

**NOTICE OF A REGULAR MEETING  
BONDURANT CITY COUNCIL  
FEBRUARY 18, 2025**

**NOTICE IS HEREBY GIVEN** that a Regular Meeting of the City Council will be held at 6:00 PM on February 18, 2025, in the Bondurant City Center, 200 Second Street, Northeast, Bondurant, Polk County, Iowa. Said meeting is open, and the public is encouraged to attend.

**AGENDA**

1. Roll Call
2. Call to Order and Declaring a Quorum
3. Abstentions declared
4. Perfecting and Approval of the Agenda
5. Consent Agenda:

*All items listed below are considered routine by the City Council and will be enacted by one motion. There will be no separate discussion of these items unless a Council Member or citizen so requests, in which event the item will be removed from the Consent Agenda and considered separately.*

- a. Approval of February 3, 2025, City Council Meeting Minutes
- b. Claims List
- c. Applications for Council Approval
- d. Receive & File - BES January Monthly Report
- e. Receive & File - January 8, 2025, Library Board Meeting Minutes & Director's Report
- f. - Resolution approving Pay Request No. 2 to Ball Team LLC for the Bondurant City Park Reconstruction Phase 2 Project in the amount of \$115,498.15
- g. - Resolution approving Change Order No. 4 for negative quantity reduction of items not done for the 15<sup>th</sup> Street, SE and 13<sup>th</sup> Street Stormwater Improvements in the amount of -\$44,830.00
- h. - Resolution approving Pay Request No. 16 to KLC Construction LLC for the 15th Street and NE 88th Street/32nd Street, SE and Jorie Way Water Main Project in the amount of \$41,012.51 (Release of Retainage)
- i. - Resolution approving pay request no. 3 to James Construction LLC for the 15th St./13th St./Field Tiling Stormwater Project in the amount of \$16,225.63 (Release of Retainage)
- j. - Resolution approving Pay Request No. 8 to Gerard Tank & Steel for the Water Tower Project in the amount of \$291,527.27

The Bondurant City Council maintains the right to waive the first and second readings of ordinances presented and may pass the third and final reading of the same ordinance within the same council meeting.

Any person with a disability who requires a modification or accommodation in order to participate in the meeting, or any person with limited English proficiency (LEP) who requires language assistance to communicate with the City Council during the meeting, should contact the City Clerk, (515) 967-2418 or [shagan@cityofbondurant.com](mailto:shagan@cityofbondurant.com), no fewer than two business days prior to the meeting to enable the City of Bondurant to make reasonable arrangements to assure accessibility or language assistance for the meeting.

- k. - Resolution approving change order No. 2 to Brothers Cleaning Corporation DBE Brothers Concrete for the Bondurant City Park Reconstruction Project in the amount of \$196,154.41
- l. - Resolution approving Pay Request No. 3 (Final Pay Request) to Brothers Cleaning Corporation DBE Brothers Concrete for the Bondurant City Park Reconstruction Project in the amount of \$780,982.84
- m. - Resolution approving Pay Request No. 3 to Alliance Construction Group LLC for the Civic Campus Improvements Phase 2 Project in the amount of \$67,419.36
- n. - Resolution approving the Hazard Mitigation Plan
- 6. Guests requesting to address the City Council
- 7. Action Items
  - a. O-250203-203 - (Second Reading) Discussion of Cemetery Plot Prices and possible consideration of one or more readings of Ordinance Amending Chapter 115 - Cemetery to Remove Plot Prices and Establish a Fee Schedule
  - b. R-250203-39- Resolution Adopting a Cemetery Fee Schedule (Tabled from February 3, 2025 City Council Meeting)
- 8. Reports / Comments and appropriate action thereon:
  - a. Mayor
  - b. Council Members
  - c. Administrator
  - d. Directors
- 9. **Closed Session**- Pursuant to Iowa Code 21.5.1(j) to discuss property acquisition and 21.5.1(c) potential or pending litigation
- 10. Adjournment

The Bondurant City Council maintains the right to waive the first and second readings of ordinances presented and may pass the third and final reading of the same ordinance within the same council meeting.

Any person with a disability who requires a modification or accommodation in order to participate in the meeting, or any person with limited English proficiency (LEP) who requires language assistance to communicate with the City Council during the meeting, should contact the City Clerk, (515) 967-2418 or [shagan@cityofbondurant.com](mailto:shagan@cityofbondurant.com), no fewer than two business days prior to the meeting to enable the City of Bondurant to make reasonable arrangements to assure accessibility or language assistance for the meeting.





**BUSINESS OF THE CITY COUNCIL  
BONDURANT, IOWA  
AGENDA STATEMENT**

Item No. 5.a.  
For Meeting of 2/18/2025  
**Motion**

**TITLE:** Approval of February 3, 2025, City Council Meeting Minutes

**CONTACT PERSON:**

**BRIEF HISTORY & ANALYSIS:**

**FUNDING SOURCE:**

**STAFF RECOMMENDATION:**

**APPROVED FOR SUBMITTAL:**

**ATTACHMENTS:**

1. February 3, 2025 City Council Meeting Minutes

\*A virtual meeting was offered.

BONDURANT CITY COUNCIL  
Minutes  
February 3, 2025  
Bondurant City Council

1. Roll Call

Present: Mayor Doug Elrod, Council Member Tara Cox,  
Council Member Angela McKenzie, Council  
Member Bob Pepper, Council Member Matt  
Sillanpaa, Council Member Chad Driscoll

City Officials  
Present: City Administrator Marketa Oliver, City Clerk  
Shelby Hagan, Finance & Employee Services  
Director Jene Jess, Public Works Director John  
Horton, Planning & Community Development  
Director Maggie Murray, Fire Chief Aaron  
Kreuder, City Planner Isaac Pezley, City  
Engineer Greg Roth, Assistant Fire Chief  
Anthony Rauterberg

2. Call to Order and Declaring a Quorum

Mayor Elrod called the meeting to order at 06:01 PM and declared a quorum.

3. Abstentions declared

None.

4. Perfecting and Approval of the Agenda

Motion by Pepper, seconded by Driscoll, to amend the agenda by removing item #6b and #10. Vote on Motion 5-0. Motion carried. Motion by Pepper, seconded by Cox, to approve the agenda as amended. Vote on Motion 5-0. Motion carried.

5. Consent Agenda:

*All items listed below are considered routine by the City Council and will be enacted by one motion. There will be no separate discussion of these items unless a Council Member or citizen so requests, in which event the item will be removed from the Consent Agenda and considered separately.*

- a. Approval of January 21, 2025, City Council Meeting Minutes
- b. Claims List & Treasurer's Report
- c. Applications for Council Approval
- d. Receive & File - Library Director's Report
- e. 2024 Planning & Zoning Commission Annual Report

*\*A virtual meeting was offered.*

- f. R-250203-30- Resolution modifying Council Meeting Schedule for Calendar Year 2025
- g. R-250203-31- Resolution Approving Purchase of Service Body from Truck Equipment Inc. in amount of \$20,635.00
- h. R-250203-32- Resolution adopting street design practices policy for the City of Bondurant Street network
- i. R-250203-33- Resolution approving an Independent Contractor Agreement with Joshua Wiener in the amount of \$3,500 for refined design services regarding the proposed Moving Curiously installation along the Chichaqua Valley Trail in the Grain District
- j. R-250203-34- Resolution accepting temporary construction easement and temporary right-of-entry document for the Civic Campus trail construction work at 1920 2nd Street, NE
- k. R-250203-35- Resolution setting date of public hearing on the Application for State Revolving Fund (SRF) Loan for the Water Treatment Plant Project
- l. R-250203-36- Resolution certifying the 2024 Special Federal Census for the City of Bondurant to the Iowa Secretary of State and the Treasurer of the State of Iowa
- m. R-250203-37- Resolution approving pay request No. 4 to Ryan Companies for the Bondurant Emergency Services Facility Project in the amount of \$457,556.81
- n. R-250203-38- Resolution approving the Traffic Safety Improvement Program Funding Agreement in the amount of \$400,000  
City Administrator Oliver presented comments on the Census. Council Member Driscoll questioned item #5h.

Motion by Driscoll, seconded by McKenzie, to Approve the Consent Agenda. Roll Call: Ayes: Cox, McKenzie, Pepper, Sillanpaa, Driscoll. Nays: None. Absent: None. Motion carried 5-0.

6. Guests requesting to address the City Council

- a. Polk County Sheriff's Report  
Lieutenant Grego reported 542 calls of service for January.

*\*A virtual meeting was offered.*

- b. Jill Altringer, Polk County Supervisor  
Unable to attend.

7. **Public Hearing**

- a. Public hearing on the request for rezoning from the Agricultural (A-1) District to the Medium Industrial (M-2) District, on the property located at 1920 2nd Street, NE  
Mayor Elrod opened the public hearing at 06:19 PM.

Planning & Community Development Director Murray explained the rezoning request to the council and the public.

Mayor Elrod closed the public hearing at 06:20 PM.

- b. Public hearing on the request for rezoning from the Conservancy (U-1) District to the Light Industrial (M-1) District, on portions of the property located at 1506 Garfield Street, SW  
Mayor Elrod opened the public hearing at 06:20 PM.

Planning & Community Development Director Murray explained the rezoning request to the council and the public.

Mayor Elrod closed the public hearing at 06:21 PM.

8. **Action Items**

- a. O-250203-201 - (First Reading) Ordinance rezoning property located at 1920 2nd Street NE from the Agricultural (A-1) District to the Medium Industrial (M-2) District  
Motion by McKenzie, seconded by Driscoll, to waive the first and second reading, and approve the third and final reading of O-250203-201. Roll Call: Ayes: Cox, McKenzie, Peffer, Sillanpaa, Driscoll. Nays: None. Absent: None. Motion carried 5-0.
- b. O-250203-202 - (First Reading) Ordinance rezoning portions of the property located at 1506 Garfield Street, SW from the Conservancy (U-1) District to the Light Industrial (M-1) District  
Motion by McKenzie, seconded by Driscoll, to waive the first and second reading, and approve the third and final reading of Approve O-250203-202. Roll Call: Ayes: Cox, McKenzie, Peffer, Sillanpaa, Driscoll. Nays: None. Absent: None. Motion carried 5-0.
- c. O-250203-203 - (First Reading) Discussion of Cemetery Plot Prices and possible consideration of one or more readings of Ordinance Amending Chapter 115 - Cemetery to Remove Plot Prices and Establish a Fee Schedule

*\*A virtual meeting was offered.*

Motion by McKenzie, seconded by Driscoll, to Approve the first reading of O-250203-203. Roll Call: Ayes: Cox, McKenzie, Pepper, Sillanpaa, Driscoll. Nays: None. Absent: None. Motion carried 5-0.

- d. R-250203-39- Discussion and Possible consideration of Resolution Adopting a Cemetery Fee Schedule  
Motion by McKenzie, seconded by Pepper, to Table R-250203-39. Roll Call: Ayes: Cox, McKenzie, Pepper, Sillanpaa, Driscoll. Nays: None. Absent: None. Motion carried 5-0.
- e. R-250203-40- Resolution appointing a Representative to the Mid-Iowa Planning Alliance (MIPA) Board of Directors for CY25  
Motion by McKenzie, seconded by Cox, to Approve R-250203-40 and appoint Council Member Chad Driscoll as the alternate. Roll Call: Ayes: Cox, McKenzie, Pepper, Sillanpaa, Driscoll. Nays: None. Absent: None. Motion carried 5-0.
- f. R-250203-41- Resolution regarding approval of the site plan for BonduBikes at 13 Main Street, SE  
Motion by McKenzie, seconded by Pepper, to Approve R-250203-41. Roll Call: Ayes: Cox, McKenzie, Pepper, Sillanpaa, Driscoll. Nays: None. Absent: None. Motion carried 5-0.
- g. R-250203-42- Discussion and possible consideration of resolution approving the Targeted Business & Industry Program application for the BonduBikes and Crafted Connections project at 13 Main Street, SE  
Motion by Cox, seconded by McKenzie, to Approve R-250203-42. Roll Call: Ayes: Cox, McKenzie, Sillanpaa, Driscoll. Nays: Pepper. Absent: None. Motion carried 4-1.

9. Reports / Comments and appropriate action thereon:

- a. Mayor  
MAC & MPO update.
- b. Council Members  
McKenzie - DART & ICON update.  
Driscoll - BRAVO update.  
Sillanpaa - Upcoming P&Z Workshop.  
Cox - Chamber & Library update.  
Pepper - Questioned the Water Tower's status.
- c. Administrator  
Grant update, Chamber Dinner, splash pad update, Federal Government update.
- d. Directors  
Jess - GFOA update.  
Murray - None.  
Horton - Department update.

*\*A virtual meeting was offered.*

Kreuder - Department update.

Hagan - Department & Chamber update.

10. **Closed Session**- Pursuant to Iowa Code 21.5.1(j) to discuss property acquisition and 21.5.1(c) potential or pending litigation  
Deleted.

11. Adjournment

Motion by Pepper, seconded by Cox, to adjourn at 07:41 PM. Vote on Motion 5-0. Motion carried.

---

Shelby Hagan, City Clerk

ATTEST:

---

Doug Elrod, Mayor

I, the understated Mayor of the City of Bondurant, Polk County, Iowa, hereby certify that the foregoing is a true and accurate copy of proceedings had and done by the City Council on February 3, 2025, that all the subjects included in the foregoing proceedings were contained in the agenda for the meeting kept continually current and readily available for the public inspection at the Office of the City Clerk; that such subject were contained in said agenda for at least twenty-four hours prior to said meeting and the said minutes from which the foregoing proceedings have been extracted were in written form and available for public inspection within ten business days and prior to the next convened meeting of said body.

---

Doug Elrod, Mayor



# Check Register

Packet: APPKT01114 - 2/3/2025 REIMBURSEMENT CHECKS

By Check Number

| Vendor Number                   | Vendor Name    | Payment Date | Payment Type | Discount Amount | Payment Amount | Number |
|---------------------------------|----------------|--------------|--------------|-----------------|----------------|--------|
| Bank Code: AP Bank Code-AP Bank |                |              |              |                 |                |        |
| 2233                            | JENE JESS      | 02/03/2025   | Regular      | 0.00            | 132.72         | 64756  |
| 2676                            | TIFFANY LUING  | 02/03/2025   | Regular      | 0.00            | 208.75         | 64757  |
| 2274                            | CRAIG MARSHMAN | 02/03/2025   | Regular      | 0.00            | 614.56         | 64758  |

| Bank Code AP Bank Code Summary |               |               |          |         |
|--------------------------------|---------------|---------------|----------|---------|
| Payment Type                   | Payable Count | Payment Count | Discount | Payment |
| Regular Checks                 | 3             | 3             | 0.00     | 956.03  |
| Manual Checks                  | 0             | 0             | 0.00     | 0.00    |
| Voided Checks                  | 0             | 0             | 0.00     | 0.00    |
| Bank Drafts                    | 0             | 0             | 0.00     | 0.00    |
| EFT's                          | 0             | 0             | 0.00     | 0.00    |
|                                | 3             | 3             | 0.00     | 956.03  |



Fund Summary

| Fund | Name        | Period | Amount       |
|------|-------------|--------|--------------|
| 999  | POOLED CASH | 2/2025 | 956.03       |
|      |             |        | <hr/> 956.03 |



# Check Register

Packet: APPKT01196 - 2/10/25 AUTOMATED PAYMENTS

By Check Number

| Vendor Number                   | Vendor Name                    | Payment Date | Payment Type  | Discount Amount | Payment Amount | Number    |
|---------------------------------|--------------------------------|--------------|---------------|-----------------|----------------|-----------|
| Bank Code: AP Bank Code-AP Bank |                                |              |               |                 |                |           |
| 2705                            | AMAZON CAPITAL SERVICES        | 02/10/2025   | AP Automation | 0.00            | 1,036.99       | APA000325 |
| 2345                            | AMERICAN WATER WORKS ASSOCIA   | 02/10/2025   | AP Automation | 0.00            | 450.00         | APA000326 |
| 0048                            | BAKER & TAYLOR                 | 02/10/2025   | AP Automation | 0.00            | 1,724.71       | APA000327 |
| 2927                            | CAN PLAY                       | 02/10/2025   | AP Automation | 0.00            | 500.00         | APA000328 |
| 0577                            | CAPITAL CITY EQUIPMENT         | 02/10/2025   | AP Automation | 0.00            | 89.76          | APA000329 |
| 1228                            | CINTAS CORPORATION #762        | 02/10/2025   | AP Automation | 0.00            | 112.95         | APA000330 |
| 0145                            | DIAM PEST CONTROL              | 02/10/2025   | AP Automation | 0.00            | 75.00          | APA000331 |
| 0459                            | GALLS LLC                      | 02/10/2025   | AP Automation | 0.00            | 249.72         | APA000332 |
| 1525                            | GANNETT MEDIA CORP             | 02/10/2025   | AP Automation | 0.00            | 1,888.70       | APA000333 |
| 0185                            | HACH COMPANY                   | 02/10/2025   | AP Automation | 0.00            | 323.05         | APA000334 |
| 0193                            | HAWKEYE TRUCK EQUIPMENT        | 02/10/2025   | AP Automation | 0.00            | 178.20         | APA000335 |
| 2754                            | HR GREEN, INC.                 | 02/10/2025   | AP Automation | 0.00            | 565.50         | APA000336 |
| 0230                            | IOWA ONE CALL                  | 02/10/2025   | AP Automation | 0.00            | 323.70         | APA000337 |
| 2272                            | IAFC MEMBERSHIP                | 02/10/2025   | AP Automation | 0.00            | 17.92          | APA000338 |
| 2337                            | IMAGESTUFF.COM, INC.           | 02/10/2025   | AP Automation | 0.00            | 796.45         | APA000339 |
| 0968                            | KNOX COMPANY                   | 02/10/2025   | AP Automation | 0.00            | 2,098.00       | APA000340 |
| 1340                            | KONICA MINOLTA                 | 02/10/2025   | AP Automation | 0.00            | 535.76         | APA000341 |
| 2642                            | KONICA MINOLTA BUSINESS SOLUTI | 02/10/2025   | AP Automation | 0.00            | 282.64         | APA000342 |
| 2619                            | KONICA MINOLTA PREMIER FINANCI | 02/10/2025   | AP Automation | 0.00            | 288.63         | APA000343 |
| 2619                            | KONICA MINOLTA PREMIER FINANCI | 02/10/2025   | AP Automation | 0.00            | 252.06         | APA000344 |
| 1238                            | LOGOED APPAREL & PROMOTIONS    | 02/10/2025   | AP Automation | 0.00            | 6,214.41       | APA000345 |
| 2236                            | MATHESON TRIGAS INC            | 02/10/2025   | AP Automation | 0.00            | 322.40         | APA000346 |
| 0842                            | MENARDS - ALTOONA              | 02/10/2025   | AP Automation | 0.00            | 1,176.43       | APA000347 |
| 0599                            | MICROMARKETING LLC             | 02/10/2025   | AP Automation | 0.00            | 3,161.37       | APA000348 |
| 2100                            | MIDWEST TAPE, LLC              | 02/10/2025   | AP Automation | 0.00            | 2,425.04       | APA000349 |
| 0308                            | MUNICIPAL SUPPLY, INC.         | 02/10/2025   | AP Automation | 0.00            | 2,077.54       | APA000350 |
| 1457                            | OREILLY AUTO PARTS             | 02/10/2025   | AP Automation | 0.00            | 61.94          | APA000351 |
| 1858                            | OVERDRIVE INC                  | 02/10/2025   | AP Automation | 0.00            | 368.21         | APA000352 |
| 2712                            | PLAYAWAY PRODUCTS LLC          | 02/10/2025   | AP Automation | 0.00            | 54.14          | APA000353 |
| 2574                            | STERICYCLE, INC.               | 02/10/2025   | AP Automation | 0.00            | 522.70         | APA000354 |
| 1534                            | STRATUS BUILDNG SOLUTIONS IOW  | 02/10/2025   | AP Automation | 0.00            | 1,326.56       | APA000355 |
| 2928                            | TERRABOUND SOLUTIONS INC       | 02/10/2025   | AP Automation | 0.00            | 5,530.00       | APA000356 |
| 2661                            | THE REINALT - THOMAS CORPORATI | 02/10/2025   | AP Automation | 0.00            | 244.00         | APA000357 |
| 2310                            | TITAN MACHINERY                | 02/10/2025   | AP Automation | 0.00            | 4,080.00       | APA000358 |
| 2406                            | UNIQUE                         | 02/10/2025   | AP Automation | 0.00            | 58.25          | APA000359 |
| 0525                            | US CELLULAR                    | 02/10/2025   | AP Automation | 0.00            | 306.53         | APA000360 |
| 2887                            | WOODYS AUTO REPAIR SERVICE BOI | 02/10/2025   | AP Automation | 0.00            | 63.19          | APA000361 |

## Bank Code AP Bank Code Summary

| Payment Type   | Payable Count | Payment Count | Discount | Payment   |
|----------------|---------------|---------------|----------|-----------|
| Regular Checks | 0             | 0             | 0.00     | 0.00      |
| Manual Checks  | 0             | 0             | 0.00     | 0.00      |
| Voided Checks  | 0             | 0             | 0.00     | 0.00      |
| Bank Drafts    | 0             | 0             | 0.00     | 0.00      |
| EFT's          | 0             | 0             | 0.00     | 0.00      |
| AP Automation  | 70            | 37            | 0.00     | 39,782.45 |
|                | 70            | 37            | 0.00     | 39,782.45 |

|               |    |    |      |           |
|---------------|----|----|------|-----------|
| AP Automation | 70 | 37 | 0.00 | 39,782.45 |
|---------------|----|----|------|-----------|

Fund Summary

| Fund | Name        | Period | Amount           |
|------|-------------|--------|------------------|
| 999  | POOLED CASH | 2/2025 | 39,782.45        |
|      |             |        | <u>39,782.45</u> |



# Payroll Check Register

## Checks

Pay Period: 1/27/2025-2/9/2025

Packet: PYPKT00663 - 01/27-02/09/25 PAID ON 02/14/25  
Payroll Set: CITY OF BONDURANT, IA - 01

| Employee | Employee # | Check Type | Date | Amount | Number |
|----------|------------|------------|------|--------|--------|
|----------|------------|------------|------|--------|--------|

