroid; North American Vertical Datum of 1988

1 inch = 500 feet 1:6,000

0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR



FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL 138 OF 400

FEMA

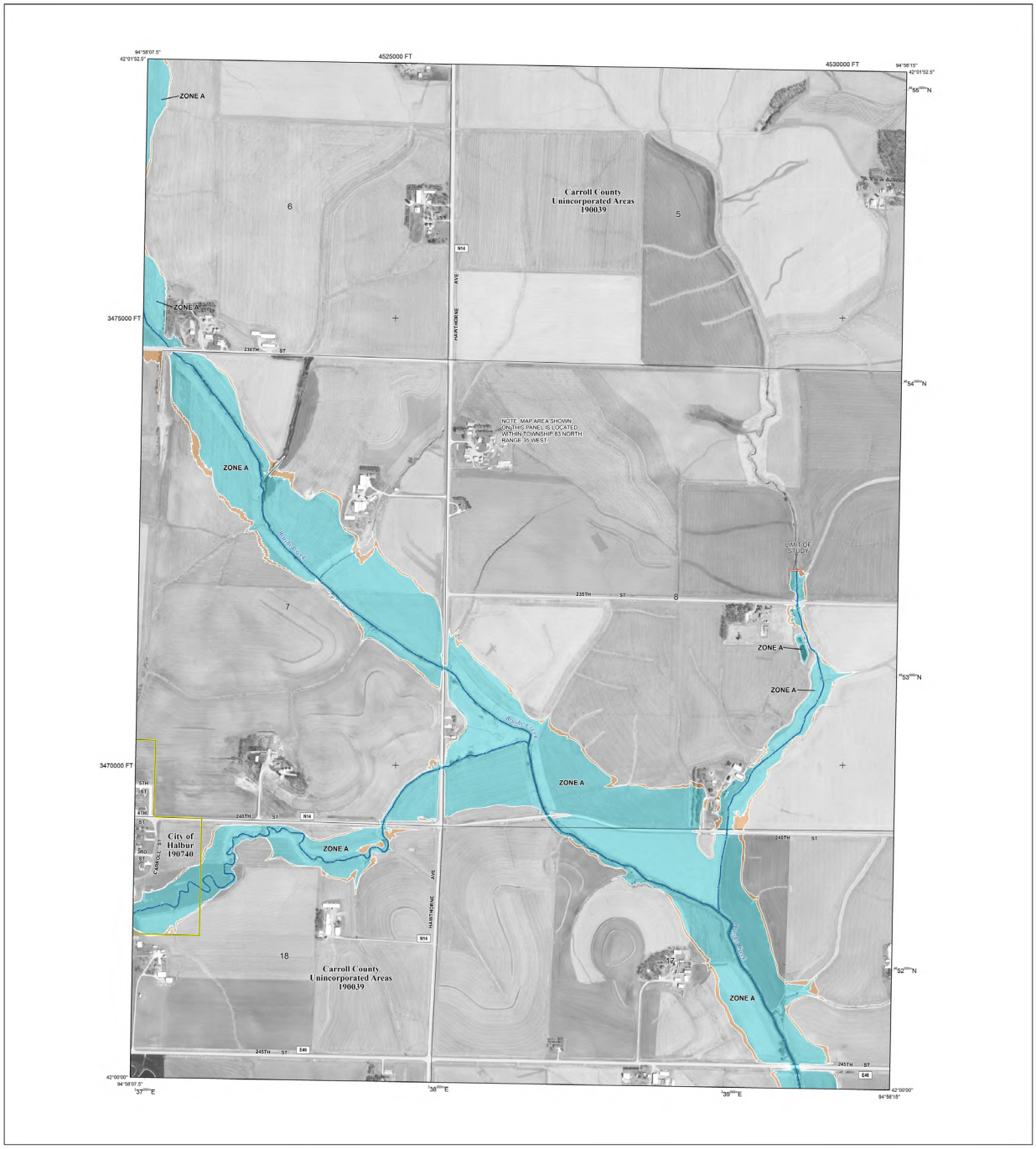
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL COUNTY	190039	0138	C
HALBUR, CITY OF	190740	0138	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0138C

EFFECTIVE DATE
SEPTEMBER 15, 2017



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HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) *Zone A,V, A99*
	With BFE or Depth *Zone AE, AO, AH, VE, AR*
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
	Future Conditions 1% Annual Chance Flood Hazard *Zone X*
	Area with Reduced Flood Risk due to Levee See Notes *Zone X*
	NO SCREEN Area of Minimal Flood Hazard *Zone X*
OTHER AREAS	Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
	18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
	Coastal Transect
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
	513 Base Flood Elevation Line (BFE)
OTHER FEATURES	Limit of Study
	Jurisdiction Boundary

NOTES TO USERS

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SCALE

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1 inch = 500 feet 1:6,000

0 500 1,000 2,000 Feet

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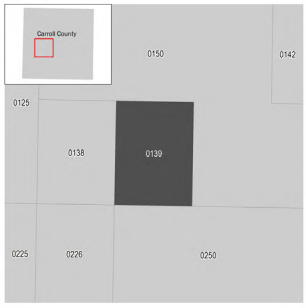
PANEL LOCATOR



FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL 139 OF 400

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL COUNTY	190039	0139	C
HALBUR, CITY OF	190740	0139	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0139C

EFFECTIVE DATE
SEPTEMBER 15, 2017

Table H.15: City of Halbur Status of Previous Mitigation Actions

	Status				
Previous Actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not Implemented**
1 additional warning siren	X				
Educate public on hyper reach notification					X
Promote NOAA radios to the public					X
Complete current plan and make plans to update every five years		X			
Inform public on hazardous materials locations and hazards				X	
Find alternative water sources for fire protection	X				
Designate shelters	X				
Enforce building codes, city codes, and zoning codes			X		
Install a backup generator at the fire station	X				
Encourage use of one call to avoid damage to utilities			X		
Continue tree-trimming, enforcing ordinances when needed			X		
Provide funding needed to train personnel (fire, EMS, and police)	X				
Continue training programs for fire personnel			X		
Continue fire safety education			X		
Make sure EMS volunteers trained to EMT-B or I			X		
Make sure fire volunteers trained to FF levels			X		
Keep updating and upgrading snow plow equipment, sand trucks, etc			X		
Update first responder notification equipment	X				
Keep fire hydrants updated and working, replacing as needed			X		
Post signs and increase police surveillance around critical facilities					X
Monitor water usage to detect leaks in lines			X		
Maintain a City-wide evacuation plan in case of a major hazardous incident	X				

	Status				
Previous Actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not Implemented**
Continue to budget for and fund street repairs			X		
Continue participation in the National Flood Insurance Program					X
Maintain existing drainage ways and storm sewer intake			X		
Provide curbside brush pick up services each spring and fall		X			
Regularly monitor and maintain existing outdoor warning sirens			X		
Purchase new pumper truck				X	
Complete water main improvements			X		
Check water and sewer lines for leaks			X		
Regularly maintain and inspect the water tower and treatment plant			X		
Assess the needs of the emergency response department on an annual basis			X		
Continue training programs for fire personnel, including training with air packs, hazardous materials, and terrorism			X		
Develop a plan for water allocation in case of severe drought				X	

Action Plan

Section 201.6 (c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

Section 201.6 (c)(3)(iii): The mitigation strategy shall include an action plan, describing how the action 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 associated costs.

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

Table H.16: City of Halbur Action Plan

Goal 1	**Enhance Community Protection**
Objective 1	Improve Public Warning Capabilities
Objective 2	Maintain Current Hazard Mitigation Plan
Objective 3	Hazardous Materials-tier II sites
Objective 4	Protect and Enforce Regulatory Measures in Existing and New Development Areas
Objective 5	Protect Against Fires
Objective 6	Provide Shelter Facilities in case of Disasters
Goal 2	**Protect Against Power Outage**
Objective 1	Provide Back-Up Systems for Critical Systems and Assets
Objective 2	Use Prevention Techniques to Minimize Disruption in Services
Goal 3	**Maintain and Support Public Safety, Including Facilities, Equipment, and Training**
Objective 1	Improve First Responder Resources and Capabilities
Objective 2	Provide Education and Training Programs to Increase Public and Responder Awareness
Objective 3	Provide Needed Equipment and Facilities
Goal 4	**Update Communications Systems**
Objective 1	Improve Public Warning Capabilities
Goal 5	**Maintain and Protect Public Infrastructure**
Objective 1	Maintain and Improve Roads, Bridges, and Other Transportation
Objective 2	Maintain and Improve Water Mains, Power Lines, Stormwater Systems, and Other Critical Assets
Objective 1	Maintain and Improve Roads, Bridges, and Other Transportation
Objective 2	Maintain and Improve Water Mains, Power Lines, Stormwater Systems, and Other Critical Assets

Table H.17 City of Halbur Mitigation Actions

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Replace warning siren, install additional as necessary	Tornado, Thunderstorm/ Lightning/Hail	Mod	Fire Department	Low	HMGP Grant, State Match, City Funds, Local Foundations	Emergency Services	Mid
Promote NOAA radios to the public	Flash Flood, Tornado, Windstorm, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning	Mod	Emergency Management, Fire Department, City Council	Minimal	City Funds, Fire Department Budget	Emergency Services	Ongoing
Complete current plan and make plans to update every five years	Extreme Heat, Flash Flood, Grass/Wild Land Fire, HAZMAT Incident, Human Disease, Infrastructure Failure, Levee/ Dam Failure, Radiological, River Flooding, Severe Winter Storm, Terrorism, Thunderstorm/Lightning/ Hail, Tornado, Transportation Incident, Windstorm	High	City Council	Minimal	HMGP Grant, State Match, City Funds, Carroll County Emergency Management Budget	Public Education and Awareness	Ongoing
Inform public on hazardous materials locations and hazards	HAZMAT Incident	Low	Emergency Services, City Council, Fire Department	Minimal	City General Fund	Public Education and Awareness	Ongoing
Enforce building codes, city codes, and zoning codes	Infrastructure Failure	High	City Council	Minimal	City General Fund, Violation Fees	Prevention	Ongoing
Encourage use of one call to avoid damage to utilities	Infrastructure Failure	Low	Emergency Management, City Council	Minimal	City General Fund	Emergency Services	Ongoing
Continue tree-trimming, enforcing ordinances when needed	Windstorm, Infrastructure Failure	Low	City Council	Minimal	City General Fund, Violation Fees	Property Protection	Ongoing

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Continue fire safety education	Infrastructure Failure	Mod	Fire Department	Minimal	Fire Department Budget, Donations	Public Education and Awareness	Ongoing
Make sure EMS volunteers trained to EMT-B or I	Extreme Heat, Human Disease, HAZMAT Incident	Mod	Emergency Services	Minimal	Local Foundations, Emergency Services Budget	Emergency Services	Ongoing
Keep updating and upgrading snow plow equipment, sand trucks, etc	Severe Winter Storms, Human Disease	Low	City Council	Low	City Equipment Budget	Emergency Services	Ongoing
Keep fire hydrants updated and working, replacing as needed	Infrastructure Failure	Mod	Fire Department, City Council	Low	City Utility	Emergency Services	Ongoing
Post signs and increase police surveillance around critical facilities	HAZMAT Incident	Low	Emergency Management, City Council	Low	City General Fund	Emergency Services	Mid
Monitor water usage to detect leaks in lines	Drought, Infrastructure Failure	Mod	Fire Department, City Council	Low	City Utility Fund	Emergency Services	Ongoing
Continue fire safety education	Extreme Heat, Flash Flood, Grass/Wild Land Fire, HAZMAT Incident, Human Disease, Infrastructure Failure, Levee/ Dam Failure, Radiological, River Flooding, Severe Winter Storm, Terrorism, Thunderstorm/Lightning/ Hail, Tornado, Transportation Incident, Windstorm	Mod	Fire Department, Emergency Services	Minimal	Fire Department Budget, City General Fund	Emergency Services	Ongoing
Continue to budget for and fund street repairs	Infrastructure Failure	Mod	Public Works	Low	City Road Fund, County Road Fund	Structural Project	Ongoing

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Continue participation in the National Flood Insurance Program	River Flooding	Low	City Council	Low	City General Fund	Property Protection	Ongoing
Maintain existing drainage ways and storm sewer intake	Flash Flood, River Flooding	Mod	Public Works	Moderate	City Funds	Natural Resource Protection	Mid
Provide curbside brush pick up services each spring and fall	Grass/Wild Land Fire, Infrastructure Failure	Mod	City Council	Minimal	City General Fund	Property Protection	Ongoing
Regularly monitor and maintain existing outdoor warning sirens	Tornado, Windstorm, Thunderstorm/Lightning/ Hail	Mod	Public Works, City Council	Minimal	City General Fund, Local Foundations	Emergency Services	Ongoing
Encourage use of NOAA weather radios at local businesses and residences	Tornado, Windstorm	Mod	City Council	Minimal	City General Fund	Public Education and Awareness	Ongoing
Update first responder notification equipment	Extreme Heat, Flash Flood, Grass/Wild Land Fire, HAZMAT Incident, Human Disease, Infrastructure Failure, Levee/ Dam Failure, Radiological, River Flooding, Severe Winter Storm, Terrorism, Thunderstorm/Lightning/ Hail, Tornado, Transportation Incident, Windstorm	Mod	Fire Department	Minimal	Fire Department Budget, County EMA, Local Foundations	Emergency Services	Ongoing
Complete water main improvements	Infrastructure Failure	High	City Council	Moderate	City Utility Funds, Community Development Block Grants, USDA Rural Development, Iowa SRF	Property Protection	Mid

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Check water and sewer lines for leaks	Infrastructure Failure, Human Disease	High	City Council	Low	City Utility Funds	Property Protection	Ongoing
Regularly maintain and inspect the water tower and treatment plant	Infrastructure Failure, HAZMAT Incident, Windstorm, Terrorism, Tornado	Low	City Council	Minimal	City Utility Funds	Prevention	Ongoing
Assess the needs of the emergency response department on an annual basis	Extreme Heat, Flash Flood, Grass/Wild Land Fire, HAZMAT Incident, Human Disease, Infrastructure Failure, Levee/ Dam Failure, Radiological, River Flooding, Severe Winter Storm, Terrorism, Thunderstorm/Lightning/ Hail, Tornado, Transportation Incident, Windstorm	Mod	Fire Department	Minimal	Fire Department Budget	Emergency Services	Ongoing
Develop a plan for water allocation in case of severe drought	Drought	High	City Council, Rural Water	Minimal	City General Fund, Carroll County EMA	Natural Resource Protection	Short
Install a back-up generator at the park shelter house	Infrastructure Failure, Severe Winter Storm, Extreme Heat, Tornado	High	City Council	Low	City General Fund, Local Foundations, FEMA HMGP	Structural Project	Short
Purchase necessary equipment including chainsaws and grapple to remove and maintain trees	Windstorm, Tornado, Thunderstorm/Lightning/ Hail, Severe Winter Storm	High	City Council	Minimal	City General Fund, Local Foundations	Natural Resource Protection, Prevention	Short
Purchase snow removal equipment	Severe Winter Storm	High	City Council	Mod	City General Fund, Local Foundations, Public Works	Property Protection	Short

Incorporation into Other Planning Mechanisms

Where possible, Halbur will consider the findings from this document when updating or creating new planning and operating documents. Information from this plan will be utilized to update and expand the following documents:

- Hazard Mitigation Plan
- Comprehensive Plan
- Zoning Ordinance
- Floodplain Regulations
- Housing Needs Assessment
- Building Code
- Strategic Plan

While the city currently does not have any of the plans listed below, if these plans were to be created during the life of this plan, this plan will be used to guide the development of:

- Water Conservation Plans
- Storm Water Management Plans
- Parks and Recreation Plans

Appendix I: City of Lanesboro

Community Profile

History

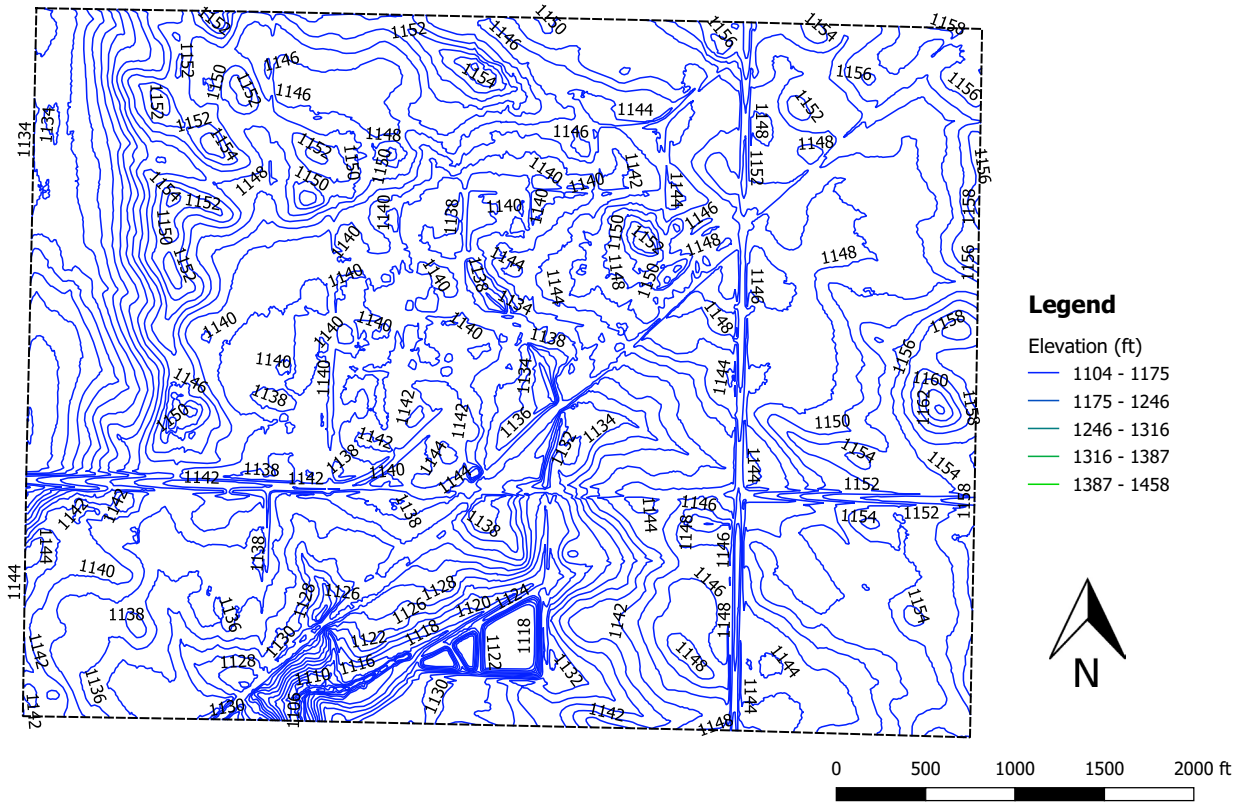
Lanesboro was founded in 1902 as a water stop town for the Chicago & Great Western railroad. The town served the surrounding rural area for commerce into the mid-20th century and today remains a quaint community with agribusiness as its main economic driver.

Geography and Environment

Lanesboro is located in the northeast corner of Carroll County. Lanesboro's lack of proximity to a major roadway is most likely hindering its ability to grow. Highway 30 is located 10 miles to the south. Lanesboro is 8.3 miles from Lake City, 17.5 miles from Carroll, 29.8 miles from Jefferson and 33.3 miles from Sac City.

The highest elevation in Carroll County can be found along the eastern side of the county. Here, the elevation can reach as much as 1,550 feet above sea-level. However, Lanesboro is located in the northeast corner of Carroll County. Here the elevation ranges from roughly 1,120 feet to 1,156 feet, a relatively flat community. The following map displays Lanesboro's elevation in relation to the rest of Carroll County.

Map I.1: City of Lanesboro Elevation

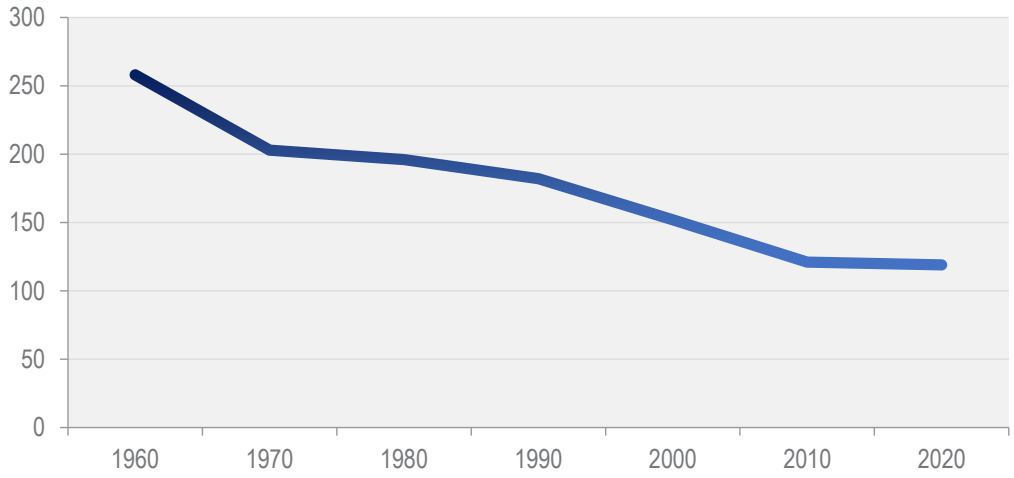


Demographics

The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Lanesboro's population through past, present, and future trends of the region.

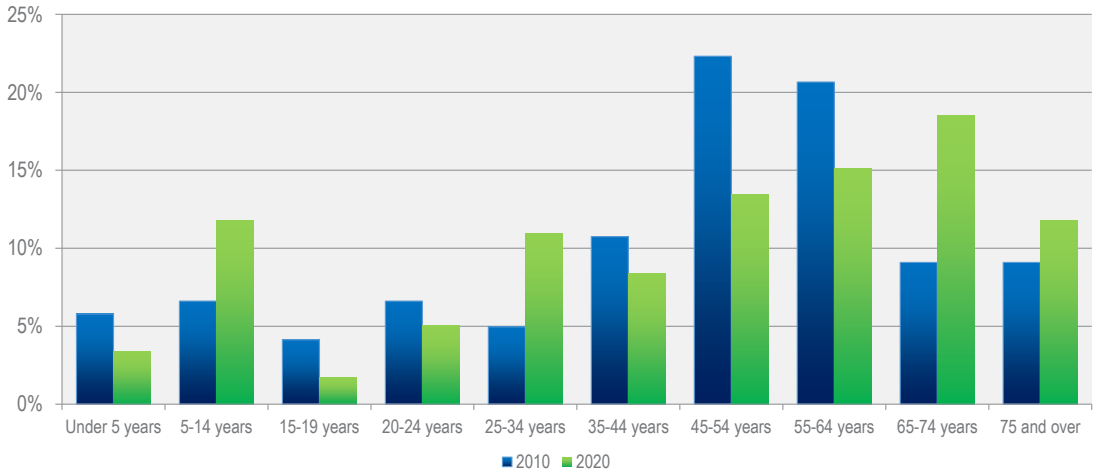
Over the past 50 years, the City of Lanesboro has experienced a gradual decline. In 1960, Lanesboro had a population of 258. Since then, the City's population has declined 54% (139 residents) to 119 in 2020. The most dramatic change happened between 1960 and 1970 when the city lost 55 residents. Figure I.1 shows the City of Lanesboro's population trend since 1960.

Figure I.1: City of Lanesboro Historic Population, 1960-2020



The City's population is not very different from other parts of Carroll County, and even most of the State of Iowa. Population cohorts at age 50 and above have generally higher numbers than other younger cohorts. This information can be found in figure I.2.

Figure I.2: City of Lanesboro Age Distribution



Housing

A community's ability to attract new residents is important. One of the most important aspects to attracting residents is housing. A community's housing stock, type of households, and housing availability and affordability are determining factors.

Since 2010, the city's housing stock has decreased by six units. Owner-occupied units decreased by seven while renter-occupied units increased by one unit. Vacant housing units remained stable. Table I.1 shows a breakdown of the city's occupied and vacant housing units.

Table I.1: City of Lanesboro Housing Units, 2010 & 2022

	2010		2022	
	Number	**Percent**	**Number**	**Percent**
Occupied Housing Units	62	83.8%	56	82.4%
Owner Occupied	49	79.0%	42	75.0%
Renter Occupied	13	21.0%	14	25.0%
Vacant Housing Units	12	16.2%	12	17.6%
Total Housing Units	74	100.0%	68	100.0%

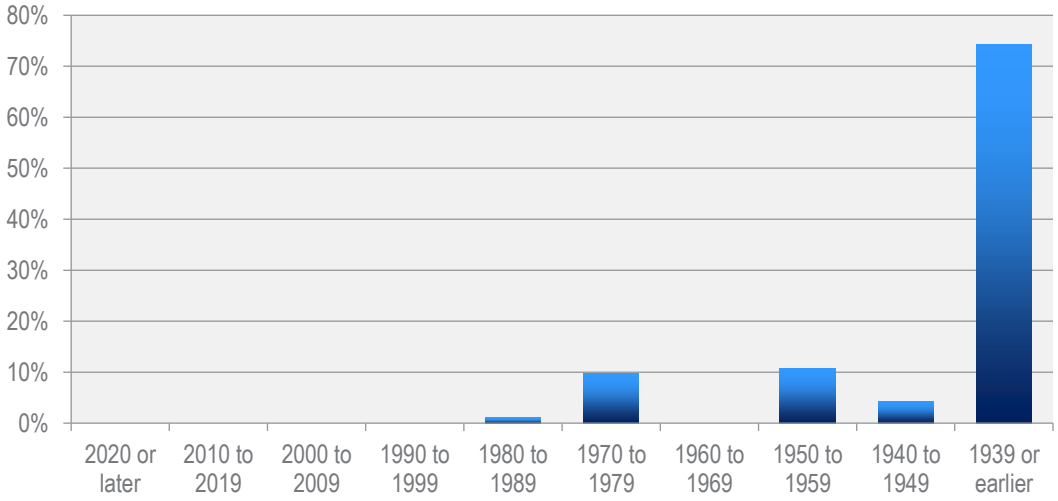
Lanesboro, like many other small rural towns in Iowa, has a lower median housing value of $78,300. The State of Iowa has a median housing value of $181,600. The city's homes can be very affordable and can be used to attract new residents, but they may deteriorate faster and will need a number of repairs and updates. According to the 2022 American Community Survey Estimates, 33.3% of the city's homes are valued less than $50,000. A complete breakdown of the value of homes in Lanesboro can be found in table I.2. Knowing information about the city's housing stock is useful after a disaster hits to determine how much damage was done, and how it will affect the city moving forward.

Table I.2: City of Lanesboro Value of Owner-Occupied Units, 2022

Value of Housing Unit	Percent of Homes
Less than $50,000	33.3%
$50,000 to $99,999	41.7%
$100,000 to $149,999	11.1%
$150,000 to $199,999	11.1%
$200,000 to $299,999	2.8%
$300,000 to $499,999	0.0%
$500,000 to $999,999	0.0%
$1,000,000 or more	0.0%

Figure I.3 showcases the year housing units within the City of Lanesboro were constructed. Like most of the county, Lanesboro has a large portion (74.2%) of the homes constructed in 1939 or earlier. A majority of the city's housing was built prior to 1939, which provides residents with more affordable housing opportunities. Building standards of today utilize the most recent construction materials and safety features, ensuring that the new residential structures are as safe as possible. This does not mean that older homes are more unsafe, just that they may be more susceptible to hazard damage.

Figure I.3: City of Lanesboro Year Housing Units Constructed, 2022



Economics

Household income is an important indicator of the economic base in Carroll County. In Lanesboro, the median household income is $40,313 which would classify a large number of the households in Lanesboro as "working" or "middle" class. Table I.3 breaks down the city's households by income. The City of Lanesboro's household income breakdown is similar to the other rural communities in the area, and the combination of more affordable housing with the current incomes generally provides residents with a decent quality of life. Many residents of Lanesboro travel to other larger neighboring cities like Carroll or Jefferson where more employment opportunities are present.

Table I.3: City of Lanesboro Household Income, 2022

Income and Benefits (2022 Inflation-Adjusted Dollars)	Number of Households	Percent of Households
Less than $10,000	10	24.4%
$10,000 to $14,999	1	2.4%
$15,000 to $24,999	4	9.8%
$25,000 to $34,999	4	9.8%
$35,000 to $49,999	6	14.6%
$50,000 to $74,999	3	7.3%
$75,000 to $99,999	7	17.1%
$100,000 to $149,999	5	12.2%
$150,000 to $199,999	0	0.0%
$200,000 or more	1	2.4%
Median Household Income	$40,313	-
Mean Household Income	$61,583	-

Lanesboro, overall, is a small rural community in a small rural county. A large percent of the businesses within the county serves the largely agricultural economy. Table I.4 breaks down what industry Lanesboro residents work in. Educational services, and health care and social assistance employs the largest cohort of residents with 30.3% employed in this industry. The second largest is construction, with 18.2% of the residents employed in this industry.

Table I.4: City of Lanesboro Employment by Industry, 2022

Industry	Number	Percent
Total civilian non-farm employment, 16 years and over	33	100%
Agriculture, Forestry, Fishing, Hunting, Mining	1	3.0%
Construction	6	18.2%
Manufacturing	2	6.1%
Wholesale Trade	1	3.0%
Retail Trade	3	9.1%
Transportation and warehousing and utilities	4	12.1%
Information	0	0.0%
Finance and insurance, and real estate and rental and leasing	2	6.1%
Professional, scientific, management, administrative, and waste management services	0	0.0%
Educational, health care, and social assistance	10	30.3%
Arts, entertainment, recreation, accommodation, and food services	2	6.1%
Other services, except public administration	0	0.0%
Public Administration	2	6.1%

Existing Documents

Table I.5 provides a compilation of the current planning and regulatory documents in place for the City of Lanesboro. The table also shows the last time the documents were last updated. These documents help understand the process the city has already undertaken and what documents can be created to help guide the city. First and foremost is the previous hazard mitigation plan as this document lays out specific strategies to help the city reduce the impact hazards have on the community and those who live in it.

Lanesboro does not have a comprehensive plan or zoning code. These two documents would work hand-in-hand to guide future development within the city. The comprehensive plan would assist the city to take a deep dive into the city's assets, utilities, and infrastructure. This plan would also include a hazard chapter which would address disaster response items as well as mitigation for the future. The city's zoning code would create a policy to keep certain zones away from one another to reduce the risk to humans and structures. The different zones can pose different threats to others, such as some industrial uses having a higher HAZMAT incident probability which if located in a residential zone, could pose large health issues to the overall population. The zoning codes also include information for street and sidewalk regulations which can reduce the number of transportation incidents. The creation of a capital improvement plan which lays out future projects and necessary funding would help the city budget for, and allow them to be proactive, not reactive to future needs. Expanding conversations with the local COG and engineering firms would allow the city to explore additional options that have worked in similar communities facing similar situations. Outside organizations are also beneficial with finding funding for projects which otherwise may be out of the city's budget. Road, water, and sewer infrastructure continues to need upgrades and pursuing funding opportunities could reduce impacts of hazards on these infrastructure types. Training staff to current requirements would allow for a more thought-out response to a hazard or hazard warning. Cross training staff regardless of responsibility on different departments can better prepare the city and can lead to things being noticed that previously went unnoticed.

Table I.5: City of Lanesboro Existing Documents

Document	Yes/No	Year
Previous HMP	Yes	2020
Comprehensive Plan	No	-
Building Code	No	-
Zoning Ordinance	No	-
Strategic Plan	No	-
Housing Needs Assessment	Yes	2017
NFIP Participant	No	-
Floodplain Regulations	No	-

NFIP Participation

While there is a small stream within the community, river flooding has not been reported within the city limits. The area in and around the City of Lanesboro was mapped in 2017 and there are limited flood areas within the city limits, located away from infrastructure and structures. While the city has been mapped, the city does not participate in the NFIP.

Outlook and Future Development

Since the last plan update, the City of Lanesboro has seen some limited development. The majority of this development has come as residential rehabilitation. The City continues to improve the amenities that have been offered to residents for a number of years.

Over the life of this plan, the city does not anticipate much change to the growth of the city. The city anticipates rehabilitation of homes throughout town to continue as well. While new businesses may not locate into the city, it is anticipated that the current businesses will expand to some extent. Overall, growth and development on a similar scale should continue throughout the five year life span of this plan.

Essential Infrastructure and Services

Knowing what services and infrastructure serve the city can be beneficial in a time of disaster so the appropriate companies can be contacted in need of utility shutoff or transportation routes. The City's essential infrastructure and services can be found in Table I.6.

Table I.6: City of Lanesboro Essential Infrastructure and Services

Major Arterials	E16 & N47	**Air Service**	Arthur N. Neu Airport
Water Service	City of Lake City	**Sewer Service**	City of Lanesboro
Electric Service	MidAmerican Energy	**Gas Service**	LP
Sanitation/Solid Waste	Local Haulers	**Landfill**	Carroll County Landfill
Phone and Internet	Wireless	**Law Enforcement**	Carroll County Sheriff
Fire Service	Lanesboro Fire Department	**Ambulance Service**	Carroll County Ambulance Service

Table I.7: City of Lanesboro Critical Facilities

Number on Map	Name	Address	Type
1	Lanesboro City Hall	210 East Main Street	Essential Facility
2	Lanesboro Fire Department	101 Main Street	Essential Facility
3	NEW Cooperative	200 1st Street	HAZMAT
4	United Methodist Church	202 3rd Street	Vulnerable Population

Map I.2: City of Lanesboro Critical Facilities

Table I.8: City of Lanesboro Risk Assessment

Hazard	Comments
Animal/Plant/Crop Disease	The City of Lanesboro contains a large amount of agricultural land. Although this land represents a large portion of the community, there have been minimal reported losses from animal/plant/crop disease within in the community. While this does impact the community, it is normally indirectly impacted.
Drought	Drought occurrences have increased across the state, and the City of Lanesboro has not been exempt from this hazard. Droughts continue to increase in severity and while there is little warning, this hazard can cause both direct and indirect issues for the City and it's residents.
Earthquake	There have been no instances of earthquake in the City of Lanesboro, and the committee feels there will be no instances during the life of this plan.
Expansive Soils	There have been no instances of expansive soils in the City of Lanesboro, and the committee feels there will be no instances during the life of this plan.
Extreme Heat	Extreme heat events impact the City of Lanesboro. Education may be one of the best action tools to combat the effects of extreme heat as individuals need to know the effects of extreme heat and how it can affect the body.
Flash Flood	Since 2020, there have been no instances of flash flooding in the City of Lanesboro. While flash floods have little to no warning time, with no instances within the last planning period, the committee has determined this hazard is not a high priority hazard to address, but will consider mitigation actions to prepare the community for response to an event.
Grass/Wild Land Fire	Grass and wild land fires are most commonly field fires or controlled burns that get out of hand in and immediately surrounding the city. This hazard can pose a large threat to the community as elements out of anyone's control, such as wind direction and speed, can change this hazard from harmless and controlled to out of control in a matter of minutes and can pose a threat to life.
HAZMAT Incident	Within the most recent planning period, there have been no instances of hazardous spills within the City of Lanesboro. With no instances within city limits or in the surrounding rural land in the last five years, the committee feels this hazard is a minimal threat to the community and mitigation actions should be considered and implemented to prevent any instances.
Human Disease	Iowa and more specifically the City of Lanesboro are still feeling the effects of the COVID-19 pandemic. The pandemic has reignited the need to plan for future outbreaks and examine the city's current practices. The pandemic also reminded the public the importance of staying informed and staying vigilant to protect themselves.

Infrastructure Failure	Infrastructure failures occur with little to no warning and can cause major disruptions within the community. Planning to respond to this hazard is important to the community to protect lives and property. The most likely infrastructure failure within Lanesboro would be structural failure of either bridges or roadways. As these instances have no warning time, planning must be completed prior to an event happening to be able to respond in a quick manner.
Levee/Dam Failure	There are no levees or dams located in or leading into the City of Lanesboro. It is extremely unlikely that levee or dam failure will impact the city.
Radiological	During the previous planning period, there were no instances of Radiological Incident in Lanesboro and the committee does not anticipate any happening in the next planning period. If an incident were to occur, the committee feels it would be a small, contained situation that would not threaten the community as a whole.
River Flooding	Within Lanesboro, a very small amount of land is located in the flood zone. Since 2020, there have been no reported instances of river flooding in Lanesboro. This hazard has a low probability of effecting the community, and has historically not caused significant reportable damage within the community. Which is why the community chooses to not participate in the NFIP. Primary mitigation actions for this hazard would include limitations on construction in the flood zone.
Severe Winter Storm	Severe Winter Storms continue to impact the City of Lanesboro. These storms while historically, have caused little damage, continue to build in strength, threatening property and lives within the city. The warning period of this hazard continues to grow with meteorological advances, but can still pose great risks to the community.
Terrorism	There have been no instances of terrorism in the City of Lanesboro during the previous plan period and the committee feels there will be no instances during the life of this plan. If an instance were to occur, the committee feels it would be a targeted incident that would not threaten the entire community.
Thunderstorm/ Lightning/Hail	Thunderstorm/lightning/hail instances are frequent within the community. While they are frequent, most storms pose no threat to life, crops, or property. This hazard is prevalent in Lanesboro but is normally not severe in nature.
Tornado	Carroll County has experienced a number of tornadoes in the recent past, but these have not impacted the City of Lanesboro. With the number of tornadoes that impact Carroll County growing, it is important for the city to continue to plan for the response to tornadoes as storms within Iowa continue to grow in strength. Preparing the public and community is vital to ensuring there is no loss of life.
Transportation Incident	Speed limits within the City of Lanesboro are relatively low, but increase on the edges of the community. While the speed limits are lower throughout the community, not all vehicles slow to the appropriate speed limit. With the community having lower speed limits, it is likely that any transportation incident between vehicles is likely to cause little damage to property or humans, but there is a chance of an incident which can cause extensive damage. The committee anticipates that this hazard will effect the community in varying degrees throughout the planning period.
Windstorm	Recent windstorms have caused reported damage to properties. These hazard events continue to build in magnitude, causing increasingly large amounts of damage to property and posing threats to lives. The recent derechos effected Lanesboro prompting the community to prepare more effectively for these hazards.

Table I.9: Hazards Not Affecting the City of Lanesboro

Hazard	Reason for Omission
Earthquake	Iowa as a whole has experienced the effects of few earthquakes in the past 175 years. The majority of the earthquakes were along the Mississippi River, therefore the city does not feel this hazard will impact them during this planning period.
Expansive Soils	While Iowa has expansive soils, due to the city's history of no issues in the past, the city felt this will not impact the jurisdiction over the life of this plan.
Levee/Dam Failure	There are no levees or dams that lead into the City of Lanesboro. There have been no reported instances of Levee or Dam Failure in the past impacting the community.

Loss Estimates

Table I.10: City of Lanesboro Maximum Building and Population Exposure

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	3	$172,440	119
Commercial	6	$1,938,970	
Industrial	0	$0	
Residential	89	$4,371,950	

It is unlikely that a jurisdiction can determine the impact any hazard will have. If a hazard were to impact the entire city, the numbers in table I.10 shows the number of people who would be affected and the maximum number of structures and their value. If this type of event were to occur, a shutdown of some facilities and services could last for at least two weeks and some injuries/illnesses will result in permanent disability or even death.

The following hazards were determine to have a negligible impact on the city, if they were to occur.

Dam/Levee Failure
Landslide
Radiological
River Flooding
Transportation Incident
Drought

If a hazard were to report negligible impacts, it is anticipated that the numbers impacted would be similar to table I.11. If there were any shutdown of facilities or services, it is likely that these shutdowns would be for less than twenty-four hours. If any injuries were to occur, it is anticipated that these would be able to be treated with first aid. A negligible hazard would impact approximately 9% of the city.

Table I.11: City of Lanesboro Negligible Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	0	$0	11
Commercial	0	$0	
Industrial	0	$0	
Residential	8	$393,475	

The following hazards were determine to have a limited impact on the city, if they were to occur.

Animal/Plant/Crop Disease
Thunderstorm/Lightning/Hail
Windstorm
Severe Winter Storms
Extreme Heat
Flash Flood
Grass/Wild Land Fire
Infrastructure Failure
HAZMAT Incident

If a hazard were to report limited impacts, it is anticipated that the numbers impacted would be similar to table I.12. A shutdown of some facilities and services could last more than a week and any injuries/illnesses would not result in permanent disability. It is estimated that 25% of the city would be impacted.

Table I.12: City of Lanesboro Limited Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	0	$0	30
Commercial	1	$484,742	
Industrial	0	$0	
Residential	22	$1,092,987	

The following hazards were determine to have a limited impact on the city, if they were to occur.

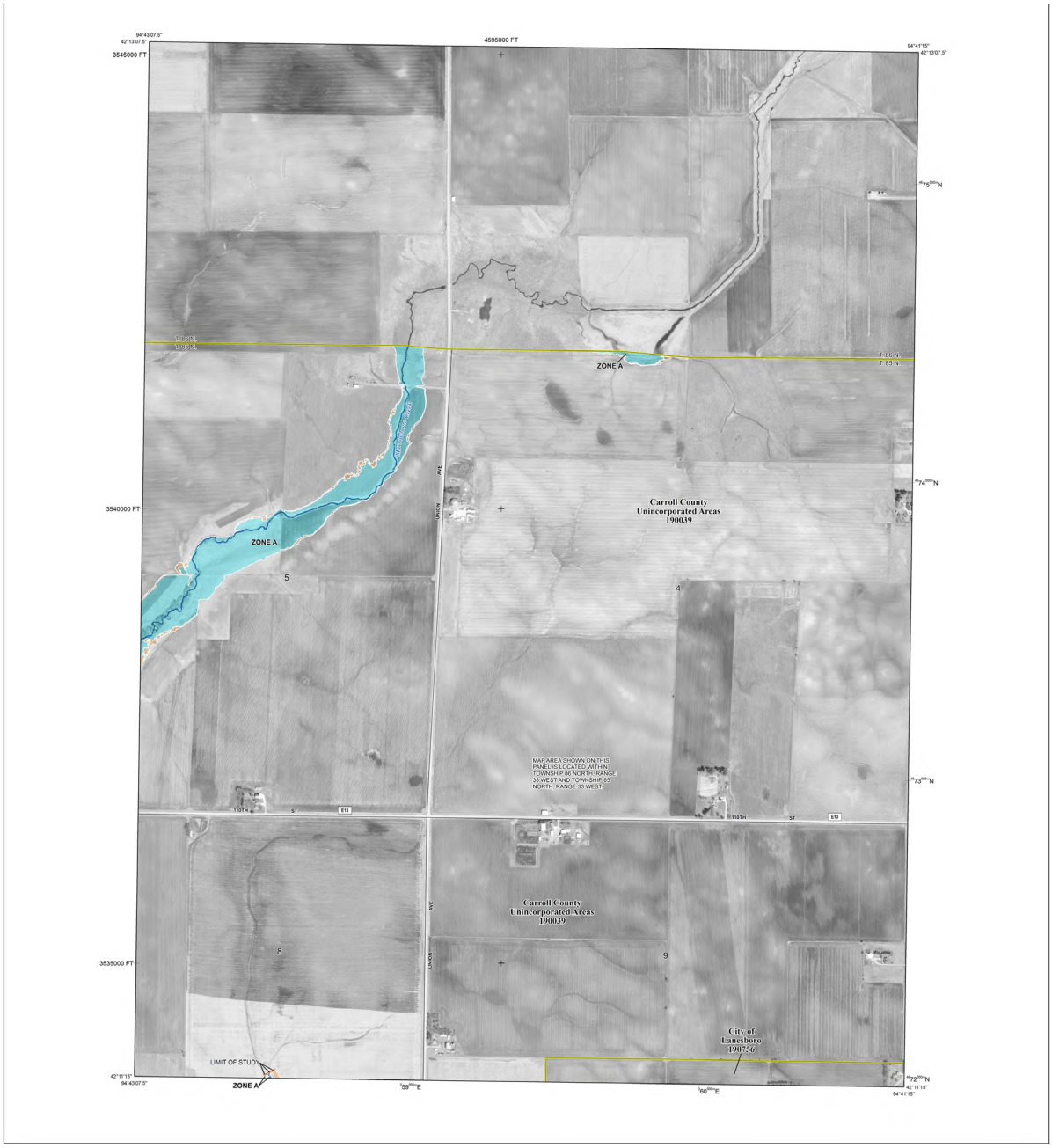
Human Disease
Tornado

If a hazard were to report critical impacts, it is anticipated that the numbers impacted would be similar to table I.13. A shutdown of some facilities and services could last for at least two weeks and some injuries/illnesses will result in permanent disability. It is estimated 50% of the city would be impacted.

Table I.13: City of Lanesboro Critical Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	1	$86,220	60
Commercial	3	$969,485	
Industrial	0	$0	
Residential	44	$2,185,975	

Flood Maps



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A,V, A99 With BFE or Depth Zone AE, AO, AH, VE, AR Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with average depth less than one foot or with drainage areas of less than one square mile Zone X Future Conditions 1% Annual Chance Flood Hazard Zone X Area with Reduced Flood Risk due to Levee See Notes Zone X
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard Zone X Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer Levee, Dike, or Floodwall
OTHER FEATURES	18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE) Coastal Transect Coastal Transect Baseline Profile Baseline Hydrographic Feature Base Flood Elevation Line (BFE) Limit of Study Jurisdiction Boundary

NOTES TO USERS

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SCALE

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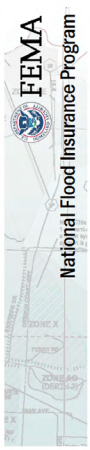
1 inch = 500 feet 1:6,000

0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR



NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL 79 OF 400

FEMA

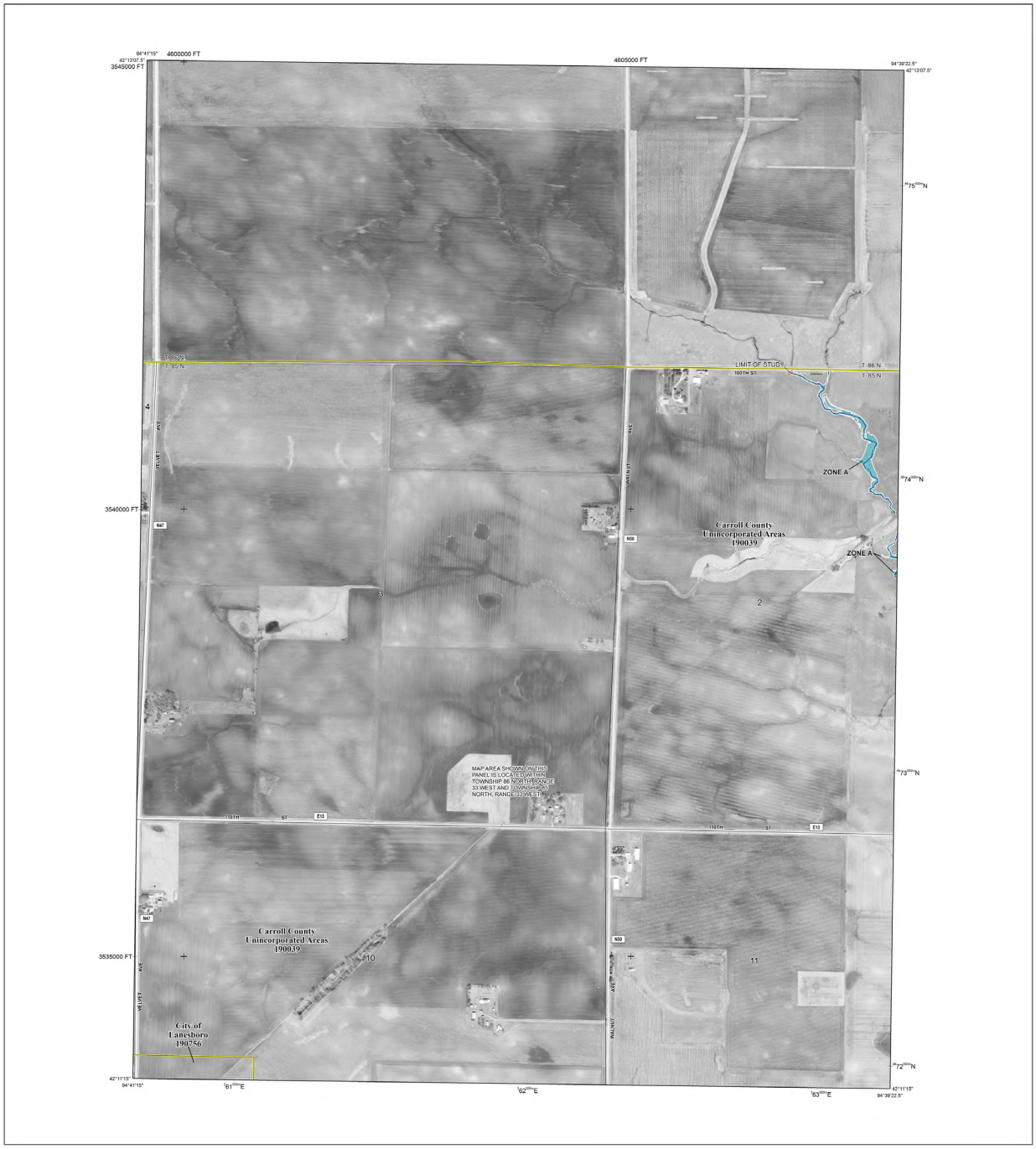
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL COUNTY	190039	0079	C
LANESBORO, CITY OF	190756	0079	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0079C

EFFECTIVE DATE
SEPTEMBER 15, 2017



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) *Zone A,V,A99* With BFE or Depth *Zone AE, AO, AH, VE, AR* Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X* Future Conditions 1% Annual Chance Flood Hazard *Zone X* Area with Reduced Flood Risk due to Levee See Notes *Zone X*
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard *Zone X* Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer Levee, Dike, or Floodwall
OTHER FEATURES	18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE) B Coastal Transect Coastal Transect Baseline Profile Baseline Hydrographic Feature 513 Base Flood Elevation Line (BFE) Limit of Study Jurisdiction Boundary

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PANEL LOCATOR

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL 83 OF 400

FEMA

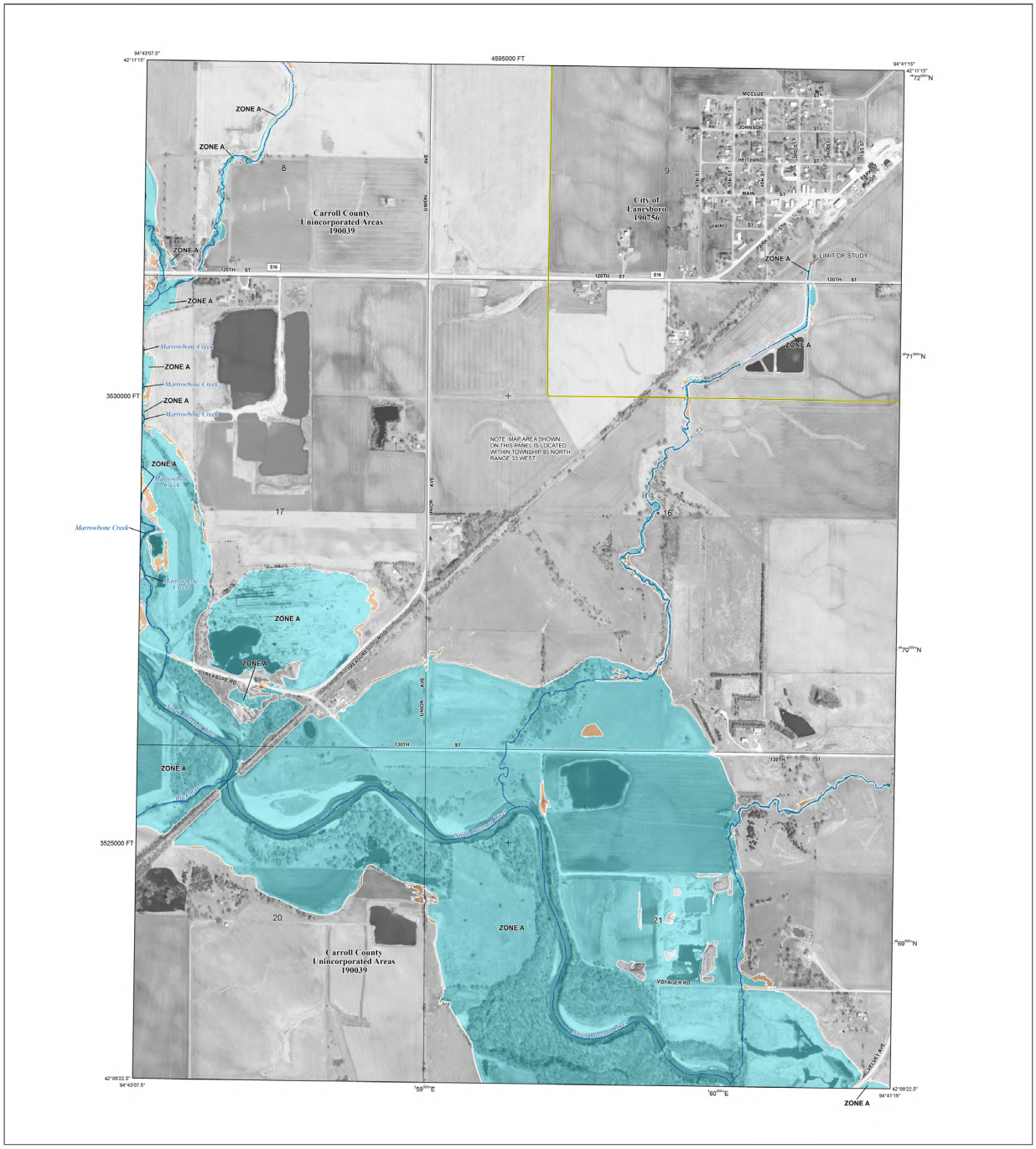
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL COUNTY	190039	0083	C
LANESBORO, CITY OF	190756	0083	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0083C

EFFECTIVE DATE
SEPTEMBER 15, 2017



FLOOD HAZARD INFORMATION

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	With BFE or Depth Zone AE, AO, AH, VE, AR
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
	Future Conditions 1% Annual Chance Flood Hazard Zone X
	Area with Reduced Flood Risk due to Levee See Notes Zone X
	NO SCREEN Area of Minimal Flood Hazard Zone X
OTHER AREAS	Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
	18.2 / 17.8 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
	8 Coastal Transect
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
	513 Base Flood Elevation Line (BFE)
OTHER FEATURES	Limit of Study
	Jurisdiction Boundary

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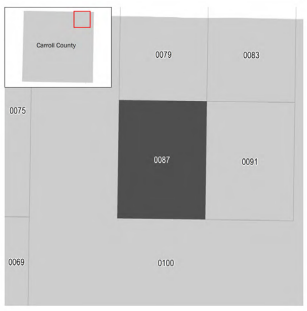
0 125 250 500 Meters

PANEL LOCATOR



FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL 87 OF 400

FEMA

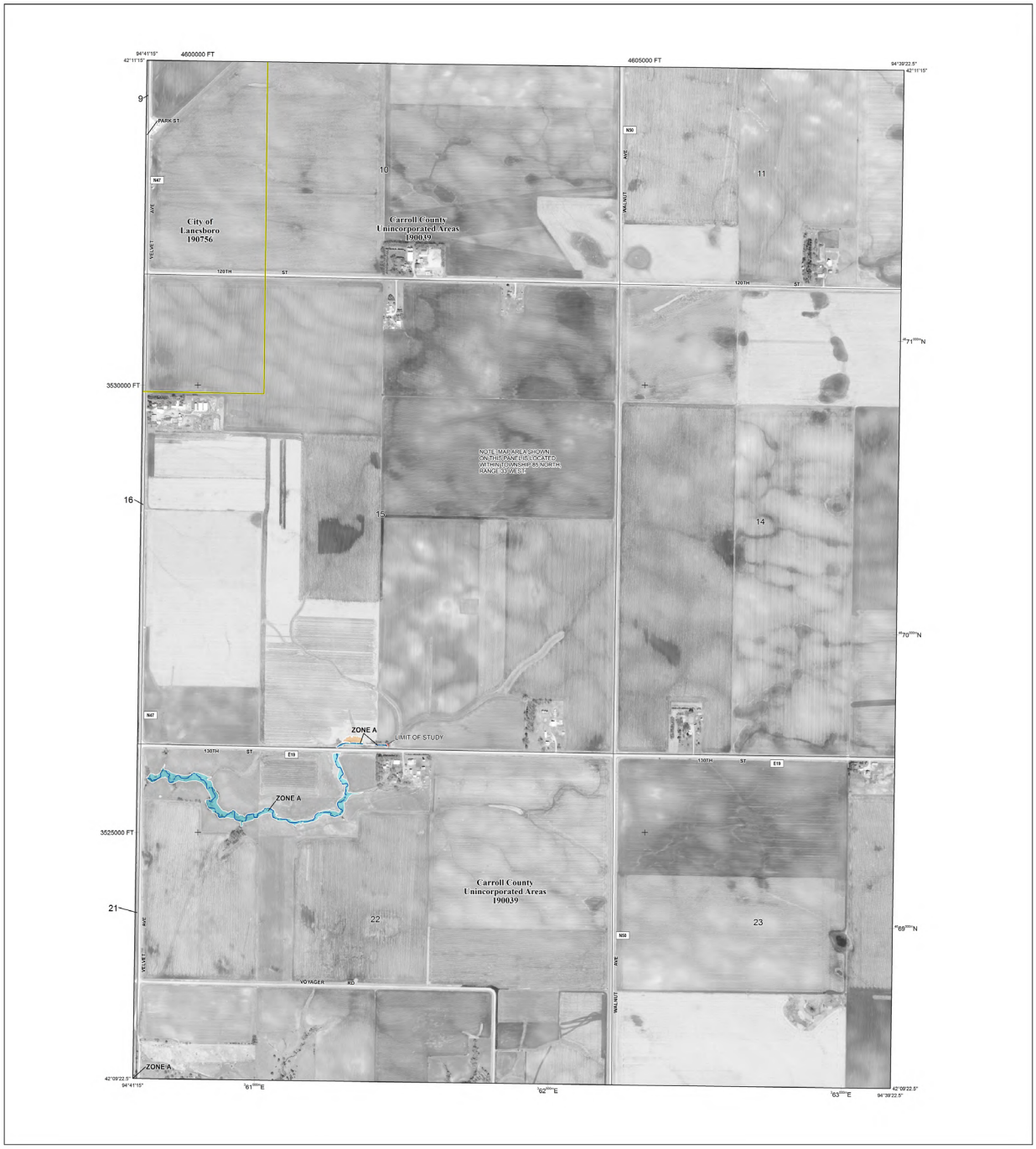
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL COUNTY	190039	0087	C
LANESBORO, CITY OF	190756	0087	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0087C

EFFECTIVE DATE
SEPTEMBER 15, 2017



FLOOD HAZARD INFORMATION

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	Area with Reduced Flood Risk due to Levee See Notes *Zone X*
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	Coastal Transect
	Coastal Transect Baseline
	Profile Baseline
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0 125 250 500 Meters

PANEL LOCATOR

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL **91** OF **400**

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL COUNTY	190039	0091	C
LANESBORO, CITY OF	190756	0091	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0091C

EFFECTIVE DATE
SEPTEMBER 15, 2017

Table I.14: City of Lanesboro Status of Previous Mitigation Actions

	Status				
Previous Actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not Implemented**
Continue fire safety education			X		
Keep fire hydrants updated and working, replacing as needed			X		
Update first responder notification equipment	X				
Provide funding needed to train personnel (fire, EMS, and police)			X		
Educate public on hyper reach notification					X
Designate shelters	X				
Enforce building codes, city codes, and zoning codes			X		
Encourage use of one call to avoid damage to utilities			X		
Complete current plan and make plans to update every five years			X		
Purchase new tanker truck and quick attack	Tanker			Quick Attack	
Acquire generator for church (electric) and fire station (water)	Fire Station			Church	
Work with electric companies to bury overhead power lines					X
Keep updating and upgrading ambulance fleet, snow plow equipment, sand trucks, etc.			X		
Update siren control panel		X			
Promote NOAA radios to the public					X
Inform public on hazardous materials locations and hazards	X				
Continue tree-trimming, enforcing ordinances when needed			X		
Continue to budget for and fund street repairs			X		
Upgrade/replace city's water system including the tower, and distribution lines	X				
Upgrade/replace city's sewer system			X		

Action Plan

Section 201.6 (c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

Section 201.6 (c)(3)(iii): The mitigation strategy shall include an action plan, describing how the action 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 associated costs.

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

Table I.15: City of Lanesboro Action Plan

Goal 1	**Minimize damage to critical facilities, infrastructure, and other community assets from the effects of hazards**
Objective 1	Improve First Responder Resources and Capabilities
Goal 2	**Reduce the extent of fatalities and minimize injuries due to the impacts of hazards**
Objective 1	Improve Public Infrastructure and Warnings
Goal 3	Improve coordination and communication with other relevant organizations and build support for hazard mitigation
Objective 1	Improve communications
Goal 4	**Maintain and support public safety facilities, including equipment and training**
Objective 1	Improve first responder resources and capabilities

Table I.16: City of Lanesboro Mitigation Actions

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Continue fire safety education	HAZMAT, Infrastructure Failure	Mod	Fire	Minimal	Fire Department Budget	Emergency Services	Ongoing
Keep fire hydrants updated and working, replacing as needed	Infrastructure Failure	Mod	City Council, Fire	Low	City Utility Fund, CDBG Grants, Iowa SRF	Emergency Services	Ongoing
Enforce building codes, city codes, and zoning codes	Infrastructure Failure	Mod	City Council	Low	City General Fund, Nuisance Fines	Property Protection	Ongoing
Encourage use of one call to avoid damage to utilities	Infrastructure Failure	Low	Pipeline, Fire, City Council, Emergency Management	Minimal	City FUnds	Public Education	Ongoing
Complete current plan and make plans to update every five years	Animal/Plant/Crop Disease, Drought, Earthquake, Expansive Soils, Extreme Heat, Flash Flood, Grass/Wild Land Fire, HAZMAT Incident, Human Disease, Infrastructure Failure, Radiological, River Flooding, Severe Winter Storm, Terrorism, Thunderstorm/Lightning/ Hail, Tornado, Transportation Incident, Windstorm	High	All	Minimal	HMGP with State Match, Carroll County EMA, City General Fund	Prevention	Mid
Acquire generator for church (electric)	Tornado, Winter Storm, Wind Storm	Mod	Fire, Emergency Management, City Council	Low	HMGP with State Match, City General Fund, Local Foundations	Emergency Services	Mid
Work with electric companies to bury overhead power lines	Infrastructure Failure	Low	Board of Supervisors, City Council	Minimal	City Funds, Private Utility Funds	Public Education	Ongoing
Update siren control panel	Tornado	Mod	City Council	Low	City General Fund, Local Foundations	Emergency Services	Mid

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Promote NOAA radios to the public	Tornado, Wind Storms, Flash Flood, Hailstorms, Fires, Winter Storms	Low	Emergency Management	Minimal	City General Fund, Fire Department, Local Foundations	Emergency Services	Ongoing
Continue tree-trimming, enforcing ordinances when needed	Infrastructure Failure, Winter Storms, Wind Storms, Tornado	Low	City Council, Board of Supervisors	Low	City General Fund, Nuisance Fines	Property Protection	Ongoing
Continue to budget for and fund street repairs	Infrastructure Failure, Transportation	Mod	City Council, Board of Supervisors, Engineer	High	City Street Fund, Carroll County Secondary Roads	Structural	Ongoing
Upgrade/replace city's sewer system	Infrastructure Failure	High	City Council	High	City Utility Fund, CDBG, USDA Rural Development (grants and loans), Iowa SRF (grants and loans)	Structural Project	Short
Install new storm siren	Tornado, Windstorm, Thunderstorm/Lightning/ Hail, Severe Winter Storm	High	City Council	Low	City General Fund, USDA Community Facilities, HMGP with State Match, Local Foundations	Emergency Services	Short
Construct a training room within the current fire department	Infrastructure Failure, HAZMAT Incident, Tornado, Severe Winter Storm, Flash Flood, River Flood	Mod	City Council, Fire Department	Low	City Funds, Fire Department Budget, Local Foundations, Private Donations	Structural Project	Short
Acquire necessary equipment for fire department volunteers to adequately respond to calls (new bunker gear, jaws cutters, pagers)	Infrastructure Failure, Grass/ Wild Land Fire, HAZMAT Incident, Transportation Incident, Tornado, Thunderstorm/Lightning/ Hail, River Flood, Flash Flood	High	Fire Department	Low	Fire Department Budget, Local Foundations, FEMA AFG, Carroll County Comm Center	Emergency Services	Ongoing

Incorporation into Other Planning Mechanisms

Where possible, Lanesboro will consider the findings from this document when updating or creating new planning and operating documents. Information from this plan will be utilized to update and expand the following documents:

- Hazard Mitigation Plan
- Housing Needs Assessment

While the city currently does not have any of the plans listed below, if these plans were to be created during the life of this plan, this plan will be used to guide the development of:

- Water Conservation Plans
- Storm Water Management Plans
- Parks and Recreation Plans
- Comprehensive Plan
- Zoning Ordinance
- Floodplain Regulations
- Building Code
- Strategic Plan

Appendix J: City of Lidderdale

Community Profile

History

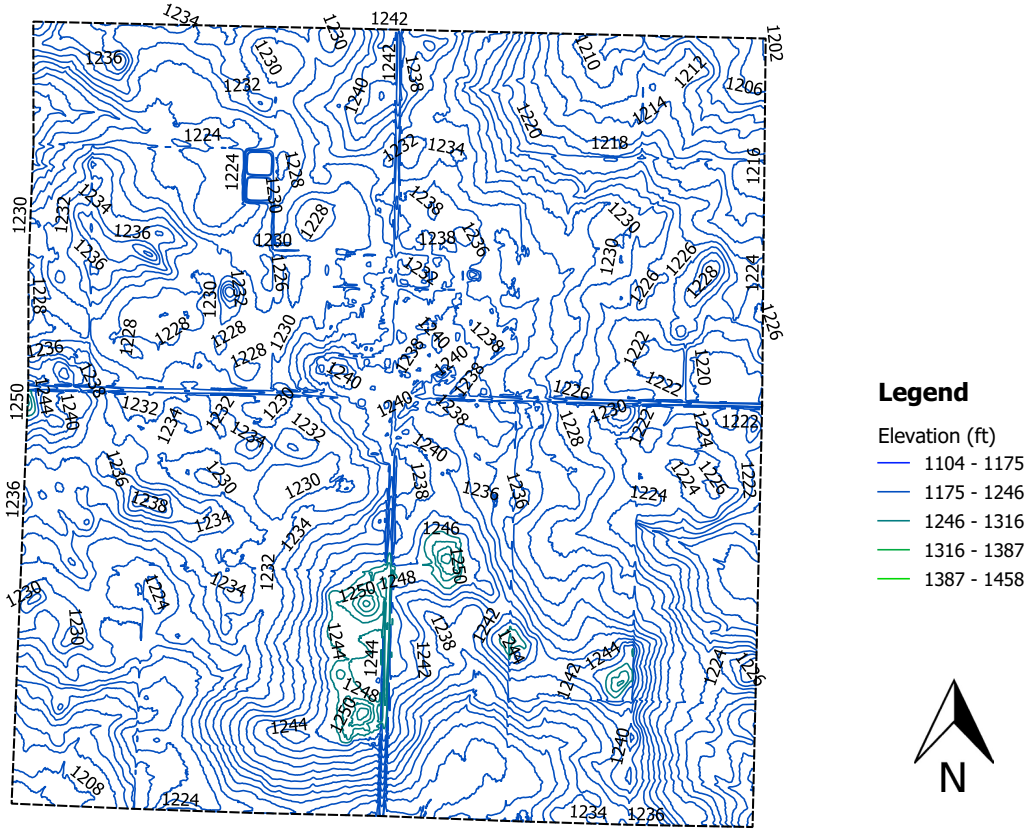
Lidderdale was originally named Kenter before it became the first stop on the Chicago Great Western Railroad. The name Lidderdale came from Lord Lidderdale, a stockholder in the English railroad corporation which constructed the line through the town's location. Rails of the Great Western Railway were laid in late fall of 1902.

Geography and Environment

Lidderdale is located in the northeast quadrant of Carroll County. Highway 30 is approximately five miles to the south of town and is the main road of travel for Lidderdale residents. Lidderdale is 8.8 miles from Carroll, 13.4 miles from Lake City, 27.1 miles from Jefferson, 31 miles from Sac City and 98 miles from Des Moines.

The highest elevation in Carroll County can be found along the eastern side of the county. Here, the elevation can reach as much as 1,550 feet above sea-level. The elevation of Lidderdale ranges from 1,210 feet to 1,236 feet, a very flat community. Map J.1 displays the City of Lidderdale's elevation.

Map J.1: City of Lidderdale Elevation

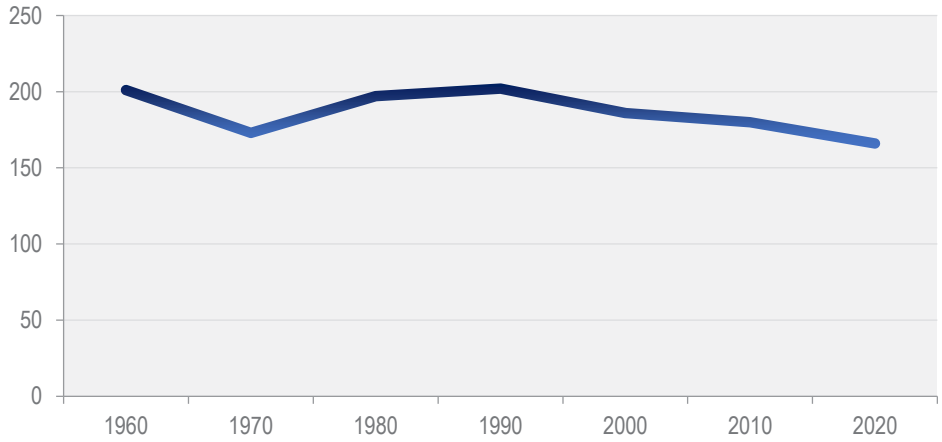


Demographics

The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Lidderdale's population through past, present, and future trends of the region.

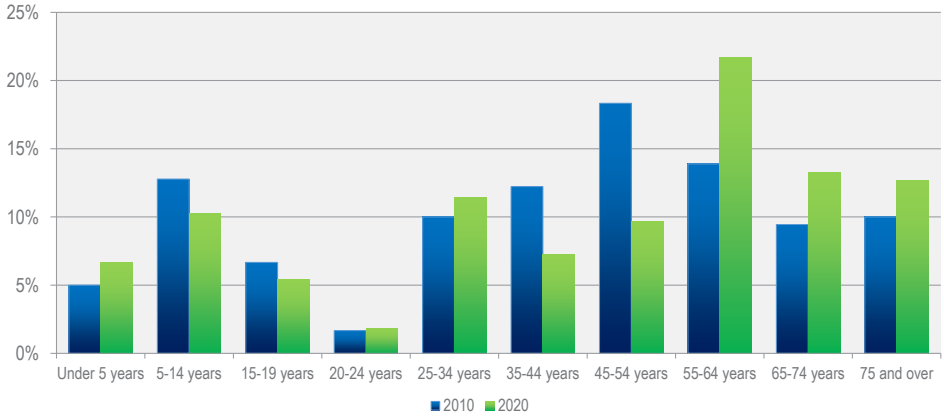
Over the past 50 years, the City of Lidderdale has experienced a gradual decline. In 1960, Lidderdale had a population of 201. Since then, the City's population has declined 17% (35 residents) to 166 in 2020. The most dramatic change happened between 1960 and 1970 when the city lost 28 residents. Figure J.1 shows the City of Lidderdale's population trend since 1960.

Figure J.1: City of Lidderdale Historic Population, 1960-2020



The City's population is not very different from other parts of Carroll County, and even most of the State of Iowa. Population cohorts at age 50 and above have generally higher numbers than other younger cohorts. This information can be found in figure J.2.

Figure J.2: City of Lidderdale Age Distribution, 2010 & 2020



Housing

A community's ability to attract new residents is important. One of the most important aspects to attracting residents is housing. A community's housing stock, type of households, and housing availability and affordability are determining factors.

Since 2010, the city's housing stock has decreased by four units. Owner-occupied units decreased by three, while renter-occupied units increased by seven units. Vacant housing units decreased by eight units. Table J.1 shows a breakdown of the city's occupied and vacant housing units.

Table J.1: City of Lidderdale Housing Units, 2010 & 2020

	2010		2020	
	Number	Percent	Number	Percent
Occupied Housing Units	80	90.9%	84	100.0%
Owner Occupied	67	83.8%	64	76.2%
Renter Occupied	13	16.3%	20	23.8%
Vacant Housing Units	8	9.1%	0	0.0%
Total Housing Units	88	100.0%	84	100.0%

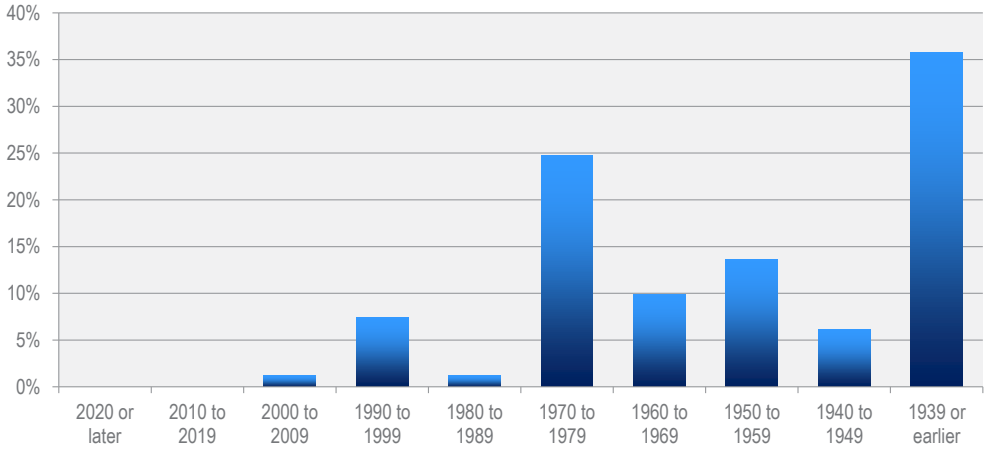
Lidderdale, like many other small rural towns in Iowa, has a lower median housing value of $122,500. The State of Iowa has a median housing value of $181,600. The city's homes can be very affordable and can be used to attract new residents, but they may deteriorate faster and will need a number of repairs and updates. According to the 2022 American Community Survey Estimates, 27.1% of the city's homes are valued less than $100,000. A complete breakdown of the value of homes in Lidderdale can be found in table J.2. Knowing information about the city's housing stock is useful after a disaster hits to determine how much damage was done, and how it will affect the city moving forward.

Table J.2: City of Lidderdale Value of Owner-Occupied Units, 2022

Value of Housing Unit	Percent of Homes
Less than $50,000	3.4%
$50,000 to $99,999	23.7%
$100,000 to $149,999	32.2%
$150,000 to $199,999	27.1%
$200,000 to $299,999	10.2%
$300,000 to $499,999	1.7%
$500,000 to $999,999	1.7%
$1,000,000 or more	0.0%

Figure J.3 showcases the year housing units within the City of Lidderdale were constructed. Like most of the county, Lidderdale has a large portion (35.8%) of the homes constructed in 1939 or earlier. The city also experienced spikes in construction during 1950-1959 and 1970-1979. The 1950s saw 13.6% of the city's homes being built, while the 1970s saw 24.7% of the city's homes being built. Building standards of today utilize the most recent construction materials and safety features, ensuring that the new residential structures are as safe as possible. This does not mean that older homes are more unsafe, just that they may be more susceptible to hazard damage.

Figure J.3: City of Lidderdale Year Housing Units Constructed, 2022



Economics

Household income is an important indicator of the economic base in Carroll County. In Lidderdale, the median household income is $68,750, which would classify a large number of the households in Lidderdale as "working" or "middle" class. Table J.3 breaks down the city's households by income. The City of Lidderdale's household income breakdown is similar to the other rural communities in the area, and the combination of more affordable housing with the current incomes generally provides residents with a decent quality of life. Many residents of Lidderdale travel to other larger neighboring cities like Carroll or Jefferson where more employment opportunities are present.

Table J.3: City of Lidderdale Household Income, 2022

Income and Benefits (2022 Inflation-Adjusted Dollars)	Number of Households	Percent of Households
Less than $10,000	3	4.1%
$10,000 to $14,999	3	4.1%
$15,000 to $24,999	8	11.0%
$25,000 to $34,999	4	5.5%
$35,000 to $49,999	7	9.6%
$50,000 to $74,999	15	20.5%
$75,000 to $99,999	17	23.3%
$100,000 to $149,999	12	16.4%
$150,000 to $199,999	3	4.1%
$200,000 or more	1	1.4%
Median Household Income	$68,750	-
Mean Household Income	$70,311	-

Lidderdale, overall, is a small rural community in a small rural county. A large percent of the businesses within the county serves the largely agricultural economy. Table J.4 breaks down what industry Lidderdale residents work in. Manufacturing employs the largest cohort of residents with 24.1% employed in this industry. The second largest is educational services, and health care and social assistance, with 14.5% of the residents employed in this industry. The third largest is agriculture, forestry, fishing and hunting, and mining with 12.0% employed.