\*\*\* No Checks Created In This Packet \*\*\*



# Payroll Check Register

## Direct Deposits

Pay Period: 1/27/2025-2/9/2025

Packet: PYPKT00663 - 01/27-02/09/25 PAID ON 02/14/25

Payroll Set: CITY OF BONDURANT, IA - 01

| Employee                  | Employee #           | Date       | Amount   | Number |
|---------------------------|----------------------|------------|----------|--------|
| ADAMS, CASSANDRA          | <a href="#">3148</a> | 02/14/2025 | 244.04   | 106023 |
| ADAMS, CASSANDRA          | <a href="#">3148</a> | 02/14/2025 | 244.03   | 106023 |
| ADKISSON, JENNIFER        | <a href="#">3145</a> | 02/14/2025 | 930.21   | 106024 |
| AGANS, PAYTON             | <a href="#">1602</a> | 02/14/2025 | 1,774.62 | 106025 |
| BAAS, JAMIE               | <a href="#">4147</a> | 02/14/2025 | 273.82   | 106026 |
| BAILEY, BOYCE E           | <a href="#">7104</a> | 02/14/2025 | 1,392.31 | 106027 |
| BERGESON, JOHN W          | <a href="#">7121</a> | 02/14/2025 | 2,018.24 | 106028 |
| BRIGGS, ASHTON S          | <a href="#">1511</a> | 02/14/2025 | 791.00   | 106029 |
| BUCKLIN, JEFFERY D        | <a href="#">1562</a> | 02/14/2025 | 266.32   | 106030 |
| CARPENTER, JOHN C         | <a href="#">5129</a> | 02/14/2025 | 1,651.02 | 106031 |
| CLAMAN, CATHERINE JO      | <a href="#">3146</a> | 02/14/2025 | 376.03   | 106032 |
| CLAMAN, CATHERINE JO      | <a href="#">3146</a> | 02/14/2025 | 250.68   | 106032 |
| COLLISON, PATRICK F       | <a href="#">5103</a> | 02/14/2025 | 2,378.97 | 106033 |
| CORY, JOHN P              | <a href="#">7120</a> | 02/14/2025 | 1,629.47 | 106034 |
| CRITTENDEN, MATTHEW       | <a href="#">1567</a> | 02/14/2025 | 1,353.89 | 106035 |
| DE LOS SANTOS, JUAN DAVID | <a href="#">7128</a> | 02/14/2025 | 1,525.29 | 106036 |
| DENHAM, DARIN             | <a href="#">7129</a> | 02/14/2025 | 1,475.19 | 106037 |
| DOMINGUEZ, MATTHEW P      | <a href="#">1513</a> | 02/14/2025 | 631.49   | 106038 |
| ELLIOTT, KYLE             | <a href="#">1568</a> | 02/14/2025 | 502.80   | 106039 |
| GANNAWAY, COURTNEY        | <a href="#">1597</a> | 02/14/2025 | 967.25   | 106040 |
| GILSON, DUSTY ALAN        | <a href="#">7124</a> | 02/14/2025 | 1,575.37 | 106041 |
| HAGAN, SHELBY L           | <a href="#">5118</a> | 02/14/2025 | 2,733.60 | 106042 |
| HARMISON, TROY G          | <a href="#">1503</a> | 02/14/2025 | 1,856.68 | 106043 |
| HIGGINS, DAVID P.         | <a href="#">7105</a> | 02/14/2025 | 1,538.97 | 106044 |
| HOFFMAN, JOSHUA MATTHEW   | <a href="#">1578</a> | 02/14/2025 | 903.01   | 106045 |
| HORTON, JOHN C            | <a href="#">7112</a> | 02/14/2025 | 3,667.33 | 106046 |
| HORTON, JOHN C            | <a href="#">7112</a> | 02/14/2025 | 100.00   | 106046 |
| HUFF, TIMOTHY J           | <a href="#">1559</a> | 02/14/2025 | 2,284.86 | 106047 |
| JESS, JENE' N             | <a href="#">5123</a> | 02/14/2025 | 3,544.59 | 106048 |
| JOHNSON, ANNASTASHA       | <a href="#">5130</a> | 02/14/2025 | 1,461.52 | 106049 |
| KING, CHRISTINA M         | <a href="#">3143</a> | 02/14/2025 | 535.41   | 106050 |
| KLINKER-FELD, MICHELL M   | <a href="#">3135</a> | 02/14/2025 | 2,609.82 | 106051 |
| KLUS, KATIE               | <a href="#">5134</a> | 02/14/2025 | 1,720.43 | 106052 |
| KOBER, ANDREW M           | <a href="#">1557</a> | 02/14/2025 | 443.78   | 106053 |
| KREUDER, AARON M          | <a href="#">1441</a> | 02/14/2025 | 3,921.67 | 106054 |
| KRUSE, OSCAR              | <a href="#">1586</a> | 02/14/2025 | 1,061.69 | 106055 |
| LUING, TIFFANY A          | <a href="#">5133</a> | 02/14/2025 | 1,915.20 | 106056 |
| LUNDQUIST, BRADLEY D      | <a href="#">1555</a> | 02/14/2025 | 997.36   | 106057 |
| MARSHMAN, CRAIG A         | <a href="#">5125</a> | 02/14/2025 | 1,751.10 | 106058 |
| MASON, KYLE               | <a href="#">1598</a> | 02/14/2025 | 1,035.73 | 106059 |
| MERRILL, SARAH J          | <a href="#">1590</a> | 02/14/2025 | 3,242.33 | 106060 |
| MEYERES, KYLEIGH          | <a href="#">1601</a> | 02/14/2025 | 702.63   | 106061 |
| MILLER, BRODY E           | <a href="#">1582</a> | 02/14/2025 | 1,950.91 | 106062 |
| MURRAY, MARGARET          | <a href="#">5126</a> | 02/14/2025 | 3,276.54 | 106063 |
| OLIVER, MARKETA S         | <a href="#">8403</a> | 02/14/2025 | 300.00   | 106064 |
| OLIVER, MARKETA S         | <a href="#">8403</a> | 02/14/2025 | 3,918.69 | 106064 |
| PEZLEY, ISAAC J           | <a href="#">5132</a> | 02/14/2025 | 2,360.43 | 106065 |
| POWELL, TREVOR ALAN       | <a href="#">7130</a> | 02/14/2025 | 519.13   | 106066 |
| RAUTERBERG, ANTHONY       | <a href="#">1599</a> | 02/14/2025 | 2,686.60 | 106067 |
| REYNOLDS, RAY A           | <a href="#">1537</a> | 02/14/2025 | 834.04   | 106068 |
| RICCIO, ANTHONY F         | <a href="#">1583</a> | 02/14/2025 | 710.26   | 106069 |

| Employee                 | Employee #           | Date       | Amount   | Number |
|--------------------------|----------------------|------------|----------|--------|
| SCHINCKE, MEGAN          | <a href="#">3137</a> | 02/14/2025 | 125.00   | 106070 |
| SCHINCKE, MEGAN          | <a href="#">3137</a> | 02/14/2025 | 1,283.87 | 106070 |
| SEXTON, WILLIAM M        | <a href="#">7125</a> | 02/14/2025 | 1,213.99 | 106071 |
| SEXTON, WILLIAM M        | <a href="#">7125</a> | 02/14/2025 | 250.00   | 106071 |
| SOCKNESS TEEPLE, MEGAN E | <a href="#">3147</a> | 02/14/2025 | 2,010.08 | 106072 |
| SOCKNESS TEEPLE, MEGAN E | <a href="#">3147</a> | 02/14/2025 | 250.00   | 106072 |
| SPENCER, OWEN            | <a href="#">1603</a> | 02/14/2025 | 258.42   | 106073 |
| SPOERRY, DANIELLE M      | <a href="#">1527</a> | 02/14/2025 | 1,864.10 | 106074 |
| SUHR, CARLENE E.F.       | <a href="#">3144</a> | 02/14/2025 | 1,464.88 | 106075 |
| SUMMERS, AANNA N         | <a href="#">1575</a> | 02/14/2025 | 1,970.46 | 106076 |
| SUMMERS, ALAN C          | <a href="#">1534</a> | 02/14/2025 | 2,021.03 | 106077 |
| WELTHA, CLAYTON          | <a href="#">1566</a> | 02/14/2025 | 586.14   | 106078 |



# Payroll Check Register Report Summary

Pay Period: 1/27/2025-2/9/2025

Packet: PYPKT00663 - 01/27-02/09/25 PAID ON 02/14/25  
Payroll Set: CITY OF BONDURANT, IA - 01

| Type            | Count     | Amount           |
|-----------------|-----------|------------------|
| Regular Checks  | 0         | 0.00             |
| Manual Checks   | 0         | 0.00             |
| Reversals       | 0         | 0.00             |
| Voided Checks   | 0         | 0.00             |
| Direct Deposits | 63        | 90,134.32        |
| <b>Total</b>    | <b>63</b> | <b>90,134.32</b> |



# Payroll Check Register

## Checks

Pay Period: 1/27/2025-2/9/2025

Packet: PYPKT00662 - 2/14/25 BUCKLIN VACATION PAYOUT  
Payroll Set: CITY OF BONDURANT, IA - 01

| Employee | Employee # | Check Type | Date | Amount | Number |
|----------|------------|------------|------|--------|--------|
|----------|------------|------------|------|--------|--------|

\*\*\* No Checks Created In This Packet \*\*\*





# Payroll Check Register

## Direct Deposits

Pay Period: 1/27/2025-2/9/2025

Packet: PYPKT00662 - 2/14/25 BUCKLIN VACATION PAYOUT

Payroll Set: CITY OF BONDURANT, IA - 01

| Employee           | Employee #           | Date       | Amount | Number |
|--------------------|----------------------|------------|--------|--------|
| BUCKLIN, JEFFERY D | <a href="#">1562</a> | 02/14/2025 | 52.12  | 106079 |



# Payroll Check Register

## Report Summary

Pay Period: 1/27/2025-2/9/2025

Packet: PYPKT00662 - 2/14/25 BUCKLIN VACATION PAYOUT  
Payroll Set: CITY OF BONDURANT, IA - 01

| Type            | Count    | Amount       |
|-----------------|----------|--------------|
| Regular Checks  | 0        | 0.00         |
| Manual Checks   | 0        | 0.00         |
| Reversals       | 0        | 0.00         |
| Voided Checks   | 0        | 0.00         |
| Direct Deposits | 1        | 52.12        |
| <b>Total</b>    | <b>1</b> | <b>52.12</b> |



# Refund Check Register

## Refund Check Detail

UBPKT06414 - Refunds 01 UBPKT06412 Regular

| Account           | Name                     | Date     | Check # | Amount                 | Code     | Receipt | Amount | Type                   |
|-------------------|--------------------------|----------|---------|------------------------|----------|---------|--------|------------------------|
| 01-01183-02       | KOCK, CLARE M            | 2/7/2025 | 64759   | 122.64                 |          |         | 122.64 | Generated From Billing |
| 01-01662-02       | KENNETH CORNELIUS        | 2/7/2025 | 64760   | 10.73                  |          |         | 10.73  | Generated From Billing |
| 01-01700-03       | GROTH, AUSTIN D          | 2/7/2025 | 64761   | 73.57                  |          |         | 73.57  | Generated From Billing |
| 01-02400-06       | JOHNSTON, TYLER M        | 2/7/2025 | 64762   | 36.19                  |          |         | 36.19  | Deposit                |
| 01-02411-10       | MCKENY, CRYSTAL D        | 2/7/2025 | 64763   | 69.46                  |          |         | 69.46  | Generated From Billing |
| 01-05180-07       | RICHMOND, KATRINA        | 2/7/2025 | 64764   | 67.38                  |          |         | 67.38  | Deposit                |
| 04-03439-03       | ROBERTS, MASON A         | 2/7/2025 | 64765   | 109.97                 |          |         | 109.97 | Deposit                |
| 06-02482-02       | HILL, BROCK A            | 2/7/2025 | 64766   | 122.64                 |          |         | 122.64 | Generated From Billing |
| 15-01426-02       | FELIX & RITA HINSON      | 2/7/2025 | 64767   | 108.10                 |          |         | 108.10 | Deposit                |
| 16-01811-02       | BRANDON & KRISTIN COOK   | 2/7/2025 | 64768   | 161.92                 |          |         | 161.92 | Generated From Billing |
| 16-01965-00       | GH HOMES LLC             | 2/7/2025 | 64769   | 52.16                  |          |         | 52.16  | Deposit                |
| 16-01977-00       | BERKEY HOMEBUILDERS, INC | 2/7/2025 | 64770   | 108.12                 |          |         | 108.12 | Deposit                |
| 16-02057-00       | LLC, D R HORTON - IOWA,  | 2/7/2025 | 64771   | 115.82                 |          |         | 115.82 | Generated From Billing |
| 16-02069-00       | D R HORTON - IOWA, LLC   | 2/7/2025 | 64772   | 117.76                 |          |         | 117.76 | Generated From Billing |
| Total Refunds: 14 |                          |          |         | Total Refunded Amount: | 1,276.46 |         |        |                        |

## Revenue Code Summary

| Revenue Code            | Amount  |
|-------------------------|---------|
| 996 - UNAPPLIED CREDITS | 1276.46 |
| Revenue Total:          | 1276.46 |

## General Ledger Distribution

Posting Date: 02/03/2025

|       | Account Number      | Account Name         | Posting Amount | IFT |
|-------|---------------------|----------------------|----------------|-----|
| Fund: | 600 - WATER         |                      |                |     |
|       | 600-000-1101        | CLAIM ON POOLED CASH | -1,276.46      | Yes |
|       | 600-050-2141        | APPLIED CREDITS      | 1,276.46       |     |
|       | 600 Total:          |                      | 0.00           |     |
| Fund: | 999 - POOLED CASH   |                      |                |     |
|       | 999-000-1100        | POOLED CASH          | -1,276.46      |     |
|       | 999-050-2300        | DUE TO OTHER FUNDS   | 1,276.46       | Yes |
|       | 999 Total:          |                      | 0.00           |     |
|       | Distribution Total: |                      | 0.00           |     |



# Payable Register

## Payable Detail by Vendor Name

Packet: APPKT01200 - PYPKT00662 - 2/14/25 BUCKLIN VACATION  
PAYOUT

| Payable #           | Payable Type | Post Date | Payable Date | Due Date | Discount Date | Amount | Tax | Shipping | Discount | Total |
|---------------------|--------------|-----------|--------------|----------|---------------|--------|-----|----------|----------|-------|
| Payable Description | Bank Code    |           |              |          | On Hold       |        |     |          |          |       |

Vendor: [0238 - IOWA WORKFORCE DEVELOPMENT](#)

Vendor Total: 0.17

|                            |                        |           |           |           |           |                         |      |             |      |            |
|----------------------------|------------------------|-----------|-----------|-----------|-----------|-------------------------|------|-------------|------|------------|
| <a href="#">INV0004584</a> | Invoice                | 3/28/2025 | 3/28/2025 | 3/28/2025 | 3/28/2025 | 0.17                    | 0.00 | 0.00        | 0.00 | 0.17       |
| Unemployment Insurance     | AP Bank Code - AP Bank |           |           |           | No        | Payment Date: 3/28/2025 |      | Bank Draft: |      | DFT0003684 |

### Items

| Item Description       | Commodity | Units | Price | Amount | Tax  | Shipping | Discount | Total |
|------------------------|-----------|-------|-------|--------|------|----------|----------|-------|
| Unemployment Insurance | NA        | 0.00  | 0.00  | 0.17   | 0.00 | 0.00     | 0.00     | 0.17  |

### Distributions

| Account Number               | Account Name      | Project Account Key | Amount | Percent |
|------------------------------|-------------------|---------------------|--------|---------|
| <a href="#">112-050-2122</a> | STATE WITHHOLDING |                     | 0.17   | 100.00% |

Vendor: [1512 - IRS USATAXPYMT](#)

Vendor Total: 8.64

|                            |                        |           |           |           |           |                         |      |             |      |            |
|----------------------------|------------------------|-----------|-----------|-----------|-----------|-------------------------|------|-------------|------|------------|
| <a href="#">INV0004583</a> | Invoice                | 2/14/2025 | 2/14/2025 | 2/14/2025 | 2/14/2025 | 8.64                    | 0.00 | 0.00        | 0.00 | 8.64       |
| Federal Tax Withheld       | AP Bank Code - AP Bank |           |           |           | No        | Payment Date: 2/14/2025 |      | Bank Draft: |      | DFT0003683 |

### Items

| Item Description            | Commodity | Units | Price | Amount | Tax  | Shipping | Discount | Total |
|-----------------------------|-----------|-------|-------|--------|------|----------|----------|-------|
| Social Security Withholding | NA        | 0.00  | 0.00  | 7.00   | 0.00 | 0.00     | 0.00     | 7.00  |

### Distributions

| Account Number               | Account Name              | Project Account Key | Amount | Percent |
|------------------------------|---------------------------|---------------------|--------|---------|
| <a href="#">112-050-2121</a> | FICA/MEDICARE WITHHOLDING |                     | 7.00   | 100.00% |

### Items

| Item Description     | Commodity | Units | Price | Amount | Tax  | Shipping | Discount | Total |
|----------------------|-----------|-------|-------|--------|------|----------|----------|-------|
| Medicare Withholding | NA        | 0.00  | 0.00  | 1.64   | 0.00 | 0.00     | 0.00     | 1.64  |

### Distributions

| Account Number               | Account Name              | Project Account Key | Amount | Percent |
|------------------------------|---------------------------|---------------------|--------|---------|
| <a href="#">112-050-2121</a> | FICA/MEDICARE WITHHOLDING |                     | 1.64   | 100.00% |

Payable Summary

| Type         | Count | Gross | Tax  | Shipping | Discount | Total | Manual Payment | Balance |
|--------------|-------|-------|------|----------|----------|-------|----------------|---------|
| Invoice      | 2     | 8.81  | 0.00 | 0.00     | 0.00     | 8.81  | 8.81           | 0.00    |
| Grand Total: |       | 8.81  | 0.00 | 0.00     | 0.00     | 8.81  | 8.81           | 0.00    |

Account Summary

| Account                      | Name                      | Amount |
|------------------------------|---------------------------|--------|
| <a href="#">112-050-2121</a> | FICA/MEDICARE WITHHOLDING | 8.64   |
| <a href="#">112-050-2122</a> | STATE WITHHOLDING         | 0.17   |
| Total:                       |                           | 8.81   |

**Tax Abatement Applications**  
**February 18, 2025**  
**City of Bondurant**

| Name                  | Address                         | Closing Date | Cost          |
|-----------------------|---------------------------------|--------------|---------------|
| AAA+E Truck Shop, LLC | 601 23 <sup>rd</sup> Street, SW | 11/18/2025   | \$2.3 Million |
|                       |                                 |              |               |
|                       |                                 |              |               |
|                       |                                 |              |               |
|                       |                                 |              |               |
|                       |                                 |              |               |
|                       |                                 |              |               |
|                       |                                 |              |               |
|                       |                                 |              |               |
|                       |                                 |              |               |
|                       |                                 |              |               |
|                       |                                 |              |               |
|                       |                                 |              |               |
|                       |                                 |              |               |
|                       |                                 |              |               |

# Bondurant Emergency Services

January 2025

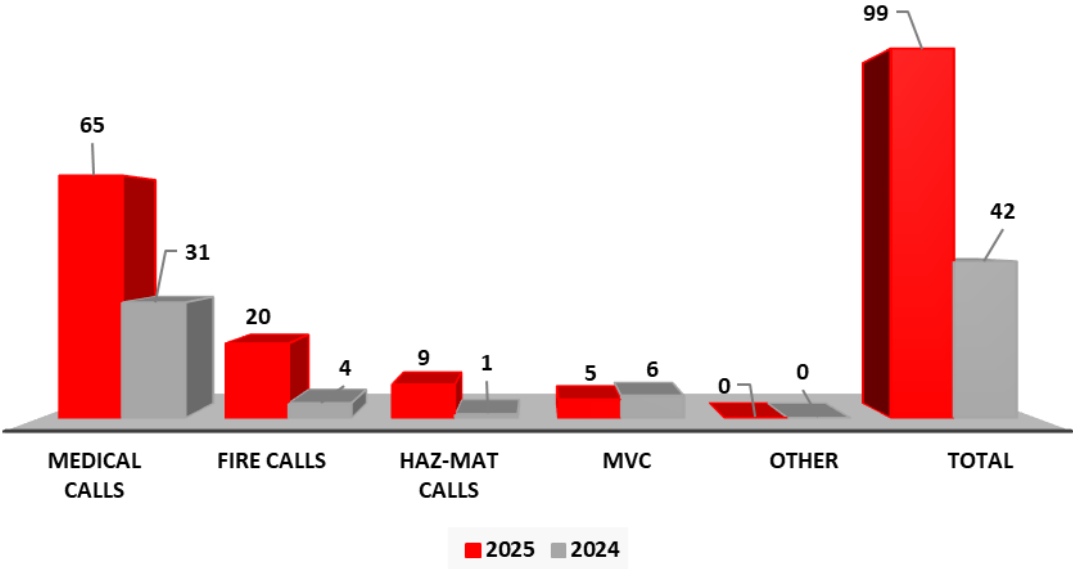
Monthly Report





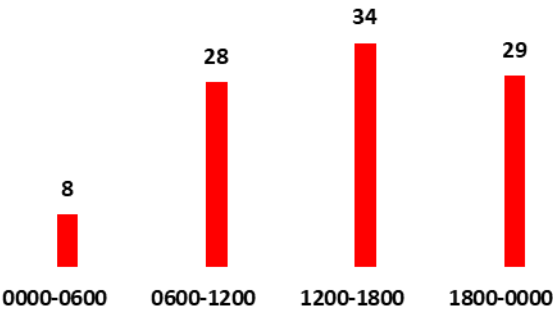
# Operational Statistics

## 2 year January Comparison

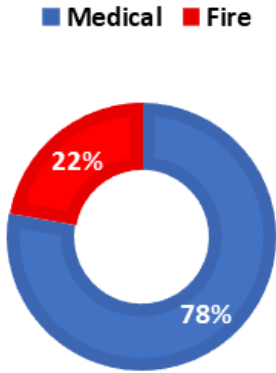


Number of Calls in 6 Hour Blocks

All-Time  
Record Month For January



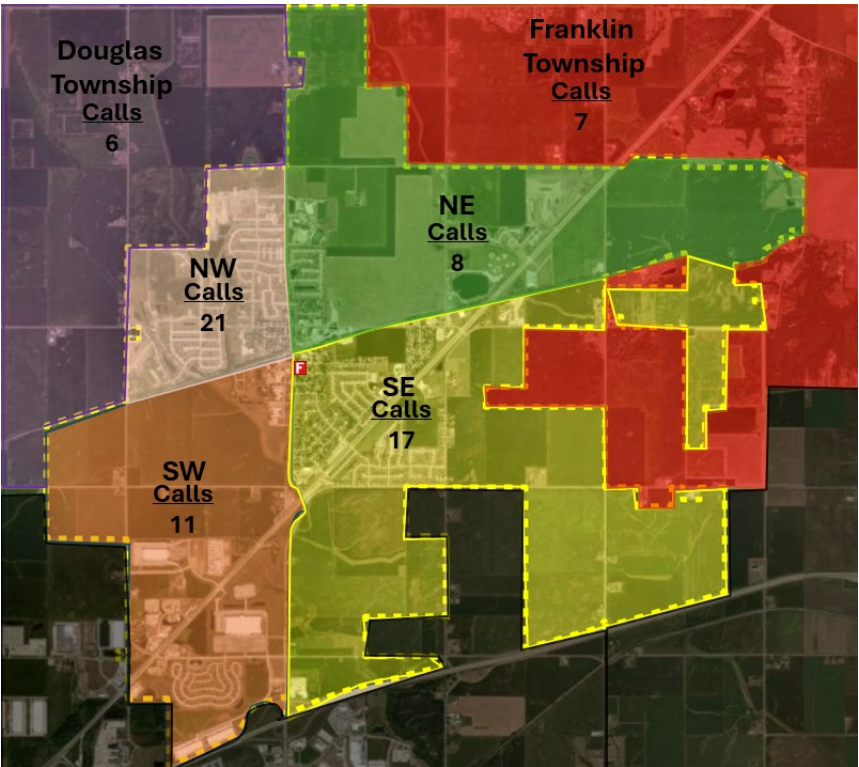
## SIMULTANEOUS CALL BREAKDOWN



| Simultaneous Calls |   |                   |   |
|--------------------|---|-------------------|---|
| 2024               |   | 2025              |   |
| 2nd out calls      | 2 | 2nd out calls     | 9 |
| 3rd out calls      | 0 | 3rd out calls     | 0 |
| 4th+ out calls     | 0 | 4th+ out calls    | 0 |
| TOTAL              | 2 | TOTAL             | 9 |
| 5% Multiple Calls  |   | 9% Multiple Calls |   |

# Operational Statistics

## Number of Calls per District In January



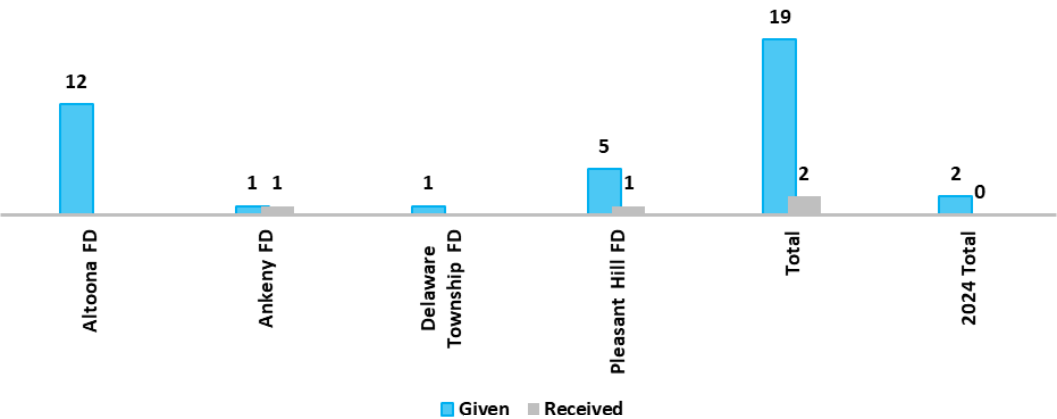
Closest Unit Response Incidents (CUR)  
Given



Closest Unit Response Incidents (CUR)  
Received

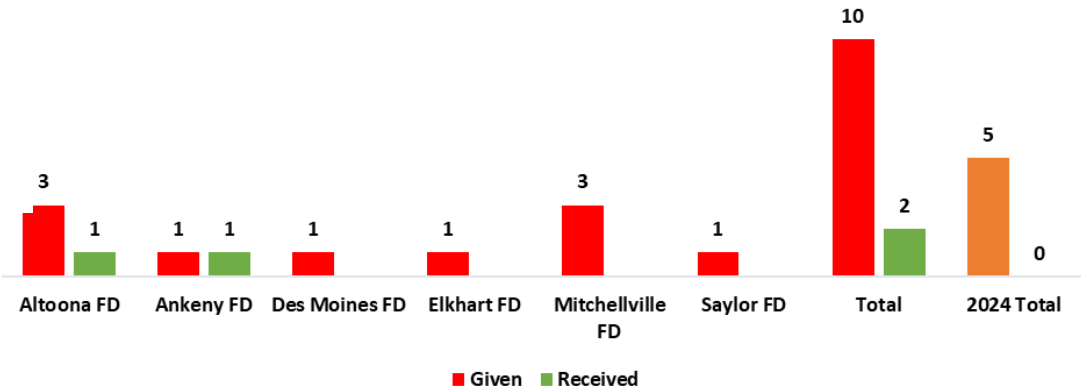


## January Automatic Aid Given vs Received



## January Mutual Aid Given vs Received

Incidents Unable to Respond

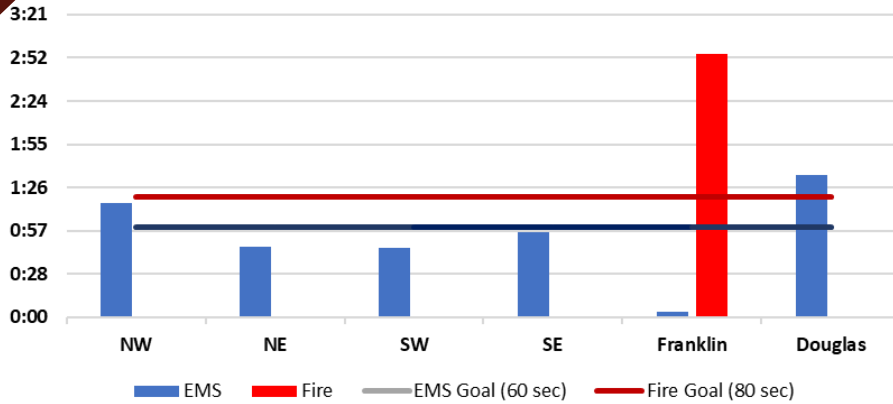


# Operational Statistics

## Response Times

### Emergent Response

Chute Times  
(emergent response)