Table J.4: City of Lidderdale Employment by Industry, 2022

Industry	Number	Percent
Total civilian non-farm employment, 16 years and over	83	100%
Agriculture, Forestry, Fishing, Hunting, Mining	10	12.0%
Construction	6	7.2%
Manufacturing	20	24.1%
Wholesale Trade	2	2.4%
Retail Trade	6	7.2%
Transportation and warehousing and utilities	6	7.2%
Information	1	1.2%
Finance and insurance, and real estate and rental and leasing	8	9.6%
Professional, scientific, management, administrative, and waste management services	6	7.2%
Educational, health care, and social assistance	12	14.5%
Arts, entertainment, recreation, accommodation, and food services	4	4.8%
Other services, except public administration	2	2.4%
Public Administration	0	0.0%

Existing Documents & Capabilities

Table J.5 provides a compilation of the current planning and regulatory documents in place for the City of Lidderdale. The table also shows the last time the documents were last updated. These documents help understand the process the city has already undertaken and what documents can be created to help guide the city. First and foremost is the previous hazard mitigation plan as this document lays out specific strategies to help the city reduce the impact hazards have on the community and those who live in it. Lidderdale has a comprehensive plan and a zoning code. These two documents work hand-in-hand to guide the future development of the city. The comprehensive plan takes a deep dive into the city's inventory of assets, utilities, and infrastructure. This plan also includes a hazard chapter which addresses some disaster response items as well as mitigation for the future. The city's zoning code was created to keep certain zones away from one another to reduce the risk to humans and structures. The different zones can pose different threats to others, such as some industrial uses having a higher HAZMAT incident probability which if located in a residential zone, could pose large health issues to the overall population. The zoning codes also include information for street and sidewalk regulations which can reduce the number of transportation incidents.

The City of Lidderdale is a proactive community, which benefits them in regards to mitigation of hazards. A capital improvement plan which lays out future projects and necessary funding would help the city budget for, and allow them to be proactive, not reactive to future needs. Expanding conversations with the local COG and engineering firms would allow the city to explore additional options that have worked in similar communities facing similar situations. Outside organizations are also beneficial with finding funding for projects which otherwise may be out of the city's budget. Road, water, and sewer infrastructure continues to need upgrades and pursuing funding opportunities could reduce impacts of hazards on these infrastructure types. Training staff to current requirements would allow for a more thought-out response to a hazard or hazard warning. Cross training staff regardless of responsibility on different departments can better prepare the city and can lead to things being noticed that previously went unnoticed.

Table J.5: City of Lidderdale Existing Documents

Document	Yes/No	Year
Previous HMP	Yes	2020
Comprehensive Plan	Yes	2008
Building Code	No	-
Zoning Ordinance	Yes	2008
Strategic Plan	Yes	1995
Housing Needs Assessment	Yes	2017
NFIP Participant	No	-
Floodplain Regulations	No	-

NFIP Participation

While the City of Lidderdale is surrounded by areas of flood zone, there are no special flood hazard areas located within the city limits. The area in and around the City of Lidderdale was mapped in 2017 and there are no flood zones within the city limits. While the city has been mapped, due to there being no zones within the city limits, the city does not participate in the NFIP.

Outlook and Future Development

Since the last plan update, the City of Lidderdale has seen some limited development. The majority of this development has come as residential rehabilitation. The City continues to improve the amenities that have been offered to residents for a number of years.

Over the life of this plan, the city does not anticipate much change to the growth of the city. The city anticipates rehabilitation of homes throughout town to continue as well. While new businesses may not locate into the city, it is anticipated that the current businesses will expand to some extent. Overall, growth and development on a similar scale should continue throughout the five year life span of this plan.

Essential Infrastructure and Services

Knowing what services and infrastructure serve the city can be beneficial in a time of disaster so the appropriate companies can be contacted in need of utility shutoff or transportation routes. The City's essential infrastructure and services can be found in Table J.6.

Table J.6: City of Lidderdale Essential Infrastructure and Services

Major Arterials	E26 & N28	**Air Service**	Arthur N. Neu Airport
Water Service	WCIRWA	**Sewer Service**	City of Lidderdale
Electric Service	MidAmerican Energy	**Gas Service**	Residential - None Private line to the Co-op
Sanitation/Solid Waste	Local Haulers	**Landfill**	Carroll County Landfill
Phone and Internet	Western Iowa Networks, Wireless	**Law Enforcement**	Carroll County Sheriff
Fire Service	Lidderdale Fire Department	**Ambulance Service**	Carroll County Ambulance Service

Table J.7: City of Lidderdale Critical Facilities

Number on Map	Name	Address	Type
1	Immanuel Lutheran Church	103 E 4th Street	Vulnerable Population
2	Lidderdale City Hall	121 North Main Street	Essential Facility
3	Lidderdale Fire Station	North Main Street	Essential Facility
4	NEW Cooperative	340 South Main Street	HAZMAT
5	Water Tower	Sampson Street and 3rd Street	Utility
6	Storage Facility	N36	HAZMAT
7	Community Building	N Main Street	Vulnerable Population

Map J.2: City of Lidderdale Critical Facilities

Table J.8: City of Lidderdale Risk Assessment

Hazard	Comments
Animal/Plant/Crop Disease	The City of Lidderdale contains a large amount of agricultural land. Although this land represents a large portion of the community, there have been minimal reported losses from animal/plant/crop disease within in the community. While this does impact the community, it is normally indirectly impacted.
Drought	Drought occurrences have increased across the state, and the City of Lidderdale has not been exempt from this hazard. Droughts continue to increase in severity and while there is little warning, this hazard can cause both direct and indirect issues for the City and it's residents.
Earthquake	There have been no instances of earthquake in the City of Lidderdale, and the committee feels there will be no instances during the life of this plan.
Expansive Soils	There have been no instances of expansive soils in the City of Lidderdale, and the committee feels there will be no instances during the life of this plan.
Extreme Heat	Extreme heat events impact the City of Lidderdale. Education may be one of the best action tools to combat the effects of extreme heat as individuals need to know the effects of extreme heat and how it can affect the body.
Flash Flood	Since 2020, there have been no instances of flash flooding in the City of Lidderdale. While flash floods have little to no warning time, with no instances within the last planning period, the committee has determined this hazard is not a high priority hazard to address, but will consider mitigation actions to prepare the community for response to an event.
Grass/Wild Land Fire	Grass and wild land fires are most commonly field fires or controlled burns that get out of hand in and immediately surrounding the city. This hazard can pose a large threat to the community as elements out of anyone's control, such as wind direction and speed, can change this hazard from harmless and controlled to out of control in a matter of minutes and can pose a threat to life.
HAZMAT Incident	Within the most recent planning period, there have been no instances of hazardous spills within the City of Lidderdale. With no instances within city limits or in the surrounding rural land in the last five years, the committee feels this hazard is a minimal threat to the community and mitigation actions should be considered and implemented to prevent any instances.
Human Disease	Iowa and more specifically the City of Lidderdale are still feeling the effects of the COVID-19 pandemic. The pandemic has reignited the need to plan for future outbreaks and examine the city's current practices. The pandemic also reminded the public the importance of staying informed and staying vigilant to protect themselves.
Infrastructure Failure	Infrastructure failures occur with little to no warning and can cause major disruptions within the community. Planning to respond to this hazard is important to the community to protect lives and property. The most likely infrastructure failure within Lidderdale would be structural failure of either bridges or roadways. As these instances have no warning time, planning must be completed prior to an event happening to be able to respond in a quick manner.

Levee/Dam Failure	There are no levees or dams located in or leading into the City of Lidderdale. It is extremely unlikely that levee or dam failure will impact the city.
Radiological	During the previous planning period, there were no instances of Radiological Incident in Lidderdale and the committee does not anticipate any happening in the next planning period. If an incident were to occur, the committee feels it would be a small, contained situation that would not threaten the community as a whole.
River Flooding	Within Lidderdale city limits, there are no flood zones. There have been no reported instances of river flooding in Lidderdale for at least 20 years. This hazard has a extremely low probability of effecting the community, and has historically not caused any reportable damage within the community. Which is why the community chooses to not participate in the NFIP. With no flood zones within the community, this hazard is not anticipated to impact the city.
Severe Winter Storm	Severe Winter Storms continue to impact the City of Lidderdale. These storms while historically, have caused little damage, continue to build in strength, threatening property and lives within the city. The warning period of this hazard continues to grow with meteorological advances, but can still pose great risks to the community.
Terrorism	There have been no instances of terrorism in the City of Lidderdale during the previous plan period and the committee feels there will be no instances during the life of this plan. If an instance were to occur, the committee feels it would be a targeted incident that would not threaten the entire community.
Thunderstorm/ Lightning/Hail	Thunderstorm/lightning/hail instances are frequent within the community. While they are frequent, most storms pose no threat to life, crops, or property. This hazard is prevalent in Lidderdale but is normally not severe in nature.
Tornado	Carroll County has experienced a number of tornadoes in the recent past, but these have not impacted the City of Lidderdale. With the number of tornadoes that impact Carroll County growing, it is important for the city to continue to plan for the response to tornadoes as storms within Iowa continue to grow in strength. Preparing the public and community is vital to ensuring there is no loss of life.
Transportation Incident	Speed limits within the City of Lidderdale are relatively low, but increase on the edges of the community. While the speed limits are lower throughout the community, not all vehicles slow to the appropriate speed limit. With the community having lower speed limits, it is likely that any transportation incident between vehicles is likely to cause little damage to property or humans, but there is a chance of an incident which can cause extensive damage. The committee anticipates that this hazard will effect the community in varying degrees throughout the planning period.
Windstorm	Recent windstorms have caused reported damage to properties. These hazard events continue to build in magnitude, causing increasingly large amounts of damage to property and posing threats to lives. The recent derechos effected Lidderdale prompting the community to prepare more effectively for these hazards.

Table J.9: Hazards Not Affecting the City of Lidderdale

Hazard	Reason for Omission
Earthquake	Iowa as a whole has experienced the effects of few earthquakes in the past 175 years. The majority of the earthquakes were along the Mississippi River, therefore the city does not feel this hazard will impact them during this planning period.
Expansive Soils	While Iowa has expansive soils, due to the city's history of no issues in the past, the city felt this will not impact the jurisdiction over the life of this plan.
Levee/Dam Failure	There are no levees or dams that lead into the City of Lidderdale. There have been no reported instances of Levee or Dam Failure in the past impacting the community.
River Flooding	There are no flood hazard areas within the City of Lidderdale. The lack of flood zones and no reported history of flooding within the community has led the community to remove this hazard.

Loss Estimates

Table J.10: City of Lidderdale Maximum Building and Population Exposure

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	2	$273,730	166
Commercial	20	$3,929,807	
Industrial	3	$5,556,380	
Residential	81	$10,454,293	

It is unlikely that a jurisdiction can determine the impact any hazard will have. If a hazard were to impact the entire city, the numbers in table J.10 shows the number of people who would be affected and the maximum number of structures and their value. If this type of event were to occur, a shutdown of some facilities and services could last for at least two weeks and some injuries/illnesses will result in permanent disability or even death.

The following hazards were determine to have a negligible impact on the city, if they were to occur.

Dam/Levee Failure
Landslide
Radiological
River Flooding
Transportation Incident
Drought

If a hazard were to report negligible impacts, it is anticipated that the numbers impacted would be similar to table J.11. If there were any shutdown of facilities or services, it is likely that these shutdowns would be for less than twenty-four hours. If any injuries were to occur, it is anticipated that these would be able to be treated with first aid. A negligible hazard would impact approximately 9% of the city.

Table J.11: City of Lidderdale Negligible Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	0	$0	15
Commercial	2	$785,961	
Industrial	0	$0	
Residential	7	$940,886	

The following hazards were determine to have a limited impact on the city, if they were to occur.

Animal/Plant/Crop Disease
Thunderstorm/Lightning/Hail
Windstorm
Severe Winter Storms
Extreme Heat
Flash Flood
Grass/Wild Land Fire
Infrastructure Failure
HAZMAT Incident

If a hazard were to report limited impacts, it is anticipated that the numbers impacted would be similar to table J.12. A shutdown of some facilities and services could last more than a week and any injuries/illnesses would not result in permanent disability. It is estimated that 25% of the city would be impacted.

Table J.12: City of Lidderdale Limited Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	0	$0	42
Commercial	5	$982,451	
Industrial	0	$0	
Residential	20	$2,613,573	

The following hazards were determine to have a limited impact on the city, if they were to occur.

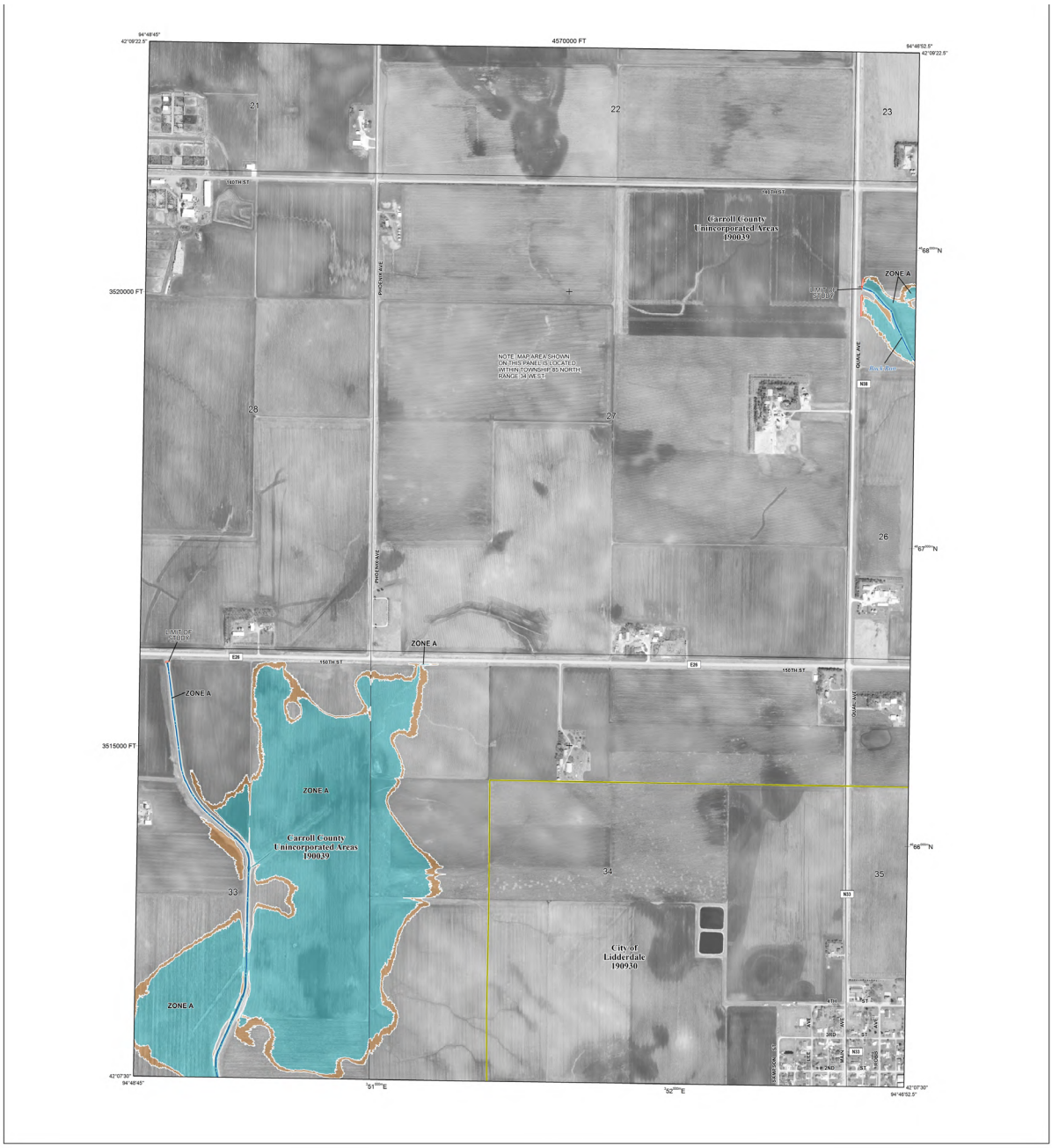
Human Disease
Tornado

If a hazard were to report critical impacts, it is anticipated that the numbers impacted would be similar to table J.13. A shutdown of some facilities and services could last for at least two weeks and some injuries/illnesses will result in permanent disability. It is estimated 50% of the city would be impacted.

Table J.13: City of Lidderdale Critical Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	1	$136,865	83
Commercial	10	$1,964,903	
Industrial	1	$2,778,190	
Residential	40	$5,227,146	

Flood Maps



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

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SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A, V, A99
	With BFE or Depth Zone AE, AO, AH, VE, AR
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
	Future Conditions 1% Annual Chance Flood Hazard Zone X
	Area with Reduced Flood Risk due to Levee See Notes Zone X
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard Zone X
	Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
	18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
	Coastal Transect
	Coastal Transect Baseline
OTHER FEATURES	Profile Baseline
	Hydrographic Feature
	513 Base Flood Elevation Line (BFE)
	Limit of Study
	Jurisdiction Boundary

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SCALE

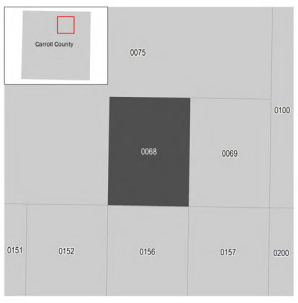
Map Projection:
State Plane Iowa North (FIPS Zone 1401) Coordinate System, Lambert Conformal Conic Projection; North American Datum 1983, GRS 1980 spheroid; North American Vertical Datum of 1988

1 inch = 500 feet 1:6,000

0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR



National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL 68 OF 400

FEMA

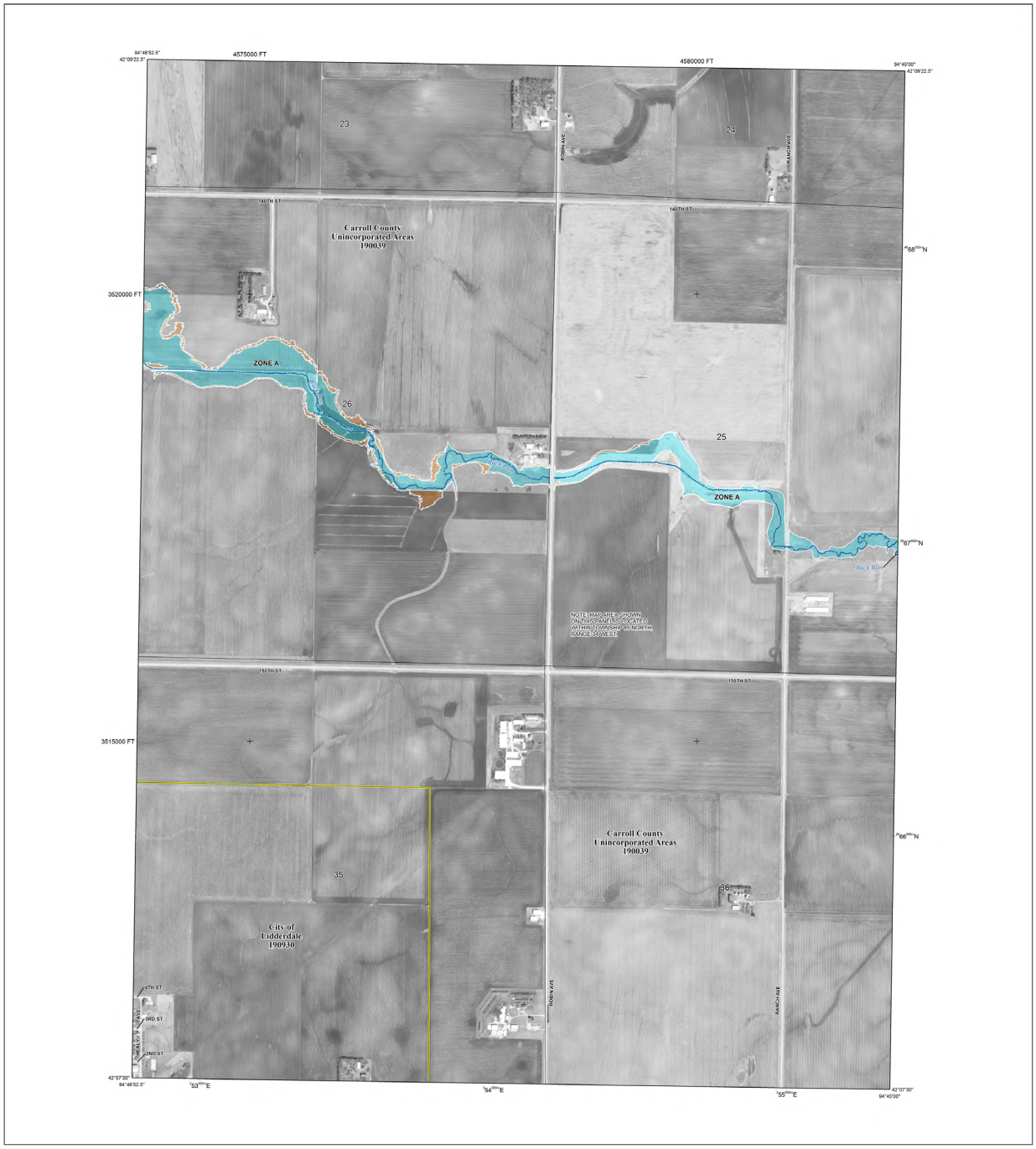
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL COUNTY	190039	0068	C
LIDDERDALE, CITY OF	190930	0068	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0068C

EFFECTIVE DATE
SEPTEMBER 15, 2017



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

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OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X* Future Conditions 1% Annual Chance Flood Hazard *Zone X* Area with Reduced Flood Risk due to Levee See Notes *Zone X* NO SCREEN Area of Minimal Flood Hazard *Zone X*
OTHER AREAS	Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer Levee, Dike, or Floodwall
OTHER FEATURES	18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE) B Coastal Transect Coastal Transect Baseline Profile Baseline Hydrographic Feature 513 Base Flood Elevation Line (BFE) Limit of Study Jurisdiction Boundary

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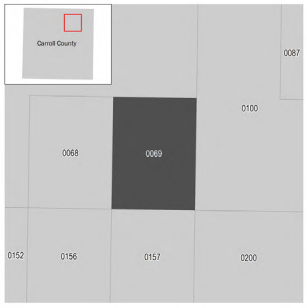
0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR



FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL 69 OF 400

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL COUNTY	190039	0069	C
LIDDERDALE, CITY OF	190930	0069	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0069C

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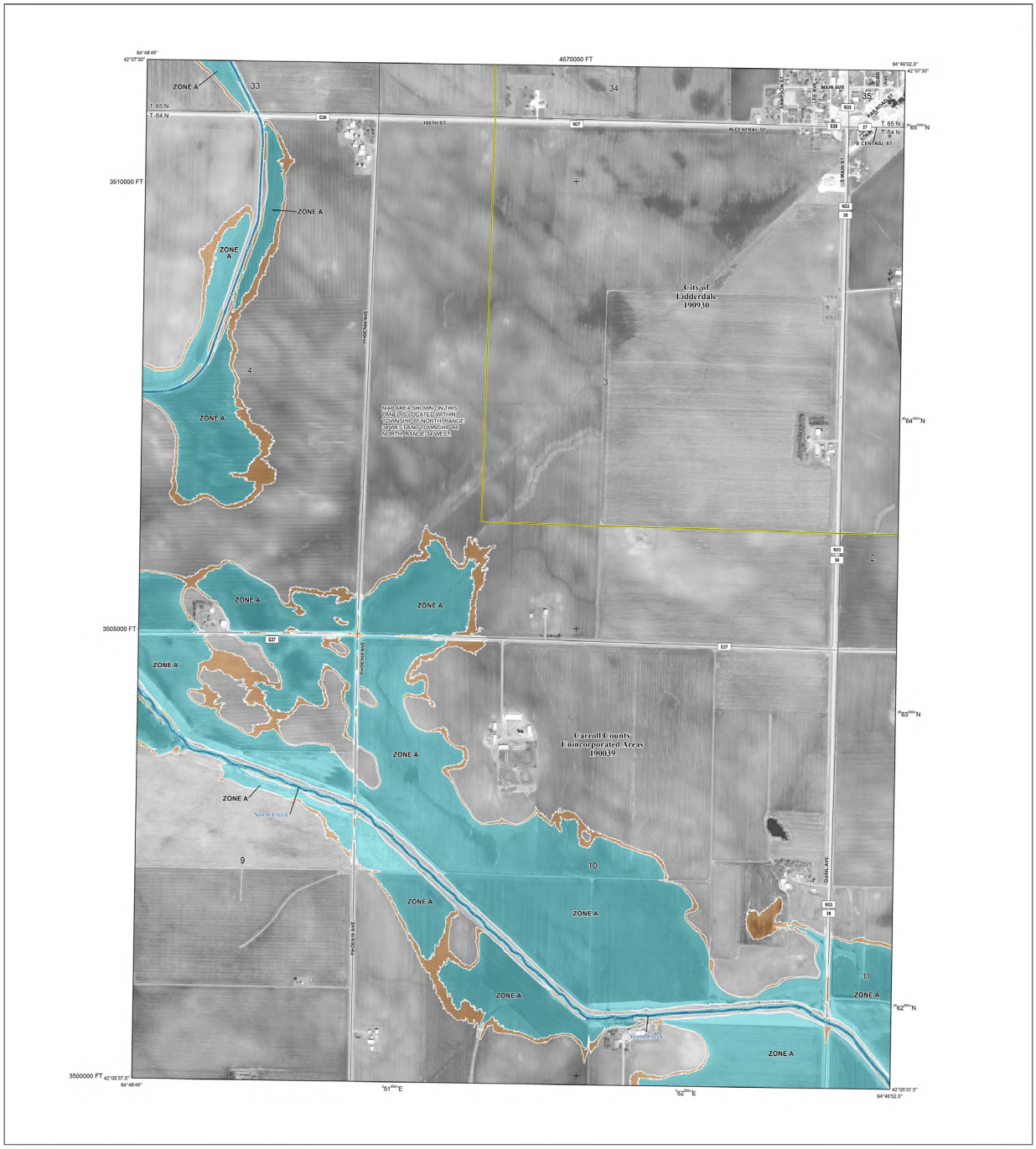

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	Area with Reduced Flood Risk due to Levee See Notes *Zone X*
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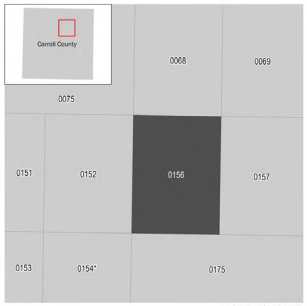

* PANEL NOT PRINTED

FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL 156 OF 400

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL COUNTY	190039	0156	C
LIDDERDALE, CITY OF	190930	0156	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
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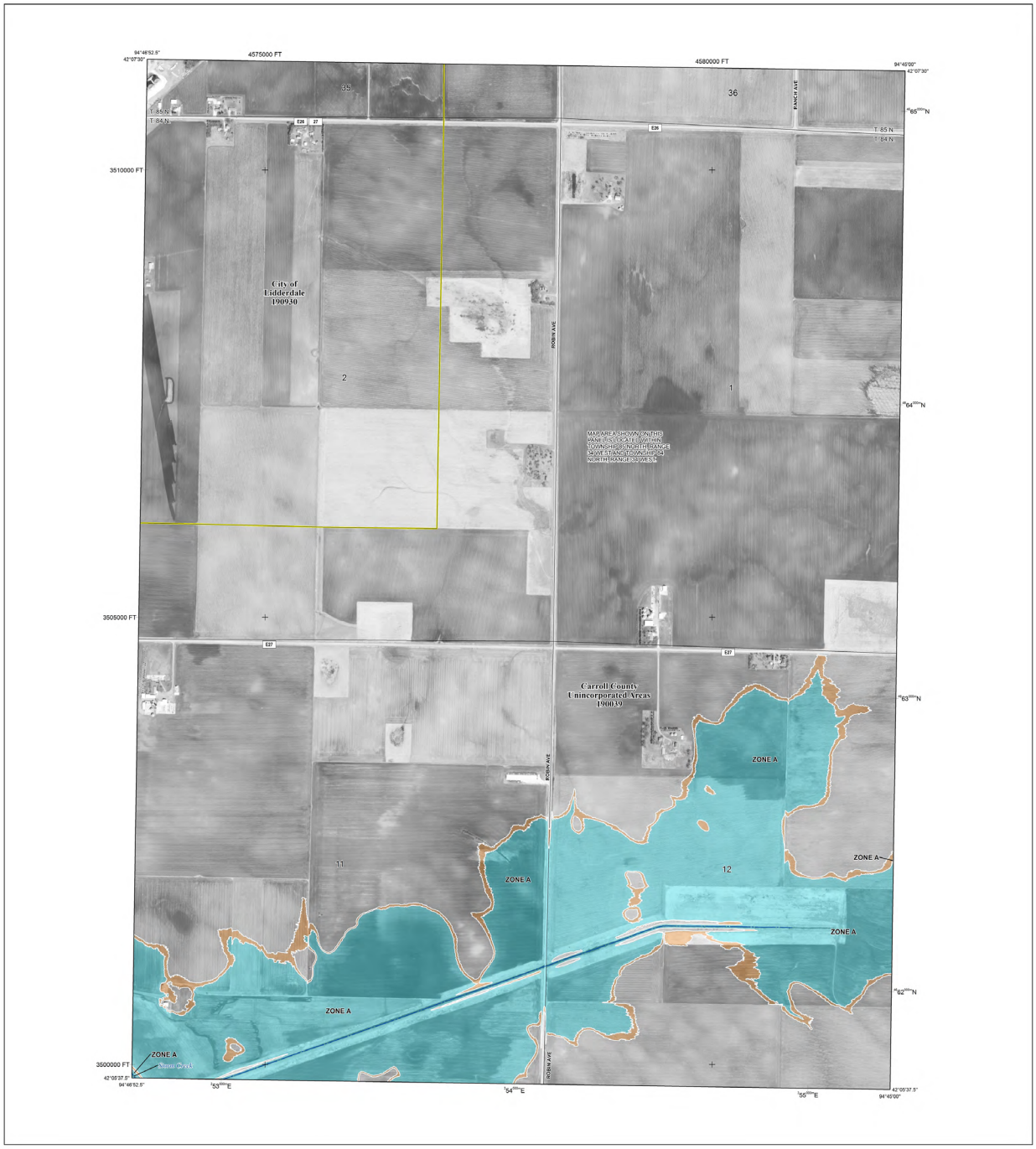

FLOOD HAZARD INFORMATION

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OTHER FEATURES	18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE) Coastal Transect Coastal Transect Baseline Profile Baseline Hydrographic Feature 513 Base Flood Elevation Line (BFE) Limit of Study Jurisdiction Boundary

NOTES TO USERS

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was provided in digital format by the Iowa Department of Natural Resources. This information was derived from digital orthophotography at a 2-foot ground resolution from imagery flown in April 2009.

SCALE

Map Projection:
State Plane Iowa North (FIPS Zone 1401) Coordinate System, Lambert Conformal Conic Projection; North American Datum 1983, GRS 1980 spheroid; North American Vertical Datum of 1988

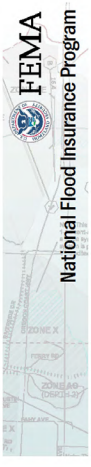
1 inch = 500 feet 1:6,000

0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR

* PANEL NOT PRINTED



NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL **157** OF **400**

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL COUNTY	190039	0157	C
LIDDERDALE, CITY OF	190930	0157	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0157C

EFFECTIVE DATE
SEPTEMBER 15, 2017

Table J.14: City of Lidderdale Status of Previous Mitigation Actions

	Status				
Previous Actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not Implemented**
Additional warning sirens			X		
Educate public on hyper reach notification				X	
Promote NOAA radios to the public					X
Complete current plan and make plans to update every five years		X			
Inform public on hazardous materials locations and hazards			X		
Find alternative water sources for fire protection	X				
Locate and get permission to use farm ponds	X				
Use old farm wells to fill tanker storage					X
Designate shelters	X				
Enforce building codes, city codes, and zoning codes			X		
Construct building to house generator	X				
Encourage use of one call to avoid damage to utilities			X		
Work with electric companies to bury overhead power lines				X	
Continue tree-trimming, enforcing ordinances when needed			X		
Provide funding needed to train personnel (fire, EMS, and police)			X		
Continue training programs for fire personnel			X		
Make sure EMS volunteers trained to EMT-B or I			X		
Make sure fire volunteers trained to FF levels			X		
Continue fire safety education			X		
Recruit and train new members whenever possible			X		
Keep updating and upgrading ambulance fleet, snow plow equipment, sand trucks, etc			X		
Update first responder notification equipment			X		

	Status				
Previous Actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not Implemented**
Continue to budget for and fund street repairs			X		
Keep fire hydrants updated and working, replacing as needed			X		
Post signs and increase police surveillance around critical facilities			X		
Replace wastewater generator	X				

Action Plan

Section 201.6 (c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

Section 201.6 (c)(3)(iii): The mitigation strategy shall include an action plan, describing how the action 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 associated costs.

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

Table J.15: City of Lidderdale Action Plan

Goal 1	**Enhance Community Protection**
Objective 1	Improve Public Warning Capabilities
Objective 2	Maintain Current Hazard Mitigation Plan
Objective 3	Hazardous Materials-tier II sites
Objective 4	Protect and Enforce Regulatory Measures in Existing and New Development Areas
Objective 5	Protect Against Fires
Objective 5	Provide Shelter Facilities in case of Disasters
Goal 2	**Protect Against Power Outage**
Objective 1	Use Prevention Techniques to Minimize Disruption in Services
Goal 3	**Maintain and Support Public Safety, Including Facilities, Equipment, and Training**
Objective 1	Improve First Responder Resources and Capabilities
Objective 2	Provide Education and Training Programs to Increase Public and Responder Awareness
Objective 3	Maintain needed personnel for fire and EMS
Objective 4	Provide Needed Equipment and Facilities
Goal 4	**Update Communications Systems**
Objective 1	Improve Public Warning Capabilities
Goal 5	**Maintain and Protect Public Infrastructure**
Objective 1	Maintain and Improve Roads, Bridges, and Other Transportation

Table J.15: City of Lidderdale Mitigation Actions

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Install additional warning sirens, replace sirens as necessary	Tornado, Windstorm	High	City Council	Low	City General Fund, Local Foundations, HMGP with State Match	Emergency Services	Mid
Promote NOAA radios to the public	Tornado, Severe Winter Storms, Thunderstorm/ Lightning/Hail	High	City Council, Emergency Management	Minimal	City General Fund, Fire Department, Local Foundations	Public Education and Awareness	Short
Complete current plan and make plans to update every five years	Animal/Plant/Crop Disease, Drought, Earthquake, Expansive Soils, Extreme Heat, Flash Flood, Grass/Wild Land Fire, HAZMAT Incident, Human Disease, Infrastructure Failure, Radiological, River Flooding, Severe Winter Storm, Terrorism, Thunderstorm/Lightning/ Hail, Tornado, Transportation Incident, Windstorm	High	City Council	Minimal	City General Fund, Carroll County EMA, HMGP with State Match	Emergency Services	Mid
Inform public on hazardous materials locations and hazards	Radiological, HAZMAT	Mod	Public Works	Minimal	City General Funds	Public Education and Awareness	Ongoing
Find alternative water sources for fire protection	Drought	High	Public Works	Moderate	City Utility Fund	Natural Resource Protection	Mid
Locate and get permission to use farm ponds	Drought, Grass and Wild Land Fire	High	Public Works	Minimal	City General Fund	Natural Resource Protection	Short

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Use old farm wells to fill tanker storage	Infrastructure Failure, Grass and Wild Land Fire	Mod	Fire Department	Minimal	Fire Department	Natural Resource Protection	Short
Designate shelters	Tornado, Severe Winter Storms, River Flooding	High	City Council	Moderate	City General Fund	Emergency Services	Mid
Enforce building codes, city codes, and zoning codes	Infrastructure Failure	Mod	City Council	Minimal	City General Fund, Nuisance Fines	Property Protection	Ongoing
Construct building to house generator	Tornado, Severe Winter Storms, Thunderstorm/ Lightning/Hail, Infrastructure Failure	High	City Council	Moderate	City General Fund	Emergency Services	Short
Encourage use of one call to avoid damage to utilities	Infrastructure Failure	Mod	Utilities	Minimal	City Utility Fund, Private Utilities	Property Protection	Ongoing
Work with electric companies to bury overhead power lines	Tornado, Severe Winter Storms, Thunderstorm/ Lightning/Hail, Windstorm, Infrastructure Failure	High	Utilities	High	City Utility Fund, Private Utilities, Iowa Energy RLF	Property Protection	Mid
Continue tree-trimming, enforcing ordinances when needed	Tornado, Severe Winter Storms, Thunderstorm/ Lightning/Hail, Windstorm, Infrastructure Failure	Mod	City Council	Minimal	City General Fund, Nuisance Fines	Property Protection	Ongoing
Continue fire safety education	Grass or Wild Land Fire, Infrastructure Failure	High	Fire Department, Red Cross	Minimal	City Funds, Fire Department, Local Foundations	Public Education and Awareness	Ongoing
Continue to budget for and fund street repairs	Infrastructure Failure	High	Public Works, City Council	High	City Street Fund, Carroll County Secondary Roads	Prevention	Ongoing
Keep fire hydrants updated and working, replacing as needed	Grass or Wild Land Fire, Infrastructure Failure	Mod	Fire Department, Public Works	Moderate	City Utility Funds, Iowa CDBG Fund, SRF	Emergency Services	Ongoing

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Post signs and increase police surveillance around critical facilities	Terrorism	Mod	City Council, Police Department	Minimal	City General Fund	Property Protection	Mid
Replace wastewater generator	Infrastructure Failure, Flash Flood	High	City Council	Low	City Utility Fund, Local Foundations, Iowa SRF, USDA Rural Development	Property Protection	Long

Incorporation into Other Planning Mechanisms

Where possible, Lanesboro will consider the findings from this document when updating or creating new planning and operating documents. Information from this plan will be utilized to update and expand the following documents:

- Hazard Mitigation Plan
- Housing Needs Assessment
- Comprehensive Plan
- Zoning Ordinance
- Strategic Plan

While the city currently does not have any of the plans listed below, if these plans were to be created during the life of this plan, this plan will be used to guide the development of:

- Water Conservation Plans
- Storm Water Management Plans
- Parks and Recreation Plans
- Floodplain Regulations
- Building Code

Appendix K: City of Manning

Community Profile

History

In 1881, the Chicago, Milwaukee and St. Paul Railroads were constructed across Iowa. These rails all crossed at what is now the City of Manning. The Milwaukee Railroad Depot was located northwest of the current Legion Hall. The Chicago Great Western Railroad, which ran from Fort Dodge to Council Bluffs, was constructed through Manning in 1903. This depot was located on West Third Street. Trains were traveling through Manning in five different directions giving Manning a distinct advantage over many other towns and making Manning an important destination.

There was much debate surrounding the name of the town. Many liked the name "Jeffrey Junction", while others thought naming the town "Warrick" after the local railroad water supply was more fitting. The residents eventually decided to name the town after O.H. Manning. O.H. Manning began his professional career as a schoolteacher and later became a newspaper publisher, lawyer, and politician. He was most notably known for being the attorney general for the Iowa Southwest branch of the Chicago and Northwestern Railroads. He also handled the land transactions for the Western Town Lot Company.

With the help of O.H. Manning and the influence of the rail systems, Manning was officially incorporated in August of 1881. Lots began selling on July 28, 1881 and by August 25, 53 lots had been sold. This included several of the first businesses in town: a grocery store, hardware store, saloon and a doctor's office. The first issue of the Manning Monitor was published on November 17, 1881. The first issue reported a total population of 414. It also reported that 85 buildings, including 45 businesses, had been built. Only six weeks later, the number of buildings rose to 112 and Manning reached a total population of 568 people.

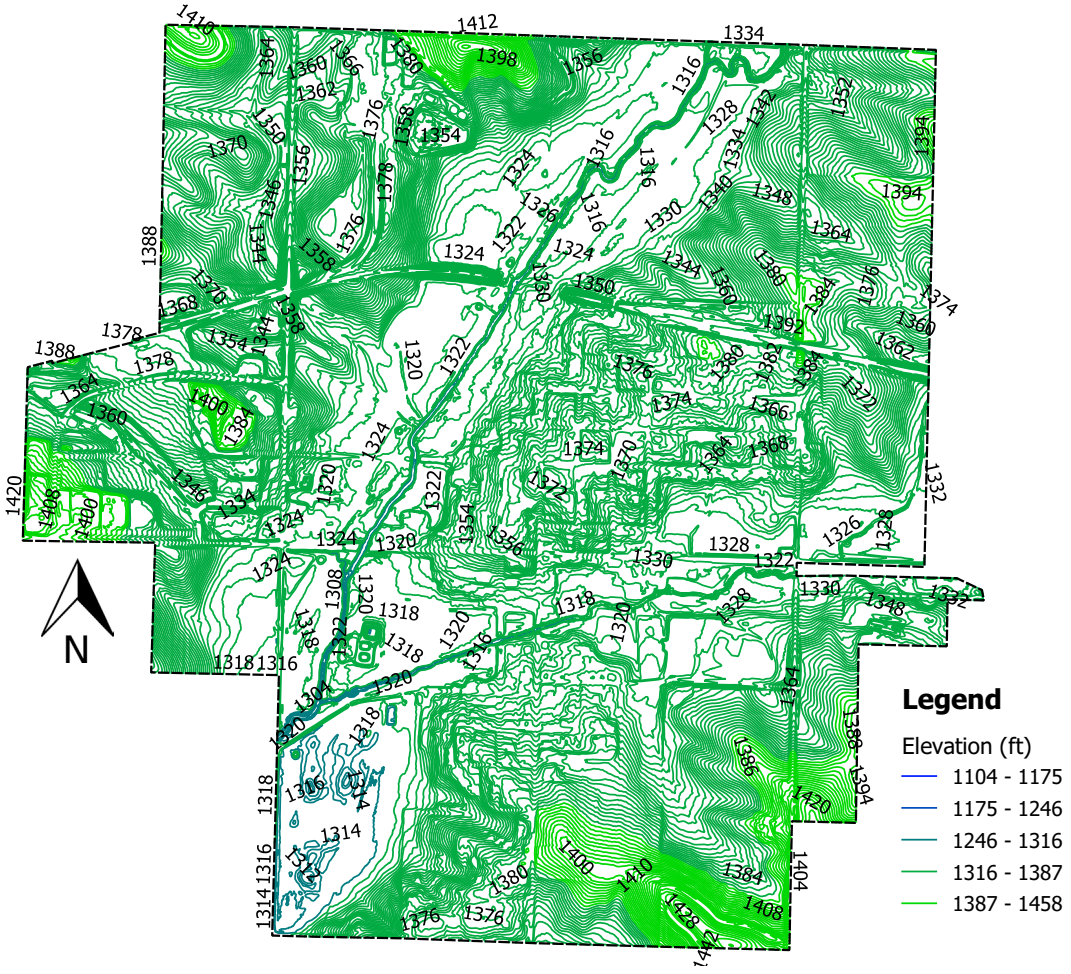
Throughout the years, Manning developed the many amenities needed for a successful community, including utilities, sidewalks, fire and police departments, a public library, an airport, swimming pool, parks, a post office, churches, a hospital, an ambulance service, a strong public school system, and other essential facilities and infrastructures. Many of these amenities were centered on the strong German Heritage still present in Manning today.

Geography and Environment

Manning is located in the far southwest corner of Carroll County. IA 141 bisects the community running east/west. Manning is 10 miles to the west of Highway 71, which provides convenient travel accessibility to the residents of Manning. Manning is located 19.8 miles from Audubon, 21.6 miles from Coon Rapids, 22.3 miles from Carroll, and 23.2 miles from Denison, and 91.4 miles from Des Moines.

The highest elevation in Carroll County can be found along the eastern side of the county. Here, the elevation can reach as much as 1,550 feet above sea-level. Manning has one of the highest elevations of all Carroll County communities. Here, elevation can range from 1,316 feet towards his southwest corner to 1,432 feet in both the southeast and northwest corners. Map K.1 displays Manning's elevation.

Map K.1: City of Manning Elevation

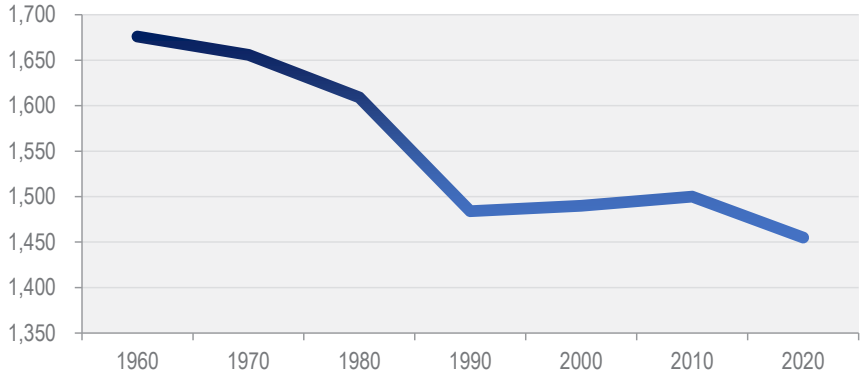


Demographics

The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Manning's population through past, present, and future trends of the region.

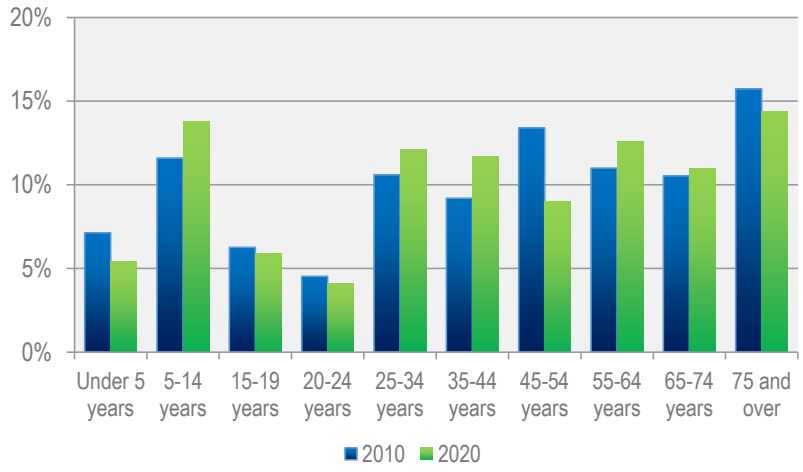
Over the past 50 years, the City of Manning has experienced a gradual decline. In 1960, Manning had a population of 1,676. Since then, the City's population has decreased 13% (221 residents) to 1,455 in 2020. The most dramatic change happened between 1980 and 1990, when the city lost 125 residents. Figure K.1 shows the City of Manning's population trend since 1960.

Figure K.1: City of Manning Historic Population, 1960-2020



The City's population makeup is not very different from other parts of Carroll County, and even most of the State of Iowa. Population cohorts at age 50 and above have generally higher numbers than other younger cohorts. This information can be found in figure K.2.

Figure K.2: City of Manning Age Distribution, 2010 & 2020



Housing

A community's ability to attract new residents is important. One of the most important aspects to attracting residents is housing. A community's housing stock, type of households, and housing availability and affordability are determining factors.

Since 2010, the city's housing stock has increased by 28 units. Owner-occupied units have increased by 7, while renter-occupied units have decreased by 9. During this same time, the City saw a 45.5% increase in vacant properties. Table K.1 shows a breakdown of the city's occupied and vacant housing units.

Table K.1: City of Manning Housing Units, 2010 & 2022

	2010		2022	
	Number	**Percent**	**Number**	**Percent**
Occupied Housing Units	653	90.8%	651	87.1%
Owner Occupied	472	72.3%	479	73.6%
Renter Occupied	181	27.7%	172	26.4%
Vacant Housing Units	66	9.2%	96	12.9%
Total Housing Units	719	100.0%	747	100.0%

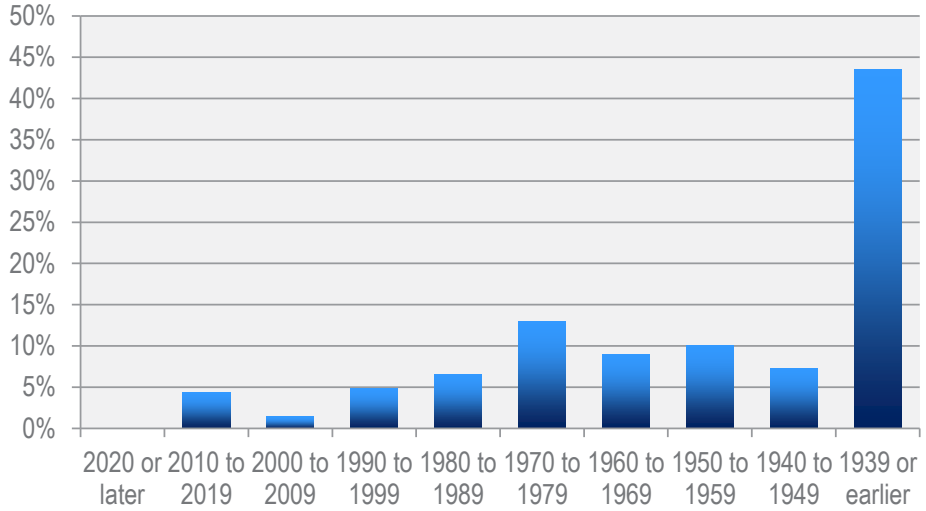
Manning, like many other small rural towns in Iowa, has a lower median housing value of $99,400. The State of Iowa has a median housing value of $181,600. Manning's homes can be very affordable and can be used to attract new residents, but they may deteriorate faster and will need a number of repairs and updates. According to the 2022 American Community Survey Estimates, 50.8% of the city's homes are valued less than $100,000. A complete breakdown of the value of homes in Manning can be found in table K.2. Knowing information about the city's housing stock is useful after a disaster hits to determine how much damage was done, and how it will affect the city moving forward.

Table K.2: City of Manning Value of Owner-Occupied Units, 2022

Value of Housing Unit	Percent of Homes
Less than $50,000	5.1%
$50,000 to $99,999	45.7%
$100,000 to $149,999	29.4%
$150,000 to $199,999	7.5%
$200,000 to $299,999	8.4%
$300,000 to $499,999	3.6%
$500,000 to $999,999	0.3%
$1,000,000 or more	0.0%

Figure K.3 showcases the year housing units within the City of Manning were constructed. Like most of the county, Manning has a large portion (43.5%) of the homes constructed in 1939 or earlier. The city also experienced spikes in construction during 1970-1979. The 1970s saw 13.0% of the city's homes being built. The 1950s were the second largest housing construction year with 10.0% of the city's housing being built. Building standards of today utilize the most recent construction materials and safety features, ensuring that the new residential structures are as safe as possible. This does not mean that older homes are more unsafe, just that they may be more susceptible to hazard damage.

Figure K.3: City of Manning Year Housing Units Constructed, 2022



Economics

Household income is an important indicator of the economic base in Carroll County. In Manning, the median household income is $62,031, which would classify a large number of the households in Manning as "middle" class. Table K.3 breaks down the city's households by income. The City of Manning's household income breakdown is similar to the other rural communities in the area, and the combination of more affordable housing with the current incomes generally provides residents with a decent quality of life. Educational services, and health care, and social assistance is the largest industry within the City, which consistent with the County as a whole. Some residents of Manning commute to other larger neighboring cities like Carroll, Atlantic, and Harlan.

Table K.3: City of Manning Household Income, 2022

Income and Benefits (2022 Inflation-Adjusted Dollars)	Number of Households	Percent of Households
Less than $10,000	31	4.3%
$10,000 to $14,999	32	4.5%
$15,000 to $24,999	21	2.9%
$25,000 to $34,999	56	7.8%
$35,000 to $49,999	70	9.7%
$50,000 to $74,999	240	33.4%
$75,000 to $99,999	83	11.5%
$100,000 to $149,999	144	20.0%
$150,000 to $199,999	23	3.2%
$200,000 or more	19	2.6%
Median Household Income	$62,031	-
Mean Household Income	$77,929	-

Manning, overall, is a small rural community a small rural county. A large percent of the businesses within the county serves the largely agricultural economy. Table K.4 breaks down what industry Manning residents work in. Educational services, and health care and social assistance employ the largest cohort of residents, with 31.5% of the city's residents being employed in this industry. Manufacturing is the second largest industry and employs 14.4% of the city's population.

Table K.4: City of Manning Employment by Industry, 2022

Industry	Number	Percent
Total civilian non-farm employment, 16 years and over	798	100.0%
Agriculture, Forestry, Fishing, Hunting, Mining	39	4.9%
Construction	44	5.5%
Manufacturing	115	14.4%
Wholesale Trade	27	3.4%
Retail Trade	70	8.8%
Transportation and warehousing and utilities	35	4.4%
Information	11	1.4%
Finance and insurance, and real estate and rental and leasing	45	5.6%
Professional, scientific, management, administrative, and waste management services	34	4.3%
Educational, health care, and social assistance	251	31.5%
Arts, entertainment, recreation, accommodation, and food services	21	2.6%
Other services, except public administration	48	6.0%
Public Administration	58	7.3%

Existing Documents & Capabilities

Table K.5 provides a compilation of the current planning and regulatory documents in place for the City of Manning. The table also shows the last time the documents were last updated. These documents help understand the process the city has already undertaken and what documents can be created to help guide the city. First and foremost is the previous hazard mitigation plan as this document lays out specific strategies to help the city reduce the impact hazards have on the community and those who live in it. Manning has a comprehensive plan and a zoning code. These two documents work hand-in-hand to guide the future development of the city. The comprehensive plan takes a deep dive into the city's inventory of assets, utilities, and infrastructure. This plan also includes a hazard chapter which addresses some disaster response items as well as mitigation for the future. The city's zoning code was created to keep certain zones away from one another to reduce the risk to humans and structures. The different zones can pose different threats to others, such as some industrial uses having a higher HAZMAT incident probability which if located in a residential zone, could pose large health issues to the overall population. The zoning codes also include information for street and sidewalk regulations which can reduce the number of transportation incidents.

The City of Manning is overall proactive community, which benefits them in regards to mitigation of hazards. A capital improvement plan which lays out future projects and necessary funding would help the city budget for, and allow them to be proactive, not reactive to future needs. Expanding conversations with the local COG and engineering firms would allow the city to explore additional options that have worked in similar communities facing similar situations. Outside organizations are also beneficial with finding funding for projects which otherwise may be out of the city's budget. Road, water, and sewer infrastructure continues to need upgrades and pursuing funding opportunities could reduce impacts of hazards on these infrastructure types. Training staff to current requirements would allow for a more thought-out response to a hazard or hazard warning. Cross training staff regardless of responsibility on different departments can better prepare the city and can lead to things being noticed that previously went unnoticed.

Table K.5: City of Manning Existing Documents

Document	Yes/No	Year
Previous HMP	Yes	2020
Comprehensive Plan	Yes	2023
Building Code	State	2010
Zoning Ordinance	Yes	2023
Strategic Plan	Yes	2019
Housing Needs Assessment	Yes	Underway
NFIP Participant	Yes	1986
Floodplain Regulations	Yes	2017

NFIP Participation

In the past, there have been instances of flooding within the city limits of Manning. Manning started participating in the NFIP in 1986, and the flood map was updated and adopted in 2017. The city's FIRMs can be found in the later in this appendix. The City Administrator also acts as the Floodplain Administrator for the city. Any development/demolition in the floodplain is required to obtain a permit which regulates the development/demolition and lays out the NFIP regulations that must be followed. Manning participates in the NFIP and implements substantial improvement / substantial damage provisions in the following manner: Local officials (1) determine the cost of work, (2) determine the market value of buildings, (3) make SI/SD

determinations and provide determinations to property owners, and (4) require owners to obtain permits to bring substantially improved and substantially damaged structures into compliance with the floodplain management requirements.

Outlook and Future Development

Since the last plan update, the City of Manning has undergone sizeable development. On a regular basis, there are new homes constructed within the City limits. A large number of these homes are constructed south of Iowa Highway 141. In addition to the new construction, a number of homes are rehabilitated on an annual basis. The City continues to have a thriving Main Street which has recently seen some facade rehabilitation. There has also been other commercial development around the City. The City itself has continued to expand the services it provides to its citizens, and it continues to improve the amenities that have been offered within the City for a number of years.

Over the life of this plan, the city does not anticipate this growth to slow. The city anticipates homes to continue to be built south of Highway 141 and rehabilitation of homes throughout town to continue as well. While new businesses may not locate into the city, it is anticipated that the current businesses will expand to some extent. Overall, growth and development on a similar scale should continue throughout the five year life span of this plan.

Essential Infrastructure and Services

Knowing what services and infrastructure serve the city can be beneficial in a time of disaster so the appropriate companies can be contacted in need of utility shutoff or transportation routes. The City's essential infrastructure and services can be found in Table K.6.

Table K.6: City of Manning Essential Infrastructure and Services

Major Arterials	IA Highway 141	**Air Service**	Arthur N. Neu Airport
Water Service	City of Manning	**Sewer Service**	City of Manning
Electric Service	Manning Municipal Utilities	**Gas Service**	Manning Municipal Utilities
Sanitation/Solid Waste	City Contracted	**Landfill**	Carroll County Landfill
Phone and Internet	Manning Municipal Utilities, Windstream, Wireless	**Law Enforcement**	Manning Police Department
Fire Service	Manning Fire Department	**Ambulance Service**	Carroll County Ambulance Service

Table K.7: City of Manning Critical Facilities

Number on Map	Name	Address	Type
1	AGP Inc.	1000 300th Street	HAZMAT
2	Aspinwall Co-Op	516 Highway 141	HAZMAT
3	Timmerman Apartments	34 May Street	Vulnerable Population
4	Child Care Center	123 Main Street	Vulnerable Population
5	City Hall	321 Center Street	Essential Facility
6	Manning Senior Living	203 11th Street	Vulnerable Population
7	Walker Apartments	820 12th Street	Vulnerable Population
8	Fire Station	700 West Street	Essential Facility
9	Hausbarn	130 Heritage Drive	Vulnerable Population
10	Van Wall Equipment	402 6th Street	HAZMAT
11	IKM-Manning School	209 10th Street	Vulnerable Population
12	Natural Gas Border Station	W Highway 141	HAZMAT
13	Manning Regional Healthcare Center	1550 6th Street	Essential Facility
14	Manning Municipal Utilities	321 Center Street	Utility
15	Zion Lutheran Church (Preschool)	1204 Center Street	Vulnerable Population
16	Plastico	303 Center Street	HAZMAT
17	Public Works	309 Elm Street	Essential Facility
18	Rec Center	702 6th Street	Vulnerable Population
19	Casey's	351 6th Street	HAZMAT
20	Senior Center	612 Main Street	Vulnerable Population
21	Storm Sirens	Various	Essential Facility
22	Terrace Apartments	421 Center Street	Vulnerable Population
23	Wastewater Treatment Plant	South of 6th Street near West Nishnabotna River	Utility
24	Water Tower	Center Street & 3rd Street	Utility
25	Water Treatment Plant	310 West Street	Utility
26	Wells	Various	Utility
27	Cobblestone Hotel	120 Heritage Drive	Vulnerable Population

Map K.2: City of Manning Critical Facilities

IKM-Manning Community School District

The IKM-Manning Community School District is made up of three buildings, two of which are located in Manning. This plan will focus on the Middle and High Schools which are located at 209 Tenth Street in Manning. Students and staff participate in drills and educational programs related to hazards and the mitigation of them. The District maintains its own equipment and supplies to maintain roads and walkways on campus.

Table K.8: IKM-Manning Community School District Enrollment

School Year	Facility	Enrollment	Facility	Enrollment	Facility	Enrollment	Total Manning Enrollment
2018-19	Preschool	36	Middle School	273	High School	206	515
2019-20	Preschool	32	Middle School	280	High School	193	505
2020-21	Preschool	31	Middle School	272	High School	200	503
2021-22	Preschool	30	Middle School	284	High School	209	523
2022-23	Preschool	38	Middle School	284	High School	196	518
2023-24	Preschool	34	Middle School	289	High School	195	518

Hazard Scores

Table K.9: City of Manning Risk Assessment

Hazard	Comments
Animal/Plant/Crop Disease	The City of Manning contains a large amount of agricultural land. Although this land represents a large portion of the community, there have been minimal reported losses from animal/plant/crop disease within in the community. While this does impact the community, it is normally indirectly impacted.
Drought	Drought occurrences have increased across the state, and the City of Manning has not been exempt from this hazard. Droughts continue to increase in severity and while there is little warning, this hazard can cause both direct and indirect issues for the City and it's residents.
Earthquake	There have been no instances of earthquake in the City of Manning, and the committee feels there will be no instances during the life of this plan.
Expansive Soils	There have been no instances of expansive soils in the City of Manning, and the committee feels there will be no instances during the life of this plan.
Extreme Heat	Extreme heat events impact the City of Manning. Education may be one of the best action tools to combat the effects of extreme heat as individuals need to know the effects of extreme heat and how it can affect the body.
Flash Flood	Since 2020, there have been no instances of flash flooding in the City of Manning. While flash floods have little to no warning time, with no instances within the last planning period, the committee has determined this hazard is not a high priority hazard to address, but will consider mitigation actions to prepare the community for response to an event.

Grass/Wild Land Fire	Grass and wild land fires are most commonly field fires or controlled burns that get out of hand in and immediately surrounding the city. This hazard can pose a large threat to the community as elements out of anyone's control, such as wind direction and speed, can change this hazard from harmless and controlled to out of control in a matter of minutes and can pose a threat to life.
HAZMAT Incident	Within the most recent planning period, there have been no instances of hazardous spills within the City of Manning. There was one spill that occurred outside of city limits, but it did not impact the community. With no instances within city limits in the last five years, the committee feels this hazard is a minimal threat to the community and mitigation actions should be considered and implemented to prevent any instances.
Human Disease	Iowa and more specifically the City of Manning are still feeling the effects of the COVID-19 pandemic. The pandemic has reignited the need to plan for future outbreaks and examine the city's current practices. The pandemic also reminded the public the importance of staying informed and staying vigilant to protect themselves.
Infrastructure Failure	Infrastructure failures occur with little to no warning and can cause major disruptions within the community. Planning to respond to this hazard is important to the community to protect lives and property. The most likely infrastructure failure within Manning would be structural failure of either bridges or roadways. As these instances have no warning time, planning must be completed prior to an event happening to be able to respond in a quick manner.
Levee/Dam Failure	There are no levees or dams located in the City of Manning, and there are no high hazard dams on waterways that lead into the city. There is one low hazard dam that is located southwest of the community, but the water from that dam flows away from the city. It is unlikely that levee or dam failure will impact the city, although the city feels that planning for river flooding and planning for dam/levee failure are similar in nature.
Radiological	During the previous planning period, there were no instances of Radiological Incident in Manning and the committee does not anticipate any happening in the next planning period. If an incident were to occur, the committee feels it would be a small, contained situation that would not threaten the community as a whole.
River Flooding	Within Manning, approximately 20% of the city's land is located in the flood zone. Since 2020, there have been no reported instances of river flooding in Manning. This hazard has a medium probability of effecting the community, and has historically not caused significant reportable damage within the community. Primary mitigation actions for this hazard would include limitations on construction in the flood zone.
Severe Winter Storm	Severe Winter Storms continue to impact the City of Manning. These storms while historically, have caused little damage, continue to build in strength, threatening property and lives within the city. The warning period of this hazard continues to grow with meteorological advances, but can still pose great risks to the community.
Terrorism	There have been no instances of terrorism in the City of Manning during the previous plan period and the committee feels there will be no instances during the life of this plan. If an instance were to occur, the committee feels it would be a targeted incident that would not threaten the entire community.
Thunderstorm/ Lightning/Hail	Thunderstorm/lightning/hail instances are frequent within the community. While they are frequent, most storms pose no threat to life, crops, or property. This hazard is prevalent in Manning but is normally not severe in nature.

Tornado	Carroll County has experienced a number of tornadoes in the recent past, but these have not caused large damage within the city. With the number of tornadoes that impact Carroll County growing, it is important for the city to continue to plan for the response to tornadoes as storms within Iowa continue to grow in strength. Preparing the public and community is vital to ensuring there is no loss of life.
Transportation Incident	Speed limits within the City of Manning are relatively low, but increase on the edges of the community. While the speed limits are lower throughout the community, IA Highway 141 runs through town, and not all vehicles slow to the appropriate speed limit. With the community having mostly lower speed limits, it is likely that any transportation incident between vehicles is likely to cause little damage to property or humans, but there is a chance of an incident which can cause extensive damage. The committee anticipates that this hazard will effect the community in varying degrees throughout the planning period.
Windstorm	Recent windstorms have caused reported damage to properties. These hazard events continue to build in magnitude, causing increasingly large amounts of damage to property and posing threats to lives. The recent derechos effected Manning prompting the community to prepare more effectively for these hazards.

Table K.10: Hazards Not Affecting the City of Manning

Hazard	Reason for Omission
Earthquake	Iowa as a whole has experienced the effects of few earthquakes in the past 175 years. The majority of the earthquakes were along the Mississippi River, therefore the city does not feel this hazard will impact them during this planning period.
Expansive Soils	While Iowa has expansive soils, due to the city's history of no issues in the past, the city felt this will not impact the jurisdiction over the life of this plan.

Loss Estimates

Table K.11: City of Manning Maximum Building and Population Exposure

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	100	$50,120	1,455
Commercial	107	$16,706,870	
Industrial	8	$7,353,590	
Residential	747	$87,674,240	

It is unlikely that a jurisdiction can determine the impact any hazard will have. If a hazard were to impact the entire city, the numbers in table K.11 shows the number of people who would be affected and the maximum number of structures and their value. If this type of event were to occur, a shutdown of some facilities and services could last for at least two weeks and some injuries/illnesses will result in permanent disability or even death.

The following hazards were determine to have a negligible impact on the city, if they were to occur.

Dam/Levee Failure
Landslide
Radiological
Transportation Incident
Drought

If a hazard were to report negligible impacts, it is anticipated that the numbers impacted would be similar to table K.12. If there were any shutdown of facilities or services, it is likely that these shutdowns would be for less than twenty-four hours. If any injuries were to occur, it is anticipated that these would be able to be treated with first aid. A negligible hazard would impact approximately 9% of the city.

Table K.12: City of Manning Negligible Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	9	$4,511	131
Commercial	10	$1,503,618	
Industrial	1	$661,823	
Residential	67	$7,890,682	

The following hazards were determine to have a limited impact on the city, if they were to occur.

Thunderstorm/Lightning/Hail
Windstorm
Severe Winter Storms
Extreme Heat
Flash Flood
Grass/Wild Land Fire
Infrastructure Failure
HAZMAT Incident
River Flooding

If a hazard were to report limited impacts, it is anticipated that the numbers impacted would be similar to table K.13. A shutdown of some facilities and services could last more than a week and any injuries/illnesses would not result in permanent disability. It is estimated that 25% of the city would be impacted.

Table K.13: City of Manning Limited Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	25	$12,530	364
Commercial	27	$4,176,718	
Industrial	2	$1,838,398	
Residential	187	$21,918,560	

The following hazards were determine to have a limited impact on the city, if they were to occur.

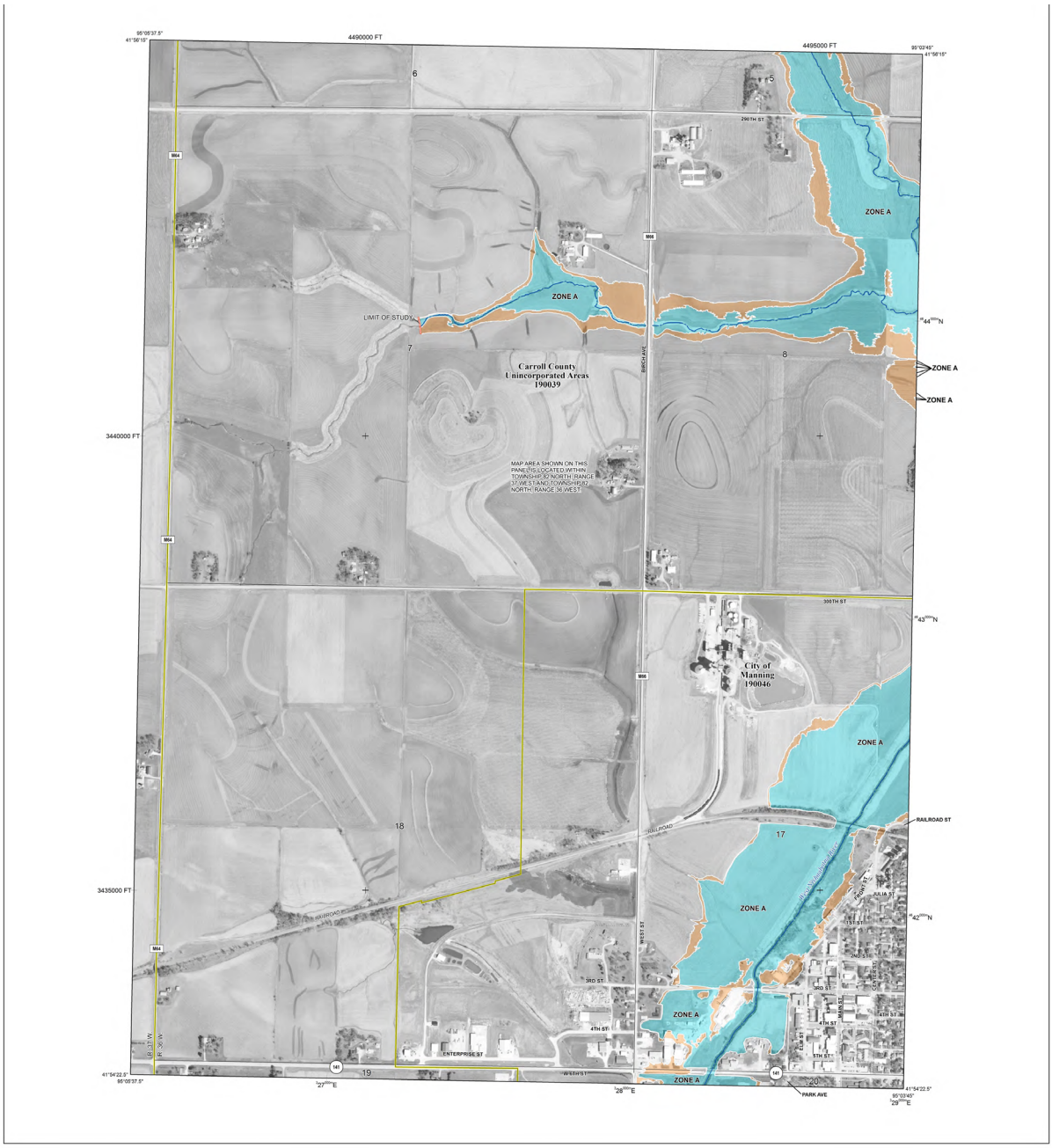
Animal/Plant/Crop Disease
Human Disease
Tornado

If a hazard were to report critical impacts, it is anticipated that the numbers impacted would be similar to table K.14. A shutdown of some facilities and services could last for at least two weeks and some injuries/illnesses will result in permanent disability. It is estimated 50% of the city would be impacted.

Table K.14: City of Manning Critical Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	50	$25,060	728
Commercial	54	$8,353,435	
Industrial	4	$3,676,795	
Residential	374	$43,837,120	

Flood Maps



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A,V, A99
	With BFE or Depth Zone AE, AO, AH, VE, AR
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
	Future Conditions 1% Annual Chance Flood Hazard Zone X
	Area with Reduced Flood Risk due to Levee See Notes Zone X
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard Zone X
	Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
OTHER FEATURES	18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
	Coastal Transect
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
	Base Flood Elevation Line (BFE)
	Limit of Study
	Jurisdiction Boundary

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SCALE

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1 inch = 500 feet 1:6,000

0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL 212 OF 400

FEMA

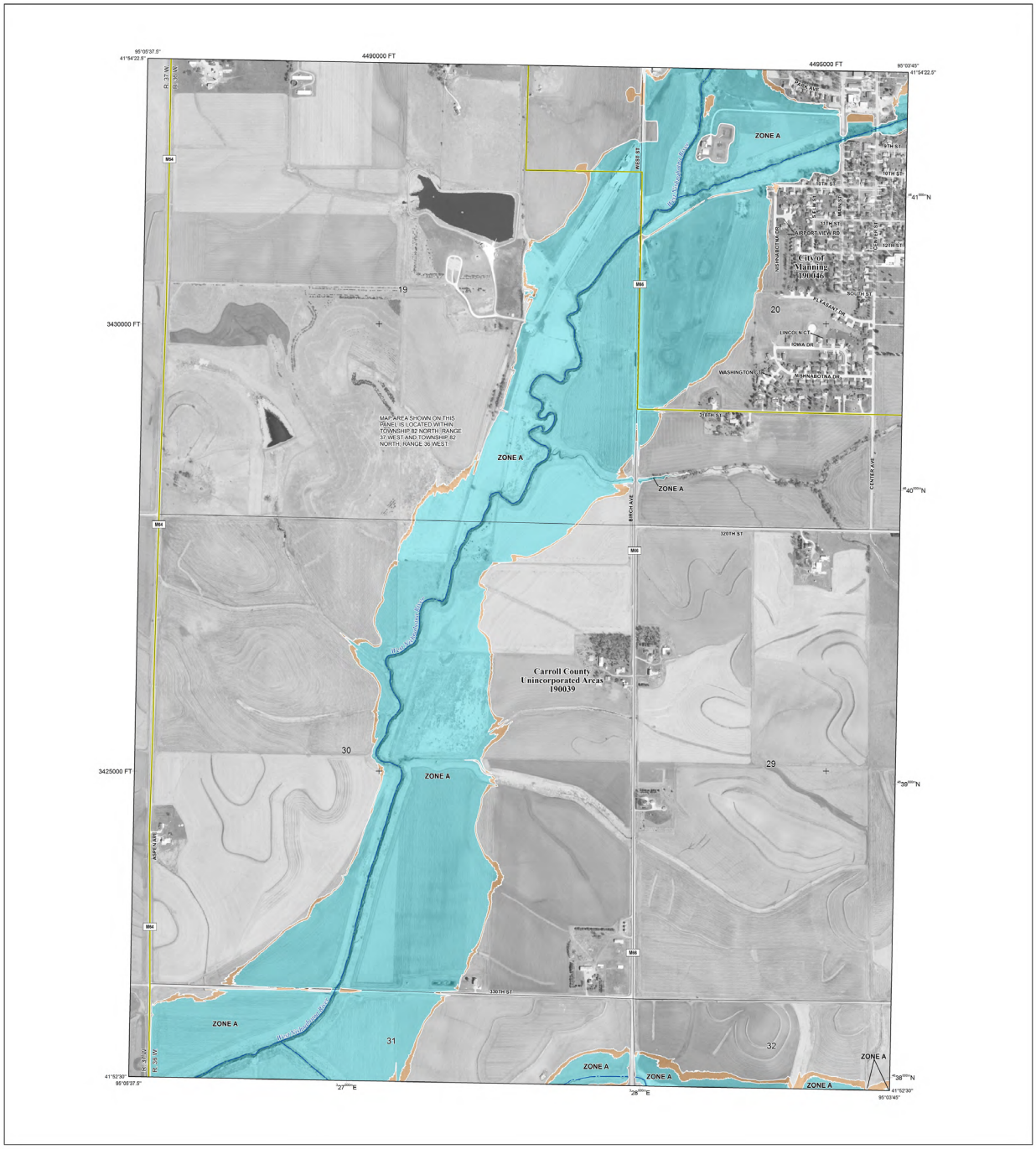
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL COUNTY	190039	0212	C
MANNING, CITY OF	190046	0212	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0212C

EFFECTIVE DATE
SEPTEMBER 15, 2017



FLOOD HAZARD INFORMATION

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SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) *Zone A, V, A99*
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	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
	Future Conditions 1% Annual Chance Flood Hazard *Zone X*
	Area with Reduced Flood Risk due to Levee See Notes *Zone X*
	NO SCREEN Area of Minimal Flood Hazard *Zone X*
OTHER AREAS	Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
	18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
	Coastal Transect
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
	513 Base Flood Elevation Line (BFE)
OTHER FEATURES	Limit of Study
	Jurisdiction Boundary