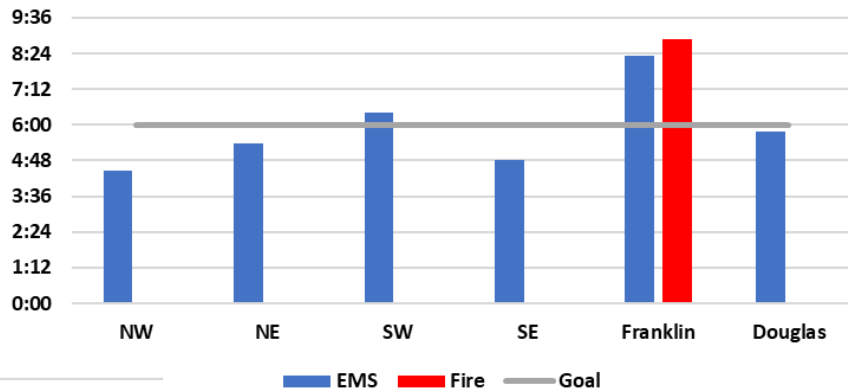


Delayed response due to multiple calls or staffing levels

Chute- 4:08

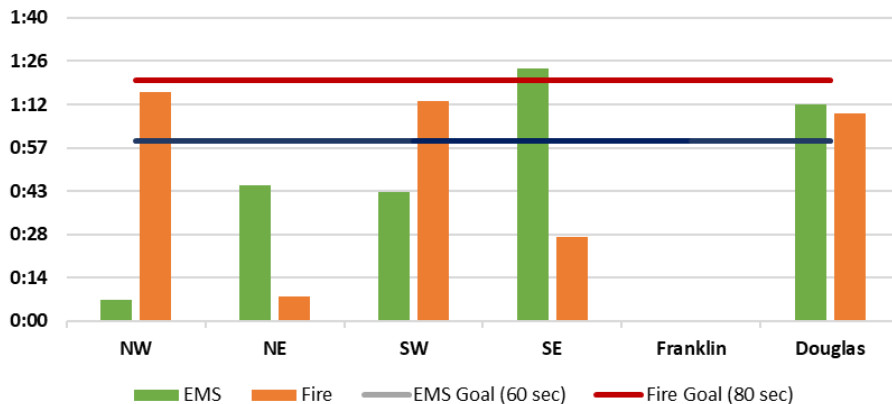
Response- 7:53

Response Times By District  
(emergent response)

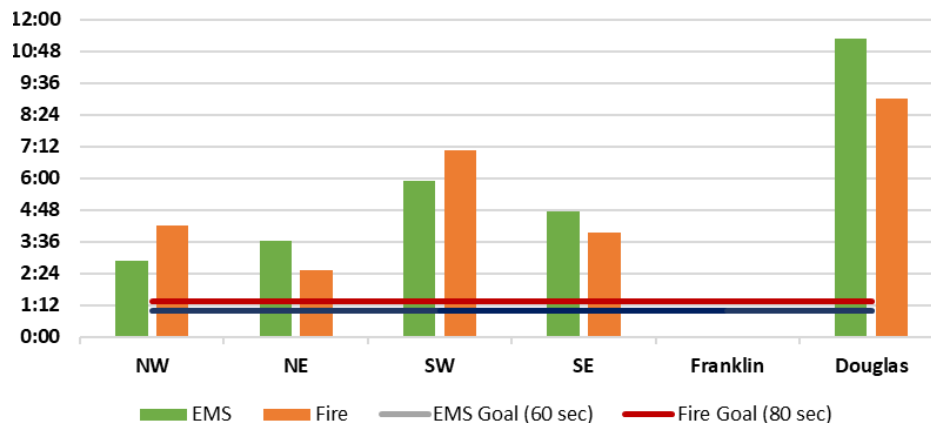


## Non-Emergent Response

Chute Times  
(non-emergent response)



Response Times  
(non-emergent response)

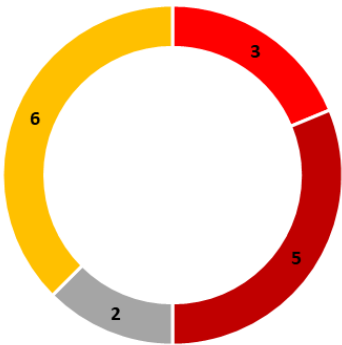


# Fire Operational Statistics

| January Fire Saved vs. Loss |      |             |       |       |             |
|-----------------------------|------|-------------|-------|-------|-------------|
| 2024                        |      |             | 2025  |       |             |
| Saved                       | Loss | Total Value | Saved | Loss  | Total Value |
| \$0                         | \$0  | \$0         | \$    | \$200 | \$200       |



Fire Alarm Breakdown



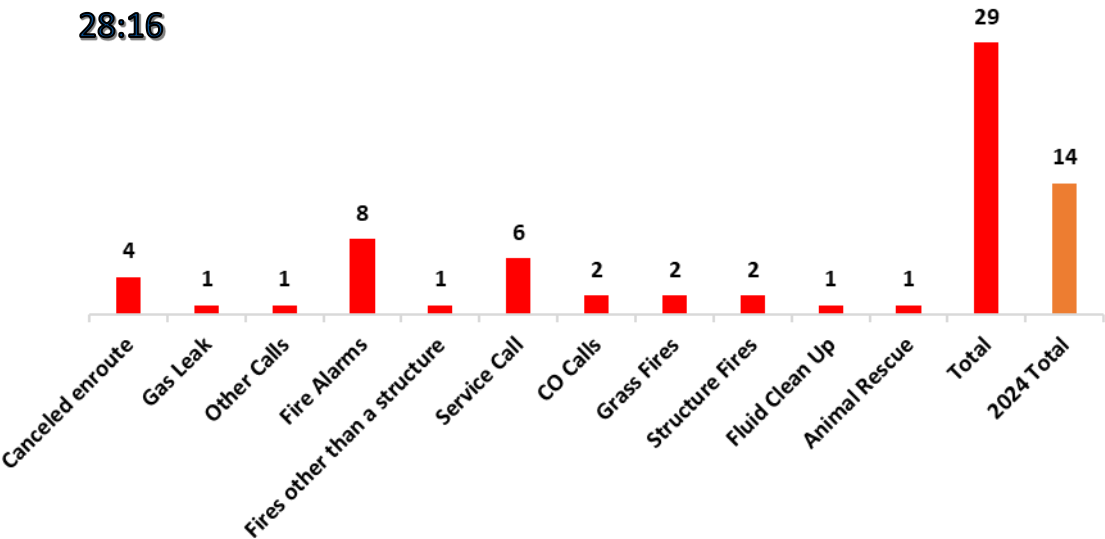
■ Commercial Alarm ■ Residential Alarm ■ Good Alarms ■ False Alarms



Average Fire Incident Time

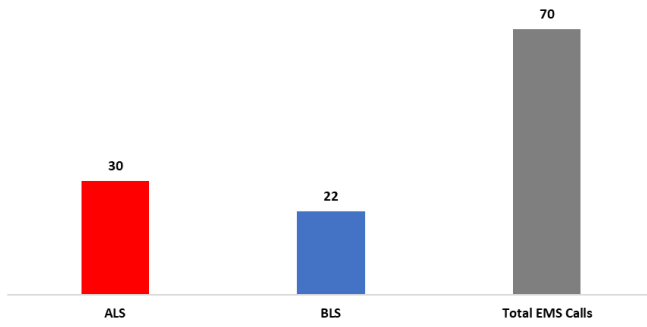
28:16

Fire/Haz-Mat/Other

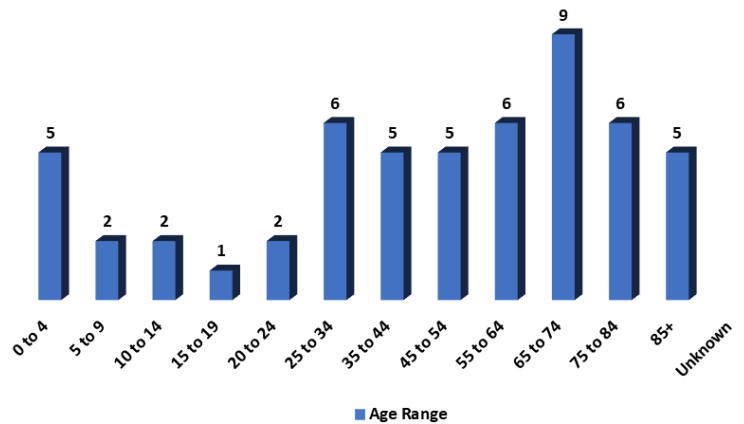


# EMS Operational Statistics

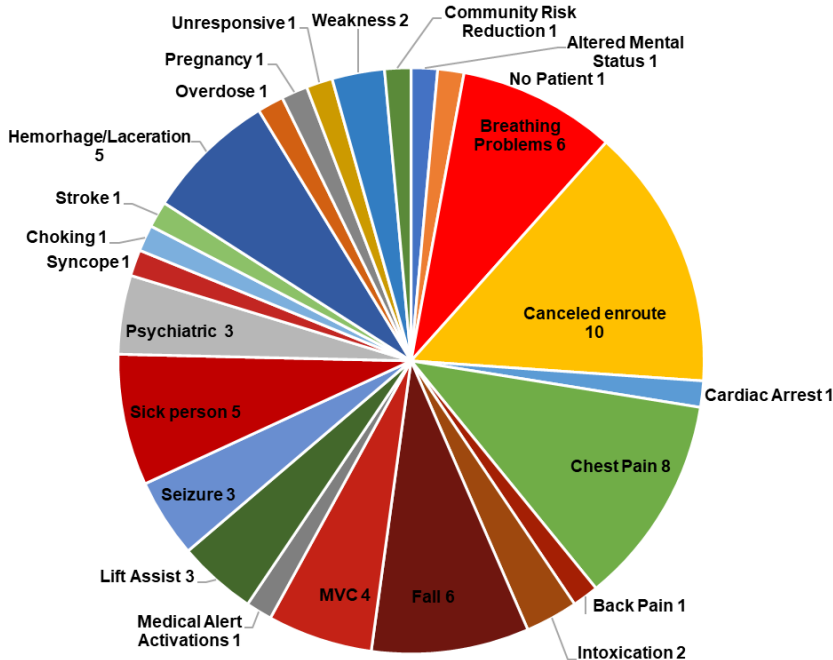
Advanced/Basic Life Support Calls



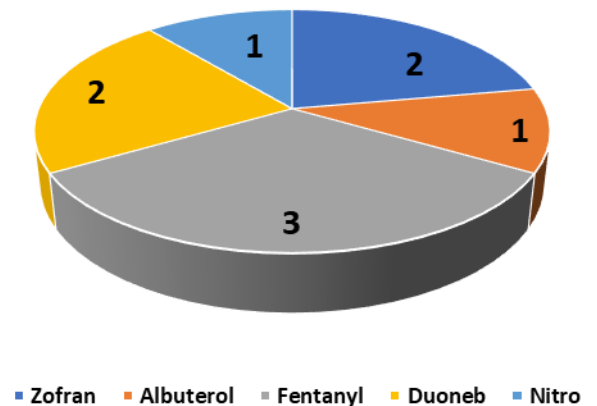
Patient Age Demographics



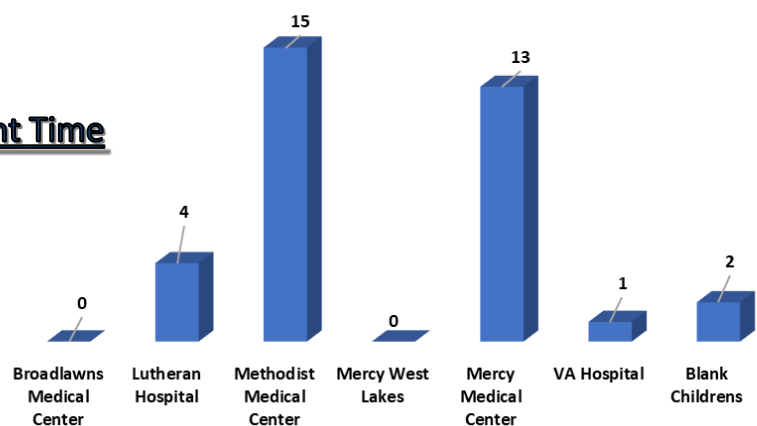
EMS Call Purpose by Provider Primary Impression



Medications Administered



Hospital Destination Transports



Average EMS Incident Time

49:20



# Training Division

For the month of January department members trained on the following:

## Fire Training

Aerial Operations  
Engineer Training  
Building Construction  
Driving Simulator

## EMS Training

CPR Renewal  
ACLS Renewal

## Professional Development

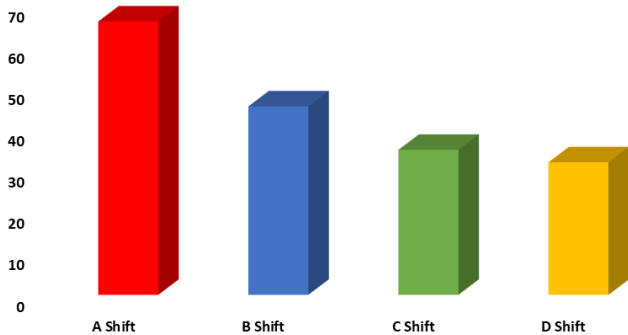
Mentoring

## SOG's/Protocol Review

Lucas Device  
Rehab  
Discontinuation of CPR  
AED & Manual Defib  
Orientation Program



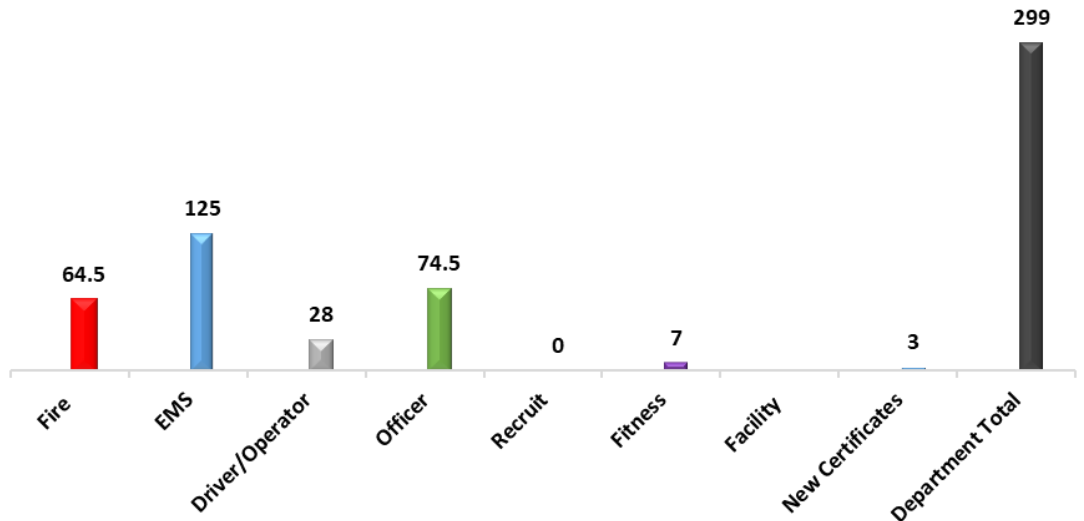
Total Training Hours Per Shift



## New Clearance

Kyle Elliot- Ladder

Training Hours By Type

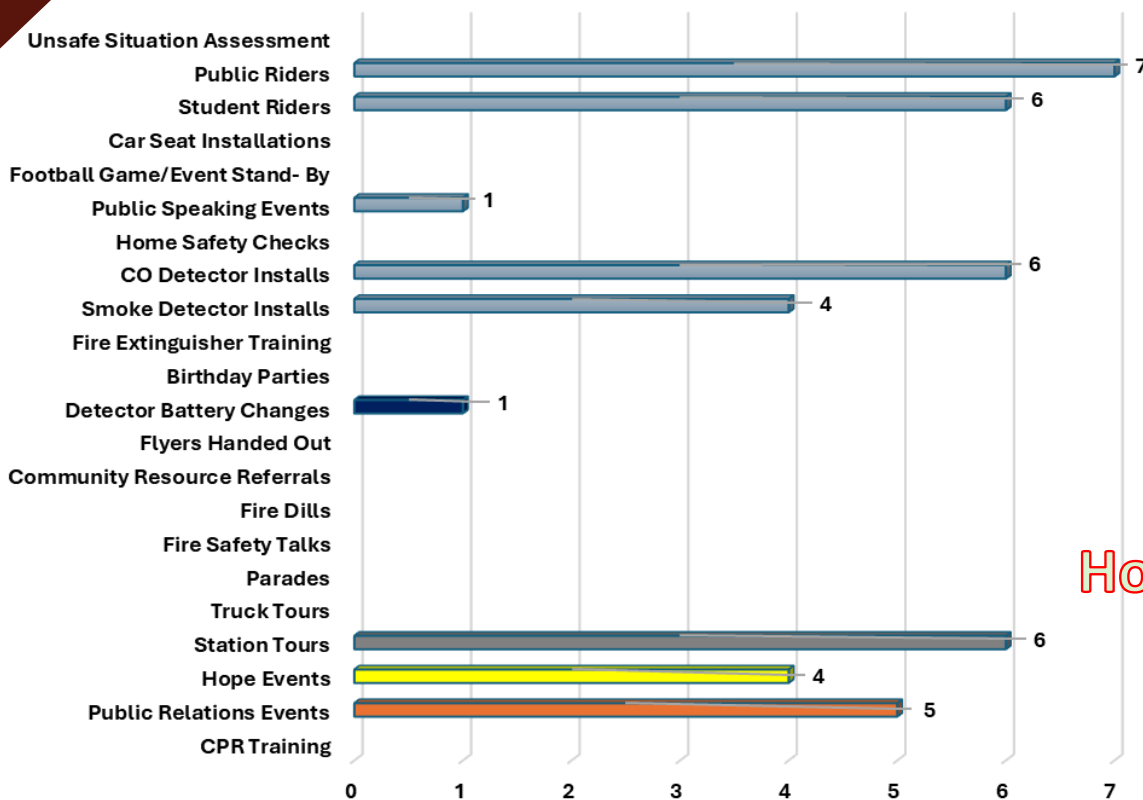


## New Certifications

Kyle Elliot- Driver/Operator- Aerial  
Ray Reynolds- EFO 2nd Class

# Community Risk Reduction/ Public Education

## Community Risk Reduction/Public Events

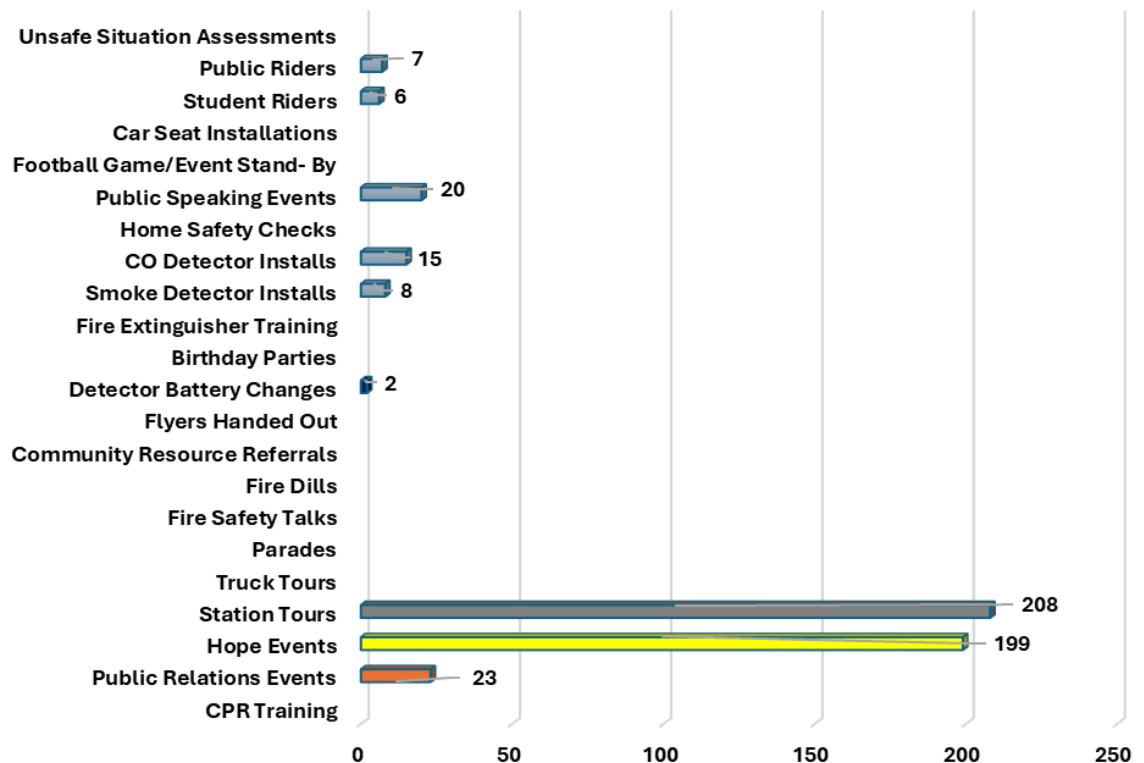


**40 Events  
Attended**

**96.5 Total  
Hours Dedicated**

**488 Total Citizens Outreached**

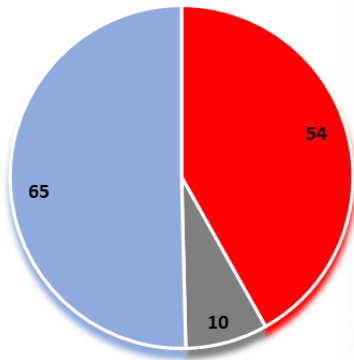
**Citizens Served**





# Code Enforcement

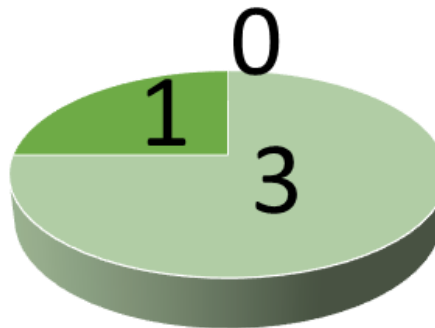
Station Work Hours



■ Station Work Detail ■ Maintenance ■ PT Admin Hours



Code Enforcement



■ Commercial Inspections ■ Alarm Tests ■ Site Plan Reviews

Reinspections Completed



Violations





# Incidents & Happenings



## **January 13th– Paramedic School** 101 Grant St. N., Fire Station– Bondurant

Two members began their paramedic journey. This will greatly enhance the service to the citizens and visitors of Bondurant.

## **January 11th– Department Christmas Party** 315 2nd St. NW, American Legion– Bondurant

The Department had its annual Christmas party. Plaques were given for years of service to 3 former members.



## **January 13th– Animal Rescue** 101 Grant St. N., Fire Station– Bondurant

E412 responded to assist animal control with getting a cat off a roof. The home owner stopped by to say thanks afterwards

## **January 15th– Grain Bin Rescue** 6000 Blk. NE 78th Ave– Bondurant

E412 & A414 responded to a grain bin rescue. Crews found one person inside a bin of corn. Crews extricated the patient out of the bin and transported to a local hospital.



## **January 23rd– Structure Fire** 4300 Blk. Sheridan Ave– Delaware Township

E412, & C410 responded automatic aid to Delaware Township for a structure fire. Crews assisted with fire extinguishment and overhaul. They were on scene about an hour and a half. No injuries were reported.

## **January 26th– Structure Fire** 15100 Blk. NE 68th St.– Elkhart

E412 responded mutual aid to Elkhart for a structure fire. Crews assisted with fire extinguishment and overhaul. They were on scene about an hour and a half. No injuries were reported.



## **January 26th-31st– EFO Class** National Fire Academy– Maryland

Lt. Ray Reynolds attended Class 2 of this Executive Fire Officer Program. This is an elite class for fire service chief officers.

# Incidents & Happenings



## January 26th– Motor Vehicle Collision

11000 Blk. NE 64th Ave– Bondurant

E412, & A414 responded to a call for wires down. Upon arrival, crews found a vehicle on its side with a patient trapped in the vehicle and live wires on the car. An ambulance was requested and power company. Once power was shut off, patient was extricated through the windshield. Minor injuries were reported. They were on scene about an hour and a half.