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0 125 250 500 Meters

PANEL LOCATOR

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL 214 OF 400

FEMA

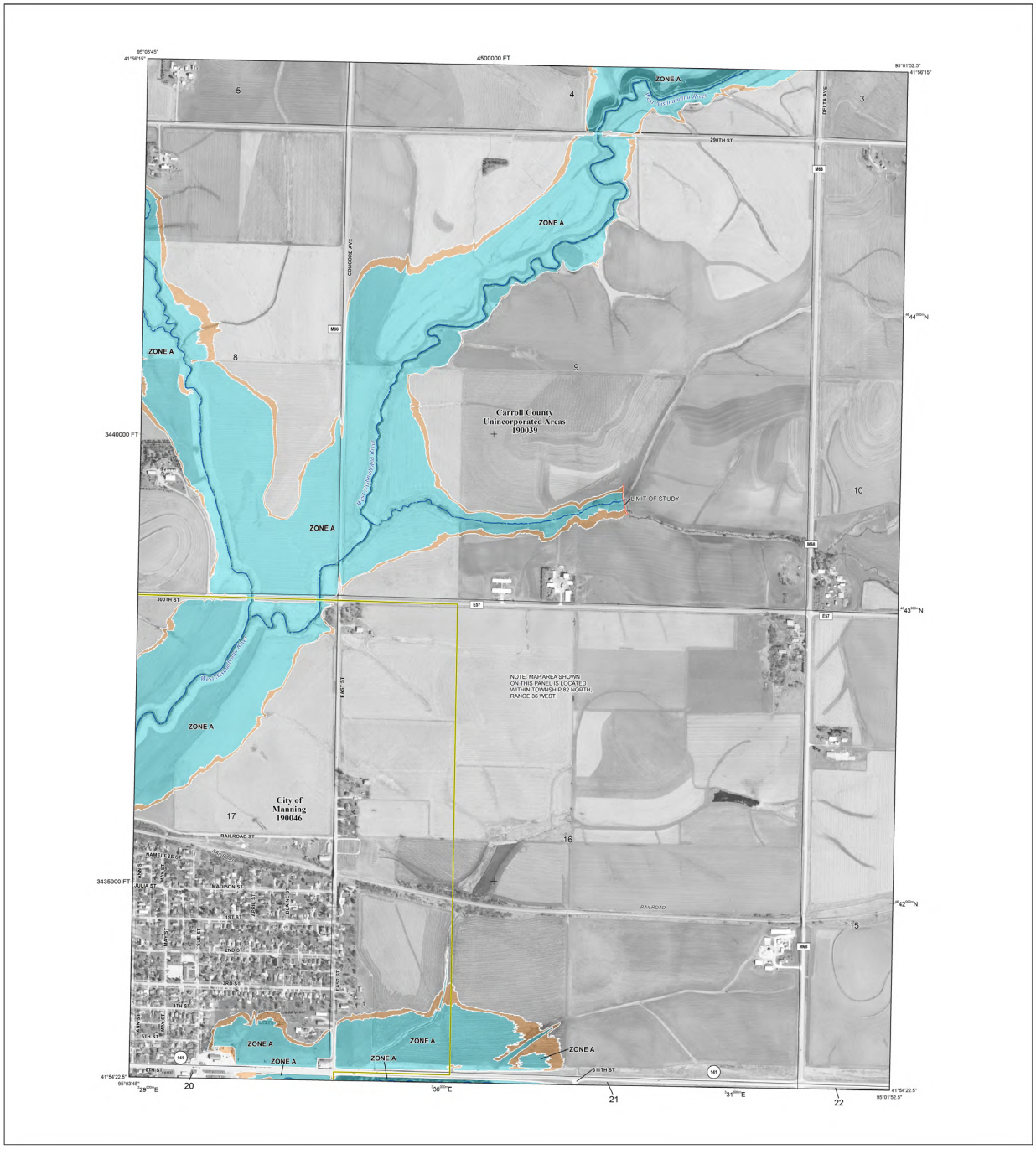
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL COUNTY	190039	0214	C
MANNING, CITY OF	190046	0214	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0214C

EFFECTIVE DATE
SEPTEMBER 15, 2017



FLOOD HAZARD INFORMATION

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	Levee, Dike, or Floodwall
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	Coastal Transect
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
	513 Base Flood Elevation Line (BFE)
OTHER FEATURES	Limit of Study
	Jurisdiction Boundary

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0 125 250 500 Meters

PANEL LOCATOR

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL 216 OF 400

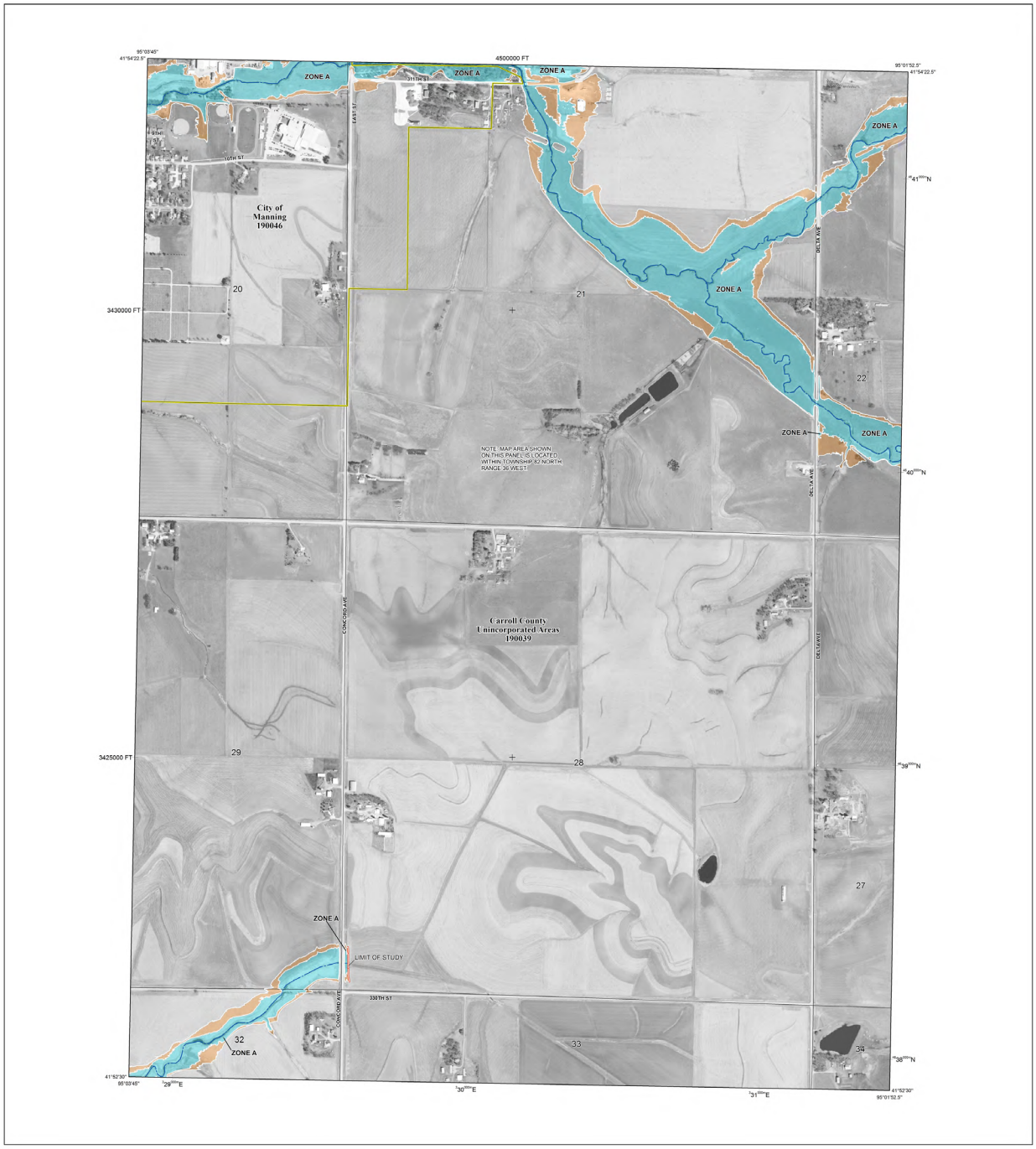
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL COUNTY	190039	0216	C
MANNING, CITY OF	190046	0216	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0216C

EFFECTIVE DATE
SEPTEMBER 15, 2017



FLOOD HAZARD INFORMATION

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OTHER AREAS	Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer Levee, Dike, or Floodwall
	18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE) Coastal Transect Coastal Transect Baseline Profile Baseline Hydrographic Feature 513 Base Flood Elevation Line (BFE)
OTHER FEATURES	Limit of Study Jurisdiction Boundary

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PANEL LOCATOR

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL 218 OF 400

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL COUNTY	190039	0218	C
MANNING, CITY OF	190046	0218	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0218C

EFFECTIVE DATE
SEPTEMBER 15, 2017

Draft Flood Map

Flood Risk Map

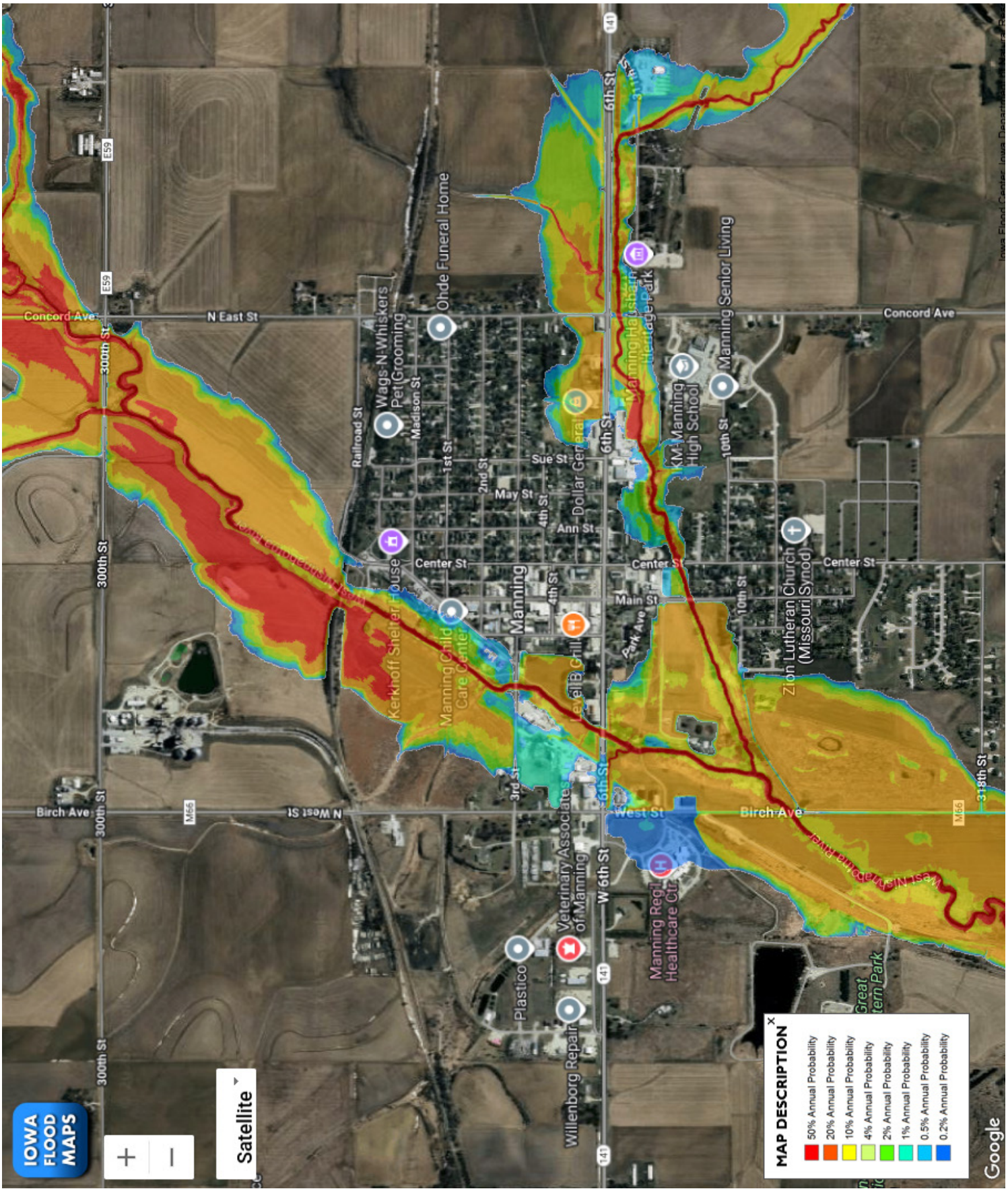


Table K.15: City of Manning Status of Previous Mitigation Actions

	Status				
Previous Actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not Implemented**
Evaluate and upgrade warning siren coverage, including encoder	X		X		
Educate public on hyper reach notification			X		
Promote NOAA radios to the public		X			
Complete current plan and make plans to update every five years			X		
Inform public on HAZMAT Incidents locations and hazards	As Needed				
Identify potential storm shelters	X				
Enforce building codes, city codes, and zoning codes			X		
Encourage use of one call to avoid damage to utilities			X		
Continue tree-trimming, enforcing ordinances when needed			X		
Provide funding needed to train personnel (fire, EMS, and police)			X		
Continue training programs for fire personnel, including training with air packs, HAZMAT Incidents, and terrorism			X		
Make sure EMS volunteers trained to EMT-B or I			X		
Make sure fire volunteers trained to FF levels			X		
Continue fire safety education			X		
Update officer firearms	X				
Recruit and train new members whenever possible			X		
Keep updating and upgrading snow plow equipment, sand trucks, etc			X		
Update police and first responder notification equipment	X				
Continue to budget for and fund street repairs			X		
Improve drainage at elementary building to reduce excessive moisture and associated risk of mold growth	X				

	Status				
Previous Actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not Implemented**
Schedule bridge improvements and inspections			X		
Keep fire hydrants updated and working, replacing as needed			X		
Post signs and increase police surveillance around critical facilities			X		
Implement storm water runoff plan in South Manning				X	
Continue participation in NFIP			X		
Train additional staff to start and operate generators	X				
Install dry hydrants in static water sources				X	
Purchase mobile generators for critical response				X	
Build regional fire training center				X	
Install a storm shelter at the school				X	
Update the emergency action plan		X			
Purchase a utility vehicle for emergency response	X				
Place emergency markers on trails and other non-address locations for response to emergency calls				X	
ISICS	X				

Action Plan

Section 201.6 (c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

Section 201.6 (c)(3)(iii): The mitigation strategy shall include an action plan, describing how the action 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 associated costs.

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

Table K.16: City of Manning Action Plan

Goal 1	**Enhance Community Protection**
Objective 1	Improve Public Warning Capabilities
Objective 2	Maintain Current Hazard Mitigation Plan
Objective 3	Hazardous Materials-tier II sites
Objective 4	Protect and Enforce Regulatory Measures in Existing and New Development Areas
Objective 5	Provide Shelter Facilities in case of Disasters
Goal 2	**Protect Against Power Outage**
Objective 1	Provide Back-Up Systems for Critical Systems and Assets
Objective 2	Use Prevention Techniques to Minimize Disruption in Services
Goal 3	**Maintain and Support Public Safety, Including Facilities, Equipment, and Training**
Objective 1	Improve First Responder Resources and Capabilities
Objective 2	Provide Education and Training Programs to Increase Public and Responder Awareness
Objective 3	Maintain needed personnel for fire and EMS
Objective 4	Provide Needed Equipment and Facilities
Objective 5	Increase Officer Safety
Goal 4	**Update Communications Systems**
Objective 1	Enhance cross-agency, intra-agency and inter-agency communications
Objective 2	Improve Public Warning Capabilities
Goal 5	**Maintain and Protect Public Infrastructure**
Objective 1	Maintain and Improve Roads, Bridges, and Other Transportation
Objective 2	Maintain and Improve Water Mains, Power Lines, Stormwater Systems, and Other Critical Assets

Table K.17 City of Manning Mitigation Actions

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Educate public on hyper reach notification	Animal/Plant/Crop Disease, Drought, Earthquake, Expansive Soils, Extreme Heat, Flash Flood, Grass/Wild Land Fire, HAZMAT Incident, Human Disease, Infrastructure Failure, Levee/Dam Failure, Radiological, River Flooding, Severe Winter Storm, Terrorism, Thunderstorm/ Lightning/Hail, Tornado, Transportation Incident, Windstorm	High	Emergency Services, City Council	Minimal	City Funds	Public Education and Awareness	Short
Promote NOAA radios to the public	Flash Flood, Tornado, Windstorm, River Flooding, Severe Winter Storms, Thunderstorm/Lightning/ Hail	High	Emergency Services, Fire Department, Police Department, City Council	Low	City Funds, Fire Department	Public Education and Awareness	Mid
Complete current plan and make plans to update every five years	Animal/Plant/Crop Disease, Drought, Earthquake, Expansive Soils, Extreme Heat, Flash Flood, Grass/Wild Land Fire, HAZMAT Incident, Human Disease, Infrastructure Failure, Levee/Dam Failure, Radiological, River Flooding, Severe Winter Storm, Terrorism, Thunderstorm/ Lightning/Hail, Tornado, Transportation Incident, Windstorm	High	Emergency Services, Fire Department, Police Department, City Council	Minimal	City Funds, County Funds, HMGP, State Match	Emergency Services	Short

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Inform public on HAZMAT Incidents locations and hazards	HAZMAT Incident	Low	City Council	Minimal	City Funds	Public Education and Awareness	Ongoing
Identify potential storm shelters	River Flooding, Severe Winter Storm, Thunderstorm/ Lightning/Hail, Tornado, Windstorm	High	City Council	Minimal	City Funds	Emergency Services	Short
Enforce building codes, city codes, and zoning codes	Infrastructure Failure, River Flooding, Levee/Dam Failure	Mod	City Council	Minimal	City Funds	Property Protection	Ongoing
Encourage use of one call to avoid damage to utilities	Infrastructure Failure	Mod	Utilities, City Council	Minimal	City Funds, Manning Municipal Utilities Funds	Public Education and Awareness	Ongoing
Continue tree-trimming, enforcing ordinances when needed	Infrastructure Failure, Windstorm, Tornado, Thunderstorm/Lightning/ Hail	High	City Council	Moderate	City Funds	Property Protection	Ongoing
Provide funding needed to train personnel (fire, EMS, and police)	Extreme Heat, Flash Flood, Grass/Wild Land Fire, HAZMAT Incident, Human Disease, Infrastructure Failure, Levee/ Dam Failure, Radiological, River Flooding, Severe Winter Storm, Terrorism, Thunderstorm/Lightning/ Hail, Tornado, Transportation Incident, Windstorm	High	Emergency Services, Fire Department, Police Department, City Council	Low	City Funds, Fire Department, EMS, Local Foundations, Private Donations, FEMA AFG	Emergency Services	Ongoing

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Continue training programs for fire personnel, including training with air packs, HAZMAT Incidents, and terrorism	Grass/Wild Land Fire, HAZMAT Incident, Human Disease, Radiological, Transportation Incident	High	Emergency Services, Fire Department, Police Department, City Council	Moderate	City Funds, Fire Department, EMS, Local Foundations, Private Donations, FEMA AFG	Emergency Services	Ongoing
Make sure EMS volunteers trained to EMT-B or I	Extreme Heat, Flash Flood, Grass/Wild Land Fire, HAZMAT Incident, Human Disease, Infrastructure Failure, Levee/ Dam Failure, Radiological, River Flooding, Severe Winter Storm, Terrorism, Thunderstorm/Lightning/ Hail, Tornado, Transportation Incident, Windstorm	High	Emergency Services, Fire Department, Police Department, City Council	Moderate	City Funds, Fire Department, EMS, Local Foundations, Private Donations	Emergency Services	Short
Make sure fire volunteers trained to FF levels	Grass/Wild Land Fire, HAZMAT Incident, Radiological, Transportation Incident	High	Emergency Services, Fire Department, Police Department, City Council	Low	City Funds, Fire Department, EMS, Local Foundations, Private Donations, FEMA AFG	Emergency Services	Short
Continue fire safety education	Grass or Wild Land Fire, Infrastructure Failure	Mod	Emergency Services, Fire & Police Department,	Low	City Funds, Fire Department, Police Department	Public Education and Awareness	Ongoing
Recruit and train new members whenever possible	Terrorism	Low	Police Department, City Council	Minimal	City Funds, Local Foundations	Emergency Services	Ongoing
Continue to budget for and fund/complete street repairs	Infrastructure Failure	High	City Council	High	City Funds, Carroll County, IDOT	Structural Project	Ongoing

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Schedule bridge improvements and inspections	Infrastructure Failure	High	City Council, County	High	City Funds, Carroll County, IDOT	Structural Project	Ongoing
Keep fire hydrants updated and working, replacing as needed	Infrastructure Failure	High	Public Works	Moderate	City Funds, Iowa SRF, CDBG, USDA grants and loans	Emergency Services	Ongoing
Post signs and increase police surveillance around critical facilities	Terrorism	Low	Public Works	Low	City Funds	Property Protection	Short
Implement storm water runoff plan in South Manning	Flash Flood	Mod	City Council	Low	City Funds, Carroll County	Property Protection	Long
Continue participation in NFIP	River Flooding	Mod	City Council	Low	City Funds	Property Protection	Ongoing
Install dry hydrants in static water sources	Drought	Mod	Fire Department, WC Rural Water	Moderate	City, Fire Department, West Central Iowa Rural Water	Structural Project	Long
Purchase mobile generators for critical response	Drought, Extreme Heat, Flash Flood, Grass/Wild Land Fire, HAZMAT Incident, Human Disease, Infrastructure Failure, Levee/Dam Failure, Radiological, River Flooding, Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado, Windstorm	High	Fire Department, Police Department, City Council	Low	City Funds, Local Foundations, Fire Department, Police Department, HGMP, State Match, USDA Community Facilities	Emergency Services	Short
Build regional fire training center to better respond to incidents	Infrastructure Failure	Mod	Fire Department	Moderate	City Funds, Local Foundations, Fire Department, HGMP, State Match, USDA Community Facilities	Emergency Services	Long

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Install a storm shelter at the school	Tornado, Windstorm, Infrastructure Failure	High	City Council, School Administration	High	School Funds, City Funds, HGMP, State Match	Structural Project	Mid
Update the emergency action plan	Animal/Plant/Crop Disease, Drought, Earthquake, Expansive Soils, Extreme Heat, Flash Flood, Grass/Wild Land Fire, HAZMAT Incident, Human Disease, Infrastructure Failure, Levee/Dam Failure, Radiological, River Flooding, Severe Winter Storm, Terrorism, Thunderstorm/ Lightning/Hail, Tornado, Transportation Incident, Windstorm	High	City Council, Fire Department, Police Department	Minimal	City Funds, Fire Department, Police Department	Emergency Services	Short
Place emergency markers on trails and other non-address locations for response to emergency calls	Extreme Heat, Flash Flood, Grass/Wild Land Fire, HAZMAT Incident, Infrastructure Failure, Levee/Dam Failure, River Flooding, Terrorism, Thunderstorm/Lightning/ Hail, Tornado, Transportation Incident, Windstorm	High	City Council, County 911	Minimal	City Funds, Local Foundations	Emergency Services	Short
Obtain a 4-seater UTV for trail access	Extreme Heat, Flash Flood, Grass/Wild Land Fire, Infrastructure Failure, Levee/Dam Failure, River Flooding, Thunderstorm/ Lightning/Hail, Tornado, Transportation Incident, Windstorm	High	City Council, Fire Department, Police Department	Low	City Funds, Local Foundations, FEMA AFG with State Match	Emergency Services	Short

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Conduct disaster preparedness training and distribute disaster kits	Animal/Plant/Crop Disease, Drought, Earthquake, Expansive Soils, Extreme Heat, Flash Flood, Grass/Wild Land Fire, HAZMAT Incident, Human Disease, Infrastructure Failure, Levee/Dam Failure, Radiological, River Flooding, Severe Winter Storm, Terrorism, Thunderstorm/ Lightning/Hail, Tornado, Transportation Incident, Windstorm	High	City Council, Fire Department, Police Department	Minimal	City funds, AARP, Local Foundations	Public Education and Awareness	Short
Create vulnerable population list	Drought, Extreme Heat, Flash Flood, Grass/ Wild Land Fire, HAZMAT Incident, Human Disease, Infrastructure Failure, Levee/Dam Failure, Severe Winter Storm, Terrorism, Tornado, Windstorm	High	City Council, Fire Department, Police Department	Minimal	City Funds	Prevention	Short
Install additional wells	Drought, Infrastructure Failure	High	City Council	Mod	City Funds, Iowa SRF, CDBG, USDA Community Facilities	Structural Project	Mid
Purchase ground to locate the tree burn pile	Grass/Wild Land Fire	High	City Council	Minimal	City Funds	Prevention	Short
Remove Ash Trees	Grass/Wild Land Fire, Severe Winter Storm, Windstorm, Thunderstorm/Lightning/ Hail	High	City Council	Low	City Funds	Prevention	Ongoing
Purchase Staff Radios	Infrastructure Failure	High	City Council	Minimal	City Funds, Local Foundations	Emergency Services	Short

Table K.18: IKM-Manning Community Schools Risk Assessment

Hazard	Comments
Extreme Heat	Extreme heat events continue to impact Manning and the IKM-Manning Community School District. Education may be one of the best action tools to combat the effects of extreme heat as individuals need to know the effects of extreme heat and how it can affect the body.
Flash Flood	Since 2020, there have been no instances of flash flooding in the City of Manning. While flash floods have little to no warning time, with no instances within the last planning period, the committee has determined this hazard is not a high priority hazard to address, but will consider mitigation actions to prepare the community for response to an event.
Human Disease	Iowa and more specifically the City of Manning are still feeling the effects of the COVID-19 pandemic. The school district continues to have certain precautions and policies in place to better protect students and faculty. The pandemic has reignited the need to plan for future outbreaks and examine the city and school's current practices. The pandemic also reminded the public the importance of staying informed and staying vigilant to protect themselves.
Infrastructure Failure	Infrastructure failures occur with little to no warning and can cause major disruptions within the community. Planning to respond to this hazard is important to the community to protect lives and property. The most likely infrastructure failure within the IKM-Manning School District would be structural failure of either bridges or roadways. These failures would impact busing primarily. As these instances have no warning time, planning must be completed prior to an event happening to be able to respond in a quick manner.
Severe Winter Storm	Severe Winter Storms continue to impact the City of Manning and the School District. These storms while historically, have caused little damage, continue to build in strength, threatening property and lives within the city. The warning period of this hazard continues to grow with meteorological advances, but can still pose great risks to the community. These instances can require the school to be able to change schedules and bus routing to ensure the safety of the children.
Terrorism	There have been no instances of terrorism in the City of Manning or the IKM-Manning Community School District during the previous plan period and the committee feels there will be no instances during the life of this plan. If an instance were to occur, the committee feels it would be a targeted incident that would not threaten the entire community.
Thunderstorm/ Lightning/Hail	Thunderstorm/lightning/hail instances are frequent within the community. While they are frequent, most storms pose no threat to life or property. This hazard is prevalent in Manning but is normally not severe in nature.
Tornado	Carroll County has experienced a number of tornadoes in the recent past, but the City of Manning has not been impacted directly. While the city has not experienced any tornadoes within the past planning period, it is important for the city to continue to plan for the response to tornadoes as storms within Iowa continue to grow in strength. Preparing the public and community is vital to ensuring there is no loss of life.

Transportation Incident	Speed limits within the majority of the City of Manning are relatively low, but portions of the school district have higher speed limits. With a portion of the district having lower speed limits, it is likely that any transportation incident between vehicles is likely to cause little damage to property or humans, but there is a chance of an incident which can cause extensive damage. The committee anticipates that this hazard will effect the district in varying degrees throughout the planning period.
Windstorm	Recent windstorms have caused reported damage to properties. These hazard events continue to build in magnitude, causing increasingly large amounts of damage to property and posing threats to lives. The recent derechos effected Manning prompting the community to prepare more effectively for these hazards.

IKM-Manning Community Schools Action Plan

Section 201.6 (c)(3)(iii): The mitigation strategy shall include an action plan, describing how the action 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 associated costs.

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

Table K.19: IKM-Manning Community Schools Action Plan

Goal 1	**Minimize damage to critical facilities, infrastructure, and other school assets from the effects of hazards**
Objective 1	Improve early warning signs
Objective 2	Improve infrastructure
Objective 3	Provide back-up assistance for all critical systems
Goal 2	**Minimize to the greatest possible extent the vulnerability of the students and visitors to the IKM-Manning Community Schools to the impacts of all identified hazards**
Objective 1	Protection of school children and staff
Goal 3	**Improve coordination, communication, and response operations with other relevant organizations**
Objective 1	Provide education and training
Objective 2	Improve first responder resources and capabilities
Goal 4	**Improve public communication, education, and awareness of hazards and their risks to the IKM-Manning Community School District**
Objective 1	Provide education and training

Table K.20: IKM-Manning Community Schools Mitigation Actions

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Backup generator at middle school	Infrastructure Failure, Extreme Heat, Severe Winter Storm	Medium	Superintendent, School Board, Maintenance Position	Moderate	School Funds, FEMA HMGP, Local Foundations	Emergency Services	Mid
Build a safe room at both schools	Infrastructure Failure, Tornado, Windstorm	High	School Board, Superintendent, School District's Engineering Firm	High	School Funds, City Funds, FEMA HMGP, Local Foundations	Prevention	Short
Training on bus evacuation	Transportation Incident	High	Transportation Director, Bus Drivers	Low	School Funds, Training Grants	Emergency Services	Ongoing
Continue to train local volunteers as much as feasibly possible	Terrorism, Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado, Flash Flood, Windstorm, Transportation Incident	High	IKM-Manning School District	Minimal	School Funds, FEMA AFG & SAFER	Public Education and Awareness	Ongoing
Install GPS in all school buses	Transportation Incident	Low	IKM-Manning School District	Moderate	School Funds, Iowa Department of Education	Emergency Services	Mid
Continued practice of drills and safety procedures with children at school	Tornado, Infrastructure Failure, Terrorism	High	IKM-Manning School District	Low	City Funds, School Funds	Public Education and Awareness	Ongoing
Create an emergency operations plan with an infections disease section	Human Disease	High	IKM-Manning School District, Carroll County Public Health	Minimal	School Funds	Prevention	Short

Incorporation into Other Planning Mechanisms

Where possible, Manning will consider the findings from this document when updating or creating new planning and operating documents. Information from this plan will be utilized to update and expand the following documents:

- Hazard Mitigation Plan
- Comprehensive Plan
- Zoning Ordinance
- Floodplain Regulations
- Housing Needs Assessment
- Building Code
- Strategic Plan

While the city currently does not have any of the plans listed below, if these plans were to be created during the life of this plan, this plan will be used to guide the development of:

- Water Conservation Plans
- Storm Water Management Plans
- Parks and Recreation Plans

Incorporation in to Other Planning Mechanisms- IKM-Manning Community Schools

The update of the mitigation strategy will be provided to the School Superintendent for consideration in the next update cycle of the capital improvement plan. Information will be utilized to expand and improve the school's mitigation to potential hazard events.

Appendix L: City of Ralston

Community Profile

History

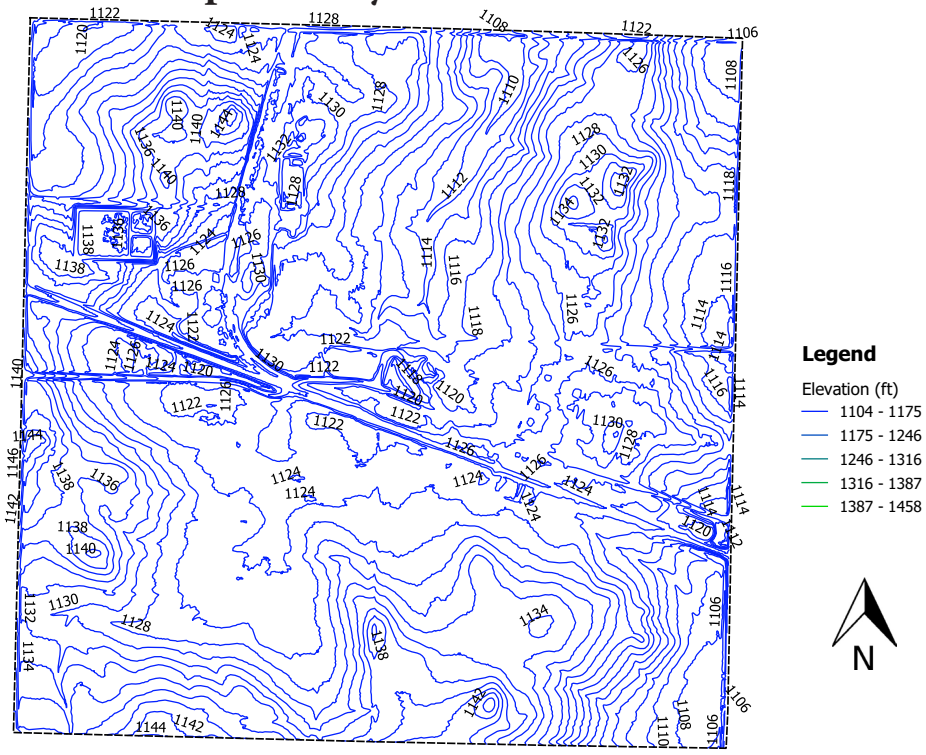
For many years Slater Siding, just west of present-day Ralston was used by the railroad as a passing track and storage facility. In 1891, a station was established in honor of an officer of the American Express Company. The first agent was H.S. Olds, who transferred from Manning. H.H. Lester was the first merchant in Ralston and moved to Ralston from Carrollton and built a frame building in a cornfield. He had difficulty establishing a Post Office but was eventually successful and was appointed postmaster.

Geography and Environment

Ralston is located on the eastern Carroll County limits. Highway 30 runs through the northeast corner of town and is the main mode of transportation for members of the community. Ralston is located 6.9 miles from Glidden, 13.8 miles from Carroll, 14.2 miles from Coon Rapids, 15.6 miles from Jefferson and 82 miles from Des Moines.

The highest elevation in Carroll County can be found along the eastern side of the county. Here, the elevation can reach as much as 1,550 feet above sea-level. Ralston is located in the lower area of Carroll County and has an elevation range from 1,120 feet to 1,146, a significantly flat community. Map L.1 displays Ralston's elevation.

Map L.1: City of Ralston Elevation

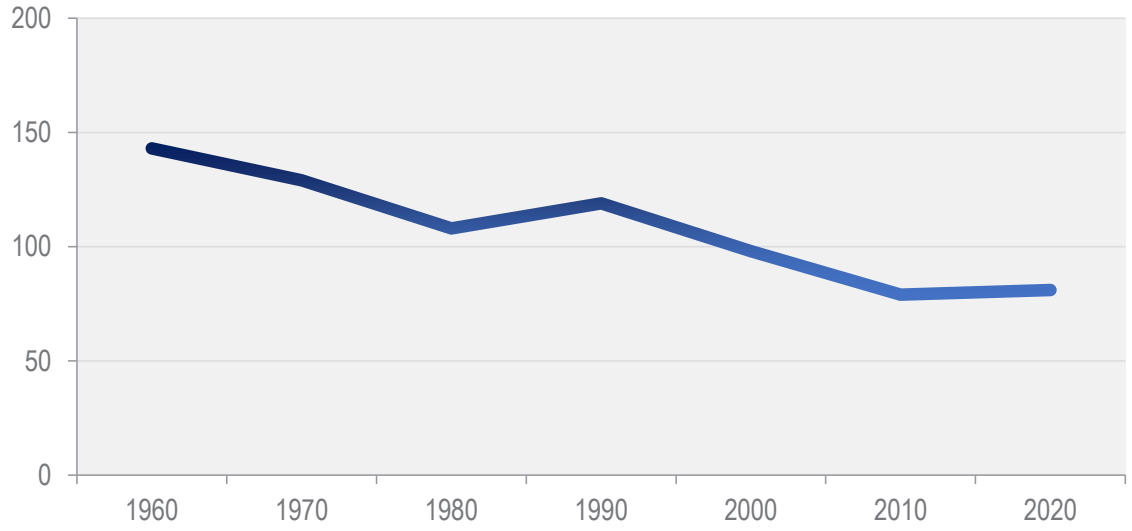


Demographics

The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Ralston's population through past, present, and future trends of the region.

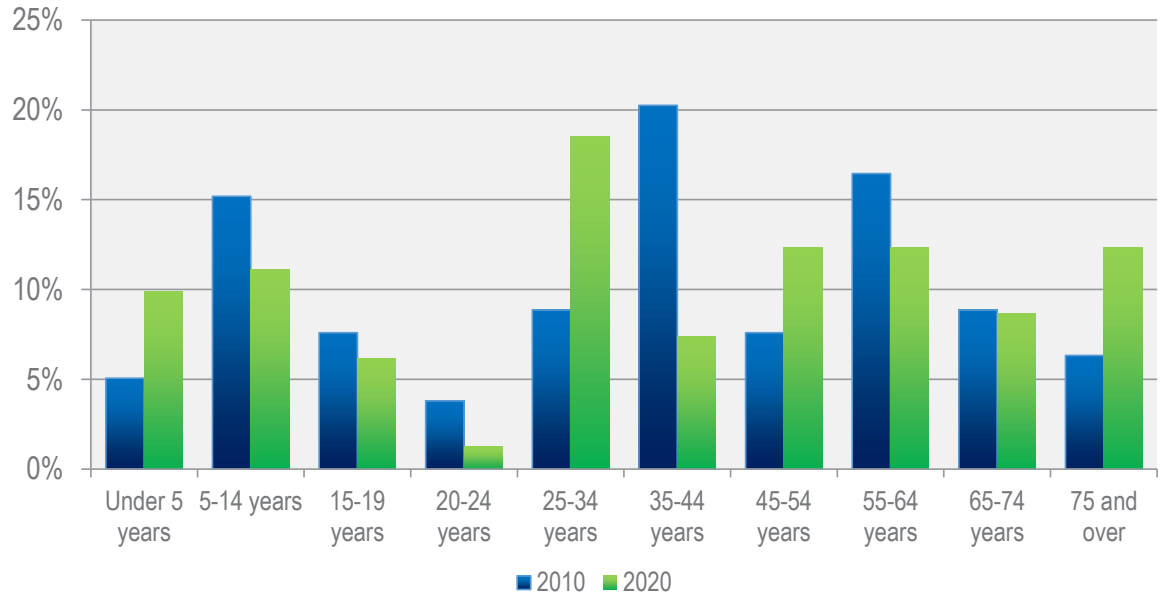
Over the past 50 years, the City of Ralston has experienced a decline in population. In 1960, Ralston had a population of 143. Since then, the City's population has declined 43% (62 residents) to 81 in 2020. The most dramatic change happened between 1970-1980 and 1990-2000, when the city lost 21 residents. Figure L.1 shows the City of Ralston's population trend since 1960.

Figure L.1: City of Ralston Historic Population, 1960-2020



The City's population is slightly different from the county's as there is not the large spike in older residents as seen in other parts of the county. In 2020, the largest age group was 25-34 years (18.5%). Figure L.2 displays the age of the city's population in 2020 compared to 2010.

Figure L.2: City of Ralston Age Distribution, 2010 & 2020



Housing

A community's ability to attract new residents is important. One of the most important aspects to attracting residents is housing. A community's housing stock, type of households, and housing availability and affordability are determining factors.

Since 2010, the city's housing stock has decreased by 6 units. Renter-occupied units increased by three and owner-occupied units decreased by two. In this same time period, the city saw its vacant housing units decrease by seven, from 7 to 0 units. Table L.1 shows a breakdown of the city's occupied and vacant housing units.