## January 29th– Grass Fire

4100 Blk. Broadway Ave– Des Moines

E412 was requested mutual aid to Des Moines for a large grass fire. Crews assisted with fire extinguishment and were on scene for about 2.5 hours.



## January 30th– Motor Vehicle Collision

1200 Blk. Hubbell Ave– Bondurant

A414 & C421 responded to a call for an MVC with significant damage. Due to staffing, the engine was not available to respond. Upon arrival, crews found a two car crash with one occupant in a vehicle. One patient was transported to a local hospital.

# Public Relations



## **January 22nd– Station Tour**

101 Grant St. N., Fire Station– Bondurant

1st graders from Morris Elementary stopped by for a tour. They learned about the fire engines, ambulances, and the equipment.

## **January 23rd– Station Tour**

101 Grant St. N., Fire Station– Bondurant

1st graders from Morris Elementary stopped by for a tour. They learned about the fire engines, ambulances and the equipment.



## **January 24th– Station Tour**

101 Grant St. N., Fire Station– Bondurant

1st graders from Morris Elementary stopped by for a tour. They learned about the fire engines, ambulances and the equipment.

# You've Been Caught Doing an Amazing Job!

Dear Bondurant Fire station,

Thank you so much  
for allowing our first grade  
class to come and visit.  
You all went above and  
beyond to make us have  
the best time! We loved  
going through all the  
vehicles, meeting Hope,  
showing us all the supplies,  
and all the goodies we  
received. We appreciate all you  
do! 😊 Thanks,  
Niobe Shield  
and class

Bondurant Emergency Crew  
THANK YOU! We  
can't thank you enough  
for taking the time out  
of your day to show  
us the fire station and  
equipment inside! We  
had a blast spending  
our morning with  
you! Thank you for  
expanding our learning  
outside of the classroom.  
♡ Mrs. Dolash's  
1st Grade Class





## Librarian items: January 2025

- Director Klinker-Feld attended City Council meeting on January 6
- Director Klinker-Feld attended the City Staff Meetings on January 7, 14, and 28.
- Director Klinker-Feld Attended the City's B.O.L.D. meeting on January 8. The topic was OSHA and FSLA information.
- Grimes Public Library found a replacement company for the Adventure Pass. They are working diligently to get it up and running hopefully before the end of February.
- A new Library Clerk has been hired. Ezra Adams began on January 13. She is a high school student.
- The library was closed the following times for the holidays:
  - Closed January 1 for New Year's Day
  - Closed January 20 for Martin Luther King, Jr. Day
- The Library partnered with Bondurant-Farrar Schools to present the program "Raising Tech-Savvy Kids" on January 14. The program is based upon the book The Anxious Generation. There are planned follow-up events coming in the next few months including a book discussion of the book.
- Director Klinker-Feld is the current President of the Iowa Small Library Association and attended the group's first virtual Happy Hour to support those working in small libraries.

### Staff Updates:

#### Michell:

- Attended City Council meeting on January 6
- Attended City Staff meetings on January 7, 14, 21, and 28
- Attended a B.O.L.D. meeting January 8 on OSHA and workplace injury
- Attended New Directors Meetup virtually on January 14
- Collaborated with Bondurant Schools to present "Raising Tech Savvy Kids" on January 14 here at the library

#### Megan T:

- Current Projects
  - DVDs: To improve efficiency, staff and volunteers have started moving DVDs from the drawers behind the desk into their original cases. This change aims to streamline check-in and check-out

processes while making the DVDs more accessible to patrons. Although the project will take some time to complete, the long-term benefits will be worth the effort.

- New Volunteer: We welcomed Jennifer as a new volunteer on Monday, January 6. She dedicates one hour each week to the library and is currently helping with the DVD project. Jennifer has enjoyed being part of the effort and exploring the DVD collection.

**Megan S:**

- Pop YS - Supersize Summer Reading Program
- Check it out
- All Iowa Reads 2025 Author Presentations
- 60 tips for Youth Services in 60 minutes
- 2025 Resource Guide Deep Dive - Decorations and Displays
- Reading Dragon & Friends (Illinois Library Association & iReads)

**Carly:**

- Kids Lib
- Public Libraries: Standing Up and Standing Together

**Jennifer:**

- Adult Library Meeting on January 15

**Events in January:**

- 9 Story Times at the Library
- 3 Sessions of Baby Story & Play
- Messy Munchkins
- 9 Sessions of Fit for Life!
- Adult Craft Night
- Adult Crafternoon
- Book Discussion for Adults
- Books on Tap book discussion at Reclaimed Rails
- Coloring Night at the Library

**Events in January:**

- 12 Story Times
- 4 Baby Story Times
- Messy Munchkins
- After School BINGO
- After School Craft
- After School Movie
- Book Club for grades 3-5
- Book Club for grades 6-8
- Curious & Creative Kids Club
- Finals Week R&R for three afternoons
- Teens Only Sunday Funday
- Anime Club
- Teen Café

- 8 sessions of Fit for Life
- Relaxation Stations
- How to Protect Your Assets
- Book Discussion for Adults
- Coffee Social
- Introvert Book Club
- Coloring at the Library
- Adult Crafternoon

## Stats for January 2025

- Total Circulation for the month of January 2025: **6030**
- Total Circulation for the month of January 2024: **4981**
- Online usage (Libby, Hoopla, Brainfuse, Rocket Language, Adventure Pass for January 2025: **3329**
- Online usage (Libby, Hoopla, Brainfuse, Rocket Language, Adventure Pass for January 2024: **2538**
- Door Count January 2025: **4076**
- Door Count January 2024: **3943**
- Staff assisting patrons by phone, with the catalog, computers, etc. for January 2025: **394**
- Staff assisting patrons by phone, with the catalog, computers, etc. for January 2024: **375**
- Story Times in January 2025: **24 held with 561 attending**
- Story Times in January 2024: **24 held with 520 attending**
- Program attendance for adults and children in January 2025: **883**
- Program attendance for adults and children in January 2024: **800**
- In-house internet use for January 2025: **522**
- In-house internet use for January 2024: **573**
- Wi Fi users for January 2025: **894**
- Wi Fi users for January 2024: **1157**
- Hot spot use for January 2025: **80**
- Hot spot use for January 2024: **81**
- Meeting Room use for January 2025: **103**
- Meeting Room use for January 2024: **92**
- New library cards issued in January 2025: **55**
- New library cards issued in January 2024: **56**

- The library borrowed **43** items from other libraries and loaned **157** items for other libraries.
- **167** items were added to the collection, and **45** items were removed.
- Mobile printing for January 2025: **27**
- Mobile printing for January 2024: **43**
- **33** patrons used the Tablet Station in January 2025; **43** in January 2024.



**Meeting Minutes**  
**Bondurant Community Library | Library Board of Trustees**  
**Wednesday, January 8, 2025**

**Call to order:** Meeting called to order at 6:02 PM by President Bryant.

1. **Roll Call:** *Members Present:* Josh Bryant, Julie Bergeson, Amber Flinn, Travis Appelgate, and Mike Kramer. Sue Ugolini attended virtually. Tara Cox (City Council Liaison) and Director Klinker-Feld were also present.

**Guests:** None

2. **Perfecting and Approving the Agenda:** Motion to approve the agenda by Bergeson, seconded by Kramer. Motion carried.

3. **Approval of Consent Agenda:**

- a. Minutes of past meeting – December 2024
- b. Financial Report
- c. Approve Warrant list / authorize expenditures
- d. Staff Report – December 2024
- e. Director's Report – December 2024
- f. Statistics – December 2024

Motion to approve the above consent agenda by Kramer, seconded by Flinn. Motion carried.

4. **Public Comments:** None.

5. **Library Foundation Update:** No update.

6. **Friends of the Library Update:** Upcoming Puzzle Night on January 29, 2025.

7. **City Council Liaison Report:** On January 15, 2025 there will be a Grant Writing Workshop for non-profit organizations. City should receive valuation funding estimates soon. New building for Bondurant Emergency Services is progressing. Working on a redesign for Fire Station to be a Community Building.

8. **Old Business:** None.

9. **New Business:**

**a) Craft and Hobby:** Director Klinker—Feld reviewed a new on—line resource for patrons that includes short how-to videos for a wide variety of crafts, hobbies, fitness videos.

**b) Review/Approve Job Descriptions.** Motion to approve by Kramer, seconded by Bergeson. Motion carried.

**c) Review Long-Range Plan.** Director Klinker-Feld provided an update on activities and strategies in the BPL long-range plan.

**d) Verify Board Contact Information.** Board members verified contact information was up-to-date and made edits accordingly.

**e) Election of Officers.** The following slate of officers was presented: President, Josh Bryant; Vice-President, Mike Kramer; Secretary, Julie Bergeson. Motion to approve slate of officers by Flinn, seconded by Appelgate. Motion carried.

**10. Board President Items:** President Bryant welcomed and congratulated Director Klinker-Feld on her first Board meeting as Director.

**12. Adjournment:** Motion to adjourn by Bergeson, seconded by Appelgate. Motion carried.

**Next Meeting:** February 5, 2025 at 6 PM.



**BUSINESS OF THE CITY COUNCIL  
BONDURANT, IOWA  
AGENDA STATEMENT**

Item No. 5.f.  
For Meeting of 2/18/2025  
**Resolution**

**TITLE:** - Resolution approving Pay Request No. 2 to Ball Team LLC for the Bondurant City Park Reconstruction Phase 2 Project in the amount of \$115,498.15

**CONTACT PERSON:**

John Horton, Public Works Director

**BRIEF HISTORY & ANALYSIS:** Staff recommend to the Council the approval of the attached resolution to approve pay app #2 in the amount of \$115,498.15 related to the Bondurant City Park Reconstruction Phase 2 Project.

This pay application has been reviewed by City Staff and Architects from RDG Planning and Design for accuracy and is for work completed on the Phase 2 project through January 31st, 2025. There has been some good progress on the construction as most of the underground work has been completed to date.

**FUNDING SOURCE:** CIP Budget supported by General Obligation Bonds, TIF Bonds, and LOSST

**STAFF RECOMMENDATION:** Approve resolution on a roll call vote.

**APPROVED FOR SUBMITTAL:**

**ATTACHMENTS:**

1. RESOLUTION NO. 250218-43
2. Pay Request No. 2

CITY OF BONDURANT  
RESOLUTION NO. 250218-43

RESOLUTION APPROVING PAY REQUEST NO. 2 TO BALL TEAM LLC FOR THE  
BONDURANT CITY PARK RECONSTRUCTION PHASE 2 PROJECT IN THE  
AMOUNT OF \$115,498.15

WHEREAS the Bondurant City Park Reconstruction Project Pay Request No. 2 was submitted on February 6<sup>th</sup>, 2025; AND

WHEREAS the pay request no. 2 is for work completed from though January 31<sup>st</sup>, 2025, on the Bondurant City Park Reconstruction Phase 2 Project; AND

WHEREAS City Staff and architects from RDG have reviewed the pay request for accuracy.

NOW, THEREFORE, BE IT RESOLVED, by the City Council of the City of Bondurant, Iowa, that the Pay Request No. 2 to Ball Team LLC in the amount of \$115,498.15 hereby approved.

Passed this 18<sup>th</sup> day of February 2025,

By: \_\_\_\_\_  
Doug Elrod, Mayor

ATTEST: I, Shelby Hagan, City Clerk of Bondurant, hereby certify that at a meeting of the City Council held on the above date, among other proceedings the above was adopted.

IN WITNESS WHEREOF, I have hereunto set my hand the day and year above written.

\_\_\_\_\_  
Shelby Hagan, City Clerk

| Name      | Yay | Nay | Abstain | Absent |
|-----------|-----|-----|---------|--------|
| Cox       |     |     |         |        |
| Driscoll  |     |     |         |        |
| McKenzie  |     |     |         |        |
| Peffer    |     |     |         |        |
| Sillanpaa |     |     |         |        |

# APPLICATION AND CERTIFICATION FOR PAYMENT

PAGE 1 OF 2

PAGES

TO OWNER: City of Bondurant  
200 2nd Street NE PO Box 37  
Bondurant, IA 50035

PROJECT: Bondurant City Park PH 2  
201 Main SE  
Bondurant, IA 50035

APPLICATION NO: 2

Distribution to:

|                          |            |
|--------------------------|------------|
| <input type="checkbox"/> | OWNER      |
| <input type="checkbox"/> | ARCHITECT  |
| <input type="checkbox"/> | CONTRACTOR |
| <input type="checkbox"/> |            |
| <input type="checkbox"/> |            |

PERIOD TO: 01/31/25

FROM CONTRACTOR:  
Ball Team, LLC  
10550 New York Ave. Suite 200  
Urbandale, IA 50322

VIA ARCHITECT: RDG  
301 Grand Ave  
Des Moines, IA 50309

Owner Contract No:  
Contract Date: 12/10/24

CONTRACT FOR: General Construction

PROJECT NOS: 24-098

## CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract.  
Continuation Sheet, AIA Document G703, is attached.

|                                                                           |    |              |
|---------------------------------------------------------------------------|----|--------------|
| 1. ORIGINAL CONTRACT SUM                                                  | \$ | 1,600,000.00 |
| 2. Net change by Change Orders                                            | \$ | 0.00         |
| 3. CONTRACT SUM TO DATE (Line 1 + 2)                                      | \$ | 1,600,000.00 |
| 4. TOTAL COMPLETED & STORED TO DATE (Column G on G703)                    | \$ | 143,448.00   |
| 5. RETAINAGE:                                                             |    |              |
| a. 5 % of Completed Work (Column D + E on G703)                           | \$ | 7,172.40     |
| b. 5 % of Stored Material (Column F on G703)                              | \$ | 0.00         |
| Total Retainage (Lines 5a + 5b or Total in Column I of G703)              | \$ | 7,172.40     |
| 6. TOTAL EARNED LESS RETAINAGE (Line 4 Less Line 5 Total)                 | \$ | 136,275.60   |
| 7. LESS PREVIOUS CERTIFICATES FOR PAYMENT (Line 6 from prior Certificate) | \$ | 20,777.45    |
| 8. CURRENT PAYMENT DUE                                                    | \$ | 115,498.15   |
| 9. BALANCE TO FINISH, INCLUDING RETAINAGE (Line 3 less Line 6)            | \$ | 1,463,724.40 |

| CHANGE ORDER SUMMARY                               | ADDITIONS | DEDUCTIONS |
|----------------------------------------------------|-----------|------------|
| Total changes approved in previous months by Owner | \$0.00    | \$0.00     |
| Total approved this Month                          | \$0.00    | \$0.00     |
| TOTALS                                             | \$0.00    | \$0.00     |
| NET CHANGES by Change Order                        | \$0.00    |            |

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:

By: [Signature] Date: 2/6/25

State of: Iowa  
Subscribed and sworn to before me this 6<sup>th</sup> day of February  
Notary Public: Karen Hansen  
My Commission expires: 12-26-26



## ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising the application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED ..... \$ **115,498.15**

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

ARCHITECT: RDG

By: [Signature] Date: **1/6/25**

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

# CONTINUATION SHEET

AIA DOCUMENT G703

PAGE 2 OF 2

AIA Document G702, APPLICATION AND CERTIFICATION FOR PAYMENT, containing Contractor's signed certification is attached.

In tabulations below, amounts are stated to the nearest dollar.

Use Column I on Contracts where variable retainage for line items may apply.

APPLICATION NO: 2  
APPLICATION DATE: 2/6/25  
PERIOD TO: 01/31/25  
PROJECT NO: 24-098

| A<br>ITEM<br>NO. | B<br>DESCRIPTION OF WORK                         | C<br>SCHEDULED<br>VALUE | D<br>WORK COMPLETED                     |              | F<br>MATERIALS<br>PRESENTLY<br>STORED<br>(NOT IN<br>D OR E) | G                                                      |              | H<br>BALANCE<br>TO FINISH<br>(C - G) | I<br>RETAINAGE<br>(IF VARIABLE<br>RATE) |
|------------------|--------------------------------------------------|-------------------------|-----------------------------------------|--------------|-------------------------------------------------------------|--------------------------------------------------------|--------------|--------------------------------------|-----------------------------------------|
|                  |                                                  |                         | FROM PREVIOUS<br>APPLICATION<br>(D + E) | THIS PERIOD  |                                                             | TOTAL<br>COMPLETED<br>AND STORED<br>TO DATE<br>(D+E+F) | %<br>(G ÷ C) |                                      |                                         |
| 1                | General Conditions                               | \$ 239,339.00           | 9935.00                                 | \$ 20,328.00 | \$ -                                                        | \$ 30,263.00                                           | 13%          | \$ 209,076.00                        | \$ 1,513.15                             |
| 2                | Survey & Layout                                  | 6,900.00                | 0.00                                    | 1,323.00     | 0.00                                                        | 1,323.00                                               | 19%          | 5,577.00                             | 66.15                                   |
| 3                | Temp Fence                                       | 10,217.00               | 0.00                                    | 8,196.00     | 0.00                                                        | 8,196.00                                               | 80%          | 2,021.00                             | 409.80                                  |
| 4                | Site Demo & Grading                              | 56,200.00               | 0.00                                    | 30,910.00    | 0.00                                                        | 30,910.00                                              | 55%          | 25,290.00                            | 1,545.50                                |
| 5                | Water Service                                    | 9,760.00                | 0.00                                    | 9,760.00     | 0.00                                                        | 9,760.00                                               | 100%         | 0.00                                 | 488.00                                  |
| 6                | Sanitary Service                                 | 2,225.00                | 0.00                                    |              | 0.00                                                        | 0.00                                                   | 0%           | 2,225.00                             | 0.00                                    |
| 7                | Storm Drainage                                   | 22,625.00               | 0.00                                    |              | 0.00                                                        | 0.00                                                   | 0%           | 22,625.00                            | 0.00                                    |
| 8                | Erosion Control                                  | 6,000.00                | 0.00                                    |              | 0.00                                                        | 0.00                                                   | 0%           | 6,000.00                             | 0.00                                    |
| 9                | Landscaping                                      | 25,236.00               | 0.00                                    |              | 0.00                                                        | 0.00                                                   | 0%           | 25,236.00                            | 0.00                                    |
| 10               | Concrete - Water Building Footing, Wall, & Sla   | 53,250.00               | 0.00                                    | 47,250.00    | 0.00                                                        | 47,250.00                                              | 89%          | 6,000.00                             | 2,362.50                                |
| 11               | Concrete - Spray Ground Footing & Wall           | 34,000.00               | 0.00                                    |              | 0.00                                                        | 0.00                                                   | 0%           | 34,000.00                            | 0.00                                    |
| 12               | Concrete - Spray Ground Slab                     | 39,000.00               | 0.00                                    |              | 0.00                                                        | 0.00                                                   | 0%           | 39,000.00                            | 0.00                                    |
| 13               | Concrete - Sidewalks                             | 22,275.00               | 0.00                                    |              | 0.00                                                        | 0.00                                                   | 0%           | 22,275.00                            | 0.00                                    |
| 14               | Concrete - Misc.                                 | 6,850.00                | 0.00                                    |              | 0.00                                                        | 0.00                                                   | 0%           | 6,850.00                             | 0.00                                    |
| 15               | Masonry - CMU                                    | 18,775.00               | 0.00                                    |              | 0.00                                                        | 0.00                                                   | 0%           | 18,775.00                            | 0.00                                    |
| 16               | Masonry - Stone                                  | 14,775.00               | 0.00                                    |              | 0.00                                                        | 0.00                                                   | 0%           | 14,775.00                            | 0.00                                    |
| 17               | Rough Carpentry Materials - Glu-lams             | 22,950.00               | 0.00                                    |              | 0.00                                                        | 0.00                                                   | 0%           | 22,950.00                            | 0.00                                    |
| 18               | Rough Carpentry Materials                        | 44,148.00               | 0.00                                    |              | 0.00                                                        | 0.00                                                   | 0%           | 44,148.00                            | 0.00                                    |
| 19               | Carpentry Installation (Div 6 Rough, Div 8, Div  | 22,340.00               | 0.00                                    |              | 0.00                                                        | 0.00                                                   | 0%           | 22,340.00                            | 0.00                                    |
| 20               | Finish Carpentry Materials & Installation        | 7,228.00                | 0.00                                    |              | 0.00                                                        | 0.00                                                   | 0%           | 7,228.00                             | 0.00                                    |
| 21               | Gutter & Downspouts                              | 4,150.00                | 0.00                                    |              | 0.00                                                        | 0.00                                                   | 0%           | 4,150.00                             | 0.00                                    |
| 22               | Sofit & Fascia                                   | 8,000.00                | 0.00                                    |              | 0.00                                                        | 0.00                                                   | 0%           | 8,000.00                             | 0.00                                    |
| 23               | Exterior Trim                                    | 2,280.00                | 0.00                                    |              | 0.00                                                        | 0.00                                                   | 0%           | 2,280.00                             | 0.00                                    |
| 24               | Siding                                           | 16,000.00               | 0.00                                    |              | 0.00                                                        | 0.00                                                   | 0%           | 16,000.00                            | 0.00                                    |
| 25               | Roofing                                          | 15,750.00               | 0.00                                    |              | 0.00                                                        | 0.00                                                   | 0%           | 15,750.00                            | 0.00                                    |
| 26               | Air Barrier, Weather Barrier, Floor Sealer & See | 12,500.00               | 0.00                                    |              | 0.00                                                        | 0.00                                                   | 0%           | 12,500.00                            | 0.00                                    |
| 27               | Doors, Frames, Windows, & Louvers Materials      | 32,049.00               | 0.00                                    |              | 0.00                                                        | 0.00                                                   | 0%           | 32,049.00                            | 0.00                                    |
| 28               | Glass & Glazing                                  | 3,095.00                | 0.00                                    |              | 0.00                                                        | 0.00                                                   | 0%           | 3,095.00                             | 0.00                                    |
| 29               | Drywall / Synthetic Plaster Finish System        | 35,050.00               | 0.00                                    |              | 0.00                                                        | 0.00                                                   | 0%           | 35,050.00                            | 0.00                                    |
| 30               | Painting                                         | 8,565.00                | 0.00                                    |              | 0.00                                                        | 0.00                                                   | 0%           | 8,565.00                             | 0.00                                    |
| 31               | Specialties Materials                            | 1,450.00                | 0.00                                    |              | 0.00                                                        | 0.00                                                   | 0%           | 1,450.00                             | 0.00                                    |
| 32               | Mechanical - Mobilization                        | 20,000.00               | 0.00                                    |              | 0.00                                                        | 0.00                                                   | 0%           | 20,000.00                            | 0.00                                    |
| 33               | Mechanical - Underground Process                 | 77,419.00               | 0.00                                    |              | 0.00                                                        | 0.00                                                   | 0%           | 77,419.00                            | 0.00                                    |
| 34               | Mechanical - Perimeter Drain                     | 20,000.00               | 0.00                                    |              | 0.00                                                        | 0.00                                                   | 0%           | 20,000.00                            | 0.00                                    |

AIA DOCUMENT G703 - CONTINUATION SHEET FOR G702 - 1992 EDITION - AIA - ©1992  
THE AMERICAN INSTITUTE OF ARCHITECTS, 1735 NEW YORK AVENUE, N.W. WASHINGTON, D.C. 20006-5232

G703-1992

# CONTINUATION SHEET

AIA DOCUMENT G703

PAGE 2 OF 2

AIA Document G702, APPLICATION AND CERTIFICATION FOR PAYMENT, containing Contractor's signed certification is attached.

APPLICATION NO: 2  
APPLICATION DATE: 2/6/25

In tabulations below, amounts are stated to the nearest dollar.

PERIOD TO: 01/31/25

Use Column I on Contracts where variable retainage for line items may apply.

PROJECT NO: 24-098

| A<br>ITEM<br>NO. | B<br>DESCRIPTION OF WORK                  | C<br>SCHEDULED<br>VALUE | D<br>WORK COMPLETED                     |               | F<br>MATERIALS<br>PRESENTLY<br>STORED<br>(NOT IN<br>D OR E) | G                                                      |              | H<br>BALANCE<br>TO FINISH<br>(C - G) | I<br>RETAINAGE<br>(IF VARIABLE<br>RATE) |
|------------------|-------------------------------------------|-------------------------|-----------------------------------------|---------------|-------------------------------------------------------------|--------------------------------------------------------|--------------|--------------------------------------|-----------------------------------------|
|                  |                                           |                         | FROM PREVIOUS<br>APPLICATION<br>(D + E) | THIS PERIOD   |                                                             | TOTAL<br>COMPLETED<br>AND STORED<br>TO DATE<br>(D+E+F) | %<br>(G ÷ C) |                                      |                                         |
| 35               | Mechanical - Feature Embeds               | 30,000.00               | 0.00                                    |               | 0.00                                                        | 0.00                                                   | 0%           | 30,000.00                            | 0.00                                    |
| 36               | Mechanical - Spray Features               | 255,000.00              | 0.00                                    |               | 0.00                                                        | 0.00                                                   | 0%           | 255,000.00                           | 0.00                                    |
| 37               | Mechanical - Interior Plumbing            | 18,000.00               | 0.00                                    |               | 0.00                                                        | 0.00                                                   | 0%           | 18,000.00                            | 0.00                                    |
| 38               | Mechanical - Sprayground Filter Equipment | 45,000.00               | 0.00                                    |               | 0.00                                                        | 0.00                                                   | 0%           | 45,000.00                            | 0.00                                    |
| 39               | Mechanical - HVAC                         | 6,000.00                | 0.00                                    |               | 0.00                                                        | 0.00                                                   | 0%           | 6,000.00                             | 0.00                                    |
| 40               | Electrical - Sitework Materials           | 17,815.00               | 0.00                                    |               | 0.00                                                        | 0.00                                                   | 0%           | 17,815.00                            | 0.00                                    |
| 41               | Electrical - Sitework Labor               | 7,410.00                | 0.00                                    |               | 0.00                                                        | 0.00                                                   | 0%           | 7,410.00                             | 0.00                                    |
| 42               | Electrical - Gear                         | 89,796.00               | 0.00                                    |               | 0.00                                                        | 0.00                                                   | 0%           | 89,796.00                            | 0.00                                    |
| 43               | Electrical - Materials                    | 22,600.00               | 0.00                                    |               | 0.00                                                        | 0.00                                                   | 0%           | 22,600.00                            | 0.00                                    |
| 44               | Electrical - Labor                        | 32,904.00               | 0.00                                    |               | 0.00                                                        | 0.00                                                   | 0%           | 32,904.00                            | 0.00                                    |
| 45               | Electrical - Lighting Materials           | 62,130.00               | 0.00                                    |               | 0.00                                                        | 0.00                                                   | 0%           | 62,130.00                            | 0.00                                    |
| 46               | Electrical - Lighting Labor               | 27,775.00               | 0.00                                    |               | 0.00                                                        | 0.00                                                   | 0%           | 27,775.00                            | 0.00                                    |
| 47               | Electrical - Sitework Materials           | 3,195.00                | 0.00                                    |               | 0.00                                                        | 0.00                                                   | 0%           | 3,195.00                             | 0.00                                    |
| 48               | Bonds                                     | 11,174.00               | 11,174.00                               |               | 0.00                                                        | 11,174.00                                              | 100%         | 0.00                                 | 558.70                                  |
| 49               | General Liability Insurance               | 4,800.00                | 72.00                                   | 360.00        | 0.00                                                        | 432.00                                                 | 9%           | 4,368.00                             | 21.60                                   |
| 50               | Contractor Fee                            | 46,000.00               | 690.00                                  | 3,450.00      | 0.00                                                        | 4,140.00                                               | 9%           | 41,860.00                            | 207.00                                  |
|                  | <b>GRAND TOTALS</b>                       | \$ 1,600,000.00         | \$ 21,871.00                            | \$ 121,577.00 | \$ -                                                        | \$ 143,448.00                                          | 9%           | \$ 1,456,552.00                      | \$ 7,172.40                             |

Users may obtain validation of this document by requesting of the license a completed AIA Document D401 - Certification of Document's Authenticity



**BUSINESS OF THE CITY COUNCIL  
BONDURANT, IOWA  
AGENDA STATEMENT**

Item No. 5.g.  
For Meeting of 2/18/2025  
**Resolution**

**TITLE:** - Resolution approving Change Order No. 4 for negative quantity reduction of items not done for the 15<sup>th</sup> Street, SE and 13<sup>th</sup> Street Stormwater Improvements in the amount of -\$44,830.00

**CONTACT PERSON:**

John Horton, Public Works Director

**BRIEF HISTORY & ANALYSIS:** Staff recommend to the Council the approval of the attached resolution to approve change order #4 in the amount of -\$44,830.00 related to adjusting the original contract for work that was not completed as the property owner did not consent to easements needed to complete the work at this time. Staff will continue to try and work with adjacent property owners to obtain easements and bring back this small project at some point in the future.

The rest of the project is complete. James Construction was working on projects identified in the City's Comprehensive Stormwater Management Plan.

**FUNDING SOURCE:** Stormwater Funding

**STAFF RECOMMENDATION:** Approve resolution on a roll call vote.

**APPROVED FOR SUBMITTAL:**

**ATTACHMENTS:**

1. RESOLUTION NO. 250218-44
2. Change Order No. 4



CITY OF BONDURANT  
RESOLUTION NO. 250218-44

RESOLUTION APROVING CHANGE ORDER NO. 4 FOR CONTRACT REDUCTION  
FO WORK NOT COMPLETED ON THE 15<sup>th</sup> STREET SE AND 13<sup>th</sup> STREET SE  
STORMWATER IMPROVEMENTS PROJECT IN THE AMONT OF -\$44,830.00

WHEREAS on February 6<sup>th</sup>, 2025, the City of Bondurant received change order no. 4 for contract reduction of quantities that were not completed that were a part of the 15<sup>th</sup> Street SE and 13<sup>th</sup> Street SE Stormwater Improvement Project; AND

WHEREAS the City did not receive easements from all of the necessary property owners to complete the work and therefore redirected resources to a different stormwater project; AND

WHEREAS the City Council approves change order no. 4 for the contract reduction for work not completed on the 13<sup>th</sup> Street SE Stormwater Improvement portion of the project.

NOW, THEREFORE, BE IT RESOLVED, by the City Council of the City of Bondurant, Iowa, that change order no. 4 for the 15<sup>th</sup> Street and 13<sup>th</sup> Street Stormwater Improvement Project to James Construction LLC is hereby approved

Passed this 18<sup>th</sup> day of February 2025,

By: \_\_\_\_\_  
Doug Elrod, Mayor

ATTEST: I, Shelby Hagan, City Clerk of Bondurant, hereby certify that at a meeting of the City Council held on the above date, among other proceedings the above was adopted.

IN WITNESS WHEREOF, I have hereunto set my hand the day and year above written.

\_\_\_\_\_  
Shelby Hagan, City Clerk

| Name      | Yay | Nay | Abstain | Absent |
|-----------|-----|-----|---------|--------|
| Cox       |     |     |         |        |
| Driscoll  |     |     |         |        |
| McKenzie  |     |     |         |        |
| Peffer    |     |     |         |        |
| Sillanpaa |     |     |         |        |



## City of Bondurant

Public Works

200 Second Street NE PO Box 37

Bondurant, Iowa 50035

515-985-5110

February 6, 2025

### CHANGE ORDER NO. 4

BONDURANT, IOWA

13th STREET/15th STREET IMPROVEMENTS PROJECT

Change Order No.4 modifies the contract to decrease the following items that were not constructed as a part of this project.

#### 13<sup>th</sup> Street Improvements

| Item No. | Item Description                                        | Quantity | Unit | Unit Price | Total Price |
|----------|---------------------------------------------------------|----------|------|------------|-------------|
| 4.1      | STORM SEWER, TRENCHED, PERFORATED HDPE, 18-INCH         | 236      | LF   | \$60.00    | \$14,160    |
| 4.2      | PIPE APRON, TYPE 1, 18-INCH RCP                         | 1        | EA   | \$2850     | \$2850      |
| 4.3      | FOOTING FOR CONCRETE PIPE APRON, 18-INCH                | 1        | EA   | \$2200     | \$2200      |
| 6.1      | INTAKE, NYLOPLAST 24-INCH DRAIN BASIN                   | 2        | EA   | \$3680     | \$7360      |
| 8.1      | TEMPORARY TRAFFIC CONTROL                               | 1        | LS   | \$4500     | \$4500      |
| 9.1      | CONVENTIONAL SEEDING, FERTILIZING, AND MULCHING, TYPE 1 | 0.1      | AC   | \$20.00    | \$2000      |
| 9.2      | HYDRAULIC SEEDING AND BFM MULCHING, TYPE 4              | 0.1      | AC   | \$10.00    | \$1000      |
| 9.3      | SOD                                                     | 37       | SQ   | \$75       | \$2775      |
| 9.4      | SWPPP MANAGEMENT                                        | 1        | LS   | \$900      | \$900       |
| 9.5      | FILTER SOCK, 8-INCH, NATURAL FIBER ONLY                 | 630      | LF   | \$2.50     | \$1575      |
| 9.6      | FILTER SOCK REMOVAL                                     | 630      | LF   | \$.50      | \$315       |
| 9.7      | RIPRAP, CLASS E                                         | 7        | TON  | \$100      | \$700       |
| 9.8      | STABILIZED CONSTRUCTION ENTRANCE                        | 123      | SY   | \$15       | \$1845      |

|      |                                      |   |    |        |        |
|------|--------------------------------------|---|----|--------|--------|
| 11.1 | MONUMENT PRESERVATION OR REPLACEMENT | 1 | LS | \$1000 | \$1000 |
| 11.2 | MOBILIZATION                         | 1 | LS | \$1200 | \$1200 |
| 11.3 | CONCRETE WASHOUT                     | 1 | LS | \$450  | \$450  |

**TOTAL 13th STREET CONSTRUCTION COST \$ 44,830**

Change Order No.4 Decreases the Contract Quantities to Zero out this portion of Original Contract.

**James Construction LLC**

**By:**  \_\_\_\_\_

**Title:** Owner \_\_\_\_\_

**Date:** 02/06/2025 \_\_\_\_\_

**City of Bondurant, Iowa**

**By:** \_\_\_\_\_

**Title:** \_\_\_\_\_

**Date:** \_\_\_\_\_



**BUSINESS OF THE CITY COUNCIL  
BONDURANT, IOWA  
AGENDA STATEMENT**

Item No. 5.h.  
For Meeting of 2/18/2025  
**Resolution**

**TITLE:** - Resolution approving Pay Request No. 16 to KLC Construction LLC for the 15th Street and NE 88th Street/32nd Street, SE and Jorie Way Water Main Project in the amount of \$41,012.51 (Release of Retainage)

**CONTACT PERSON:**

John Horton, Public Works Director

**BRIEF HISTORY & ANALYSIS:** Staff recommend the attached resolution to approve Pay App #16 in the amount of \$41,012.51 related to the 15<sup>th</sup> Street and NE 88<sup>th</sup> Street/32<sup>nd</sup> St SE and Jorie Way Water Main Project.

This pay application reflects the release of retainage on the contract minus the crop damage settlement with an adjacent property owner that the city council approved back on the December 16<sup>th</sup> council agenda. This has been reviewed by Public Works and Engineers from Veenstra & Kim.

As a reminder a contract with KLC Construction LLC in the amount of \$1,995,059 was awarded by the City Council on May 22, 2023 for a water main looping project in the area where the new water tower is located at 2400 Eisenhower Drive SE.

**FUNDING SOURCE:** SRF Funds

**STAFF RECOMMENDATION:** Approve resolution on a roll call vote.

**APPROVED FOR SUBMITTAL:**

**ATTACHMENTS:**

1. RESOLUTION NO. 250218-45
2. Pay Request No. 16

CITY OF BONDURANT  
RESOLUTION NO. 250218-45

RESOLUTION APPROVING PAY REQUEST NO. 16 TO KLC CONSTRUCTION LLC.  
FOR THE 15<sup>th</sup> STREET AND NE 88<sup>th</sup> STREET/32<sup>nd</sup> STREET, SE AND JORIE WAY  
WATER MAIN PROJECT IN THE AMOUNT OF \$41,012.51 (RELEASE OF  
RETAINAGE)

WHEREAS the 15<sup>th</sup> Street and NE 88<sup>th</sup> Street/32<sup>nd</sup> Street, SE and Jorie Way Water Main  
Project Pay Request No. 16 was submitted on February 10<sup>th</sup>, 2025; AND

WHEREAS the pay request no. 16 is for Release of Retainage minus the crop loss  
settlement previously approved by Council on December 16<sup>th</sup>, 2024, on the Contract for  
the 15<sup>th</sup> Street and NE 88<sup>th</sup> Street/32<sup>nd</sup> Street, SE and Jorie Way Water Main Project;  
AND

WHEREAS City Staff and engineers from Veenstra & Kimm have reviewed the pay  
application for accuracy; AND

NOW, THEREFORE, BE IT RESOLVED, by the City Council of the City of Bondurant,  
Iowa, that the pay request no. 16 to KLC Construction LLC. in the amount of \$41,012.51  
is hereby approved.

Passed this 18<sup>th</sup> day of February 2025,

By: \_\_\_\_\_  
Doug Elrod, Mayor

ATTEST: I, Shelby Hagan, City Clerk of Bondurant, hereby certify that at a meeting of the  
City Council held on the above date, among other proceedings the above was adopted.

IN WITNESS WHEREOF, I have hereunto set my hand the day and year above written.

\_\_\_\_\_  
Shelby Hagan, City Clerk

| Name      | Yay | Nay | Abstain | Absent |
|-----------|-----|-----|---------|--------|
| Cox       |     |     |         |        |
| Peffer    |     |     |         |        |
| Driscoll  |     |     |         |        |
| McKenzie  |     |     |         |        |
| Sillanpaa |     |     |         |        |



**VEENSTRA & KIMM INC.**

3000 Westown Parkway  
West Des Moines, Iowa 50266

515.225.8000 // 800.241.8000  
www.v-k.net

February 10, 2025

Marketa Oliver  
City Administrator  
City of Bondurant  
200 Second Street NE  
P.O. Box 37  
Bondurant, Iowa 50035

BONDURANT, IOWA  
15<sup>TH</sup> STREET SE & NE 88<sup>TH</sup> STREET WATER MAIN  
32<sup>ND</sup> STREET SE & JORIE WAY WATER MAIN  
PARTIAL PAYMENT ESTIMATE NO. 16 RETAINAGE

Enclosed is a copy of Partial Payment Estimate No. 16 for the 15<sup>th</sup> Street SE & NE 88<sup>th</sup> Street Water Main and 32<sup>nd</sup> Street SE & Jorie Way Water Main project. Partial Pay Estimate No. 16 releases all remaining retainage minus the enclosed deduction for the Timmins Property Claim. Partial Pay Estimate No. 16 is in the amount of \$41,012.51.

If you have any questions or comments concerning the project, please contact the writer at 515-669-7768 or at [chornsby@v-k.net](mailto:chornsby@v-k.net).

VEENSTRA & KIMM, INC.

A handwritten signature in blue ink, appearing to read 'Callin Hornsby'.

Callin Hornsby

CRH  
428109

cc: John Horton – City of Bondurant (electronic)



# PAY ESTIMATE NO. 16

|                                    |                                                                                     |              |            |                                                           |
|------------------------------------|-------------------------------------------------------------------------------------|--------------|------------|-----------------------------------------------------------|
| Project Title                      | 15th Street SE & NE 88th Street Water Main<br>32nd Street SE & Jorie Way Water Main |              | Contractor | KLC Construction<br>2235 Payton Road<br>Corydon, IA 50060 |
| Original Contract<br>Amount & Date | \$1,995,059.00                                                                      | May 22, 2023 | Pay Period | November 18, 2024 to February 7, 2025                     |

## BID ITEMS

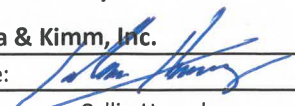
[illegible]



[illegible]

| SUMMARY                                      |          |                          |                 |
|----------------------------------------------|----------|--------------------------|-----------------|
|                                              |          | Contract Price           | Value Completed |
| Original Contract Price                      |          | \$1,995,059.00           | \$ 1,951,376.84 |
| Approved Change Orders (list each)           |          |                          |                 |
|                                              |          |                          |                 |
|                                              |          |                          |                 |
|                                              |          |                          |                 |
|                                              |          |                          |                 |
|                                              |          |                          |                 |
|                                              |          |                          |                 |
| TOTAL ALL CHANGE ORDERS                      |          | \$ -                     | \$ -            |
| Revised Contract Price                       |          | \$ 1,995,059.00          | \$ 1,951,376.84 |
| Materials Stored                             |          |                          | \$ -            |
| Value of Completed Work and Materials Stored |          |                          | \$ 1,951,376.84 |
| Less Retained Percentage (0%)                |          |                          | \$ -            |
| Net Amount Due This Estimate                 |          |                          | \$ 1,951,376.84 |
| Less Estimate(s) Previously Approved         | No.1     | \$ 237,508.32            |                 |
|                                              | No.2     | \$ 52,527.10             |                 |
|                                              | No.3     | \$ 57,887.93             |                 |
|                                              | No.4     | \$ 129,750.79            |                 |
|                                              | No.5     | \$ 272,325.07            |                 |
|                                              | No.6     | \$ 211,010.20            |                 |
|                                              | No. 7    | \$ 229,185.60            |                 |
|                                              | No. 8    | \$ 220,265.70            |                 |
|                                              | No. 9    | \$ 191,301.50            |                 |
|                                              | No. 10   | \$ 172,373.36            |                 |
|                                              | No. 11R2 | \$ 15,890.05             |                 |
|                                              | No. 12R1 | \$ 19,086.21             |                 |
|                                              | No. 13   | \$ 15,722.50             |                 |
|                                              | No. 14   | \$ 35,530.00             |                 |
|                                              | No. 15   | \$ 50,000.00             |                 |
| Less Total Pay Estimates Previously Approved |          |                          | \$ 1,910,364.33 |
|                                              |          | Amount Due This Estimate | \$ 41,012.51    |

The amount \$ 41,012.51 is recommended for approval for payment in accordance with the terms of the contract.

|                                   |                                                                                                |                   |
|-----------------------------------|------------------------------------------------------------------------------------------------|-------------------|
| Quantities Complete Submitted By: | Recommended By:                                                                                | Approved By:      |
| KLC Construction, LLC             | Veenstra & Kimm, Inc.                                                                          | City of Bondurant |
| Signature:                        | Signature:  | Signature:        |
| Name:                             | Name: Callin Hornsby                                                                           | Name:             |
| Title:                            | Title: Project Manager                                                                         | Title:            |
| Date:                             | Date: 2/10/2025                                                                                | Date:             |

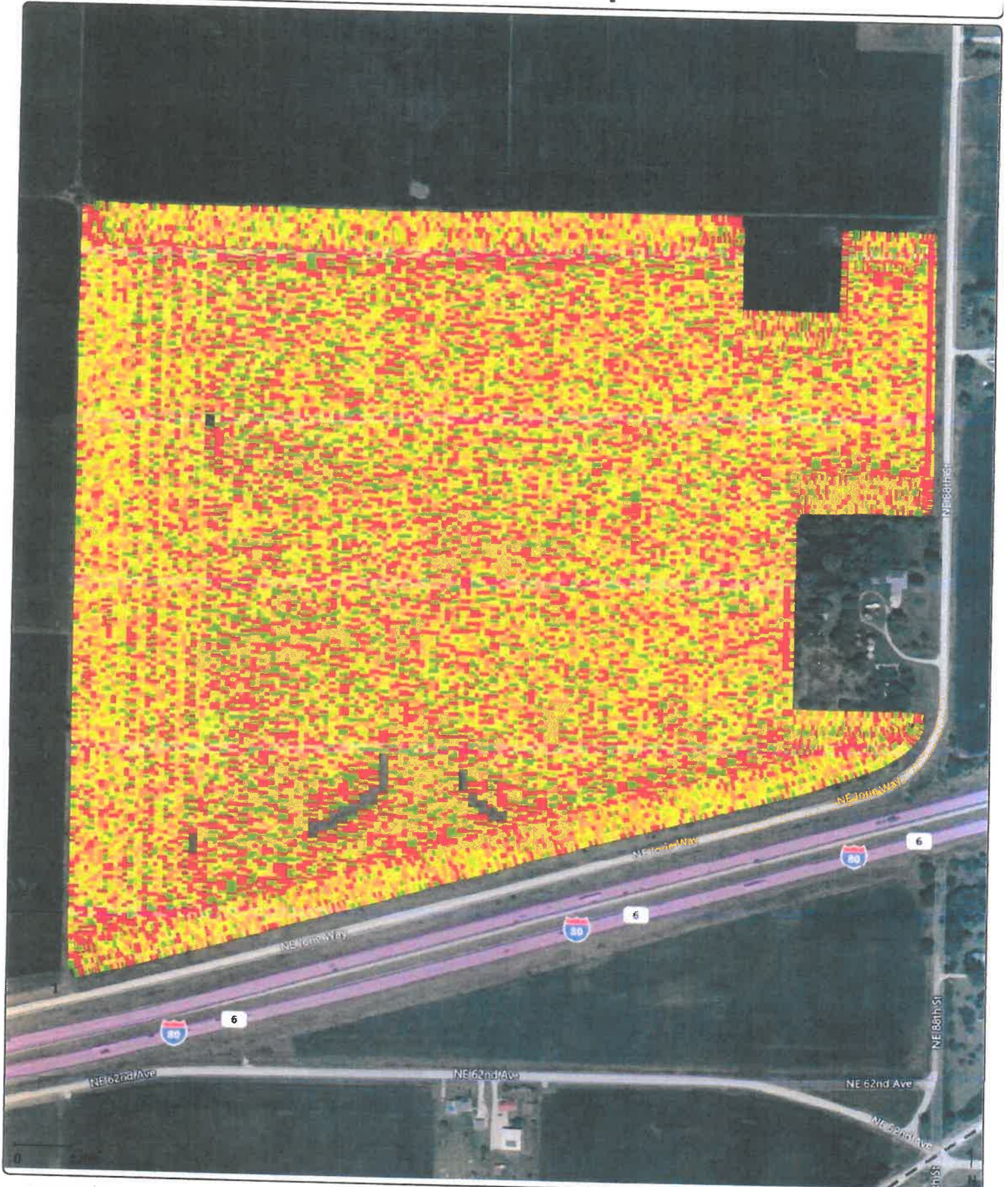
Donald C. Timmins, LC  
Calculation of crop loss due to drainage issue  
2024 crop year

Per previous discussion with Bondurant City Administrator and staff, crop loss will be calculated by comparing overall yield per acre on the Donald C. Timmins, LC farm with the overall yield per acre on a farm 1/2 mile south of the affected farm. Both farms had similar agronomy programs, were planted within 2 days, had a similar variety of seed planted, and were harvested within 2 days.

|                                                                                      | Donald C.<br>Timmins,<br>LC farm | Comparable<br>farm   |
|--------------------------------------------------------------------------------------|----------------------------------|----------------------|
| Total acres planted per maps                                                         | 110.37                           |                      |
| Total acres harvested per maps                                                       | <u>98.57</u>                     |                      |
| Acres totally lost to tile damage                                                    | 11.80                            |                      |
| Remaining acres in LC farm had diminished<br>yield due to tiles not working properly |                                  |                      |
| Yield per harvested acre                                                             | <u>195.30</u>                    | <u>226.5 Bushels</u> |
| Acres planted                                                                        | 110.37                           |                      |
|                                                                                      | <u>X 226.5</u>                   |                      |
| Expected yield                                                                       | 24,998.81                        |                      |
| Actual yield 195.3 bushels X 98.57 acres                                             | <u>19,250.72</u>                 |                      |
| Loss in yield                                                                        | <u>5,748.08</u>                  |                      |
| Market price on day of harvest                                                       | \$ 3.83                          |                      |
| Crop loss based on day of harvest market                                             | <u>\$ 22,015.16</u>              |                      |



# SMS Map



11/14/2024 11:21:17 AM

Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation.