Table L.1: City of Ralston Housing Units, 2010 & 2022

	2010		2022	
	Number	**Percent**	**Number**	**Percent**
Occupied Housing Units	38	84.4%	39	100.0%
Owner Occupied	34	89.5%	32	82.1%
Renter Occupied	4	10.5%	7	17.9%
Vacant Housing Units	7	15.6%	0	0.0%
Total Housing Units	45	100.0%	39	100.0%

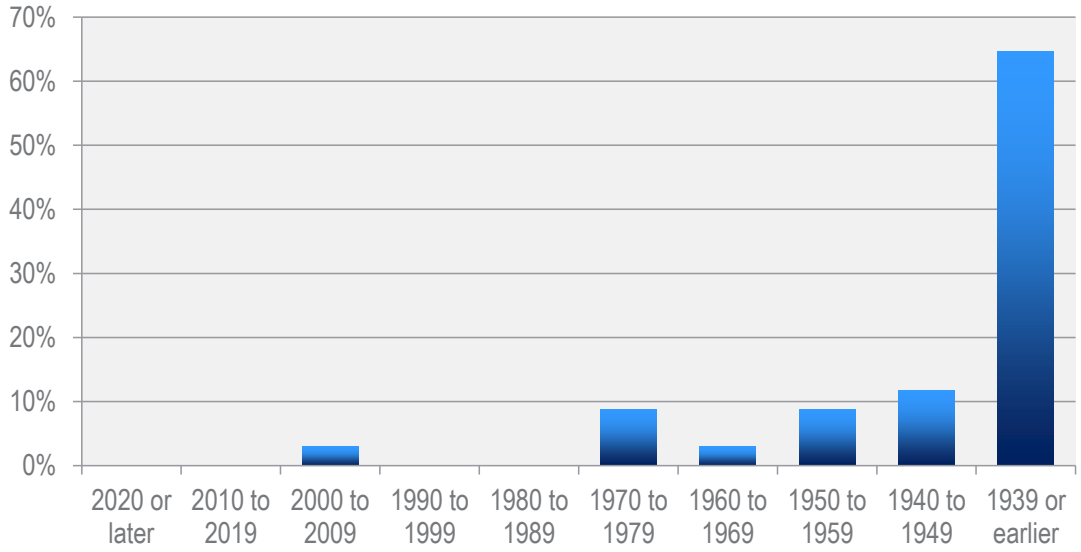
Ralston, like many other small rural towns in Iowa, has a lower median housing value of $80,800. The State of Iowa has a median housing value of $181,600. The city's homes can be very affordable and can be used to attract new residents, but they may deteriorate faster and will need a number of repairs and updates. According to the 2022 American Community Survey Estimates, 73.9% of the city's homes are valued less than $100,000. A complete breakdown of the value of homes in Ralston can be found in table L.2. Knowing information about the city's housing stock is useful after a disaster hits to determine how much damage was done, and how it will affect the city moving forward.

Table L.2: City of Ralston Value of Owner-Occupied Units, 2022

Value of Housing Unit	Percent of Homes
Less than $50,000	21.7%
$50,000 to $99,999	52.2%
$100,000 to $149,999	13.0%
$150,000 to $199,999	4.3%
$200,000 to $299,999	8.7%
$300,000 to $499,999	0.0%
$500,000 to $999,999	0.0%
$1,000,000 or more	0.0%

Figure L.3 showcases the year housing units within the City of Ralston were constructed. Like most of the county, Ralston has a large portion (64.7%) of the homes constructed in 1939 or earlier. The city also experienced spikes in construction during 1940-1949. The 1940s saw 11.8% of the city's homes being built. Building standards of today utilize the most recent construction materials and safety features, ensuring that the new residential structures are as safe as possible. This does not mean that older homes are more unsafe, just that they may be more susceptible to hazard damage.

Figure L.3: City of Ralston Year Housing Units Constructed, 2022



Economics

Household income is an important indicator of the economic base in Carroll County. In Ralston, the median household income is $66,250, which would classify a large number of the households in Ralston as "working" or "middle" class. Table L.3 breaks down the city's households by income. The City of Ralston's household income breakdown is similar to the other rural communities in the area, and the combination of more affordable housing with the current incomes generally provides residents with a decent quality of life. A large portion of residents find employment in the manufacturing industry as well as the educational services, and health care and social assistance sector. Many employees commute to other larger neighboring cities like Carroll and Jefferson where more employment opportunities are present.

Table L.3: City of Ralston Household Income, 2022

Income and Benefits (2022 Inflation-Adjusted Dollars)	Number of Households	Percent of Households
Less than $10,000	3	1.9%
$10,000 to $14,999	6	3.8%
$15,000 to $24,999	14	8.8%
$25,000 to $34,999	14	8.8%
$35,000 to $49,999	14	8.8%
$50,000 to $74,999	44	27.5%
$75,000 to $99,999	28	17.5%
$100,000 to $149,999	27	16.9%
$150,000 to $199,999	8	5.0%
$200,000 or more	2	1.3%
Median Household Income	$67,500	-
Mean Household Income	$78,004	-

Ralston, overall, is a small rural community in a small rural county. A large percent of the businesses within the county serves the largely agricultural economy. Table L.4 breaks down what industry Ralston residents work in. Educational services, and health care and social assistance employ the largest cohort of residents, with 45.2% employed in this industry. The second largest is manufacturing, with 35.5% of the residents employed in this industry.

Table L.4: City of Ralston Employment by Industry, 2022

Industry	Number	Percent
Total civilian non-farm employment, 16 years and over	31	100%
Agriculture, Forestry, Fishing, Hunting, Mining	0	0.0%
Construction	0	0.0%
Manufacturing	11	35.5%
Wholesale Trade	0	0.0%
Retail Trade	1	3.2%
Transportation and warehousing and utilities	5	16.1%
Information	0	0.0%
Finance and insurance, and real estate and rental and leasing	0	0.0%
Professional, scientific, management, administrative, and waste management services	0	0.0%
Educational, health care, and social assistance	14	45.2%
Arts, entertainment, recreation, accommodation, and food services	0	0.0%
Other services, except public administration	0	0.0%
Public Administration	0	0.0%

Existing Documents & Capabilities

Table L.5 provides a compilation of the current planning and regulatory documents in place for the City of Templeton. The table also shows the last time the documents were last updated. These documents help understand the process the city has already undertaken and what documents can be created to help guide the city. First and foremost is the previous hazard mitigation plan as this document lays out specific strategies to help the city reduce the impact hazards have on the community and those who live in it. The City of Ralston also has both a zoning code and comprehensive plan. These two documents work hand in hand to guide development within the community. The city's zoning code was created to keep certain zones away from one another to reduce the risk to humans and structures. The different zones can pose different threats to others, such as some industrial uses having a higher HAZMAT incident probability which if located in a residential zone, could pose large health issues to the overall population. The zoning codes also include information for street and sidewalk regulations which can reduce the number of transportation incidents. The City's Comprehensive Plan guides future zoning decisions and evaluates all aspects of the community and how these all interact with one another and creates an opportunity for the city to take inventory of the assets and think about mitigation of hazards at said assets.

The City of Ralston is a proactive community, which only benefits them in regards to mitigation of hazards. While the city has a current comprehensive plan, expanding this plan to really take inventory of the city's assets, utilities, and infrastructure would help the plan include a comprehensive disaster response section. A thorough capital improvement plan that has a focus on utility infrastructure would be beneficial as the city recently experienced a loss of water, and having a plan in place for a similar situation would allow the city to be proactive, not reactive. Expanding conversations with the local COG and engineering firms would allow the city to explore additional options that have worked in similar communities facing similar situations. Outside organizations are also beneficial with finding funding for projects which otherwise may be out of the city's budget. Road, water, and sewer infrastructure continues to need upgrades and pursuing funding opportunities could reduce impacts of hazards on these infrastructure types. Training staff to current required

guidelines would allow for a more thought-out response to a hazard or hazard warning. Training staff regardless of responsibility on different departments can better prepare the city and can lead to things being noticed that previously went unnoticed.

Table L.5: City of Ralston Existing Documents

Document	Yes/No	Year
Previous HMP	Yes	2020
Comprehensive Plan	Yes	2009
Building Code	No	-
Zoning Ordinance	Yes	2009
Strategic Plan	No	
Housing Needs Assessment	Yes	2017
NFIP Participant	No	-
Floodplain Regulations	Yes	2025

NFIP Participation

In the past, there have been instances of flooding within the city limits of Ralston. The City does not participate in the NFIP, but their flood maps were updated and adopted in 2017. The city adopted their first floodplain regulations in 2025. The city's FIRMs can be found in the later in this appendix. The City Clerk also acts as the Floodplain Administrator for the city. Any development/demolition in the floodplain is required to obtain a permit which regulates the development/demolition and lays out the NFIP regulations that must be followed. Manning participates in the NFIP and implements substantial improvement / substantial damage provisions in the following manner: Local officials (1) determine the cost of work, (2) determine the market value of buildings, (3) make SI/SD determinations and provide determinations to property owners, and (4) require owners to obtain permits to bring substantially improved and substantially damaged structures into compliance with the floodplain management requirements.

Outlook and Future Development

Since the last plan updated, the City of Ralston has not really experienced much development in any aspect of the community. The cooperative within the community has lessened operations and compared to previous years has greatly reduced the amount of traffic throughout the community.

Throughout the life of this plan, the city anticipates that the limited development or lack of will continue throughout the life of the plan. The minimal development or lack of, will not change the city's vulnerability to hazards over the life of this plan.

Critical Facilities

Critical facilities are facilities that are critical to the health and welfare of the population and are especially important following hazard events. Every jurisdiction is unique in such way that the list of critical facilities can vary widely from community to community. Ralston's critical facilities can be found on Map L.2.

Essential Infrastructure and Services

Knowing what services and infrastructure serve the city can be beneficial in a time of disaster so the appropriate companies can be contacted in need of utility shutoff or transportation routes. The city's essential infrastructure and services can be found in Table L.6.

Table L.6: City of Ralston Essential Infrastructure and Services

Major Arterials	U.S. Highway 30	**Air Service**	Arthur N. Neu Airport
Water Service	City of Ralston	**Sewer Service**	Septic
Electric Service	Alliant/Interstate Power and Light	**Gas Service**	Black Hills Energy
Sanitation/Solid Waste	Local Haulers	**Landfill**	Carroll County Landfill
Phone and Internet	Wireless	**Law Enforcement**	Carroll County Sheriff
Fire Service	Ralston Fire Department	**Ambulance Service**	Carroll County Ambulance Service

Table L.7: City of Ralston Critical Facilities

Number on Map	Name	Address	Type
1	Ralston City Hall/Fire Hall	114 Main Street	Essential Facility
2	Water Tower	2nd Street and Main Street	Utility

Map L.2: City of Ralston Critical Facilities

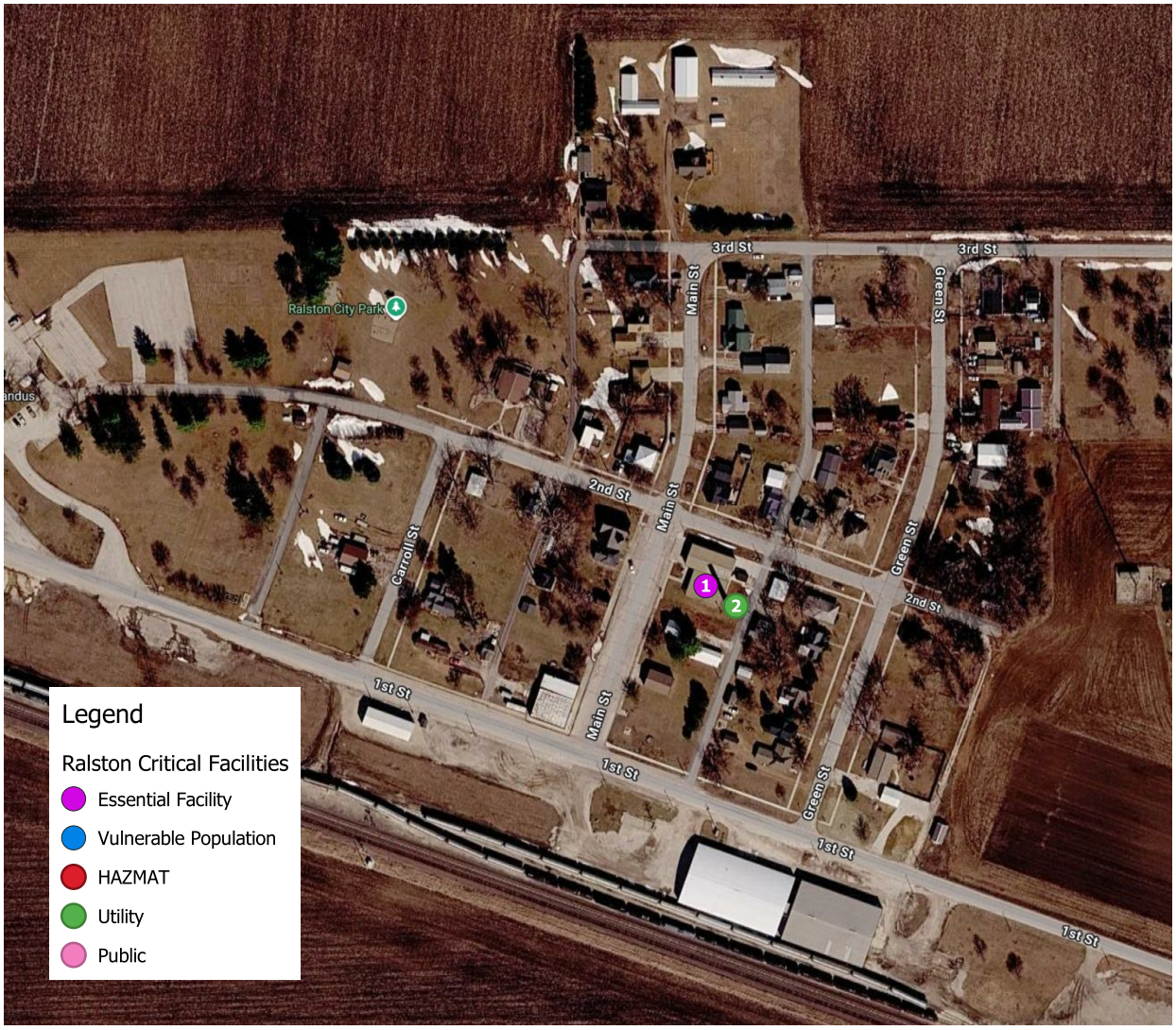


Table L.8: City of Ralston Risk Assessment

Hazard	Comments
Animal/Plant/Crop Disease	The City of Ralston contains a large amount of agricultural land. Although this land represents a recognizable portion of the community, there have been minimal reported losses from animal/plant/crop disease within in the community. While this does impact the community, it is normally indirectly impacted.
Drought	Drought occurrences have increased across the state, and the City of Ralston has not been exempt from this hazard. Droughts continue to increase in severity and while there is little warning, this hazard can cause both direct and indirect issues for the City and it's residents.
Earthquake	There have been no instances of earthquake in the City of Ralston, and the committee feels there will be no instances during the life of this plan.
Expansive Soils	There have been no instances of expansive soils in the City of Ralston, and the committee feels there will be no instances during the life of this plan.
Extreme Heat	Extreme heat events impact the City of Ralston. Education may be one of the best action tools to combat the effects of extreme heat as individuals need to know the effects of extreme heat and how it can affect the body.
Flash Flood	Since 2020, there have been no reported instances of flash flooding in the City of Ralston. While flash floods have little to no warning time, with no instances within the last planning period, the committee has determined this hazard is not a high priority hazard to address, but will consider mitigation actions to prepare the community for response to an event.
Grass/Wild Land Fire	Grass and wild land fires are most commonly field fires or controlled burns that get out of hand in and immediately surrounding the city. This hazard can pose a large threat to the community as elements out of anyone's control, such as wind direction and speed, can change this hazard from harmless and controlled to out of control in a matter of minutes and can pose a threat to life.
HAZMAT Incident	Within the most recent planning period, there have been no instances of hazardous spills within the City of Ralston. Even though there have been no instances within the past five years, with the cooperative's presence, mitigation actions should be considered and implemented to prevent any instances.
Human Disease	Iowa and more specifically the City of Ralston are still feeling the effects of the COVID-19 pandemic. The pandemic has reignited the need to plan for future outbreaks and examine the city's current practices. The pandemic also reminded the public the importance of staying informed and staying vigilant to protect themselves.
Infrastructure Failure	Infrastructure failures occur with little to no warning and can cause major disruptions within the community. Planning to respond to this hazard is important to the community to protect lives and property. The most likely infrastructure failure within Ralston would be structural failure of either bridges or roadways. As these instances have no warning time, planning must be completed prior to an event happening to be able to respond in a quick manner.

Levee/Dam Failure	There are no levees or dams located in the City of Ralston, and there are no high hazard dams on waterways that lead into the city. It is unlikely that levee or dam failure will impact the city, although the city feels that planning for river flooding and planning for dam/levee failure are similar in nature.
Radiological	During the previous planning period, there were no instances of Radiological Incident in Ralston and the committee does not anticipate any happening in the next planning period. If an incident were to occur, the committee feels it would be a small, contained situation that would not threaten the community as a whole.
River Flooding	The City of Ralston is located in an area with flood zones, which there is a moderate to high risk of flooding occurring within the community. The community is in danger from flooding caused by overflowing rivers or hard rains. There have been no instances of flooding within the community due to river flooding within the past five years, but due to the amount of land in the flood plain, the committee feels some mitigation actions related to this hazard will be beneficial to implement.
Severe Winter Storm	Severe Winter Storms continue to impact the City of Ralston. These storms while historically, have caused little damage, continue to build in strength, threatening property and lives within the city. The warning period of this hazard continues to grow with meteorological advances, but can still pose great risks to the community.
Terrorism	There have been no instances of terrorism in the City of Ralston during the previous plan period and the committee feels there will be no instances during the life of this plan. If an instance were to occur, the committee feels it would be a targeted incident that would not threaten the entire community.
Thunderstorm/ Lightning/Hail	Thunderstorm/lightning/hail instances are frequent within the community. While they are frequent, most storms pose no threat to life, crops, or property. This hazard is prevalent in Templeton but is normally not severe in nature.
Tornado	Carroll County has experienced a number of tornadoes in the recent past, but these have not been within or damaged the city of Ralston. With the number of tornadoes that impact Carroll County growing, it is important for the city to continue to plan for the response to tornadoes as storms within Iowa continue to grow in strength. Preparing the public and community is vital to ensuring there is no loss of life.
Transportation Incident	Speed limits within the City of Ralston are relatively low. With the community having lower speed limits, it is likely that any transportation incident between vehicles is likely to cause little damage to property or humans, but there is a chance of an incident which can cause extensive damage. U.S. Highway 30 runs through the northern portion of the community and has a higher speed limit than the rest of the community, which is where more harmful accidents could happen between turning truck traffic and other traffic moving 55mph or higher. The committee anticipates that this hazard will effect the community in varying degrees throughout the planning period.
Windstorm	Recent windstorms have caused reported damage to properties. These hazard events continue to build in magnitude, causing increasingly large amounts of damage to property and posing threats to lives. The recent derechos effected Ralston prompting the community to prepare more effectively for these hazards.

Table L.9: Hazards Not Affecting the City of Ralston

Hazard	Reason for Omission
Earthquake	Iowa as a whole has experienced the effects of few earthquakes in the past 175 years. The majority of the earthquakes were along the Mississippi River, therefore the city does not feel this hazard will impact them during this planning period.
Expansive Soils	While Iowa has expansive soils, due to the city's history of no issues in the past, the city felt this will not impact the jurisdiction over the life of this plan.

Loss Estimates

Table L.10: City of Ralston Maximum Building and Population Exposure

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	1	$61,270	81
Commercial	20	$3,016,680	
Industrial	1	$10,893,880	
Residential	52	$2,534,050	

It is unlikely that a jurisdiction can determine the impact any hazard will have. If a hazard were to impact the entire city, the numbers in table L.10 shows the number of people who would be affected and the maximum number of structures and their value. If this type of event were to occur, a shutdown of some facilities and services could last for at least two weeks and some injuries/illnesses will result in permanent disability or even death.

The following hazards were determine to have a negligible impact on the city, if they were to occur.

Dam/Levee Failure
Landslide
Radiological
Transportation Incident

If a hazard were to report negligible impacts, it is anticipated that the numbers impacted would be similar to table L.11. If there were any shutdown of facilities or services, it is likely that these shutdowns would be for less than twenty-four hours. If any injuries were to occur, it is anticipated that these would be able to be treated with first aid. A negligible hazard would impact approximately 9% of the city.

Table L.11: City of Ralston Negligible Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	0	$0	7
Commercial	2	$271,501	
Industrial	0	$0	
Residential	5	$228,064	

The following hazards were determine to have a limited impact on the city, if they were to occur.

Thunderstorm/Lightning/Hail	Tornado
Windstorm	Grass/Wild Land Fire
Severe Winter Storms	Infrastructure Failure
Extreme Heat	HAZMAT Incident
Flash Flood	River Flooding

If a hazard were to report limited impacts, it is anticipated that the numbers impacted would be similar to table L.12. A shutdown of some facilities and services could last more than a week and any injuries/illnesses would not result in permanent disability. It is estimated that 25% of the city would be impacted.

Table L.12: City of Ralston Limited Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	0	$0	20
Commercial	5	$754,170	
Industrial	0	$0	
Residential	13	$633,512	

The following hazards were determine to have a limited impact on the city, if they were to occur.

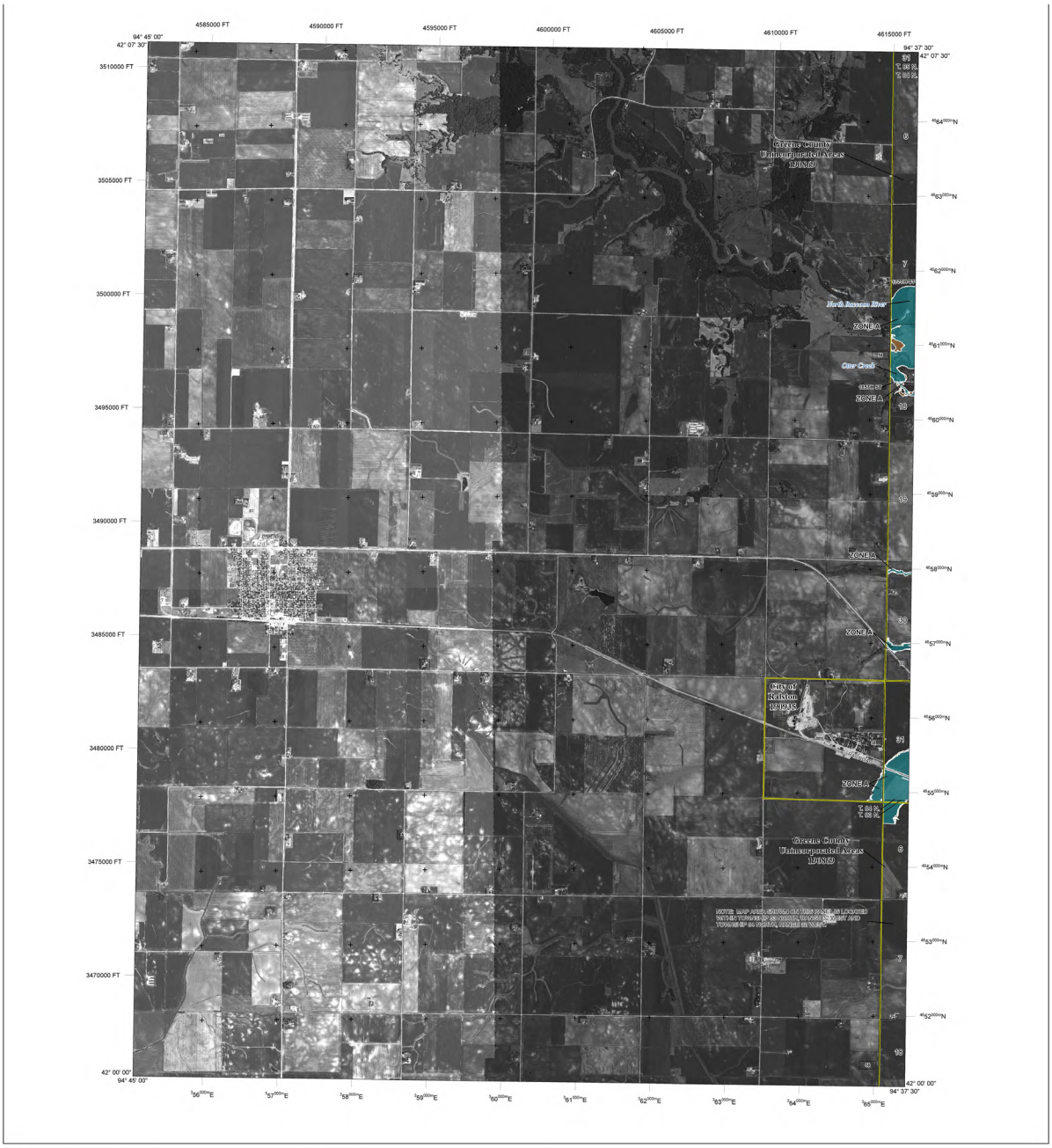
Drought
Animal/Plant/Crop Disease
Human Disease

If a hazard were to report critical impacts, it is anticipated that the numbers impacted would be similar to table L.13. A shutdown of some facilities and services could last for at least two weeks and some injuries/illnesses will result in permanent disability. It is estimated 50% of the city would be impacted.

Table L.13: City of Ralston Critical Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	0	$0	40
Commercial	10	$1,508,340	
Industrial	0	$0	
Residential	26	$1,267,025	

Flood Maps



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A,V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee See Notes. *Zone X*

OTHER AREAS
- NO SCREEN — Areas Determined to be Outside the 0.2% Annual Chance Floodplain *Zone X*
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Accredited or Provisionally Accredited Levee, Dike, or Floodwall
- Non-accredited Levee, Dike, or Floodwall
- (E) 18.2 / 17.5 — Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
- (B) Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

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To determine if flood insurance is available in the community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was provided in digital format by the United States Geological Survey (USGS). This information was derived from digital orthophotography at a 2-foot resolution from photography dated 2011.

SCALE

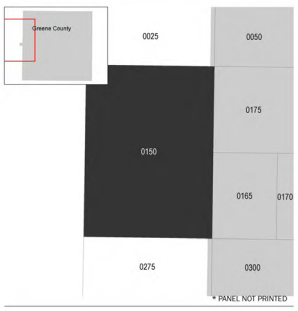
Map Projection:
NAD 1983 StatePlane Iowa North FIPS 1401 Feet;
Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 2,000 feet — 1:24,000

0 2,000 4,000 8,000 Feet

0 500 1,000 2,000 Meters

PANEL LOCATOR



* PANEL NOT PRINTED

FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

Greene County, Iowa
AND INCORPORATED AREAS

PANEL 150 OF 500

FEMA

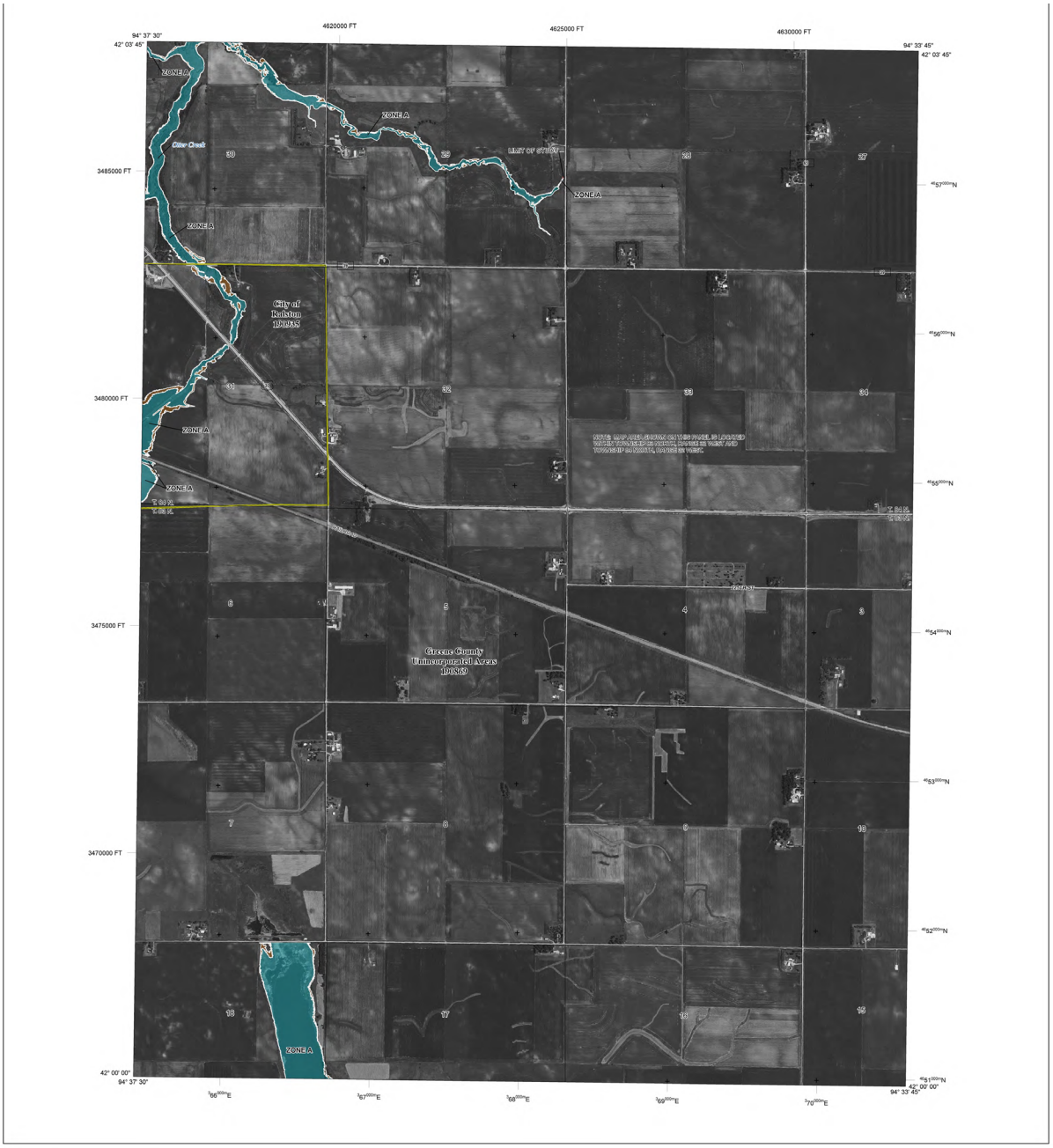
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
GREENE COUNTY	190869	0150	C
RALSTON, CITY OF	190935	0150	C

VERSION NUMBER
2.3.2.2

MAP NUMBER
19073C0150C

EFFECTIVE DATE
APRIL 19, 2016



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SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) *Zone A, A99*
	With BFE or Depth *Zone AE, AO, AH, VE, AR*
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
	Future Conditions 1% Annual Chance Flood Hazard *Zone X*
	Area with Reduced Flood Risk due to Levee See Notes. *Zone X*
OTHER AREAS	NO SCREEN Areas Determined to be Outside the 0.2% Annual Chance Floodplain *Zone X*
	Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Accredited or Provisionally Accredited Levee, Dike, or Floodwall
	Non-accredited Levee, Dike, or Floodwall
OTHER FEATURES	E 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
	8 Coastal Transect
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
	513 Base Flood Elevation Line (BFE)
	Limit of Study
	Jurisdiction Boundary

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1 inch = 1,000 feet 1:12,000

0 1,000 2,000 4,000 Feet

0 260 520 1,040 Meters

PANEL LOCATOR

* PANEL NOT PRINTED

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

Greene County, Iowa
AND INCORPORATED AREAS

PANEL 165 OF 500

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
GREENE COUNTY	190869	0165	C
RALSTON, CITY OF	190935	0165	C

VERSION NUMBER
2.3.2.2

MAP NUMBER
19073C0165C

EFFECTIVE DATE
APRIL 19, 2016

Table L.14: City of Ralston Status of Previous Mitigation Actions

	Status				
Previous Actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not Implemented**
Educate public on hyper reach notification					X
Promote NOAA radios to the public				X	
Complete current plan and make plans to update every five years		X			
Inform public on hazardous materials locations and hazards					X
Inform public about shelter location					X
Prepare first aid materials, blankets, and water at shelter location					X
Enforce building codes, city codes, and zoning codes			X		
Encourage use of one call to avoid damage to utilities			X		
Work with electric companies to bury overhead power lines	X				
Continue tree-trimming, enforcing ordinances when needed	X				
Provide funding needed to train fire personnel			X		
Continue training programs for fire personnel			X		
Make sure EMS volunteers trained to EMT-B or I					X
Make sure fire volunteers trained to FF levels			X		
Continue fire safety education			X		
Recruit and train new members whenever possible			X		
Keep updating and upgrading ambulance fleet, snow plow equipment, sand trucks, etc	X				
Update first responder notification equipment	X				
Continue to budget for and fund street repairs			X		
Keep fire hydrants updated and working, replacing as needed				X	
Post signs and increase police surveillance around critical facilities				X	

Action Plan

Section 201.6 (c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

Section 201.6 (c)(3)(iii): The mitigation strategy shall include an action plan, describing how the action 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 associated costs.

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

Table L.15: City of Ralston Action Plan

Goal 1	**Enhance Community Protection**
Objective 1	Improve Public Warning Capabilities
Objective 2	Maintain Current Hazard Mitigation Plan
Objective 3	Hazardous Materials-tier II sites
Objective 4	Protect and Enforce Regulatory Measures in Existing and New Development Areas
Objective 5	Provide Shelter Facilities in case of Disasters
Goal 2	**Protect Against Power Outage**
Objective 1	Use Prevention Techniques to Minimize Disruption in Services
Goal 3	**Maintain and Support Public Safety, Including Facilities, Equipment, and Training**
Objective 1	Improve First Responder Resources and Capabilities
Objective 2	Provide Education and Training Programs to Increase Public and Responder Awareness
Objective 3	Maintain needed personnel for fire and EMS
Objective 4	Provide Needed Equipment and Facilities
Goal 4	**Update Communications Systems**
Objective 1	Improve Public Warning Capabilities
Goal 5	**Maintain and Protect Public Infrastructure**
Objective 1	Maintain and Improve Roads, Bridges, and Other Transportation

Table L.15: City of Ralston Mitigation Actions

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Promote NOAA radios to the public	Flash Flood, Tornado, Windstorm, River Flooding, Severe Winter Storms, Thunderstorm/ Lightning/ Hail	Mod	Fire Department	Minimal	City General Fund, Fire Department Budget	Public Education and Awareness	Ongoing
Complete current plan and make plans to update every five years	Extreme Heat, Flash Flood, Grass/Wild Land Fire, HAZMAT Incident, Human Disease, Infrastructure Failure, Levee/Dam Failure, River Flooding, Severe Winter Storms, Thunderstorm/ Lightning/Hail, Tornado, Transportation Incident, Windstorm	Mod	City Council	Minimal	Carroll County EMA, Carroll County, City General Funds, HMGP with State Match	Public Education and Awareness	Ongoing
Inform public on hazardous materials locations and hazards	Hazardous Material	Mod	Fire Department	Minimal	City General Fund	Public Education and Awareness	Ongoing
Inform public about shelter location	Flash Flood, Tornado, Windstorm, River Flooding, Severe Winter Storms, Thunderstorm/ Lightning/ Hail	Mod	City Council	Minimal	City General Fund	Public Education and Awareness	Short
Prepare first aid materials, blankets, and water at shelter location	Flash Flood, Tornado, Windstorm, River Flooding, Severe Winter Storms, Thunderstorm/ Lightning/ Hail	Mod	Fire Department	Minimal	City General Fund, Fire Department Budget, Local Foundations	Emergency Services	Short

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Enforce building codes, city codes, and zoning codes	Infrastructure Failure	Mod	City Council	Minimal	City General Fund, Nuisance Fines	Prevention	Ongoing
Encourage use of one call to avoid damage to utilities	Infrastructure Failure	Mod	City Council	Minimal	City General Fund, Private Utilities	Prevention	Ongoing
Continue fire safety education	Extreme Heat, Flash Flood, Grass/Wild Land Fire, HAZMAT Incident, Human Disease, Infrastructure Failure, Levee/Dam Failure, River Flooding, Severe Winter Storms, Thunderstorm/ Lightning/Hail, Tornado, Transportation Incident, Windstorm	High	Fire Department	Minimal	City General Fund, Fire Department Budget	Emergency Services	Ongoing
Continue to budget for and fund street repairs	Infrastructure Failure	High	City Council	Moderate	City Road Fund, Iowa DOT, Carroll County, Carroll County Secondary Roads	Prevention	Ongoing
Keep fire hydrants updated and working, replacing as needed	Infrastructure Failure	High	City Council	Low	City General Fund, Iowa SRF, CDBG, USDA Community Facilities	Prevention	Ongoing
Post signs and increase police surveillance around critical facilities	Hazardous Material	Low	City Council	Low	City General Fund	Property Protection	Short

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Install new storm siren	Windstorm, Tornado, Thunderstorm/Lightning/ Hail, Severe Winter Storm	High	City Council	Minimal	City General Fund, HMGP with State Match, Local Foundations, USDA Community Facilities	Emergency Services	Short

Incorporation into Other Planning Mechanisms

Where possible, Ralston will consider the findings from this document when updating or creating new planning and operating documents. Information from this plan will be utilized to update and expand the following documents:

- Hazard Mitigation Plan
- Comprehensive Plan
- Zoning Ordinance
- Housing Needs Assessment

While the city currently does not have any of the plans listed below, if these plans were to be created during the life of this plan, this plan will be used to guide the development of:

- Water Conservation Plans
- Storm Water Management Plans
- Parks and Recreation Plans
- Building Code
- Floodplain Regulations
- Strategic Plan

Appendix M: City of Templeton

Community Profile

History

The first settlers arrived in the area near what is now Templeton in the 1860's. The first Post Office was located roughly one mile southeast of Templeton in Elba in 1872. In 1882, the construction of the Chicago, Milwaukee, and St. Paul Railroad was completed, and Templeton was platted along the new line between Marion, Iowa and Omaha. The new community quickly grew, and Elba faded until it was gone completely.