Ag Leader Technology SMS Advanced

*Planting map*

Page 1 of 2

Page 61 of 745

# Map Layer 1



Grower : Don Timmins

Farm : LC SOUTH

Field : I80

Year : 2024

Operation : Planting

Crop / Product : P1366Q

Op. Instance : Planting - 1

Area : 110.37 ac

Est. Amount : 3,844.3 ksds

Avg. Rate : 34.83 ksds/ac

Start Date : 5/16/2024

End Date : 5/16/2024

Working Time : 8.707 h

Avg. Productivity : 12.92 ac/h

GPS Count : 32136

## Rate (Count) (ksds/ac)

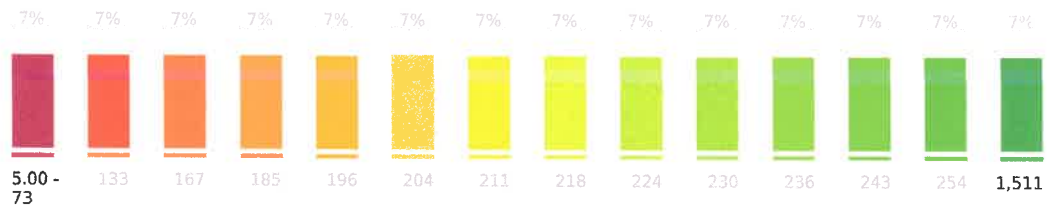
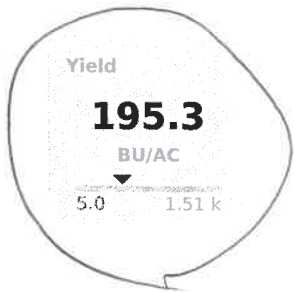
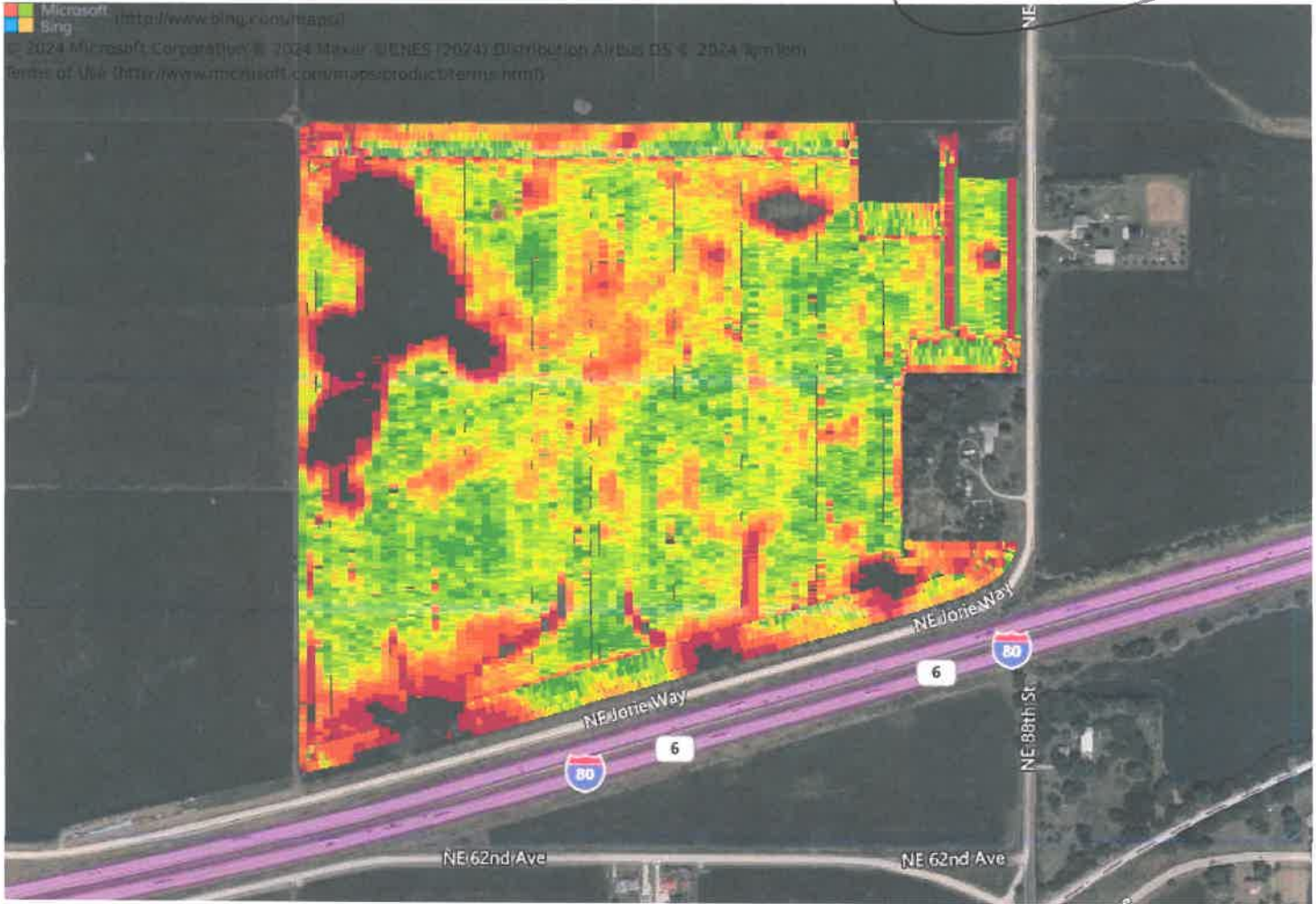
|       |   |                   |
|-------|---|-------------------|
| 46.27 | - | 518.76 ( 0.11 ac) |
| 35.14 | - | 46.27 (18.19 ac)  |
| 35.01 | - | 35.14 (17.67 ac)  |
| 34.99 | - | 35.01 (17.49 ac)  |
| 34.96 | - | 34.99 (16.83 ac)  |
| 34.89 | - | 34.96 (14.34 ac)  |
| 0.00  | - | 34.89 (28.32 ac)  |



## Corn-P1366Q - 2024

Oct 21, 2024

Grower **DON TIMMINS L C** Farm **LC South** Field Acres **LC South 98.57**

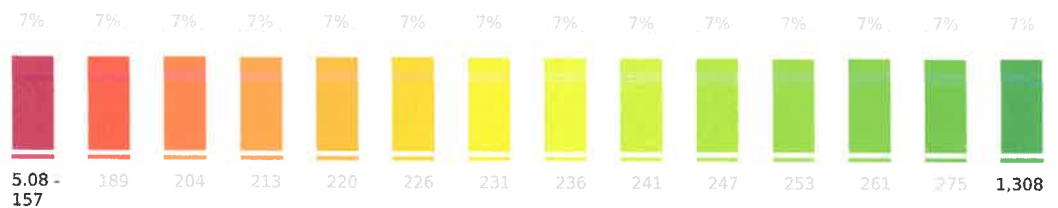
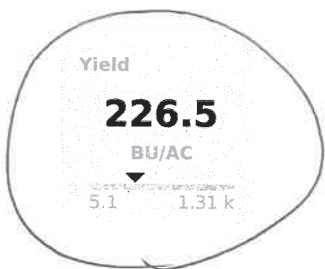
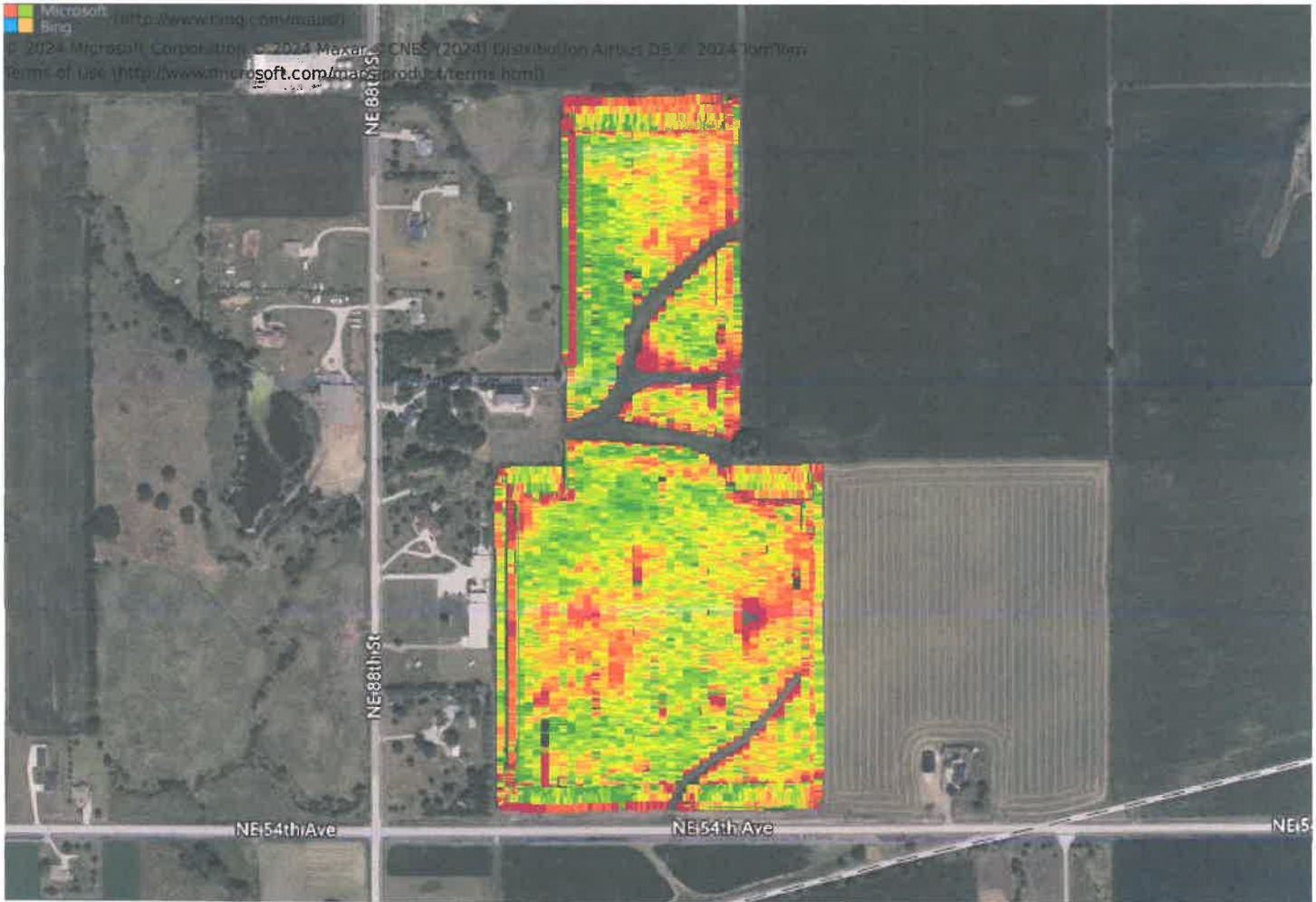


*Harvest map - Subject property*

# Corn-P1366Q - 2024

Oct 21, 2024

**Grower** Don Timmins      **Farm** Denise      **Field Acres** Denise West 51 48.36



*Harvest map - Similar Property*



**BUSINESS OF THE CITY COUNCIL  
BONDURANT, IOWA  
AGENDA STATEMENT**

Item No. 5.i.  
For Meeting of 2/18/2025  
**Resolution**

**TITLE:** - Resolution approving pay request no. 3 to James Construction LLC for the 15th St./13th St./Field Tiling Stormwater Project in the amount of \$16,225.63 (Release of Retainage)

**CONTACT PERSON:**

John Horton, Public Works Director

**BRIEF HISTORY & ANALYSIS:** Staff recommend the attached resolution to approve Pay App #3 in the amount of \$16,225.63 related to the 15th St./13th St./Field tiling Stormwater Project.

This pay application reflects the release of retainage for these two stormwater projects that were done along 15th St. SE and the property just north of the intersection of 32nd St. SE and Hwy 65.

This project has been completed, other than some restoration that Public Works staff will address in the spring.

This pay application has been reviewed by city staff for accuracy and is for the release of the retainage on the contract.

**FUNDING SOURCE:** Stormwater Funds

**STAFF RECOMMENDATION:** Approve resolution on a roll call vote.

**APPROVED FOR SUBMITTAL:**

**ATTACHMENTS:**

1. RESOLUTION NO. 250218-46
2. Final Pay application 15th St Bondurant
3. Final Pay application Midwest Underground



CITY OF BONDURANT  
RESOLUTION NO. 250218-46

RESOLUTION APPROVING PAY REQUEST NO. 3 TO JAMES CONSTRUCTION LLC  
FOR THE 15<sup>th</sup> & 13<sup>th</sup> STREET/FIELD TILING STORMWATER PROJECT IN THE  
AMOUNT OF \$16,225.63

WHEREAS the 15<sup>th</sup>/13<sup>th</sup> Street/Field Tiling Project Pay Request No. 3 was submitted on February 10<sup>th</sup>, 2025; AND

WHEREAS the pay request no. 3 is for the release of retainage on the 15<sup>th</sup>/13<sup>th</sup> Street/Field Tiling Stormwater Project; AND

WHEREAS City Staff have reviewed the pay application for accuracy.

NOW, THEREFORE, BE IT RESOLVED, by the City Council of the City of Bondurant, Iowa, that the Pay Request No. 3 to James Construction LLC in the amount of \$16,225.63 hereby approved.

Passed This 18<sup>th</sup> day of February 2025,

By: \_\_\_\_\_  
Doug Elrod, Mayor

ATTEST: I, Shelby Hagan, City Clerk of Bondurant, hereby certify that at a meeting of the City Council held on the above date, among other proceedings the above was adopted.

IN WITNESS WHEREOF, I have hereunto set my hand the day and year above written.

\_\_\_\_\_  
Shelby Hagan, City Clerk

| Name      | Yay | Nay | Abstain | Absent |
|-----------|-----|-----|---------|--------|
| Cox       |     |     |         |        |
| Driscoll  |     |     |         |        |
| McKenzie  |     |     |         |        |
| Peffer    |     |     |         |        |
| Sillanpaa |     |     |         |        |

APPLICATION AND CERTIFICATION FOR PAYMENT

AIA DOCUMENT G702

PAGE ONE OF 1 PAGES

TO OWNER:  
City of Bondurant  
200 2nd Street NE  
Bondurant, IA 50035  
FROM CONTRACTOR:  
James Construction LLC  
1601 E 29th Street  
Des Moines, IA 50317  
CONTRACT

PROJECT:15th St Improvements APPLICATION NO:2  
Final

VIA ARCHITECT: PERIOD TO:  
11/08/2024-02/07/2025

PROJECT NO'S:  
COMMITMENT NO'S  
CONTRACT DATE:

Distribution to:

|   |            |
|---|------------|
| X | OWNER      |
|   | ARCHITECT  |
|   | CONTRACTOR |
|   |            |
|   |            |

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract.  
Continuation Sheet, AIA Document G703, is attached.

- 1. ORIGINAL CONTRACT SUM \$ 53,944
- 2. Net change by Change Orders \$ 2962.50
- 3. CONTRACT SUM TO DATE (Line 1 ± 2) \$ 56,906.50
- 4. TOTAL COMPLETED & STORED TO DATE (Column G on G703) \$ 45,652.50
- 5. RETAINAGE:
  - a. 5 % of Completed Work \$ 2282.63 (Column D + E on G703)
  - b. % of Stored Material \$ (Column F on G703)Total Retainage (Lines 5a + 5b or Total in Column I of G703)
- 6. TOTAL EARNED LESS RETAINAGE (Line 4 Less Line 5 Total) \$ 43,369.87
- 7. LESS PREVIOUS CERTIFICATES FOR PAYMENT (Line 6 from prior Certificate) \$43,369.87
- 8. CURRENT PAYMENT DUE \$ 13536.63
- 9. BALANCE TO FINISH, INCLUDING RETAINAGE (Line 3 less Line 6) \$ 13536.63

| CHANGE ORDER SUMMARY                               | ADDITIONS | DEDUCTIONS |
|----------------------------------------------------|-----------|------------|
| Total changes approved in previous months by Owner |           |            |
| Total approved this Month                          |           |            |
| TOTALS                                             | 2962.50   |            |
| NET CHANGES by Change Order                        |           |            |

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:  
  
By: \_\_\_\_\_ Date: \_\_\_\_\_  
  
State of: \_\_\_\_\_ County of: \_\_\_\_\_  
Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_  
Notary Public:  
My Commission expires: \_\_\_\_\_

ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising the application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED . . . . . \$ 13536.63

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and onthe Continuation Sheet that are changed to conform with the amount certified.)  
ARCHITECT:  
By: John Horton Date: 02-11-2025  
This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

APPLICATION AND CERTIFICATION FOR PAYMENT

TO OWNER: PROJECT:
City of Bondurant Midwest Underground Tiling
200 2nd Street NE
Bondurant, IA 50035
FROM CONTRACTOR: VIA ARCHITECT:
James Construction LLC
1601 E 29th Street
Des Moines, IA 50317
CONTRACT

AIA DOCUMENT G702
APPLICATION NO:2 Final

PAGE ONE OF 1 PAGES

Distribution to:
[X] OWNER
ARCHITECT
CONTRACTOR

PERIOD TO:
PROJECT NO'S:
COMMITMENT NO'S
CONTRACT DATE:

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract. Continuation Sheet, AIA Document G703, is attached.

- 1. ORIGINAL CONTRACT SUM \$ 48380
2. Net change by Change Orders \$ 5400
3. CONTRACT SUM TO DATE (Line 1 ± 2) \$ 53780
4. TOTAL COMPLETED & STORED TO DATE (Column G on G703) \$ 53780
5. RETAINAGE:
a. 5 % of Completed Work \$ 2689
b. % of Stored Material \$
Total Retainage (Lines 5a + 5b or Total in Column I of G703)
6. TOTAL EARNED LESS RETAINAGE \$ 51091
7. LESS PREVIOUS CERTIFICATES FOR PAYMENT (Line 6 from prior Certificate) \$ 51091
8. CURRENT PAYMENT DUE \$ 2689
9. BALANCE TO FINISH, INCLUDING RETAINAGE \$ 2689

Table with 3 columns: CHANGE ORDER SUMMARY, ADDITIONS, DEDUCTIONS. Rows include Total changes approved, Total approved this Month, TOTALS, and NET CHANGES by Change Order.

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:
By: Date:
State of: County of:
Subscribed and sworn to before me this day of
Notary Public:
My Commission expires:

ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising the application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED ..... \$ \$2689.00

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

ARCHITECT:
By: John Horton Date: 02-11-2025
This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.



**BUSINESS OF THE CITY COUNCIL  
BONDURANT, IOWA  
AGENDA STATEMENT**

Item No. 5.j.  
For Meeting of 2/18/2025  
**Resolution**

**TITLE:** - Resolution approving Pay Request No. 8 to Gerard Tank & Steel for the Water Tower Project in the amount of \$291,527.27

**CONTACT PERSON:**

John Horton, Public Works Director

**BRIEF HISTORY & ANALYSIS:** Staff recommend the attached resolution to approve pay app #8 in the amount of \$291,527.27 related to the Water Tower Project.

This pay application has been reviewed by City Staff and Engineers from Veenstra & Kim for accuracy and is for work completed from November 12th through December 10th, 2024, for the project. The contractor is scheduled to be back onsite in late February to being preparing to lift the bowl. The painting will be completed in the air once the weather allows.

Staff have met with the contractor and have a bi-weekly progress meeting scheduled to keep them on track and moving forward to completion as soon as possible.

This water tower is being constructed at 2400 Eisenhower Drive SE.

**FUNDING SOURCE:** SRF Funds

**STAFF RECOMMENDATION:** Approve resolution on a roll call vote.

**APPROVED FOR SUBMITTAL:**

**ATTACHMENTS:**

1. RESOLUTION NO. 250218-47
2. Pay Request No. 8

CITY OF BONDURANT  
RESOLUTION NO. 250218-47

RESOLUTION APPROVING PAY REQUEST NO. 8 TO GERARD TANK AND STEEL  
FOR THE WATER TOWER PROJECT IN THE AMOUNT OF \$291,527.27

WHEREAS the Water Tower Project Pay Request No. 8 was submitted on February 11<sup>th</sup>, 2025; AND

WHEREAS the pay request no. 8 is for work completed through December 10<sup>th</sup>, 2024, on the Water Tower Project; AND

WHEREAS City Staff and engineers from Veenstra & Kimm have reviewed the pay application for accuracy.

NOW, THEREFORE, BE IT RESOLVED, by the City Council of the City of Bondurant, Iowa, that the Pay Request No. 8 to Gerard Tank & Steel in the amount of \$291,527.27 is hereby approved.

Passed this 18<sup>th</sup> day of February 2025,

By: \_\_\_\_\_  
Doug Elrod, Mayor

ATTEST: I, Shelby Hagan, City Clerk of Bondurant, hereby certify that at a meeting of the City Council held on the above date, among other proceedings the above was adopted.

IN WITNESS WHEREOF, I have hereunto set my hand the day and year above written.

\_\_\_\_\_  
Shelby Hagan, City Clerk

| Name      | Yay | Nay | Abstain | Absent |
|-----------|-----|-----|---------|--------|
| Cox       |     |     |         |        |
| Peffer    |     |     |         |        |
| Driscoll  |     |     |         |        |
| McKenzie  |     |     |         |        |
| Sillanpaa |     |     |         |        |



**VEENSTRA & KIMM INC.**

3000 Westown Parkway  
West Des Moines, Iowa 50266

515.225.8000 // 800.241.8000  
www.v-k.net

February 11, 2025

Marketa Oliver  
City Administrator  
City of Bondurant  
200 Second Street NE  
P.O. Box 37  
Bondurant, Iowa 50035

BONDURANT, IOWA  
WATER TOWER - REBID  
PARTIAL PAYMENT ESTIMATE NO. 8

Enclosed is a copy of Partial Payment Estimate No. 8 for the Water Tower project under the contract between the City of Bondurant and Gerard Tank & Steel. Partial Pay Estimate No. 8 is for the period ending December 10, 2024, in the amount of \$291,527.27.

If you have any questions or comments concerning the project, please contact the writer at 515-669-7768.

VEENSTRA & KIMM, INC.

A handwritten signature in blue ink, appearing to read 'Callin Hornsby', is written over a horizontal line.

Callin Hornsby

CRH  
428106

cc: Susan Melhus – Gerard Tank & Steel (electronic)  
Malcom Richerson – Gerard Tank & Steel (electronic)

**VEENSTRA & KIMM INC.**3000 Westown Parkway  
West Des Moines, Iowa 50266515.225.8000 // 800.241.8000  
www.v-k.netDate: **12/10/2024****PAY ESTIMATE NO. 8.**

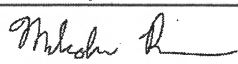
|                                    |                                                        |                                        |           |                         |                                                                                       |                   |                       |                    |
|------------------------------------|--------------------------------------------------------|----------------------------------------|-----------|-------------------------|---------------------------------------------------------------------------------------|-------------------|-----------------------|--------------------|
| Project Title                      |                                                        | Water Tower<br>City of Bondurant, Iowa |           | Contractor              | Gerard Tank & Steel, Inc.<br>1540 East 11th Street, PO Box 513<br>Concordia, KS 66901 |                   |                       |                    |
| Original Contract<br>Amount & Date |                                                        | \$4,438,273.10                         | 10-Jul-23 | Pay Period              | 12-Nov-24 to 10-Dec-24                                                                |                   |                       |                    |
| BID ITEMS                          |                                                        |                                        |           |                         |                                                                                       |                   |                       |                    |
| Bid<br>Item No.                    | Specification Section / Description                    |                                        | Unit      | Estimated<br>Quantity   | Unit Price                                                                            | Extended<br>Price | Quantity<br>Completed | Value<br>Completed |
| 1                                  | 1,000,000 Gallon Composite Water Tower                 |                                        |           |                         |                                                                                       |                   |                       |                    |
| 1.1                                | Rommed Aggregate Piers                                 |                                        | LS        | 1                       | \$ 81,000.00                                                                          | \$ 81,000.00      | 100.00%               | \$ 81,000.00       |
| 1.2                                | Foundation                                             |                                        | LS        | 1                       | \$ 510,350.00                                                                         | \$ 510,350.00     | 99.00%                | \$ 505,246.50      |
| 1.3                                | Concrete Support Shaft                                 |                                        | LS        | 1                       | \$ 811,000.00                                                                         | \$ 811,000.00     | 99.00%                | \$ 802,890.00      |
| 1.4                                | Fabricated Steel - Delivered                           |                                        | LS        | 1                       | \$ 844,308.10                                                                         | \$ 844,308.10     | 95.00%                | \$ 802,092.70      |
| 1.5                                | Steel Erection                                         |                                        | LS        | 1                       | \$ 1,112,200.00                                                                       | \$ 1,112,200.00   | 60.00%                | \$ 667,320.00      |
| 1.6                                | Field Coating                                          |                                        | LS        | 1                       | \$ 440,000.00                                                                         | \$ 440,000.00     | 15.00%                | \$ 66,000.00       |
| 1.7                                | Electrical                                             |                                        | LS        | 1                       | \$ 185,000.00                                                                         | \$ 185,000.00     | 0.00%                 | \$ -               |
| 1.8                                | Miscellaneous Start ip                                 |                                        | LS        | 1                       | \$ 32,000.00                                                                          | \$ 32,000.00      | 0.00%                 | \$ -               |
| 2                                  | 7" PCC Driveway                                        |                                        | SY        | 1,175.0                 | \$ 135.00                                                                             | \$ 158,625.00     | 0                     | \$ -               |
| 3                                  | 18" RCP Culvert                                        |                                        | LF        | 55                      | \$ 40.00                                                                              | \$ 2,200.00       | 55                    | \$ 2,200.00        |
| 4                                  | 18" RCP FES                                            |                                        | EA        | 2                       | \$ 1,000.00                                                                           | \$ 2,000.00       | 2                     | \$ 2,000.00        |
| 5                                  | 72" High Chain Link Fence                              |                                        | LF        | 720                     | \$ 52.00                                                                              | \$ 37,440.00      | 0                     | \$ -               |
| 6                                  | 72" High Chain Link Fence Double Gate                  |                                        | EA        | 2                       | \$ 1,300.00                                                                           | \$ 2,600.00       | 0                     | \$ -               |
| 7                                  | PVC Water Main in Open Cut - 16"                       |                                        | LF        | 465                     | \$ 110.00                                                                             | \$ 51,150.00      | 465                   | \$ 51,150.00       |
| 8                                  | Hydrant                                                |                                        | EA        | 1                       | \$ 9,000.00                                                                           | \$ 9,000.00       | 0                     | \$ -               |
| 9                                  | Gate Valve - 16"                                       |                                        | EA        | 2                       | \$ 14,000.00                                                                          | \$ 28,000.00      | 2                     | \$ 28,000.00       |
| 10                                 | Site Improvement                                       |                                        | LS        | 1                       | \$ 4,000.00                                                                           | \$ 4,000.00       | 0.00%                 | \$ -               |
| 11                                 | Seeding - SUDAS Type 2                                 |                                        | ACRE      | 2                       | \$ 3,000.00                                                                           | \$ 6,000.00       | 0                     | \$ -               |
| 12                                 | Exterior Decorative Lighting                           |                                        | LS        | 1                       | \$ 121,400.00                                                                         | \$ 121,400.00     | 0.00%                 | \$ -               |
|                                    |                                                        |                                        |           |                         |                                                                                       |                   |                       |                    |
| CO 1                               | Intall Level Control Valve and Bypass Valve Facilities |                                        | LS        | 1                       | \$ 181,000.00                                                                         | \$ 181,000.00     | 100.00%               | \$ 181,000.00      |
|                                    |                                                        |                                        |           | TOTAL ORIGINAL CONTRACT |                                                                                       | \$ 4,619,273.10   |                       | \$ 3,188,899.20    |