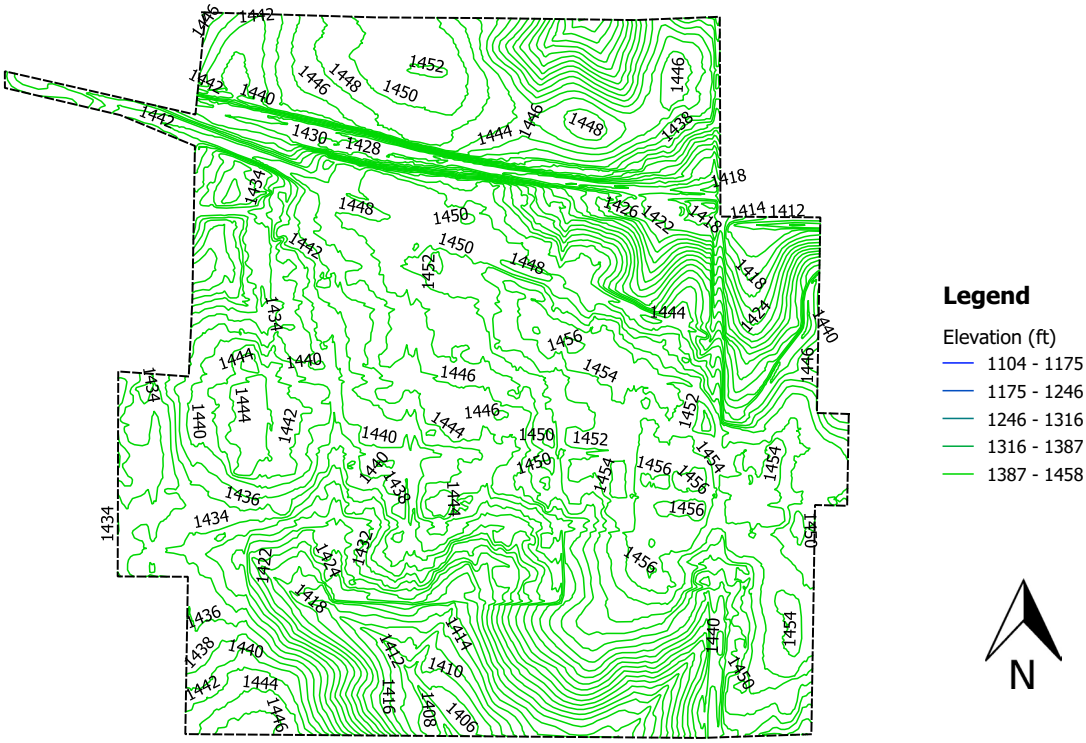
Throughout history, Templeton has been a typical small, rural, agriculture-centered community. Templeton is probably best known for the infamous bootleg whiskey produced in the area during prohibition known as "Templeton Rye". The product brought the small community notoriety throughout the Midwest, and faded mostly into legend until it was resurrected almost ten years ago. Now a legal product, the Templeton Rye Distillery is located in Templeton and is a popular tourist stop. Today, Templeton is a progressive and growing community of over 330 residents. The community is known for its neat appearance and "can-do" attitude that has resulted in continued growth in housing and business development.

Geography and Environment

Templeton is located in south central Carroll County just north of Iowa Highway 141 and its junction with U.S. Highway 71. These two roads provide the primary transportation routes to surrounding communities. Templeton is located 14.9 miles south of Carroll, 15 miles north of Audubon, 15 miles west of Coon Rapids, 27.3 miles east of Denison and 93.8 miles west of the Des Moines metropolitan area.

Templeton is located directly on the Missouri/Mississippi River watershed divide, and it has a gently rolling topography with higher elevations toward the north and lower elevations in the south-central part of town (1,402 feet). Templeton's elevation can be found in Map M.1.

Map M.1: City of Templeton Elevation

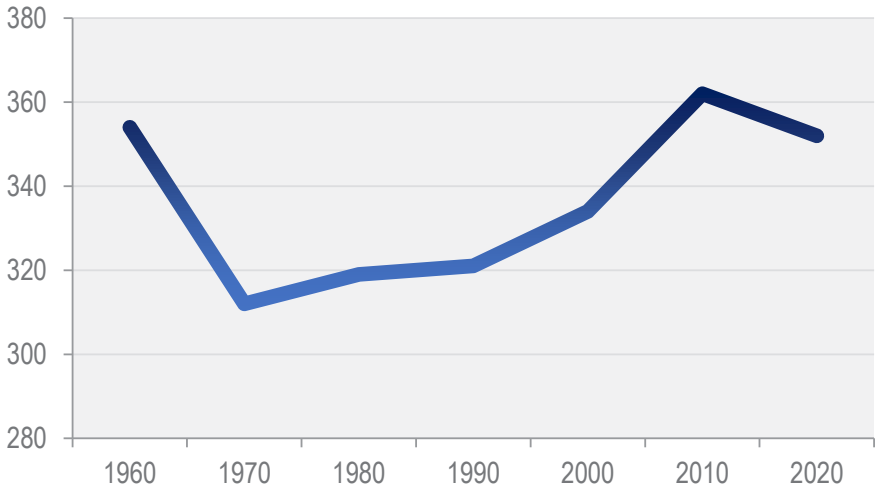


Demographics

The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Templeton's population through past, present, and future trends of the region.

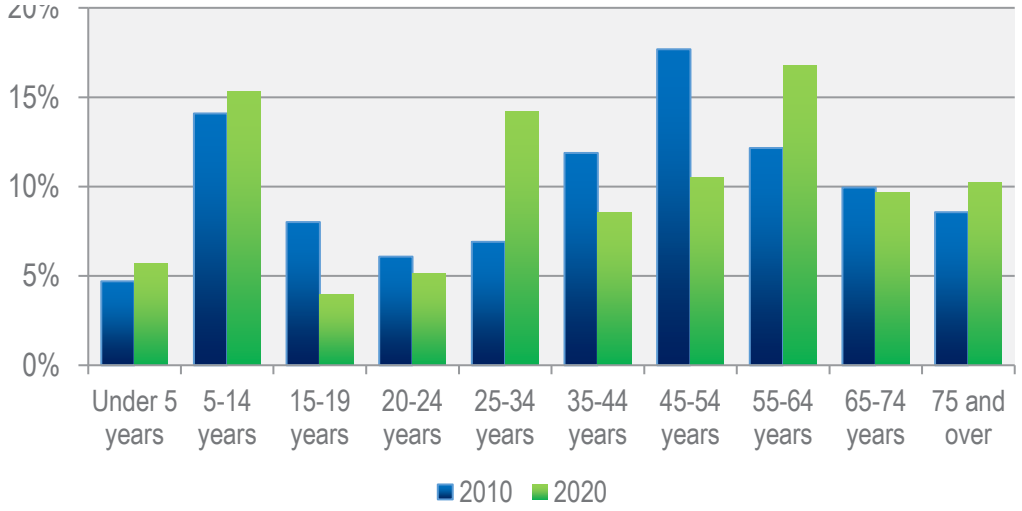
Over the past 50 years, the City of Templeton has experienced a slight decrease. In 1960, Templeton had a population of 354. Since then, the City's population has decreased 1% (2 residents) to 352 in 2020. The most dramatic change happened between 1960 and 1970, when the city lost 42 residents. After 1970, the city began seeing a slight increase in population each decade until 2010. From 2010 to 2020, the population decreased 2.8% (10 residents) to 352. Figure M.1 shows the City of Templeton's population trend since 1960.

Figure M.1: City of Templeton Historic Population, 1960-2020



The City's population makeup is not very different from other parts of Carroll County, and even most of the State of Iowa. Population cohorts at age 50 and above have generally higher numbers than other younger cohorts. This information can be found in figure M.2.

Figure M.2: City of Templeton Age Distribution, 2010 & 2020



Housing

A community's ability to attract new residents is important. One of the most important aspects to attracting residents is housing. A community's housing stock, type of households, and housing availability and affordability are determining factors.

Since 2010, the city's housing stock has decreased by 1 unit. Renter-occupied units decreased by three and owner-occupied units remained stable. In this same time period, the city saw its vacant housing units increase by two, from 3 to 5 units. Table M.1 shows a breakdown of the city's occupied and vacant housing units.

Table M.1: City of Templeton Housing Units, 2010 & 2022

	2010		2022	
	Number	**Percent**	**Number**	**Percent**
Occupied Housing Units	156	98.1%	153	96.8%
Owner Occupied	138	88.5%	138	90.2%
Renter Occupied	18	11.5%	15	9.8%
Vacant Housing Units	3	1.9%	5	3.2%
Total Housing Units	159	100.0%	158	100.0%

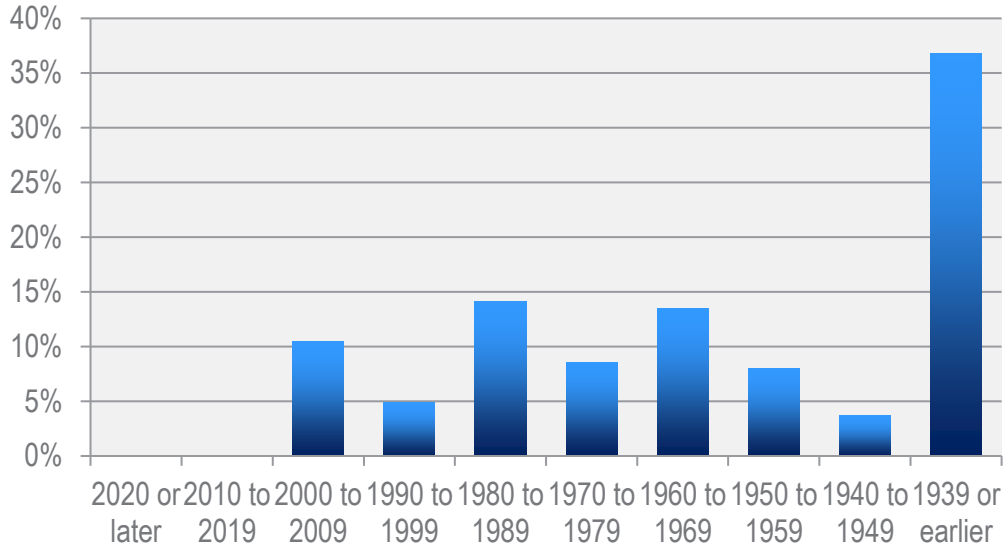
Templeton, like many other small rural towns in Iowa, has a lower median housing value of $146,900. The State of Iowa has a median housing value of $181,600. The city's homes can be very affordable and can be used to attract new residents, but they may deteriorate faster and will need a number of repairs and updates. According to the 2022 American Community Survey Estimates, 25.5% of the city's homes are valued less than $100,000. A complete breakdown of the value of homes in Templeton can be found in table M.2. Knowing information about the city's housing stock is useful after a disaster hits to determine how much damage was done, and how it will affect the city moving forward.

Table M.2: City of Templeton Value of Owner-Occupied Units, 2022

Value of Housing Unit	Percent of Homes
Less than $50,000	4.1%
$50,000 to $99,999	21.4%
$100,000 to $149,999	25.5%
$150,000 to $199,999	13.1%
$200,000 to $299,999	32.4%
$300,000 to $499,999	3.4%
$500,000 to $999,999	0.0%
$1,000,000 or more	0.0%

Figure M.3 showcases the year housing units within the City of Templeton were constructed. Like most of the county, Templeton has a large portion (36.8%) of the homes constructed in 1939 or earlier. The city also experienced spikes in construction during 1960-1969 and 1980-1989. During the 1960s, the city saw 13.5% of its housing stock being built, while the 1980s saw 14.1% of its homes constructed. Building standards of today utilize the most recent construction materials and safety features, ensuring that the new residential structures are as safe as possible. This does not mean that older homes are more unsafe, just that they may be more susceptible to hazard damage.

Figure M.3: City of Templeton Year Housing Units Constructed, 2022



Economics

Household income is an important indicator of the economic base in Carroll County. In Templeton, the median household income is $67,500, which would classify a large number of the households in Templeton as "working" or "middle" class. Table M.3 breaks down the city's households by income. The City of Templeton's household income breakdown is similar to the other rural communities in the area, and the combination of more affordable housing with the current incomes generally provides residents with a decent quality of life. A large portion of residents find employment in the retail trade and manufacturing industries. Many employees commute to other larger neighboring cities like Carroll and Audubon where more employment opportunities are present.

Table M.3: City of Templeton Household Income, 2022

Income and Benefits (2022 Inflation-Adjusted Dollars)	Number of Households	Percent of Households
Less than $10,000	3	1.9%
$10,000 to $14,999	6	3.8%
$15,000 to $24,999	14	8.8%
$25,000 to $34,999	14	8.8%
$35,000 to $49,999	14	8.8%
$50,000 to $74,999	44	27.5%
$75,000 to $99,999	28	17.5%
$100,000 to $149,999	27	16.9%
$150,000 to $199,999	8	5.0%
$200,000 or more	2	1.3%
Median Household Income	$67,500	-
Mean Household Income	$78,004	-

Templeton, overall, is a small rural community in a small rural county. A large percent of the businesses within the county serves the largely agricultural economy. Table M.4 breaks down what industry Templeton residents work in. Retail trade employs the largest cohort of residents, with 18.3% employed in this industry. The second largest is manufacturing, with 15.2% of the residents employed in this industry.

Table M.4: City of Templeton Employment by Industry, 2022

Industry	Number	Percent
Total civilian non-farm employment, 16 years and over	191	100%
Agriculture, Forestry, Fishing, Hunting, Mining	25	13.1%
Construction	7	3.7%
Manufacturing	29	15.2%
Wholesale Trade	6	3.1%
Retail Trade	35	18.3%
Transportation and warehousing and utilities	21	11.0%
Information	3	1.6%
Finance and insurance, and real estate and rental and leasing	12	6.3%
Professional, scientific, management, administrative, and waste management services	11	5.8%
Educational, health care, and social assistance	22	11.5%
Arts, entertainment, recreation, accommodation, and food services	2	1.0%
Other services, except public administration	9	4.7%
Public Administration	9	4.7%

Existing Documents & Capabilities

Table M.5 provides a compilation of the current planning and regulatory documents in place for the City of Templeton. The table also shows the last time the documents were last updated. These documents help understand the process the city has already undertaken and what documents can be created to help guide the city. First and foremost is the previous hazard mitigation plan as this document lays out specific strategies to help the city reduce the impact hazards have on the community and those who live in it. The City of Templeton also has both a zoning code and comprehensive plan. These two documents work hand in hand to guide development within the community. The city's zoning code was created to keep certain zones away from one another to reduce the risk to humans and structures. The different zones can pose different threats to others, such as some industrial uses having a higher HAZMAT incident probability which if located in a residential zone, could pose large health issues to the overall population. The zoning codes also include information for street and sidewalk regulations which can reduce the number of transportation incidents. The City's Comprehensive Plan guides future zoning decisions and evaluates all aspects of the community and how these all interact with one another and creates an opportunity for the city to take inventory of the assets and think about mitigation of hazards at said assets.

The City of Templeton continues to be a more proactive community, which only benefits them in regards to mitigation of hazards. While the city has a current comprehensive plan, expanding this plan to really take inventory of the city's assets, utilities, and infrastructure would help the plan include a comprehensive disaster response section. A thorough capital improvement plan that has a focus on utility infrastructure would be beneficial as the city recently experienced a loss of water, and having a plan in place for a similar situation would allow the city to be proactive, not reactive. Expanding conversations with the local COG and engineering firms would allow the city to explore additional options that have worked in similar communities facing similar situations. Outside organizations are also beneficial with finding funding for projects which otherwise may be out of the city's budget. Road, water, and sewer infrastructure continues to need upgrades and pursuing funding opportunities could reduce impacts of hazards on these infrastructure types. Training staff to current required guidelines would allow for a more thought-out response to a hazard or hazard warning. Training staff regardless of responsibility on different departments can better prepare the city and can lead to things being noticed that previously went unnoticed.

Table M.5: City of Templeton Existing Documents

Document	Yes/No	Year
Previous HMP	Yes	2020
Comprehensive Plan	Yes	2002
Building Code	State	2010
Zoning Ordinance	Yes	2013
Strategic Plan	Yes	2007
Housing Needs Assessment	Yes	2017
NFIP Participant	Yes	1976
Floodplain Regulations	No	-

NFIP Participation

The City of Templeton is a Non-Special Flood Hazard Area. Even though the City is not located in a flood hazard area, the City participates in the NFIP. The FIRMs which show the City and the immediate surrounding area were updated in 2017, and can be found later in this appendix.

Outlook and Future Development

Since the last plan updated, the City of Templeton has experienced some development in the residential and commercial industries. New homes continue to be built within the City on a regular basis. Along with new builds, the City has experienced the rehabilitation of residential areas, improving the safety of these homes. The City has also recently experienced growth in the City's commercial developments.

Throughout the life of this plan, the city anticipates housing development to continue on a limited scale, and anticipates that there will be additional rehabilitation occurring on residential and commercial properties. The limited housing development and small commercial growth will keep the city's vulnerability unchanged over the planning period.

Critical Facilities

Critical facilities are facilities that are critical to the health and welfare of the population and are especially important following hazard events. Every jurisdiction is unique in such way that the list of critical facilities can vary widely from community to community. Templeton's critical facilities can be found on Map M.2.

Essential Infrastructure and Services

Knowing what services and infrastructure serve the city can be beneficial in a time of disaster so the appropriate companies can be contacted in need of utility shutoff or transportation routes. The city's essential infrastructure and services can be found in Table M.6.

Table M.6: City of Templeton Essential Infrastructure and Services

Major Arterials	N18	**Air Service**	Arthur N. Neu Airport
Water Service	City of Templeton	**Sewer Service**	City of Templeton
Electric Service	MidAmerican Energy	**Gas Service**	Manning Municipal Gas
Sanitation/Solid Waste	Ray's Refuse	**Landfill**	Carroll County Landfill
Phone and Internet	Cornbelt Telephone Company	**Law Enforcement**	Carroll County Sheriff
Fire Service	Templeton Fire Department	**Ambulance Service**	Carroll County Ambulance Service

Table M.7: City of Templeton Critical Facilities

Number on Map	Name	Address	Type
1	Landus Cooperative	326 Railway Street	HAZMAT
2	Sacred Heart Church	202 South 5th Avenue	Vulnerable Population
3	Templeton City Hall	108 South Main Street	Essential Facility
4	Templeton Fire Department	117 South Main Street	Essential Facility
5	Templeton Center	230 South 5th Avenue	Vulnerable Population
6	Templeton Rye	209 East 3rd Street	Essential Facility
7	Waspy's	703 South Rye Avenue	HAZMAT
8	Water Tower	2nd Street & 3rd Avenue	Utility
9	Public Works Building	502 Industrial Road	Essential Facility

Map M.2: City of Templeton Critical Facilities

Table M.8: City of Templeton Risk Assessment

Hazard	Comments
Animal/Plant/Crop Disease	The City of Templeton contains a large amount of agricultural land. Although this land represents a recognizable portion of the community, there have been minimal reported losses from animal/plant/crop disease within in the community. While this does impact the community, it is normally indirectly impacted.
Drought	Drought occurrences have increased across the state, and the City of Templeton has not been exempt from this hazard. Droughts continue to increase in severity and while there is little warning, this hazard can cause both direct and indirect issues for the City and it's residents.
Earthquake	There have been no instances of earthquake in the City of Templeton, and the committee feels there will be no instances during the life of this plan.
Expansive Soils	There have been no instances of expansive soils in the City of Templeton, and the committee feels there will be no instances during the life of this plan.
Extreme Heat	Extreme heat events impact the City of Templeton. Education may be one of the best action tools to combat the effects of extreme heat as individuals need to know the effects of extreme heat and how it can affect the body.
Flash Flood	Since 2020, there have been no reported instances of flash flooding in the City of Templeton. While flash floods have little to no warning time, with no instances within the last planning period, the committee has determined this hazard is not a high priority hazard to address, but will consider mitigation actions to prepare the community for response to an event.
Grass/Wild Land Fire	Grass and wild land fires are most commonly field fires or controlled burns that get out of hand in and immediately surrounding the city. This hazard can pose a large threat to the community as elements out of anyone's control, such as wind direction and speed, can change this hazard from harmless and controlled to out of control in a matter of minutes and can pose a threat to life.
HAZMAT Incident	Within the most recent planning period, there have been two instances of hazardous spills within the City of Templeton. With having two different incidents in the past five years, the committee feels this hazard is a small threat to the community and mitigation actions should be considered and implemented to prevent anyfuture instances.
Human Disease	Iowa and more specifically the City of Templeton are still feeling the effects of the COVID-19 pandemic. The pandemic has reignited the need to plan for future outbreaks and examine the city's current practices. The pandemic also reminded the public the importance of staying informed and staying vigilant to protect themselves.
Infrastructure Failure	Infrastructure failures occur with little to no warning and can cause major disruptions within the community. Planning to respond to this hazard is important to the community to protect lives and property. The most likely infrastructure failure within Templeton would be structural failure of either bridges or roadways. As these instances have no warning time, planning must be completed prior to an event happening to be able to respond in a quick manner.

Levee/Dam Failure	There are no levees or dams located in the City of Templeton, and there are no high hazard dams on waterways that lead into the city. It is unlikely that levee or dam failure will impact the city, although the city feels that planning for river flooding and planning for dam/levee failure are similar in nature.
Radiological	During the previous planning period, there were no instances of Radiological Incident in Templeton and the committee does not anticipate any happening in the next planning period. If an incident were to occur, the committee feels it would be a small, contained situation that would not threaten the community as a whole.
River Flooding	The City of Templeton is located in a non-special flood hazard area, which means that there is a moderate to low risk of flooding within the community. The community is not in any immediate danger from flooding caused by overflowing rivers or hard rains. There have been no instances of flooding within the community due to river flooding, and the committee feels that although it has never happened, some mitigation actions related to this hazard may be beneficial to implement.
Severe Winter Storm	Severe Winter Storms continue to impact the City of Templeton. These storms while historically, have caused little damage, continue to build in strength, threatening property and lives within the city. The warning period of this hazard continues to grow with meteorological advances, but can still pose great risks to the community.
Terrorism	There have been no instances of terrorism in the City of Templeton during the previous plan period and the committee feels there will be no instances during the life of this plan. If an instance were to occur, the committee feels it would be a targeted incident that would not threaten the entire community.
Thunderstorm/ Lightning/Hail	Thunderstorm/lightning/hail instances are frequent within the community. While they are frequent, most storms pose no threat to life, crops, or property. This hazard is prevalent in Templeton but is normally not severe in nature.
Tornado	Carroll County has experienced a number of tornadoes in the recent past, but these have not been within or damaged the city of Templeton. With the number of tornadoes that impact Carroll County growing, it is important for the city to continue to plan for the response to tornadoes as storms within Iowa continue to grow in strength. Preparing the public and community is vital to ensuring there is no loss of life.
Transportation Incident	Speed limits within the City of Templeton are relatively low. With the community having lower speed limits, it is likely that any transportation incident between vehicles is likely to cause little damage to property or humans, but there is a chance of an incident which can cause extensive damage. The committee anticipates that this hazard will effect the community in varying degrees throughout the planning period.
Windstorm	Recent windstorms have caused reported damage to properties. These hazard events continue to build in magnitude, causing increasingly large amounts of damage to property and posing threats to lives. The recent derechos effected Templeton prompting the community to prepare more effectively for these hazards.

Table M.9: Hazards Not Affecting the City of Templeton

Hazard	Reason for Omission
Earthquake	Iowa as a whole has experienced the effects of few earthquakes in the past 175 years. The majority of the earthquakes were along the Mississippi River, therefore the city does not feel this hazard will impact them during this planning period.
Expansive Soils	While Iowa has expansive soils, due to the city's history of no issues in the past, the city felt this will not impact the jurisdiction over the life of this plan.

Loss Estimates

Table M.10: City of Templeton Maximum Building and Population Exposure

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	0	$0	352
Commercial	38	$6,263,718	
Industrial	38	$5,642,534	
Residential	167	$23,438,847	

It is unlikely that a jurisdiction can determine the impact any hazard will have. If a hazard were to impact the entire city, the numbers in table M.10 shows the number of people who would be affected and the maximum number of structures and their value. If this type of event were to occur, a shutdown of some facilities and services could last for at least two weeks and some injuries/illnesses will result in permanent disability or even death.

The following hazards were determine to have a negligible impact on the city, if they were to occur.

Dam/Levee Failure
Landslide
Radiological
Transportation Incident

If a hazard were to report negligible impacts, it is anticipated that the numbers impacted would be similar to table M.11. If there were any shutdown of facilities or services, it is likely that these shutdowns would be for less than twenty-four hours. If any injuries were to occur, it is anticipated that these would be able to be treated with first aid. A negligible hazard would impact approximately 9% of the city.

Table M.11: City of Templeton Negligible Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	0	$0	32
Commercial	4	$ 563,735	
Industrial	4	$ 507,828	
Residential	15	$ 2,109,496	

The following hazards were determine to have a limited impact on the city, if they were to occur.

Thunderstorm/Lightning/Hail	Tornado
Windstorm	Grass/Wild Land Fire
Severe Winter Storms	Infrastructure Failure
Extreme Heat	HAZMAT Incident
Flash Flood	River Flooding

If a hazard were to report limited impacts, it is anticipated that the numbers impacted would be similar to table M.12. A shutdown of some facilities and services could last more than a week and any injuries/illnesses would not result in permanent disability. It is estimated that 25% of the city would be impacted.

Table M.12: City of Templeton Limited Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	0	$0	88
Commercial	10	$1,565,930	
Industrial	10	$1,410,634	
Residential	42	$5,859,712	

The following hazards were determine to have a limited impact on the city, if they were to occur.

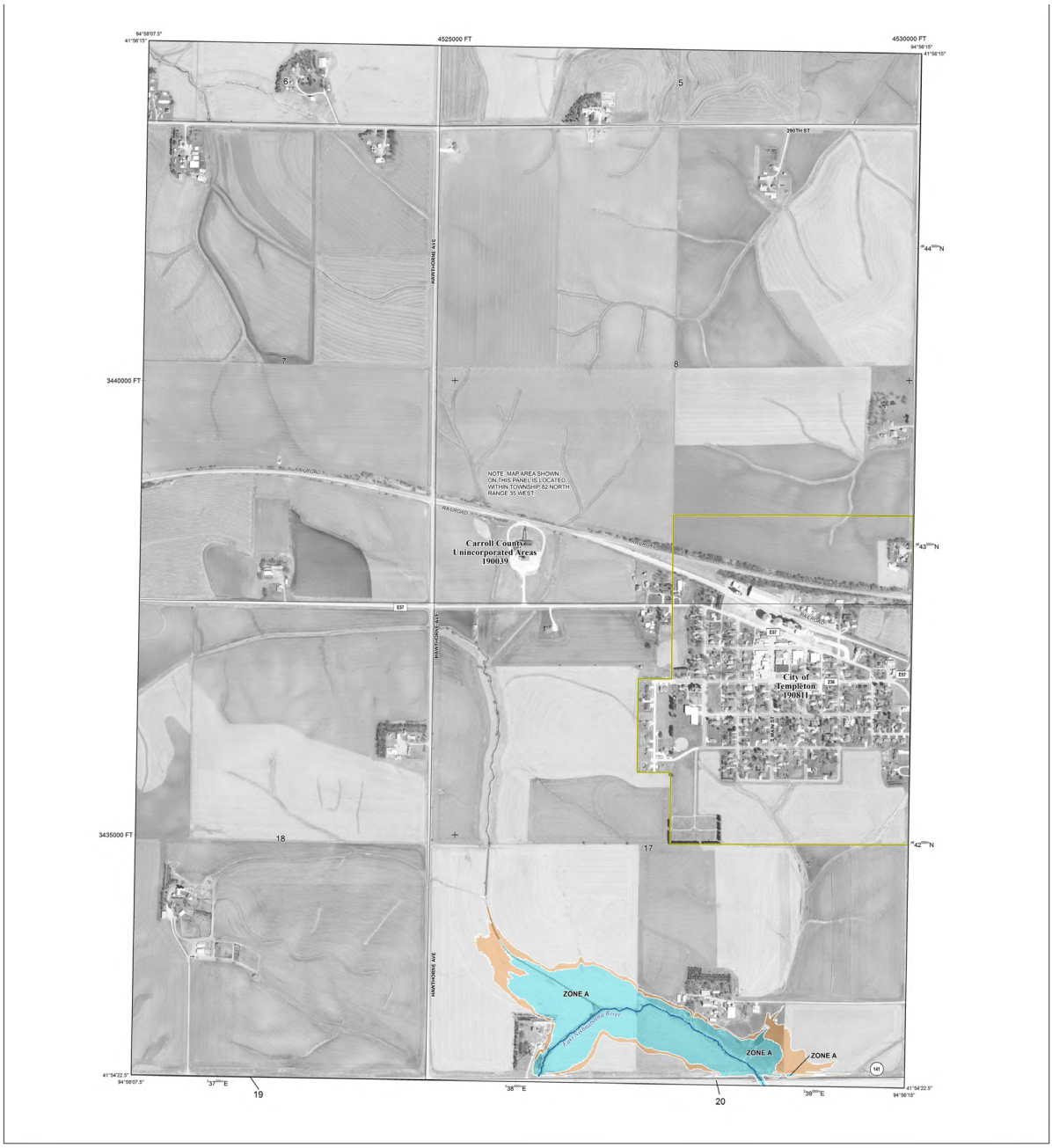
Drought
Animal/Plant/Crop Disease
Human Disease

If a hazard were to report critical impacts, it is anticipated that the numbers impacted would be similar to table M.13. A shutdown of some facilities and services could last for at least two weeks and some injuries/illnesses will result in permanent disability. It is estimated 50% of the city would be impacted.

Table M.13: City of Templeton Critical Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	0	$0	176
Commercial	19	$3,131,859	
Industrial	19	$2,821,267	
Residential	84	$11,719,424	

Flood Maps



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A,V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee See Notes *Zone X*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall
- 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

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For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was provided in digital format by the Iowa Department of Natural Resources. This information was derived from digital orthophotography at a 2-foot ground resolution from imagery flown in April 2009.

SCALE

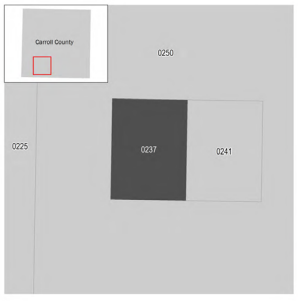
Map Projection:
State Plane Iowa North (FIPS Zone 1401) Coordinate System, Lambert Conformal Conic Projection; North American Datum 1983, GRS 1980 spheroid; North American Vertical Datum of 1988

1 inch = 500 feet 1:6,000

0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR



National Flood Insurance Program

FEMA

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL 237 OF 400

FEMA

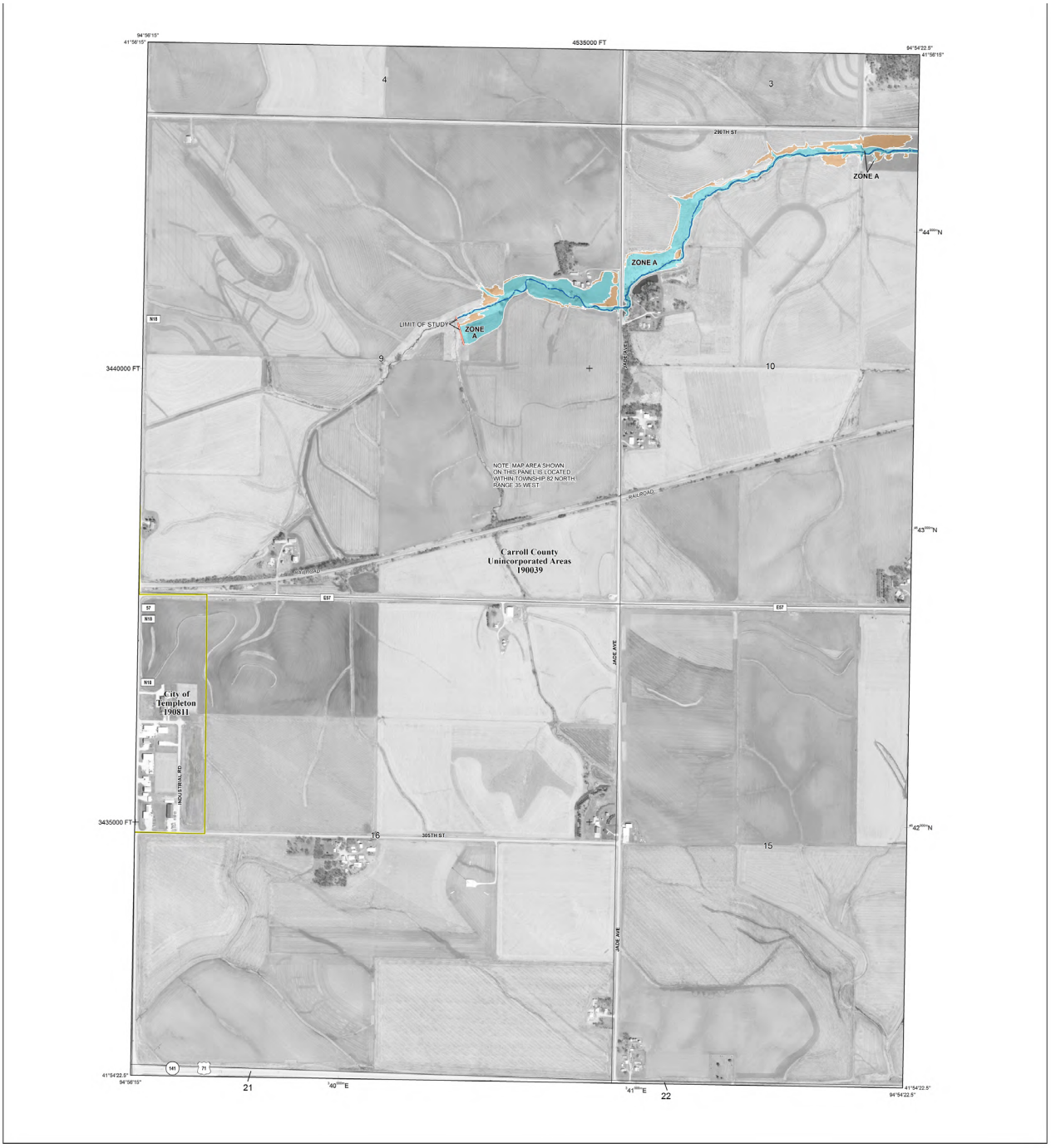
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL COUNTY	190039	0237	C
TEMPLETON, CITY OF	190811	0237	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0237C

EFFECTIVE DATE
SEPTEMBER 15, 2017



FLOOD HAZARD INFORMATION

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SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) *Zone A, V, A99* With BFE or Depth *Zone AE, AO, AH, VE, AR* Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X* Future Conditions 1% Annual Chance Flood Hazard *Zone X* Area with Reduced Flood Risk due to Levee See Notes *Zone X*
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard *Zone X* Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer Levee, Dike, or Floodwall
OTHER FEATURES	18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE) Coastal Transect Coastal Transect Baseline Profile Baseline Hydrographic Feature 513 Base Flood Elevation Line (BFE) Limit of Study Jurisdiction Boundary

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0 500 1,000 2,000 Feet

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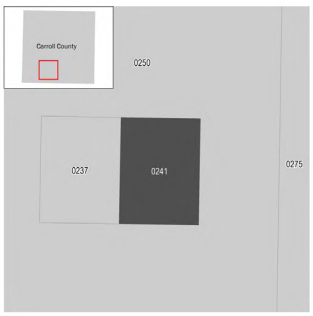
PANEL LOCATOR



FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL 241 OF 400

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL COUNTY	190039	0241	C
TEMPLETON, CITY OF	190811	0241	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0241C

EFFECTIVE DATE
SEPTEMBER 15, 2017

Table M.14: City of Templeton Status of Previous Mitigation Actions

	Status				
Previous Actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not Implemented**
Educate public on hyper reach notification			X		
Promote NOAA radios to the public			X		
Complete current plan and make plans to update every five years			X		
Inform public on hazardous materials locations and hazards			X		
Enforce building codes, city codes, and zoning codes			X		
Encourage use of one call to avoid damage to utilities			X		
Provide funding needed to train personnel (fire, EMS, and police)			X		
Continue training programs for fire personnel			X		
Make sure EMS volunteers trained to EMT-B or I			X		
Make sure fire volunteers trained to FF levels			X		
Continue fire safety education			X		
Recruit and train new members whenever possible			X		
Keep updating and upgrading snow plow equipment, sand trucks, etc			X		
Update first responder notification equipment			X		
Continue to budget for and fund street repairs			X		
Clean sewage lagoon	X				
Post signs and increase police surveillance around critical facilities			X		
Purchase new airpacks for the Fire Department			X		
Purchase a new generator for the Fire Station				X	
Update the Fire Station, including member equipment and technology			X		
Purchase a new generator for the Templeton Center				X	

Section 201.6 (c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

Section 201.6 (c)(3)(iii): The mitigation strategy shall include an action plan, describing how the action 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 associated costs.