V-K Job No. 428106



| SUMMARY                              |                                                         |                                              |                 |
|--------------------------------------|---------------------------------------------------------|----------------------------------------------|-----------------|
|                                      |                                                         | Original Contract Price                      | Value Completed |
| Bid Items Subtotal                   |                                                         | \$4,438,273.10                               | \$ 3,188,899.20 |
| APPROVED CHANGE ORDERS               |                                                         |                                              |                 |
| Change Order No.                     | Description/Notes                                       | Total Approved                               | Value Completed |
| CO 1                                 | Install Level Control Valve and Bypass Valve Facilities | \$ 181,000.00                                |                 |
|                                      |                                                         |                                              |                 |
|                                      |                                                         |                                              |                 |
| TOTAL ALL CHANGE ORDERS              |                                                         | \$ 181,000.00                                | \$ -            |
| Revised Contract Price               |                                                         | \$ 4,619,273.10                              | \$ 3,188,899.20 |
|                                      |                                                         | Total Materials Stored                       | \$ -            |
|                                      |                                                         | Value of Completed Work and Materials Stored | \$ 3,188,899.20 |
|                                      |                                                         | Less Retained Percentage (5%)                | \$ 159,444.96   |
|                                      |                                                         | Total Earned Less Retainage                  | \$ 3,029,454.24 |
| PREVIOUSLY APPROVED PARTIAL PAYMENTS |                                                         |                                              |                 |
| Less Estimate(s) Previously Approved |                                                         | Pay Estimate No.1                            | \$ 697,752.68   |
|                                      |                                                         | Pay Estimate No.2                            | \$ 323,589.00   |
|                                      |                                                         | Pay Estimate No.3                            | \$ 269,657.50   |
|                                      |                                                         | Pay Estimate No.4                            | \$ 248,995.00   |
|                                      |                                                         | Pay Estimate No.5                            | \$151,131.90    |
|                                      |                                                         | Pay Estimate No.6                            | \$984,100.89    |
|                                      |                                                         | Pay Estimate No.7                            | \$62,700.00     |
|                                      |                                                         | Less Total Pay Estimates Previously Approved | \$ 2,737,926.97 |
| Percent Complete                     | 69.0%                                                   | Amount Due This Estimate                     | \$ 291,527.27   |

The amount \$291,527.27 is recommended for approval for payment in accordance with the terms of the contract.

|                                                                |                                                                                     |                                          |                                                                                     |
|----------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------|-------------------------------------------------------------------------------------|
| Quantities Complete Submitted By:<br>Gerard Tank & Steel, Inc. |                                                                                     | Recommended By:<br>Veenstra & Kimm, Inc. | Approved By:<br>City of Bondurant, Iowa                                             |
| Signature                                                      |  | Signature                                |  |
| Title                                                          | Construction Manager                                                                | Title                                    | Project Engineer                                                                    |
| Date                                                           | 11/11/2024                                                                          | Date                                     | 2/11/2025                                                                           |
|                                                                |                                                                                     |                                          | Mayor                                                                               |





**BUSINESS OF THE CITY COUNCIL  
BONDURANT, IOWA  
AGENDA STATEMENT**

Item No. 5.k.  
For Meeting of 2/18/2025  
**Resolution**

**TITLE:** - Resolution approving change order No. 2 to Brothers Cleaning Corporation DBE Brothers Concrete for the Bondurant City Park Reconstruction Project in the amount of \$196,154.41

**CONTACT PERSON:**

John Horton, Public Works Director  
Marketa Oliver, ICMA-CM, SPHR, City Administrator

**BRIEF HISTORY & ANALYSIS:** Staff recommend to the Council the approval of the attached resolution to approve change order #2 in the amount of \$196,154.41 related to the Bondurant City Park Reconstruction Project.

This change order has been reviewed by City Staff and Architects from RDG Planning and Design for accuracy and is for additional work completed on Phase 1 of the project that was not included in change order #1 that was approved back in December. This change order also reflects several items being deducted that were not completed in the original contract as well as items that were approved in CO#1 due to some changes that were made during the final design of Phase 1 of this park reconstruction.

Changes that were made and the items that were not completed, the original design of phase 1 was expanded to enhance the overall look of the park and the playground while ultimately saving money if the changes were not made. This enabled the City to expand the project and take advantage of competitive unit pricing.

**FUNDING SOURCE:** CIP Budget/TIF/LOSST

**STAFF RECOMMENDATION:** Staff would recommend approval of the resolution.

**APPROVED FOR SUBMITTAL:**

**ATTACHMENTS:**

1. RESOLUTION NO. 250218-48
2. Change Order No. 2

CITY OF BONDURANT  
RESOLUTION NO. 250218-48

RESOLUTION APPROVING CAHNGE ORDER NO. 2 TO BROTHERS CLEANING  
CORP. dbE BROTHERS CONCRETE FOR THE BONDURANT CITY PARK  
RECONSTRUCTION PROJECT IN THE AMOUNT OF \$196,154.41

WHEREAS on October 2, 2023, the City of Bondurant approved plans and specifications and ordered construction for the Bid Package 1 of Phase 1 of the City Park project; AND

WHEREAS on October 31, 2023, the City of Bondurant received the bids for the Project; AND

WHEREAS the City received three bids, ranging from \$392,453 to \$976,043; AND

WHEREAS the architect's estimate for the project was \$550,000; AND

WHEREAS Bid Package 1 of Phase 1 of the City Park project contract was awarded to Brothers Concrete in the amount of \$392,453 on November 6, 2023; AND

WHEREAS Change Order No. 2 change order includes additional funding for the added stormwater enhancements and subgrade prep for playground and additional seat wall around the playground and basketball court; AND

WHEREAS staff recommend advancing items that were anticipated for the next phase of construction and including them in the current change order to take advantage of extremely good unit pricing, therefore, including additional walkway development, retaining seat wall, planter beds, electrical feed for power pedestals and bollards, landscaped stone edging.

WHEREAS City Staff and the Architect have reviewed the change order for accuracy; AND

WHEREAS the total amount for Change Order No. 2 is \$196,154.41, bringing the total contract amount to \$1,205,906.95.

NOW, THEREFORE, BE IT RESOLVED, by the City Council of the City of Bondurant, Iowa, that Change Order No. 2 is hereby approved as presented. Passed this 18<sup>th</sup> day of February 2025,

By: \_\_\_\_\_  
Doug Elrod, Mayor

ATTEST: I, Shelby Hagan, City Clerk of Bondurant, hereby certify that at a meeting of the City Council held on the above date, among other proceedings the above was adopted.

IN WITNESS WHEREOF, I have hereunto set my hand the day and year above written.

---

Shelby Hagan, City Clerk

| Name      | Yay | Nay | Abstain | Absent |
|-----------|-----|-----|---------|--------|
| Cox       |     |     |         |        |
| Peffer    |     |     |         |        |
| Driscoll  |     |     |         |        |
| McKenzie  |     |     |         |        |
| Sillanpaa |     |     |         |        |

## Change Order

**PROJECT:** (Name and address)  
Bondurant City Park  
201 Main St SE

**CONTRACT INFORMATION:**  
Contract For: City of Bondurant  
\$392,453.04  
Date: 10/31/23

**CHANGE ORDER INFORMATION:**  
Change Order Number: 2  
Date: 2/10/25

**OWNER:** (Name and address)  
City of Bondurant  
200 2nd St NE Box 37  
Bondurant, IA 50035  
Attn: Marketa Oliver

**ARCHITECT:** (Name and address)  
RDG Planning & Design  
301 Grand Avenue  
Des Moines, IA 50309  
Architect's Project No.: R3005.078.00

**CONTRACTOR:** (Name and address)  
Brothers Concrete  
4000 Colfax Ave.  
Des Moines, IA 50317

### THE CONTRACT IS CHANGED AS FOLLOWS:

(Insert a detailed description of the change and, if applicable, attach or reference specific exhibits. Also include agreed upon adjustments attributable to executed Construction Change Directives.)

|                                                                                                                  |              |
|------------------------------------------------------------------------------------------------------------------|--------------|
| 1) Request No. 2: 2nd St Improvements: <u>Add</u> Pavers ( Replace PCC with Pavers) .....                        | \$4,425.13   |
| 2) Request No. 3: 2nd St Improvements: <u>Delete</u> Power Pedestals & Bollards in Planting Beds .....           | -\$21,752.00 |
| 3) Request No. 4: 2nd St Improvements: <u>Delete</u> Electrical Feed for Power Pedestals / Bollards .....        | -\$19,584.00 |
| 4) Request No. 6: 2nd St Improvements: <u>Delete</u> Plant Material in Planter Beds .....                        | -\$7,100.00  |
| 5) Request No. 9: Landscaping: <u>Delete</u> Mulch Beds.....                                                     | -\$8,275.00  |
| 6) Request No. 10: Landscaping: <u>Delete</u> Stone Edging .....                                                 | -\$2,500.00  |
| 7) Request No. 14: Playground: <u>Delete</u> 4" Perforated Subdrain .....                                        | -\$6,750.00  |
| 8) Request No. 15: Playground: <u>Delete</u> 6" Subdrain .....                                                   | -\$6,625.00  |
| 9) Request No. 16: Utility: <u>Delete</u> Subdrain Connection to Existing Intake .....                           | -\$1,850.00  |
| 10) Request No. 17: Landscaping: <u>Delete</u> Planting Bed (Original Contract) .....                            | -\$2,950.00  |
| 10) Request No. 18: 2nd St Improvements: <u>Delete</u> of North Retaining Wall #2 (Minus Footing Installed)..... | -\$7,020.00  |
| 11) Request No. 19: Basketball Court: <u>Delete</u> Stripping (Original Contract).....                           | -\$2,200.00  |
| 12) Request No. 20: Basketball Court: <u>Delete</u> Guardrail.....                                               | -\$8,000.00  |
| 13) Request No. 21: Pavement: <u>Delete</u> Sidewalk, Seal Joint (Original Contract) .....                       | -\$2,080.00  |
| 14) Request No. 22: Signage: <u>Delete</u> Steel Pipe Bollard w/sign ADA Signage (Original Contract).....        | -\$4,400.00  |
| 15) Request No. 46: Playground: <u>Add</u> Surface America Playbond Surfacing .....                              | \$10,820.50  |
| 16) Request No. 47: Playground: <u>Add</u> Seat Wall. (Additional 194.58 LF) .....                               | \$31,245.71  |
| 17) Request No. 48: Basketball Court: <u>Add</u> Court Size 2096 Sq. Ft (Additional 194.58 LF).....              | \$23,517.12  |
| 18) Request No. 49: Site Improvements: <u>Add</u> Electrical Conduit (Add 700 LF) .....                          | \$15,142.20  |
| 19) Request No. 50: Playground: <u>Add</u> Trench Drains .....                                                   | \$4,815.00   |
| 20) Request No. 51: Playground: <u>Add</u> Storm Sewer Pipe and Structures .....                                 | \$42,433.65  |
| 21) Request No. 52: Site Survey: <u>Add</u> .....                                                                | \$5,555.00   |
| 22) Request No. 53: Playground: <u>Add</u> Grading, Subbase/Subgrade, PCC Slab .....                             | \$161,575.00 |
| 23) Request No. 54: Basketball Court: <u>Deduct</u> Wire Mesh .....                                              | -\$840.00    |
| 24) Request No. 55: Basketball Court: <u>Add</u> #4 Rebar Replace.....                                           | \$5,990.60   |
| 25) Request No. 56: <u>Remove</u> Sidewalk North of Splash Pad & West of Shelter.....                            | -\$7,437.50  |

TOTAL CHANGE: \$196,154.41

|                                                                          |                 |
|--------------------------------------------------------------------------|-----------------|
| The original Contract Sum was                                            | \$ 392,453.04   |
| The net change by previously authorized Change Orders                    | \$ 617,299.50   |
| The Contract Sum prior to this Change Order was                          | \$ 1,009,752.54 |
| The Contract Sum will be increased by this Change Order in the amount of | \$ 196,154.41   |
| The new Contract Sum including this Change Order will be                 | \$ 1,205,906.95 |

The Contract Time will be unchanged by ( ) days.  
The new date of Substantial Completion will be .

**NOTE:** This Change Order does not include adjustments to the Contract Sum or Guaranteed Maximum Price, or the Contract Time, that have been authorized by Construction Change Directive until the cost and time have been agreed upon by both the Owner and Contractor, in which case a Change Order is executed to supersede the Construction Change Directive.

**NOT VALID UNTIL SIGNED BY THE ARCHITECT, CONTRACTOR AND OWNER.**

RDG Planning & Design

ARCHITECT (Firm name)

SIGNATURE

Mike Bell, PLA

PRINTED NAME AND TITLE

2/10/25

DATE

Brothers Concrete

CONTRACTOR (Firm name)

SIGNATURE

Jose Cancino, Project Manager

PRINTED NAME AND TITLE

DATE

City of Bondurant

OWNER (Firm name)

SIGNATURE

Marketa Oliver, City Administrator

PRINTED NAME AND TITLE

DATE



**BUSINESS OF THE CITY COUNCIL  
BONDURANT, IOWA  
AGENDA STATEMENT**

Item No. 5.I.  
For Meeting of 2/18/2025  
**Resolution**

**TITLE:** - Resolution approving Pay Request No. 3 (Final Pay Request) to Brothers Cleaning Corporation DBE Brothers Concrete for the Bondurant City Park Reconstruction Project in the amount of \$780,982.84

**CONTACT PERSON:**

John Horton, Public Works Director  
Marketa Oliver, ICMA-CM, SPHR, City Administrator

**BRIEF HISTORY & ANALYSIS:** Staff would recommend to the Council the approval of the attached resolution to approve pay app #3 (Final Pay Application) in the amount of \$780,982.84 related to the Bondurant City Park Phase 1 Reconstruction Project. This pay application has been reviewed by City Staff and Architects from RDG Planning and Design for accuracy and is for the balance of work completed on Phase 1 of the project including all changes approved in Change Order #1 and Change Order #2. All work for Phase 1 is considered complete and the contract with Brothers Concrete is officially closed out with this Final Pay Application.

**FUNDING SOURCE:** CIP Budget

**STAFF RECOMMENDATION:** Staff would recommend approval of the resolution.

**APPROVED FOR SUBMITTAL:**

**ATTACHMENTS:**

1. RESOLUTION NO. 250218-49
2. Bondurant City Park Phase 1 - Pay Request No. 3

CITY OF BONDURANT  
RESOLUTION NO. 250218-49

RESOLUTION APPROVING PAY REQUEST NO. 3 TO BROTHERS CLEANING  
CORP. dba BROTHERS CONCRETE FOR THE BONDURANT CITY PARK PHASE 1  
RECONSTRUCTION PROJECT IN THE AMOUNT OF \$780,982.84 (FINAL PAY  
APPLICATION)

WHEREAS the Bondurant City Park Reconstruction Project Pay Request No. 3 was submitted on February 11<sup>th</sup>, 2025; AND

WHEREAS the pay request no. 3 is the Final Pay Request for all work associated with Phase 1 on the Bondurant City Park Reconstruction Project; AND

WHEREAS City Staff and architects from RDG have reviewed the pay request for accuracy.

NOW, THEREFORE, BE IT RESOLVED, by the City Council of the City of Bondurant, Iowa, that the Pay Request No. 3 to Brothers Cleaning Corp. in the amount of \$780,982.84 hereby approved.

Passed this 18<sup>th</sup> day of February 2025,

By: \_\_\_\_\_  
Doug Elrod, Mayor

ATTEST: I, Shelby Hagan, City Clerk of Bondurant, hereby certify that at a meeting of the City Council held on the above date, among other proceedings the above was adopted.

IN WITNESS WHEREOF, I have hereunto set my hand the day and year above written.

\_\_\_\_\_  
Shelby Hagan, City Clerk

| Name      | Yay | Nay | Abstain | Absent |
|-----------|-----|-----|---------|--------|
| Cox       |     |     |         |        |
| Peffer    |     |     |         |        |
| Driscoll  |     |     |         |        |
| McKenzie  |     |     |         |        |
| Sillanpaa |     |     |         |        |



# APPLICATION AND CERTIFICATION FOR PAYMENT

AIA DOCUMENT G702

PAGE ONE OF PAGES

TO GC: Brothers Cleaning Corporation  
4000 Colfax ave.  
Des Moines, IA 50317

PROJECT: Bondurant City Park Phase I  
Address: [REDACTED]

APPLICATION NO: 3

Distribution to:

|                                     |            |
|-------------------------------------|------------|
| <input checked="" type="checkbox"/> | OWNER      |
| <input type="checkbox"/>            | ARCHITECT  |
| <input type="checkbox"/>            | CONTRACTOR |
| <input type="checkbox"/>            |            |
| <input type="checkbox"/>            |            |

PERIOD TO: 2/11/2025

FROM SUBCONTRACTOR:

VIA ARCHITECT:

PROJECT NO: 0

CONTRACT FOR:

CONTRACT DATE 11/10/2024

## CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract. Continuation Sheet, AIA Document G703, is attached.

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

- |                                                                           |    |              |          |
|---------------------------------------------------------------------------|----|--------------|----------|
| 1. ORIGINAL CONTRACT SUM                                                  | \$ | 392,453.04   | Approved |
| 2. Net change by Change Orders                                            | \$ | 813,453.91   |          |
| 3. CONTRACT SUM TO DATE (Line 1 + 2)                                      | \$ | 1,205,906.95 | Approved |
| 4. TOTAL COMPLETED & STORED TO DATE (Column G on G703)                    | \$ | 780,982.84   | Approved |
| 5. RETAINAGE:                                                             |    |              |          |
| a. 0 % of Completed Work (Column D + E on G703)                           | \$ | 0.00         |          |
| b. % of Stored Material (Column F on G703)                                | \$ |              |          |
| Total Retainage (Lines 5a + 5b or Total in Column I of G703)              | \$ | 0.00         |          |
| 6. TOTAL EARNED LESS RETAINAGE (Line 4 Less Line 5 Total)                 | \$ | 780,982.84   |          |
| 7. LESS PREVIOUS CERTIFICATES FOR PAYMENT (Line 6 from prior Certificate) | \$ | 0.00         |          |
| 8. CURRENT PAYMENT DUE                                                    | \$ | 780,982.84   | Approved |
| 9. BALANCE TO FINISH, INCLUDING RETAINAGE (Line 3 less Line 6)            | \$ | 0.00         |          |

SUBCONTRACTOR:

By:

JOSE CANCINO

Date: 2/11/25

State of: IA

Subscribed and sworn to before me this

County of: Polk  
day of: 2/11/25

Notary Public: Alex Prado  
My Commission expires: 10-22-27

## ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observation comprising the application, the Architect certifies to the Owner that the Architect's knowledge, information and belief the Work has progressed in accordance with the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED \$ 780,982.84

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)  
ARCHITECT:

By:

Alex Prado

Date: 2/11/2025

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

| CHANGE ORDER SUMMARY                               | ADDITIONS    | DEDUCTIONS |
|----------------------------------------------------|--------------|------------|
| Total changes approved in previous months by Owner | \$617,299.50 | \$0.00     |
| Total approved this Month                          | \$196,154.41 | \$0.00     |
| TOTALS                                             | \$813,453.91 | \$0.00     |
| NET CHANGES by Change Order                        | \$813,453.91 |            |

AIA DOCUMENT G702 - APPLICATION AND CERTIFICATION FOR PAYMENT - 1992 EDITION - AIA® © 1992

THE AMERICAN INSTITUTE OF ARCHITECTS, 1735 NEW YORK AVE., N.W., WASHINGTON, DC 20006-5292

Users may obtain validation of this document by requesting a completed AIA Document D401 - Certification of Document's Authenticity from the Licensee.





**BUSINESS OF THE CITY COUNCIL  
BONDURANT, IOWA  
AGENDA STATEMENT**

Item No. 5.m.  
For Meeting of 2/18/2025  
**Resolution**

**TITLE:** - Resolution approving Pay Request No. 3 to Alliance Construction Group LLC for the Civic Campus Improvements Phase 2 Project in the amount of \$67,419.36

**CONTACT PERSON:**

John Horton, Public Works Director

**BRIEF HISTORY & ANALYSIS:** Staff recommend the attached resolution to approve pay app #3 in the amount of \$67,419.36 related to the Civic Campus Improvements Phase 2 Project.

This pay application has been reviewed by City Staff and Engineers from Veenstra & Kim for accuracy and is for work completed from January 8th through February 7th for the project. The underground subcontractor continues to work when the weather allows installing sanitary sewer for the project.

As a reminder, this project will serve the industrial area east of Highway 65 off 2nd Street NE and the Civic Campus Project. This project also upgrades the intersection at 2nd and Highway 65.



**FUNDING SOURCE:** RISE Grant/Bond Funding supported by GO debt and TIF

**STAFF RECOMMENDATION:** Approve resolution on a roll call vote.

**APPROVED FOR SUBMITTAL:**

**ATTACHMENTS:**

1. RESOLUTION NO. 250218-50
2. Pay Request No. 3

CITY OF BONDURANT  
RESOLUTION NO. 250218-50

RESOLUTION APPROVING PAY REQUEST NO. 3 TO ALLIANCE CONSTRUCTION  
GROUP LLC FOR THE CIVIC CAMPUS IMPROVEMENTS PHASE 2 PROJECT IN  
THE AMOUNT OF \$67,419.36

WHEREAS the Civic Campus Improvements Phase 2 Pay Request No. 3 was submitted on February 10<sup>th</sup>, 2025; AND

WHEREAS, the pay request no. 3 is for work completed January 8<sup>th</sup>, 2024 through February 7<sup>th</sup>, 2025, on the Civic Campus Phase 2 Project; AND

WHEREAS City Staff and engineers from Veenstra & Kimm have reviewed the pay application for accuracy.

NOW, THEREFORE, BE IT RESOLVED, by the City Council of the City of Bondurant, Iowa, that the pay request no. 3 to Alliance Construction Group LLC in the amount of \$67,419.36 hereby approved.

Passed this 18<sup>th</sup> day of February 2025,

By: \_\_\_\_\_  
Doug Elrod, Mayor

ATTEST: I, Shelby Hagan, City Clerk of Bondurant, hereby certify that at a meeting of the City Council held on the above date, among other proceedings the above was adopted.

IN WITNESS WHEREOF, I have hereunto set my hand the day and year above written.