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

Table M.14: City of Templeton Action Plan

Goal 1	**Enhance Community Protection**
Objective 1	Improve Public Warning Capabilities
Objective 2	Maintain Current Hazard Mitigation Plan
Objective 3	Hazardous Materials-tier II sites
Objective 4	Protect and Enforce Regulatory Measures in Existing and New Development Areas
Objective 5	Provide Shelter Facilities in case of Disasters
Goal 2	**Protect Against Power Outage**
Objective 1	Use Prevention Techniques to Minimize Disruption in Services
Goal 3	**Maintain and Support Public Safety, Including Facilities, Equipment, and Training**
Objective 1	Improve First Responder Resources and Capabilities
Objective 2	Provide Education and Training Programs to Increase Public and Responder Awareness
Objective 3	Maintain needed personnel for fire and EMS
Objective 4	Provide Needed Equipment and Facilities
Goal 4	**Update Communications Systems**
Objective 1	Improve Public Warning Capabilities
Goal 5	**Maintain and Protect Public Infrastructure**
Objective 1	Maintain and Improve Roads, Bridges, and Other Transportation
Objective 2	Maintain and Improve Water Mains, Power Lines, Stormwater Systems, and Other Critical Assets

Table M.15: City of Templeton Mitigation Actions

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Educate public on hyper reach notification	Flash Flood, Tornado, Windstorm, Extreme Heat, River Flooding, Severe Winter Storms, Thunderstorm/ Lightning/Hail	Mod	Fire Department, City Council	Minimal	City Funds	Public Education and Awareness	Short
Promote NOAA radios to the public	Flash Flood, Tornado, Windstorm, Extreme Heat, River Flooding, Severe Winter Storms, Thunderstorm/ Lightning/Hail	Mod	Fire Department, City Council, EMA	Minimal	City Funds, Fire Department	Public Education and Awareness	Short
Complete current hazard mitigation plan and make plans to update every five years	Animal/Plant/Crop Disease, Drought, Extreme Heat, Flash Flood, Grass/Wild Land Fire, HAZMAT Incident, Human Disease, Infrastructure Failure, Levee/Dam Failure, River Flooding, Severe Winter Storms, Thunderstorm/ Lightning/Hail, Tornado, Transportation Incident, Windstorm	Low	City Council	Low	City Funds, HMGP Funds, State Match	Public Education and Awareness	Mid
Inform public on hazardous materials locations and hazards	HAZMAT Incident	Mod	Fire Department, City Council	Minimal	City Funds	Public Education and Awareness	Short
Enforce building codes, city codes, and zoning codes	Infrastructure Failure	Mod	City Council	Minimal	City Funds	Property Protection	Short

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Encourage use of one call to avoid damage to utilities	Infrastructure Failure	Mod	City Council	Minimal	City Funds, Private Utilities	Prevention	Short
Provide funding needed to train personnel (fire, EMS, and police)	Extreme Heat, Flash Flood, Grass/Wild Land Fire, HAZMAT Incident, Human Disease, Infrastructure Failure, Levee/Dam Failure, River Flooding, Severe Winter Storms, Thunderstorm/ Lightning/Hail, Tornado, Transportation Incident, Windstorm	High	Fire Department, City Council	Low	City Funds, Fire Department	Emergency Services	Short
Continue training programs for fire personnel	Grass/Wild Land Fire, HAZMAT Incident, Infrastructure Failure, Transportation Incident,	High	Fire Department, City Council	Low	City Funds, Fire Department, Local Foundations, AFG	Emergency Services	Ongoing
Make sure EMS volunteers trained to EMT-B or I	Animal/Plant/Crop Disease, Drought, Extreme Heat, Flash Flood, Grass/Wild Land Fire, HAZMAT Incident, Human Disease, Infrastructure Failure, Levee/Dam Failure, River Flooding, Severe Winter Storms, Thunderstorm/ Lightning/Hail, Tornado, Transportation Incident, Windstorm	High	Fire Department, City Council	Low	City Funds, Carroll County EMS	Emergency Services	Short

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Make sure fire volunteers trained to FF levels	Animal/Plant/Crop Disease, Drought, Extreme Heat, Flash Flood, Grass/Wild Land Fire, HAZMAT Incident, Human Disease, Infrastructure Failure, Levee/Dam Failure, River Flooding, Severe Winter Storms, Thunderstorm/ Lightning/Hail, Tornado, Transportation Incident, Windstorm	High	Fire Department, City Council	Low	City Funds, Fire Department, Local Foundations, AFG	Emergency Services	Short
Continue fire safety education	Grass/Wild Land Fire	High	Fire Department, City Council	Low	City Funds	Emergency Services	Ongoing
Keep updating and upgrading snow plow equipment, sand trucks, etc	Severe Winter Storm	Mod	City Council	Low	City Funds	Emergency Services	Short
Update first responder notification equipment	Extreme Heat, Flash Flood, Grass/Wild Land Fire, HAZMAT Incident, Infrastructure Failure, River Flooding, Tornado, Windstorm	High	Fire Department	Low	City Funds	Emergency Services	Short
Continue to budget for and fund street repairs	Infrastructure Failure	High	City Council	High	City Funds, Iowa DOT	Structural Project	Ongoing
Clean sewage lagoon	Infrastructure Failure	Low	City Council	Moderate	City Funds, Iowa SRF, USDA Community Facilities	Natural Resource Protection	Mid

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Post signs and increase police surveillance around critical facilities	Terrorism	Mod	City Council	Moderate	City Funds	Emergency Services	Long
Purchase new airpacks for the Fire Department	HAZMAT Incident, Grass/Wild Land Fire	High	Fire Department, City Council	Low	City Funds, FEMA AFG, State Match, Local Foundations	Emergency Services	Short
Purchase a new generator for the Fire Station	Infrastructure Failure, Severe Winter Storm, Extreme Heat	High	Fire Department, City Council	Low	City Funds, HMGP, State Match, Local Foundations	Emergency Services	Short
Update the Fire Station, including member equipment and technology	HAZMAT Incident, Grass/Wild Land Fire, Transportation Incident, Infrastructure Failure	High	City Council, Fire Department	Low	City Funds, AFG, State Match, Local Foundations,	Emergency Services	Short
Purchase a new generator for the Templeton Center	Infrastructure Failure, Severe Winter Storm, Extreme Heat	High	City Council	Low	City Funds, HMGP, State Match, Local Foundations	Emergency Services	Short

Incorporation into Other Planning Mechanisms

Where possible, Templeton will consider the findings from this document when updating or creating new planning and operating documents. Information from this plan will be utilized to update and expand the following documents:

- Hazard Mitigation Plan
- Comprehensive Plan
- Zoning Ordinance
- Housing Needs Assessment
- Strategic Plan

While the city currently does not have any of the plans listed below, if these plans were to be created during the life of this plan, this plan will be used to guide the development of:

- Water Conservation Plans
- Storm Water Management Plans
- Parks and Recreation Plans
- Building Code
- Floodplain Regulations

Appendix N: City of Willey

Community Profile

History

The first settlers arrived to the current location of Willey as early as 1867 however the City of Willey was not established until 1911. In 1918, the road was graded, but not graveled until 1933, which caused difficult traveling in rainy weather. Among other firsts, the Iowa Public Service installed a power line to Willey, and the first street light was erected in 1925. A few years after this, the City purchased a fire truck in 1928 for the amount of $488.18. It was not until many years after in 1959 when the City installed a water system that was piped from three-fourths of a mile south of Willey.

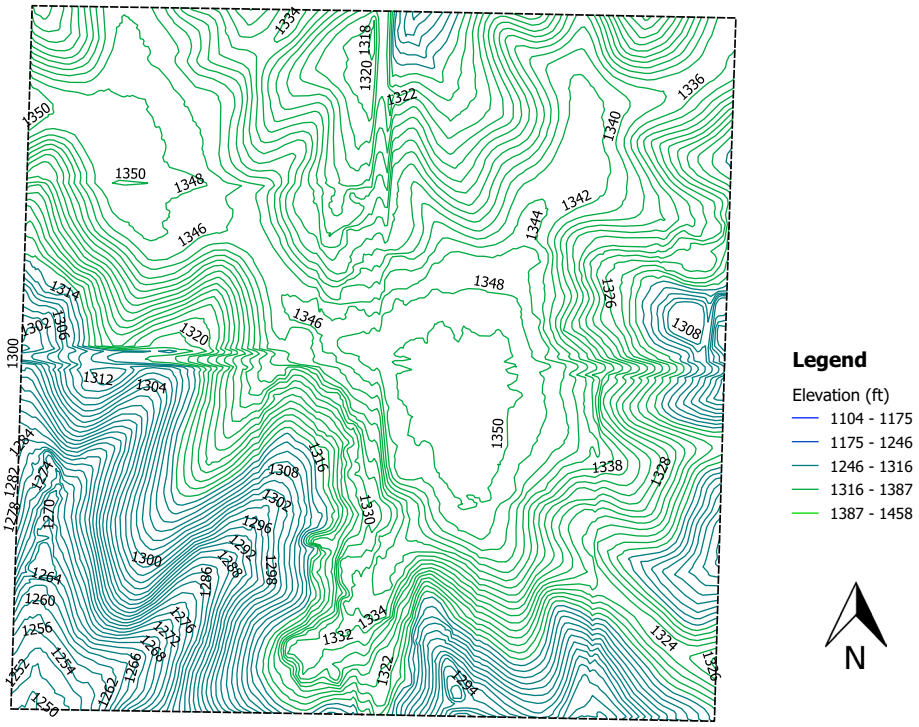
In the early days and even up until the 1960s, Willey was home to such businesses such as the Greteman General Store, Willey Post Office, Willey Creamery, taverns, Willey Garage, Den's Upholstery, M & M Construction, and the Village Gallery. Yet, in the early 1950s, large companies limited the sale of farm machinery and appliances to franchised dealers only. Many items were no longer available to the owner of the city's general store and this business along with many others soon closed its doors as larger companies were established and transportation improved. Today, Willey is primarily a bedroom community for nearby communities.

Geography and Environment

Willey is located in the southeast quadrant of Carroll County. The most notable roads near Willey include Highway 30 which is 5.9 miles to the north, and Highway 71 which is three miles to the west of town. Willey is 8.4 miles from Carroll, 14.3 miles from Coon Rapids, 24.1 miles from Audubon and 30.7 miles from Jefferson.

The highest elevation in Carroll County can be found along the eastern side of the county. Here, the elevation can reach as much as 1,550 feet above sea-level. The elevation of Willey ranges from 1,254 feet to 1,350 feet. Map N.1 display's the City of Willey's elevation.

Map N.1: City of Willey Elevation

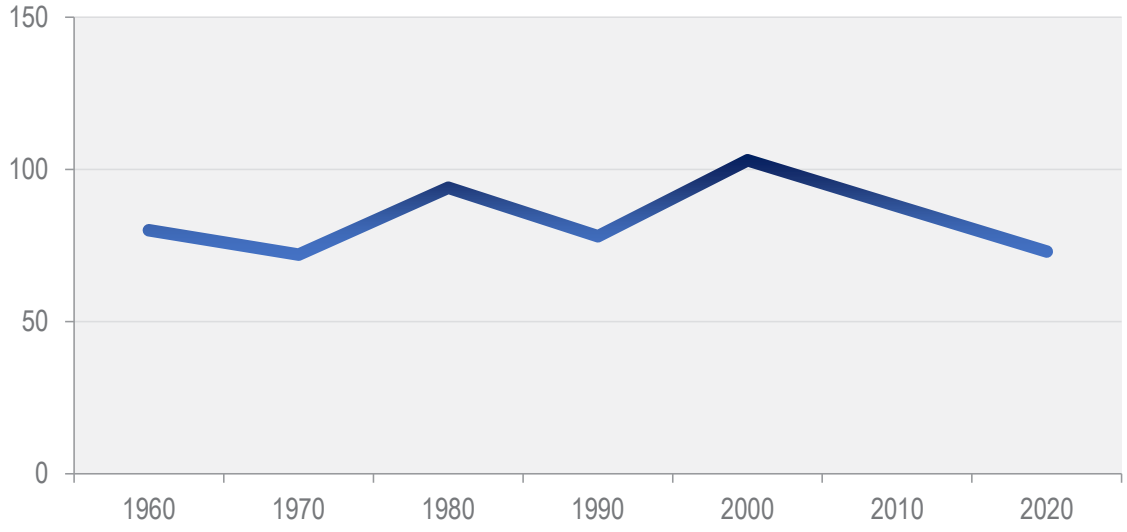


Demographics

The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Willey's population through past, present, and future trends of the region.

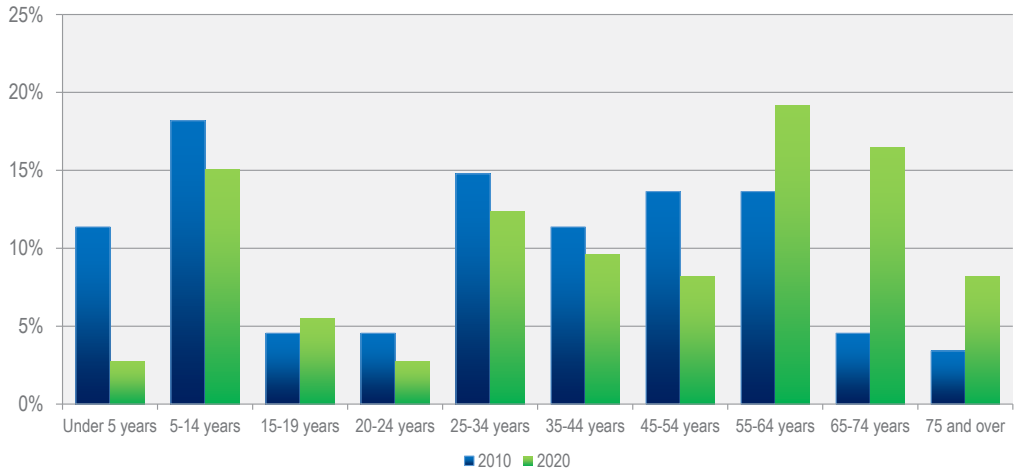
Over the past 50 years, the City of Willey has experienced a slight decrease. In 1960, Willey had a population of 80. Since then, the City's population has decreased 9% (7 residents) to 73 in 2020. The most dramatic change happened between 1980 and 1990, when the city lost 16 residents. Figure N.1 shows the City of Willey's population trend since 1960.

Figure N.1: City of Willey Historic Population, 1960-2020



The City's population makeup is not very different from other parts of Carroll County, and even most of the State of Iowa. Population cohorts at age 50 and above have generally higher numbers than other younger cohorts. This information can be found in figure N.2.

Figure N.2: City of Willey Age Distribution, 2010 & 2020



Housing

A community's ability to attract new residents is important. One of the most important aspects to attracting residents is housing. A community's housing stock, type of households, and housing availability and affordability are determining factors.

Since 2010, the city's housing stock has decreased by 3 units. Renter-occupied units decreased by three and owner-occupied units increased by one. In this same time period, the city saw its vacant housing units increase by one, from 4 to 3 units. Table N.1 shows a breakdown of the city's occupied and vacant housing units.

Table N.1: City of Willey Housing Units, 2010 & 2020

	2010		2022	
	Number	**Percent**	**Number**	**Percent**
Occupied Housing Units	31	88.6%	29	90.6%
Owner Occupied	27	87.1%	28	96.6%
Renter Occupied	4	12.9%	1	3.4%
Vacant Housing Units	4	11.4%	3	9.4%
Total Housing Units	35	100.0%	32	100.0%

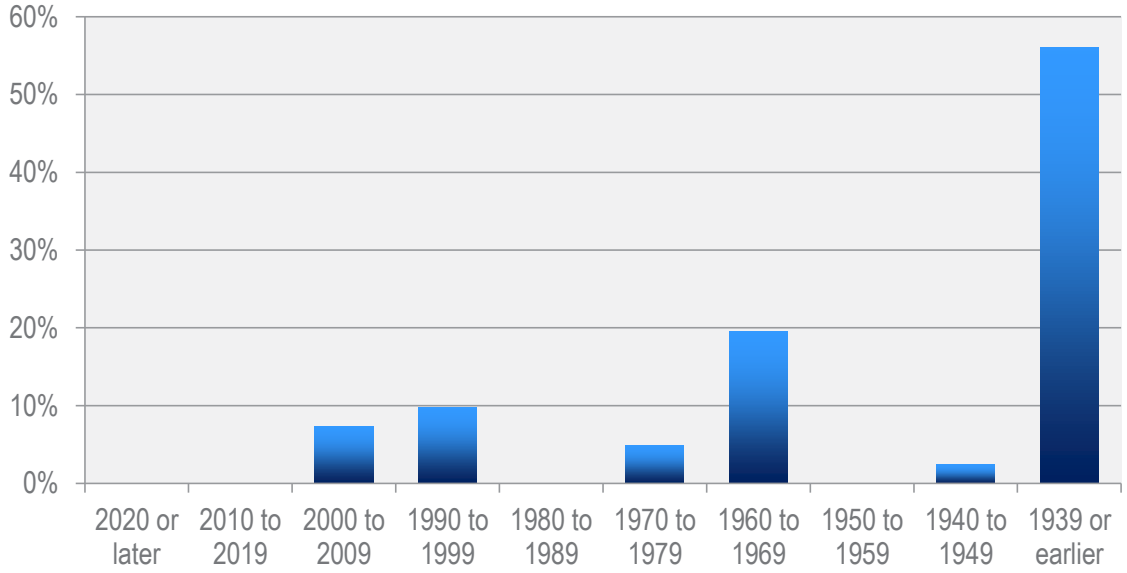
In 2022, the City of Willey was home to the largest median value of housing units in Carroll County. The median value of homes within the city was $175,000. This is only 3.6% lower than the State of Iowa median housing value of $181,600. According to the 2022 American Community Survey Estimates, 19.4% of the city's homes are valued less than $100,000. A complete breakdown of the value of homes in Willey can be found in table N.2. Knowing information about the city's housing stock is useful after a disaster hits to determine how much damage was done, and how it will affect the city moving forward.

Table N.2: City of Willey Value of Owner-Occupied Units, 2022

Value of Housing Unit	Percent of Homes
Less than $50,000	5.6%
$50,000 to $99,999	25.0%
$100,000 to $149,999	8.3%
$150,000 to $199,999	22.2%
$200,000 to $299,999	11.1%
$300,000 to $499,999	27.8%
$500,000 to $999,999	0.0%
$1,000,000 or more	0.0%

Figure N.3 showcases the year housing units within the City of Willey were constructed. Like most of the county, Willey has a large portion (56.1%) of the homes constructed in 1939 or earlier. The city also experienced spikes in construction during 1960-1969. During the 1960s, the city saw 19.5% of its housing stock being built. Building standards of today utilize the most recent construction materials and safety features, ensuring that the new residential structures are as safe as possible. This does not mean that older homes are more unsafe, just that they may be more susceptible to hazard damage.

Figure N.3: City of Willey Year Housing Units Constructed, 2022



Economics

Household income is an important indicator of the economic base in Carroll County. In Willey, the median household income is $101,250, which would classify a large number of the households in Willey as "upper-middle class". Table N.3 breaks down the city's households by income. The City of Willey's household income breakdown is slightly different from other rural communities in the area. A large portion of residents find employment in the construction industry, as well as the educational services, and health care and social assistance sector. Many employees commute to other larger neighboring cities like Carroll where more employment opportunities are present.

Table N.3: City of Willey Household Income, 2022

Income and Benefits (2022 Inflation-Adjusted Dollars)	Number of Households	Percent of Households
Less than $10,000	2	5.0%
$10,000 to $14,999	5	12.5%
$15,000 to $24,999	0	0.0%
$25,000 to $34,999	0	0.0%
$35,000 to $49,999	6	15.0%
$50,000 to $74,999	4	10.0%
$75,000 to $99,999	1	2.5%
$100,000 to $149,999	16	40.0%
$150,000 to $199,999	5	12.5%
$200,000 or more	1	2.5%
Median Household Income	$101,250	-
Mean Household Income	$94,388	-

Willey, overall, is a small rural community in a small rural county. A large percent of the businesses within the county serves the largely agricultural economy. Table N.4 breaks down what industry Willey residents work in. Construction employs the largest cohort of residents, with 23.9% employed in this industry. The second largest is educational services, and health care and social assistance, with 22.4% of the residents employed in this industry.

Table N.4: City of Willey Employment by Industry, 2022

Industry	Number	Percent
Total civilian non-farm employment, 16 years and over	67	100%
Agriculture, Forestry, Fishing, Hunting, Mining	8	11.9%
Construction	16	23.9%
Manufacturing	11	16.4%
Wholesale Trade	0	0.0%
Retail Trade	1	1.5%
Transportation and warehousing and utilities	0	0.0%
Information	0	0.0%
Finance and insurance, and real estate and rental and leasing	3	4.5%
Professional, scientific, management, administrative, and waste management services	8	11.9%
Educational, health care, and social assistance	15	22.4%
Arts, entertainment, recreation, accommodation, and food services	5	7.5%
Other services, except public administration	0	0.0%
Public Administration	0	0.0%

Existing Documents & Capabilities

Table N.5 provides a compilation of the current planning and regulatory documents in place for the City of Willey. The table also shows the last time the documents were last updated. These documents help understand the process the city has already undertaken and what documents can be created to help guide the city. First and foremost is the previous hazard mitigation plan as this document lays out specific strategies to help the city reduce the impact hazards have on the community and those who live in it. The City of Willey also has comprehensive plan. The City's Comprehensive Plan guides future zoning decisions and evaluates all aspects of the community and how these all interact with one another and creates an opportunity for the city to take inventory of the assets and think about mitigation of hazards at said assets.

The City of Willey is an active community, which only benefits them in regards to mitigation of hazards. While the city has a current comprehensive plan, expanding this plan to really take inventory of the city's assets, utilities, and infrastructure would help the plan include a comprehensive disaster response section. Adopting a zoning code would help the city distinguish parts of the community for certain development which would keep zones separated when necessary. A thorough capital improvement plan that has a focus on utility infrastructure would be beneficial as the city recently experienced a loss of water, and having a plan in place for a similar situation would allow the city to be proactive, not reactive. Expanding conversations with the local COG and engineering firms would allow the city to explore additional options that have worked in similar communities facing similar situations. Outside organizations are also beneficial with finding funding for projects which otherwise may be out of the city's budget. Road, water, and sewer infrastructure continues to need upgrades and pursuing funding opportunities could reduce impacts of hazards on these infrastructure types. Training staff to current required guidelines would allow for a more thought-out response to a hazard or hazard warning. Training staff regardless of responsibility on different departments can better prepare the city and can lead to things being noticed that previously went unnoticed.

Table N.5: City of Willey Existing Documents

Document	Yes/No	Year
Previous HMP	Yes	2020
Comprehensive Plan	Yes	2006
Building Code	No	-
Zoning Ordinance	No	-
Strategic Plan	Yes	1996
Housing Needs Assessment	Yes	2016
NFIP Participant	No	-
Floodplain Regulations	No	-

NFIP Participation

The City of Willeyis a Non-Special Flood Hazard Area. Since the city is not located in the flood plain, it does not participate in the NFIP. The FIRMs which show the City and the immediate surrounding area were updated in 2017, and can be found later in this appendix.

Outlook and Future Development

Since the last plan updated, the City of Willey has experienced some development in the residential housing stock. The City has experienced the rehabilitation of some residential homes, improving the overall safety of these structures. The City has also recently experienced expansion in the City's commercial developments.

Throughout the life of this plan, the city anticipates housing rehabilitation to continue on a limited scale. It is also anticipated that some commercial expansion/growth will be noticed. The limited housing rehabilitation and small commercial growth will keep the city's vulnerability unchanged over the planning period.

Critical Facilities

Critical facilities are facilities that are critical to the health and welfare of the population and are especially important following hazard events. Every jurisdiction is unique in such way that the list of critical facilities can vary widely from community to community. Willey's critical facilities can be found on Map N.2.

Essential Infrastructure and Services

Knowing what services and infrastructure serve the city can be beneficial in a time of disaster so the appropriate companies can be contacted in need of utility shutoff or transportation routes. The city's essential infrastructure and services can be found in Table N.6.

Table N.6: City of Willey Essential Infrastructure and Services

Major Arterials	Olympic Avenue & E53	**Air Service**	Arthur N. Neu Airport
Water Service	West Central Iowa Rural Water Association	**Sewer Service**	-
Electric Service	MidAmerican Energy	**Gas Service**	-
Sanitation/Solid Waste	Local Haulers	**Landfill**	Carroll County Landfill
Phone and Internet	Wireless	**Law Enforcement**	Carroll County Sheriff
Fire Service	Dedham Fire Department	**Ambulance Service**	Carroll County Ambulance Service

Table N.7: City of Willey Critical Facilities

Number on Map	Name	Address	Type
1	St. Mary's Catholic Church	201 Olympic Avenue	Vulnerable Population
2	Willey City Hall/Maintenance Building	242 Olympic Avenue	Essential Facility
3	Grit	401 260th Street	Essential Facility
4	Willey Ballfields	260th Street	Vulnerable Population

Map N.2: City of Willey Critical Facilities

Hazard Scores

Table N.8: City of Willey Risk Assessment

Hazard	Comments
Animal/Plant/Crop Disease	The City of Willey contains a large amount of agricultural land. Although this land represents a recognizable portion of the community, there have been minimal reported losses from animal/plant/crop disease within in the community. While this does impact the community, it is normally indirectly impacted.
Drought	Drought occurrences have increased across the state, and the City of Willey has not been exempt from this hazard. Droughts continue to increase in severity and while there is little warning, this hazard can cause both direct and indirect issues for the City and it's residents.
Earthquake	There have been no instances of earthquake in the City of Willey, and the committee feels there will be no instances during the life of this plan.

Expansive Soils	There have been no instances of expansive soils in the City of Willey, and the committee feels there will be no instances during the life of this plan.
Extreme Heat	Extreme heat events impact the City of Willey. Education may be one of the best action tools to combat the effects of extreme heat as individuals need to know the effects of extreme heat and how it can affect the body.
Flash Flood	Since 2020, there have been no reported instances of flash flooding in the City of Willey. While flash floods have little to no warning time, with no instances within the last planning period, the committee has determined this hazard is not a high priority hazard to address, but will consider mitigation actions to prepare the community for response to an event.
Grass/Wild Land Fire	Grass and wild land fires are most commonly field fires or controlled burns that get out of hand in and immediately surrounding the city. This hazard can pose a large threat to the community as elements out of anyone's control, such as wind direction and speed, can change this hazard from harmless and controlled to out of control in a matter of minutes and can pose a threat to life.
HAZMAT Incident	Within the most recent planning period, there has not been a HAZMAT incident within the City of Willey. Even though there has not been an instance in the past five years, the committee feels this hazard is a small threat to the community and mitigation actions should be considered and implemented to prevent any instances.
Human Disease	Iowa and more specifically the City of Willey are still feeling the effects of the COVID-19 pandemic. The pandemic has reignited the need to plan for future outbreaks and examine the city's current practices. The pandemic also reminded the public the importance of staying informed and staying vigilant to protect themselves.
Infrastructure Failure	Infrastructure failures occur with little to no warning and can cause major disruptions within the community. Planning to respond to this hazard is important to the community to protect lives and property. The most likely infrastructure failure within Willey would be structural failure of either bridges or roadways. As these instances have no warning time, planning must be completed prior to an event happening to be able to respond in a quick manner.
Levee/Dam Failure	There are no levees or dams located in the City of Willey, and there are no high hazard dams on waterways that lead into the city. It is unlikely that levee or dam failure will impact the city.
Radiological	During the previous planning period, there were no instances of Radiological Incident in Willey and the committee does not anticipate any happening in the next planning period. If an incident were to occur, the committee feels it would be a small, contained situation that would not threaten the community as a whole.
River Flooding	The City of Willey is located in a non-special flood hazard area, which means that there is a low risk of flooding within the community. The community is not in any immediate danger from flooding caused by overflowing rivers or hard rains. There have been no instances of flooding within the community due to river flooding, and the committee feels that although it has never happened, some mitigation actions related to this hazard may be beneficial to implement.
Severe Winter Storm	Severe Winter Storms continue to impact the City of Willey. These storms while historically, have caused little damage, continue to build in strength, threatening property and lives within the city. The warning period of this hazard continues to grow with meteorological advances, but can still pose great risks to the community.

Terrorism	There have been no instances of terrorism in the City of Willey during the previous plan period and the committee feels there will be no instances during the life of this plan. If an instance were to occur, the committee feels it would be a targeted incident that would not threaten the entire community.
Thunderstorm/ Lightning/Hail	Thunderstorm/lightning/hail instances are frequent within the community. While they are frequent, most storms pose no threat to life, crops, or property. This hazard is prevalent in Willey but is normally not severe in nature.
Tornado	Carroll County has experienced a number of tornadoes in the recent past, but these have not been within or damaged the city of Willey. One tornado in December 2021 started just north of Willey, and caused $80,000 in property damage. With the number of tornadoes that impact Carroll County growing, it is important for the city to continue to plan for the response to tornadoes as storms within Iowa continue to grow in strength. Preparing the public and community is vital to ensuring there is no loss of life.
Transportation Incident	Speed limits within the City of Willey are relatively low. With the community having lower speed limits, it is likely that any transportation incident between vehicles is likely to cause little damage to property or humans, but there is a chance of an incident which can cause extensive damage. The committee anticipates that this hazard will effect the community in varying degrees throughout the planning period.
Windstorm	Recent windstorms have caused reported damage to properties. These hazard events continue to build in magnitude, causing increasingly large amounts of damage to property and posing threats to lives. The recent derechos effected Willey prompting the community to prepare more effectively for these hazards.

Table N.9: Hazards Not Affecting the City of Willey

Hazard	Reason for Omission
Earthquake	Iowa as a whole has experienced the effects of few earthquakes in the past 175 years. The majority of the earthquakes were along the Mississippi River, therefore the city does not feel this hazard will impact them during this planning period.
Expansive Soils	While Iowa has expansive soils, due to the city's history of no issues in the past, the city felt this will not impact the jurisdiction over the life of this plan.

Loss Estimates

Table N.10: City of Willey Maximum Building and Population Exposure

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	1	$165,340	73
Commercial	2	$537,890	
Industrial	0	$0	
Residential	33	$5,628,850	

It is unlikely that a jurisdiction can determine the impact any hazard will have. If a hazard were to impact the entire city, the numbers in table N.10 shows the number of people who would be affected and the maximum number of structures and their value. If this type of event were to occur, a shutdown of some facilities and services could last for at least two weeks and some injuries/illnesses will result in permanent disability or even death.

The following hazards were determine to have a negligible impact on the city, if they were to occur.

Dam/Levee Failure	Radiological
Landslide	Transportation Incident

If a hazard were to report negligible impacts, it is anticipated that the numbers impacted would be similar to table N.11. If there were any shutdown of facilities or services, it is likely that these shutdowns would be for less than twenty-four hours. If any injuries were to occur, it is anticipated that these would be able to be treated with first aid. A negligible hazard would impact approximately 9% of the city.

Table N.11: City of Willey Negligible Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	0	$0	7
Commercial	0	$0	
Industrial	0	$0	
Residential	3	$506,597	

The following hazards were determine to have a limited impact on the city, if they were to occur.

Thunderstorm/Lightning/Hail	Tornado
Windstorm	Grass/Wild Land Fire
Severe Winter Storms	Infrastructure Failure
Extreme Heat	HAZMAT Incident
Flash Flood	River Flooding

If a hazard were to report limited impacts, it is anticipated that the numbers impacted would be similar to table N.12. A shutdown of some facilities and services could last more than a week and any injuries/illnesses would not result in permanent disability. It is estimated that 25% of the city would be impacted.

Table N.12: City of Willey Limited Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	0	$0	18
Commercial	0	$0	
Industrial	0	$0	
Residential	8	$1,407,212	

The following hazards were determine to have a limited impact on the city, if they were to occur.

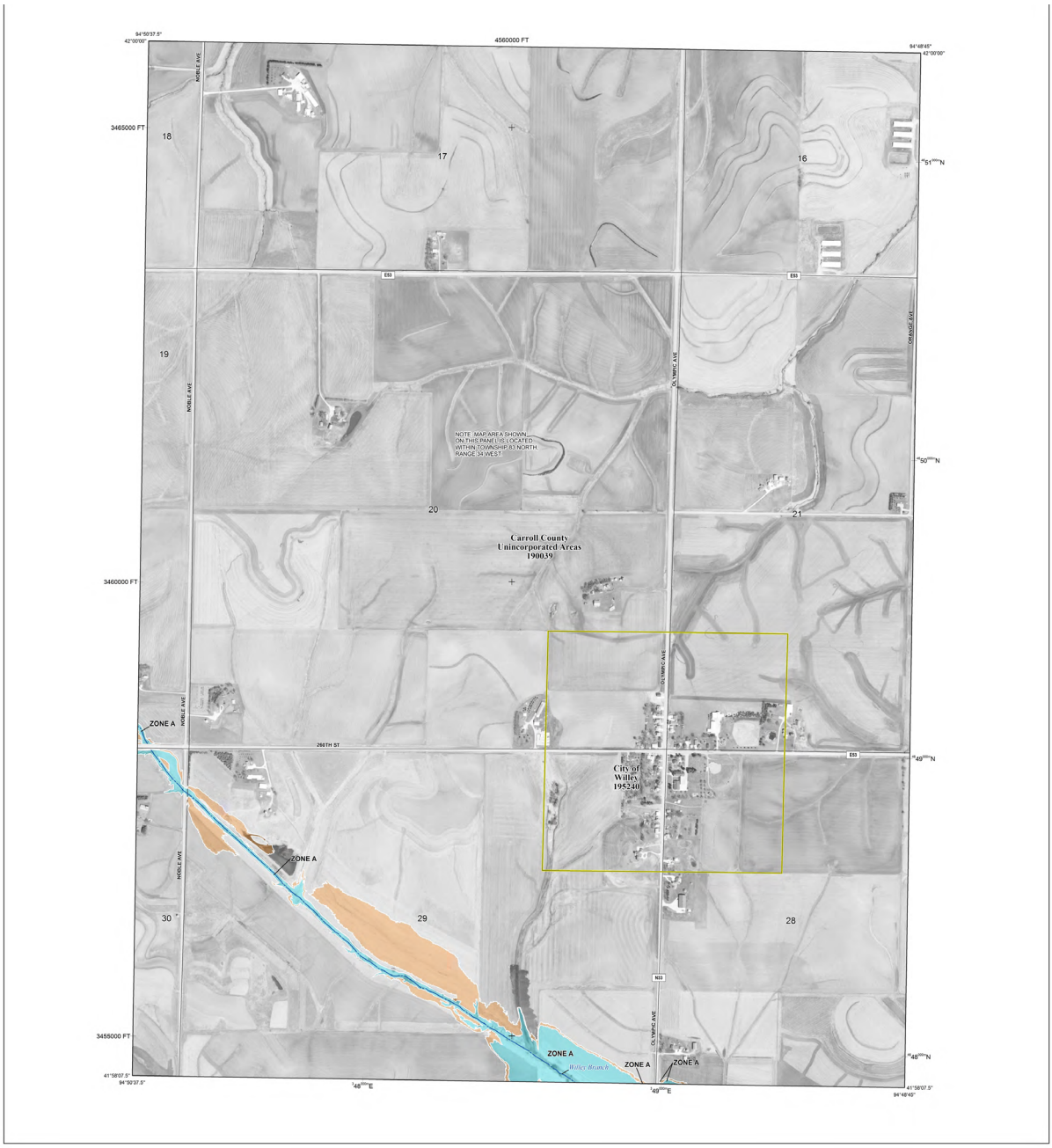
Drought
Animal/Plant/Crop Disease
Human Disease

If a hazard were to report critical impacts, it is anticipated that the numbers impacted would be similar to table N.13. A shutdown of some facilities and services could last for at least two weeks and some injuries/illnesses will result in permanent disability. It is estimated 50% of the city would be impacted.

Table N.13: City of Willey Critical Hazard Impacts

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	0	$0	37
Commercial	1	$268,945	
Industrial	0	$0	
Residential	17	$2,814,425	

Flood Map



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A,V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee See Notes *Zone X*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was provided in digital format by the Iowa Department of Natural Resources. This information was derived from digital orthophotography at a 2-foot ground resolution from imagery flown in April 2009.

SCALE

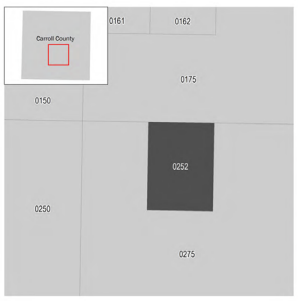
Map Projection:
State Plane Iowa North (FIPS Zone 1401) Coordinate System, Lambert Conformal Conic Projection; North American Datum 1983, GRS 1980 spheroid; North American Vertical Datum of 1988

1 inch = 500 feet 1:6,000

0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR



FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CARROLL COUNTY, IOWA
And Incorporated Areas

PANEL 252 OF 400

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL COUNTY	190039	0252	C
WILLEY, CITY OF	195240	0252	C

VERSION NUMBER
2.3.3.2

MAP NUMBER
19027C0252C

EFFECTIVE DATE
SEPTEMBER 15, 2017

Table N.14: City of Willey Status of Previous Mitigation Actions

	Status				
Previous Actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not Implemented**
Educate public on hyper reach notification					X
Promote NOAA radios to the public					X
Complete current plan and make plans to update every five years		X			
Inform public on hazardous materials locations and hazards	X				
Designate shelter	X				
Wire church hall to allow back-up generator the power the building during power outages				X	
Enforce building codes, city codes, and zoning codes			X		
Purchase portable generators for the St. Mary's Parish Hall (Shelter)					X
Encourage use of one call to avoid damage to utilities			X		
Work with electric companies to bury overhead power lines				X	
Continue to budget for and fund street repairs			X		

Action Plan

Section 201.6 (c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

Section 201.6 (c)(3)(iii): The mitigation strategy shall include an action plan, describing how the action 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 associated costs.

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

Table N.15: City of Willey Action Plan

Goal 1	**Enhance Community Protection**
Objective 1	Improve Public Warning Capabilities
Objective 2	Maintain Current Hazard Mitigation Plan
Objective 3	Hazardous Materials-tier II sites
Objective 4	Protect and Enforce Regulatory Measures in Existing and New Development Areas
Objective 5	Provide Shelter Facilities in case of Disasters
Goal 2	**Protect Against Power Outage**
Objective 1	Provide Back-Up systems for Critical Systems and Assets
Objective 2	Use Prevention Techniques to Minimize Disruption in Services
Goal 3	**Maintain and Protect Public Infrastructure**
Objective 1	Maintain and Improve Roads, Bridges, and Other Transportation

Table N.16: City of Willey Mitigation Actions

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Promote NOAA radios to the public	Flash Flood, Tornado, Windstorm, River Flooding, Severe Winter Storms, Thunderstorm/ Lightning/Hail	Mod	City Council	Low	City General Fund	Public Education and Awareness	Short
Complete current plan and make plans to update every five years	Animal/Plant/Crop Disease, Drought, Extreme Heat, Flash Flood, Grass/Wild Land Fire, HAZMAT Incident, Human Disease, Infrastructure Failure, Levee/Dam Failure, River Flooding, Severe Winter Storms, Thunderstorm/ Lightning/Hail, Tornado, Transportation Incident, Windstorm	Low	City Council	Low	City Funds, HMGP with State Match, Carroll County EMA, Carroll County Supervisors	Prevention	Ongoing
Inform public on hazardous materials locations and hazards	Hazardous Material	Low	City Council	Low	City General Fund	Public Education and Awareness	Ongoing
Wire church hall to allow back-up generator the power the building during power outages	Flash Flood, Tornado, Windstorm, River Flooding, Severe Winter Storms, Thunderstorm/ Lightning/Hail	Low	City Council	Low	Local Foundations, Private Donations, City General Fund	Emergency Services	Short
Enforce building codes, city codes, and zoning codes	Infrastructure Failure	Low	City Council	Minimal	City General Fund, Nuisance Fines	Emergency Services	Ongoing

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Purchase portable generators for the St. Mary's Parish Hall (Shelter)	Flash Flood, Tornado, Windstorm, River Flooding, Severe Winter Storms, Thunderstorm/ Lightning/Hail	Low	City Council	Low	City General Fund, Local Foundations, HMGP with State Match, NSGP with State Match	Emergency Services	Short
Encourage use of one call to avoid damage to utilities	Infrastructure Failure	Mod	City Council	Minimal	City General Fund, Private Utilities	Prevention	Ongoing
Work with electric companies to bury overhead power lines	Tornado, Windstorm, Severe Winter Storms, Thunderstorm/ Lightning/Hail	Mod	City Council	Low	City Utility Fund, GRID grants, Iowa ENERGY RLF, Local Foundations	Prevention	Mid
Continue to budget for and fund street repairs	Infrastructure Failure	Mod	City Council	Moderate	City Road Fund, Carroll County, Carroll County Secondary Roads	Prevention	Ongoing
Designate shelters	Flash Flood, Tornado, Windstorm, River Flooding, Severe Winter Storms, Thunderstorm/ Lightning/Hail	Low	City Council	Low	City General Fund	Emergency Services	Short
Install new storm siren	Tornado, Windstorm, Thunderstorm/Lightning/ Hail, Severe Winter Storm	High	City Council	Low	City Funds, HMGP with State Match, Local Foundations	Emergency Services	Short

Incorporation into Other Planning Mechanisms

Where possible, Willey will consider the findings from this document when updating or creating new planning and operating documents. Information from this plan will be utilized to update and expand the following documents:

- Hazard Mitigation Plan
- Comprehensive Plan
- Housing Needs Assessment
- Strategic Plan

While the city currently does not have any of the plans listed below, if these plans were to be created during the life of this plan, this plan will be used to guide the development of:

- Water Conservation Plans
- Storm Water Management Plans
- Parks and Recreation Plans
- Building Code
- Floodplain Regulations
- Zoning Ordinance