\_\_\_\_\_  
Shelby Hagan, City Clerk

| Name      | Yay | Nay | Abstain | Absent |
|-----------|-----|-----|---------|--------|
| Cox       |     |     |         |        |
| Driscoll  |     |     |         |        |
| McKenzie  |     |     |         |        |
| Peffer    |     |     |         |        |
| Sillanpaa |     |     |         |        |



## ESTIMATE OF CONSTRUCTION COMPLETED

## PARTIAL PAYMENT NO. 3

## PROJECT TITLE: CIVIC CAMPUS IMPROVEMENTS PHASE 2

Contractor: Alliance Construction Group LLC

Date: 2/10/2025

Original Contract Amount: \$5,251,693.65

Pay Period: January 8, 2025 to February 7, 2025

| BID ITEMS |                                             |      |                         |                           |                   |             |                         |
|-----------|---------------------------------------------|------|-------------------------|---------------------------|-------------------|-------------|-------------------------|
| ITEM NO.  | DESCRIPTION                                 | UNIT | QUANTITY                |                           |                   | UNIT PRICE  | VALUE COMPLETED TO DATE |
|           |                                             |      | ESTIMATED (ORIG. CONT.) | AUTHORIZED (INCL. C.O.'S) | COMPLETED TO DATE |             |                         |
|           | EARTHWORK                                   |      |                         |                           |                   |             |                         |
| 2.01      | Clearing and Grubbing                       | LS   | 1                       | 1                         |                   | \$9,400.00  | \$0.00                  |
| 2.02      | Topsoil                                     | CY   | 22,025                  | 22,025                    | 5,507             | \$4.80      | \$26,433.60             |
| 2.03      | Class 10 Excavation                         | CY   | 19,620                  | 19,620                    |                   | \$7.30      | \$0.00                  |
| 2.04      | Obliterate Old Roadbed                      | STA  | 15.0                    | 15.0                      |                   | \$1,200.00  | \$0.00                  |
| 2.05      | Below Grade Excavation (Core Out)           | CY   | 928                     | 928                       |                   | \$3.75      | \$0.00                  |
| 2.06      | Subgrade Preparation                        | SY   | 27,812                  | 27,812                    |                   | \$2.80      | \$0.00                  |
| 2.07      | Granular Stabilization                      | TONS | 1,753.0                 | 1,753.0                   |                   | \$47.75     | \$0.00                  |
| 2.08      | Subgrade Treatment, Geogrid                 | SY   | 2,782                   | 2,782                     |                   | \$2.50      | \$0.00                  |
| 2.09      | Modified Subbase                            | SY   | 27,812                  | 27,812                    |                   | \$7.20      | \$0.00                  |
| 2.10      | Compaction Testing                          | LS   | 1                       | 1                         | 0.15              | \$14,081.00 | \$2,112.15              |
|           | SEWERS AND DRAINS                           |      |                         |                           |                   |             |                         |
| 4.01      | Sanitary Sewer, Trenched, 8" PVC            | LF   | 974                     | 974                       | 225               | \$50.00     | \$11,250.00             |
| 4.02      | Sanitary Sewer, Trenched, 10" PVC           | LF   | 1,797                   | 1,797                     | 350               | \$51.50     | \$18,025.00             |
| 4.03      | Sanitary Sewer, Trenched, 12" PVC           | LF   | 826                     | 826                       | 829               | \$73.00     | \$60,517.00             |
| 4.04      | Sanitary Sewer Force Main, Trenched, 8" PVC | LF   | 1,857                   | 1,857                     |                   | \$55.00     | \$0.00                  |
| 4.05      | Sanitary Sewer Force Main Abandonment, Plug | LS   | 1                       | 1                         |                   | \$725.00    | \$0.00                  |
| 4.06      | Sanitary Sewer Service Stub, 6" PVC         | LF   | 420                     | 420                       | 171               | \$41.00     | \$7,011.00              |
| 4.07      | Storm Sewer, Trenched, RCP, 15"             | LF   | 2,230                   | 2,230                     |                   | \$61.00     | \$0.00                  |
| 4.08      | Storm Sewer, Trenched, RCP, 18"             | LF   | 440                     | 440                       |                   | \$62.00     | \$0.00                  |
| 4.09      | Storm Sewer, Trenched, RCP, 24"             | LF   | 543                     | 543                       |                   | \$75.00     | \$0.00                  |
| 4.10      | Storm Sewer, Trenched, RCP, 36"             | LF   | 405                     | 405                       |                   | \$110.00    | \$0.00                  |
| 4.11      | Storm Sewer, Trenched, RCP, 42"             | LF   | 1,614                   | 1,614                     |                   | \$150.00    | \$0.00                  |
| 4.12      | Pipe Apron, Concrete, 15"                   | EA   | 2                       | 2                         |                   | \$2,163.00  | \$0.00                  |
| 4.13      | Pipe Apron, Concrete, 24"                   | EA   | 2                       | 2                         |                   | \$3,030.00  | \$0.00                  |
| 4.14      | Removal of Culverts                         | LF   | 256                     | 256                       |                   | \$10.00     | \$0.00                  |
| 4.15      | Subdrain, Type 1, PVC, 6"                   | LF   | 8,446                   | 8,446                     |                   | \$13.00     | \$0.00                  |
| 4.16      | Subdrain Cleanouts                          | EA   | 7                       | 7                         |                   | \$450.00    | \$0.00                  |
| 4.17      | Subdrain Outlet                             | EA   | 72                      | 72                        |                   | \$200.00    | \$0.00                  |
| 4.18      | Field Tile Repair                           | LF   | 400                     | 400                       | 40                | \$20.00     | \$800.00                |
| 4.19      | Beveled Pipe and Guard, 24"                 | EA   | 1                       | 1                         |                   | \$2,650.00  | \$0.00                  |
|           | WATER MAINS AND APPURTENANCES               |      |                         |                           |                   |             |                         |
| 5.01      | Water Main, 4" PVC, Trenched                | LF   | 2,785                   | 2,785                     |                   | \$21.00     | \$0.00                  |
| 5.02      | Water Main, 12" PVC, Trenched               | LF   | 4,982                   | 4,982                     |                   | \$52.50     | \$0.00                  |
| 5.03      | Gate Valve, 4"                              | EA   | 2                       | 2                         |                   | \$1,200.00  | \$0.00                  |
| 5.04      | Gate Valve, 12"                             | EA   | 10                      | 10                        |                   | \$3,600.00  | \$0.00                  |
| 5.05      | Tapping Sleeve and Valve, 12"               | EA   | 1                       | 1                         |                   | \$6,550.00  | \$0.00                  |
| 5.06      | Water Service Stubs, 1.5"                   | EA   | 6                       | 6                         |                   | \$1,700.00  | \$0.00                  |
| 5.07      | Water Service Stubs, 8"                     | EA   | 2                       | 2                         |                   | \$3,250.00  | \$0.00                  |
| 5.08      | Water Service Stubs, 1.5"                   | LF   | 355                     | 355                       |                   | \$31.00     | \$0.00                  |
| 5.09      | Water Service Stubs, 8"                     | LF   | 100                     | 100                       |                   | \$31.50     | \$0.00                  |
| 5.10      | Hydrant Assembly                            | EA   | 16                      | 16                        |                   | \$6,600.00  | \$0.00                  |
| 5.11      | Blowoff Assembly                            | EA   | 3                       | 3                         |                   | \$1,680.00  | \$0.00                  |
| 5.12      | Connection to Existing                      | EA   | 2                       | 2                         |                   | \$630.00    | \$0.00                  |
| 5.13      | Water Main Abandonment                      | LS   | 1                       | 1                         |                   | \$450.00    | \$0.00                  |



[illegible]

| SUMMARY                                                                                                                   |                                                                                       |                                          |                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|------------------------------------------|---------------------------------------------------------------------------------------|
|                                                                                                                           |                                                                                       | Original Contract                        | Total Completed                                                                       |
| Bid Item Subtotal                                                                                                         |                                                                                       | \$5,251,693.65                           | \$201,398.75                                                                          |
| APPROVED CHANGE ORDERS                                                                                                    |                                                                                       |                                          |                                                                                       |
| Change Order No.                                                                                                          | Description/Notes                                                                     | Total Approved                           | Total Completed                                                                       |
| 1                                                                                                                         |                                                                                       | \$0.00                                   | \$0.00                                                                                |
| 2                                                                                                                         |                                                                                       | \$0.00                                   | \$0.00                                                                                |
| 3                                                                                                                         |                                                                                       | \$0.00                                   | \$0.00                                                                                |
| 4                                                                                                                         |                                                                                       | \$0.00                                   | \$0.00                                                                                |
| 5                                                                                                                         |                                                                                       | \$0.00                                   | \$0.00                                                                                |
| 6                                                                                                                         |                                                                                       | \$0.00                                   | \$0.00                                                                                |
| 7                                                                                                                         |                                                                                       | \$0.00                                   | \$0.00                                                                                |
| 8                                                                                                                         |                                                                                       | \$0.00                                   | \$0.00                                                                                |
| 9                                                                                                                         |                                                                                       | \$0.00                                   | \$0.00                                                                                |
| 10                                                                                                                        |                                                                                       | \$0.00                                   | \$0.00                                                                                |
| (Refer to Bid Item Schedule for Total Completed) Total Change Orders                                                      |                                                                                       | \$0.00                                   | \$0.00                                                                                |
|                                                                                                                           |                                                                                       | Total Approved                           | Total Completed                                                                       |
| Revised Contract Price                                                                                                    |                                                                                       | \$5,251,693.65                           | \$201,398.75                                                                          |
|                                                                                                                           |                                                                                       |                                          | Total Completed                                                                       |
| Total Materials Stored                                                                                                    |                                                                                       |                                          | \$82,449.85                                                                           |
| Total Completed Plus Materials Stored                                                                                     |                                                                                       |                                          | \$283,848.60                                                                          |
| Retainage (5%)                                                                                                            |                                                                                       |                                          | \$14,192.43                                                                           |
| Total Earned Less Retainage                                                                                               |                                                                                       |                                          | \$269,656.17                                                                          |
| APPROVED PARTIAL PAYMENTS                                                                                                 |                                                                                       |                                          |                                                                                       |
| Partial Payment No.                                                                                                       | Period                                                                                | Total Approved                           |                                                                                       |
| 1                                                                                                                         | November 26, 2024 to December 10, 2024                                                | \$31,587.50                              |                                                                                       |
| 2                                                                                                                         | December 11, 2024 to January 7, 2025                                                  | \$170,649.31                             |                                                                                       |
| 3                                                                                                                         |                                                                                       | \$0.00                                   |                                                                                       |
| 4                                                                                                                         |                                                                                       | \$0.00                                   |                                                                                       |
| 5                                                                                                                         |                                                                                       | \$0.00                                   |                                                                                       |
| 6                                                                                                                         |                                                                                       | \$0.00                                   |                                                                                       |
| 7                                                                                                                         |                                                                                       | \$0.00                                   |                                                                                       |
| 8                                                                                                                         |                                                                                       | \$0.00                                   |                                                                                       |
| 9                                                                                                                         |                                                                                       | \$0.00                                   |                                                                                       |
| 10                                                                                                                        |                                                                                       | \$0.00                                   |                                                                                       |
| 11                                                                                                                        |                                                                                       | \$0.00                                   |                                                                                       |
| 12                                                                                                                        |                                                                                       | \$0.00                                   |                                                                                       |
|                                                                                                                           |                                                                                       | Total Previously Approved                | \$202,236.81                                                                          |
| Amount Due This Request                                                                                                   |                                                                                       |                                          | \$67,419.36                                                                           |
| Note: The amount <b>\$67,419.36</b> is recommended for approval for payment in accordance with the terms of the Contract. |                                                                                       |                                          |                                                                                       |
| CONTRACT SUMMARY                                                                                                          |                                                                                       |                                          |                                                                                       |
|                                                                                                                           |                                                                                       | ORIGINAL CONTRACT AMOUNT                 | \$5,251,693.65                                                                        |
|                                                                                                                           |                                                                                       | TOTAL CONTRACT AMOUNT PLUS CHANGE ORDERS | \$5,251,693.65                                                                        |
|                                                                                                                           |                                                                                       | THIS PARTIAL PAYMENT                     | \$67,419.36                                                                           |
|                                                                                                                           |                                                                                       | TOTAL PARTIAL PAYMENTS INCL THIS PAYMENT | \$269,656.17                                                                          |
|                                                                                                                           |                                                                                       | BALANCE                                  | \$4,982,037.48                                                                        |
|                                                                                                                           |                                                                                       | PERCENT COMPLETE                         | 5.4%                                                                                  |
| Recommended By:                                                                                                           |                                                                                       | Contractor:                              | Approved by:                                                                          |
| Veenstra & Kimm, Inc.                                                                                                     |                                                                                       | Alliance Construction Group LLC          | City of Bondurant                                                                     |
| Signature                                                                                                                 |    | Signature                                |    |
| Name                                                                                                                      | William Weber                                                                         | Name                                     | Clint Carpenter                                                                       |
| Title                                                                                                                     | Project Manager                                                                       | Title                                    | Project Manager                                                                       |
| Date                                                                                                                      | Feb 10, 2025                                                                          | Date                                     | Feb 10, 2025                                                                          |
| Signature                                                                                                                 |  | Signature                                |  |
| Name                                                                                                                      | John Horton                                                                           | Name                                     | John Horton                                                                           |
| Title                                                                                                                     | Public Works Director                                                                 | Title                                    | Public Works Director                                                                 |
| Date                                                                                                                      | Feb 10, 2025                                                                          | Date                                     | Feb 10, 2025                                                                          |

# 428119-2 Partial Payment No. 3 (Civic Campus - Phase 2)

Final Audit Report

2025-02-11

|                 |                                              |
|-----------------|----------------------------------------------|
| Created:        | 2025-02-10                                   |
| By:             | Will Weber (wweber@v-k.net)                  |
| Status:         | Signed                                       |
| Transaction ID: | CBJCHBCAABAAg7kmDW-ol6Xw1t2WX-RmWj4WVLQaE-q7 |

## "428119-2 Partial Payment No. 3 (Civic Campus - Phase 2)" History

-  Document created by Will Weber (wweber@v-k.net)  
2025-02-10 - 10:16:56 PM GMT
-  Document emailed to Will Weber (wweber@v-k.net) for signature  
2025-02-10 - 10:18:23 PM GMT
-  Document emailed to Clint Carpenter (ccarpenter@acgiowa.com) for signature  
2025-02-10 - 10:18:23 PM GMT
-  Document emailed to jhorton@cityofbondurant.com for signature  
2025-02-10 - 10:18:23 PM GMT
-  Email viewed by Clint Carpenter (ccarpenter@acgiowa.com)  
2025-02-10 - 10:18:29 PM GMT
-  Document e-signed by Will Weber (wweber@v-k.net)  
Signature Date: 2025-02-10 - 10:18:33 PM GMT - Time Source: server
-  Document e-signed by Clint Carpenter (ccarpenter@acgiowa.com)  
Signature Date: 2025-02-10 - 10:30:35 PM GMT - Time Source: server
-  Email viewed by jhorton@cityofbondurant.com  
2025-02-11 - 0:25:49 AM GMT
-  Signer jhorton@cityofbondurant.com entered name at signing as John Horton  
2025-02-11 - 0:27:01 AM GMT
-  Document e-signed by John Horton (jhorton@cityofbondurant.com)  
Signature Date: 2025-02-11 - 0:27:03 AM GMT - Time Source: server



✔ Agreement completed.

2025-02-11 - 0:27:03 AM GMT



**BUSINESS OF THE CITY COUNCIL  
BONDURANT, IOWA  
AGENDA STATEMENT**

Item No. 5.n.  
For Meeting of 2/18/2025  
**Resolution**

**TITLE:** - Resolution approving the Hazard Mitigation Plan

**CONTACT PERSON:**

Aaron Kreuder, Fire Chief  
John Horton, Public Works Director  
Marketa Oliver, ICMA-CM, SPHR, City Administrator

**BRIEF HISTORY & ANALYSIS:** Staff have been a part of the update of the 2018 Polk County Multi-Jurisdictional Local Hazard Mitigation Plan and the development of the 2024 Polk County, Iowa Hazard Mitigation Plan (the Plan). There was a lot of good discussion, thought process, and cooperation that went into this new update that will carry the City of Bondurant, as well as other entities involved through for the next 5 year cycle.

This update will help ensure the City of Bondurant's ability to secure funding to complete some of the much needed infrastructure improvements to help in the mitigation of the more recent issues that are facing our community.

The attached resolution amends the Plan to include an update on the City of Bondurant's on the goals included in the 2018 Hazard Mitigation Plan progress and amends the Plan to include the City of Bondurant Goals in the 2024 Plan and then adopts the plan.

**FUNDING SOURCE:** NA - this serves as a foundation on which the City can apply for grants

**STAFF RECOMMENDATION:** Approve resolution on a roll call vote.

**APPROVED FOR SUBMITTAL:**

**ATTACHMENTS:**

1. RESOLUTION NO. 250218-51
2. 2024 Polk County Hazard Mitigation Plan
3. 2018 Hazard Mitigation Plan - Bondurant progress
4. 2024 Hazard Mitigation Plan - Bondurant goals

CITY OF BONDURANT  
RESOLUTION NO. 250218-51

RESOLUTION APPROVING AMENDMENT AND ADOPTION OF THE 2024 POLK  
COUNTY MULTI-JURISDICTIONAL LOCAL HAZARD MITIGATION PLAN

WHEREAS the City of Bondurant, Iowa, recognizes the threat that natural hazards pose to people and property within our community; and

WHEREAS undertaking hazard mitigation actions will reduce the potential for harm to people and property from future hazard occurrences; and

WHEREAS the U.S. Congress passed the Disaster Mitigation Act of 2000 (“Disaster Mitigation Act”) emphasizing the need for pre-disaster mitigation of potential hazards; and

WHEREAS the Disaster Mitigation Act made available hazard mitigation grants to state and local governments; and

WHEREAS an adopted Local Hazard Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

WHEREAS the City of Bondurant, Iowa, fully participated in the hazard mitigation planning process to prepare this Multi-Jurisdictional Local Hazard Mitigation Plan; and

WHEREAS the City of Bondurant has documented progress on mitigation actions through the 2018 Progress Update, which details the status of previously identified mitigation projects and activities; and

WHEREAS the City of Bondurant has established new hazard mitigation goals and strategies as outlined in the 2024 Hazard Mitigation Plan, addressing updated risks and priorities for the community; and

WHEREAS the Iowa Homeland Security and Emergency Management Division and the Federal Emergency Management Agency Region VII officials have reviewed the “Polk County Multi-Jurisdictional Local Hazard Mitigation Plan” and approved it contingent upon this official adoption of the participating governing body; and

WHEREAS the City of Bondurant, Iowa, desires to comply with the requirements of the Disaster Mitigation Act and to augment its emergency planning efforts by formally adopting the Polk County Multi-Jurisdictional Local Hazard Mitigation Plan, as amended to include the 2018 Progress Update and the 2024 Bondurant Hazard Mitigation Goals; and

WHEREAS adoption by the governing body for the City of Bondurant, Iowa, demonstrates the jurisdiction’s commitment to fulfilling the mitigation goals outlined in this Multi-Jurisdictional Local Hazard Mitigation Plan; and

WHEREAS adoption of this legitimizes the plan and authorizes responsible agencies to carry out their responsibilities under the plan.

NOW, THEREFORE, BE IT RESOLVED, that the City of Bondurant, Iowa, amends the 2024 Polk County Multi-Jurisdictional Local Hazard Mitigation Plan to incorporate the 2018 Progress Update and the 2024 Bondurant Hazard Mitigation Goals, and adopts the amended “Polk County Multi-Jurisdictional Local Hazard Mitigation Plan” as an official plan; and

BE IT FURTHER RESOLVED, the City of Bondurant, Iowa, will submit this Adoption Resolution to the Iowa Homeland Security and Emergency Management Division and Federal Emergency Management Agency Region VII officials to enable the plan’s final approval.

Passed this 3<sup>rd</sup> day of February 2025,

By: \_\_\_\_\_  
Doug Elrod, Mayor

ATTEST: I, Shelby Hagan, City Clerk of Bondurant, hereby certify that at a meeting of the City Council held on the above date, among other proceedings the above was adopted.

IN WITNESS WHEREOF, I have hereunto set my hand the day and year above written.

\_\_\_\_\_  
Shelby Hagan, City Clerk

| Name      | Yay | Nay | Abstain | Absent |
|-----------|-----|-----|---------|--------|
| Cox       |     |     |         |        |
| Peffer    |     |     |         |        |
| Driscoll  |     |     |         |        |
| McKenzie  |     |     |         |        |
| Sillanpaa |     |     |         |        |

2024

Polk County, Iowa

# Hazard Mitigation Plan



# Chapter 1:

# Introduction and Planning Process





# 1. INTRODUCTION AND PLANNING PROCESS

## 1.1. PURPOSE

Polk County and the participating cities, public school districts, and Des Moines Water Works prepared the 2024 Polk County Hazard Mitigation Plan to guide decisions about risk reduction to better protect people and property throughout the county. This plan demonstrates the jurisdiction's commitments to reducing risks from hazards and serves as a tool to help decision makers direct mitigation activities and resources. This plan was also developed to maintain Polk County and the participating jurisdictions' eligibility for certain federal grant programs; specifically, the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Assistance (HMA) grants such as the Hazard Mitigation Grant Program (HMGP), Building Resilient Infrastructure and Communities (BRIC), and Flood Mitigation Assistance (FMA) Programs. This document is an update of the previous plan, which was approved by FEMA on July 16, 2019.

## 1.2. BACKGROUND AND SCOPE

Each year in the United States, disasters take the lives of hundreds of people and injure thousands more. Nationwide, taxpayers pay billions of dollars annually to help communities, organizations, businesses, and individuals recover from disasters. These monies only partially reflect the true cost of disasters because additional expenses to insurance companies and nongovernmental organizations are not reimbursed by tax dollars. Many disasters are predictable, and much of the damage caused by these events can be alleviated or even eliminated.

Hazard mitigation is defined by FEMA as "any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event." The results of a three-year, congressionally mandated independent study to assess future savings from mitigation activities provides evidence that mitigation activities are highly cost-effective. On average, each dollar spent on mitigation saves society an average of \$4 in avoided future losses in addition to saving lives and preventing injuries.

Hazard mitigation planning is the process through which hazards that threaten communities are identified, likely impacts of those hazards are determined, mitigation goals are set, and appropriate strategies to lessen impacts are determined, prioritized, and implemented.

This plan documents the hazard mitigation planning process undertaken by the Polk County Hazard Mitigation Planning Committee (HMPC). It identifies relevant hazards and vulnerabilities in the planning area and sets forth an updated mitigation strategy to decrease vulnerability and increase resiliency and sustainability in Polk County.

The Polk County Hazard Mitigation Plan was developed collaboratively by the following participating jurisdictions within Polk County's boundaries (hereinafter referred to as the planning area):

- Unincorporated Polk County
- City of Alleman
- City of Altoona
- City of Ankeny
- City of Bondurant
- City of Clive
- City of Des Moines
- City of Elkhart
- City of Grimes
- City of Johnston
- City of Mitchellville
- City of Pleasant Hill
- City of Polk City
- City of Runnells
- City of Urbandale
- City of West Des Moines
- City of Windsor Heights
- Des Moines Water Works
- Delaware Township
- Saylor Township
- Ankeny School District 261
- Bondurant-Farrar School District 720
- Des Moines Independent School District 1737
- Johnston School District 3231
- North Polk School District 4779
- Southeast Polk School District 6101
- Urbandale School District 6579
- West Des Moines School District 6957

Saylor Township did not participate in the previous plan and joined the mitigation planning team for the first time with this 2024 update. The Dallas Center – Grimes School District was a participant in the previous plan but was unable to participate in this update due to conflicting priorities.



There are several cities within Polk County that have portions of their city limits in adjacent counties. The following cities are bi-county/multiple-county cities that are either a part of the Des Moines Metro Area that have portions of their city limits in other counties, or cities that have most of their corporate limits in Polk County.

- Clive (parts in Dallas County)
- Urbandale (parts in Dallas County)
- West Des Moines (parts in Dallas County, Madison County, & Warren County)
- Grimes (parts in Dallas County)
- Des Moines (parts in Warren County)
- Mitchellville (parts in Jasper County)

This plan was prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 (Public Law 106-390) and the implementing regulations set forth by the Interim Final Rule published in the Federal Register on February 26, 2002, (44 CFR §201.6) and finalized on October 31, 2007. (Hereafter, these requirements and regulations will be referred to collectively as the Disaster Mitigation Act.) While the act emphasized the need for mitigation plans and more coordinated mitigation planning and implementation efforts, the regulations established the requirements that local hazard mitigation plans must meet for a local jurisdiction to be eligible for certain federal disaster assistance and hazard mitigation funding under the Robert T. Stafford Disaster Relief and Emergency Act (Public Law 93-288). This update also reflects FEMA's updated Local Mitigation Planning Policy Guide, effective April 19, 2023.

Information in this plan will be used to help guide and coordinate mitigation activities and decisions for local land use policy in the future. Proactive mitigation planning will help reduce the cost of disaster response and recovery to communities and their residents by protecting critical community facilities, reducing liability exposure, and minimizing overall community impacts and disruptions. The planning area has been affected by hazards in the past and the participating jurisdictions are therefore committed to reducing future impacts from hazard events and becoming eligible for mitigation-related federal funding.

### 1.3. PLAN ORGANIZATION

This Polk County Multi-jurisdictional Hazard Mitigation Plan update is organized as follows:

- Chapter 1: Introduction and Planning Process
- Chapter 2: Planning Area Profile and Capability Assessment
- Chapter 3: Hazard Identification and Risk Assessment (HIRA)
- Chapter 4: Mitigation Strategy
- Chapter 5: Plan Maintenance Process

- Appendices

This is the same general format that was used for the 2018 Multi-jurisdictional Polk County Hazard Mitigation Plan.

### 1.4. PLANNING PROCESS

In October 2023, Polk County contracted with Witt O'Brien's to facilitate the update of the existing multi-jurisdictional local hazard mitigation plan. Witt O'Brien's role was to:

- Assist in establishing the Hazard Mitigation Planning Committee (HMPC) as defined by the Disaster Mitigation Act (DMA),
- Ensure the updated plan meets the DMA requirements as established by federal regulations and following FEMA's planning guidance,
- Facilitate the entire planning process,
- Identify the data requirements that HMPC participants could provide and conduct the research and documentation necessary to augment that data,
- Assist in facilitating the public input process,
- Produce the draft and final plan update documents, and
- Coordinate the Iowa Homeland Security and Emergency Management Division and FEMA plan reviews.

#### 1.4.1. MULTI-JURISDICTIONAL PARTICIPATION

Representatives from each participating jurisdiction, departments of the County, and other local, state, and federal organizations were invited to help develop the plan and agree upon the final contents. To ensure all key mitigation planning areas (prevention, property protection, natural resource protection, emergency services, structural flood control, and public information) were represented, the planning team encouraged participation from a wide variety of expertise backgrounds including, but not limited to, building officials, public works, planners, fire and emergency service officers, and administrative staff. The jurisdictions that elected to participate are listed above in section 1.2. Each jurisdiction that chose to participate in the planning process and development of the plan was required to meet plan participation requirements, which included:

- Designating a representative to serve on the HMPC;
- Participating in at least one plan-related meeting by either direct representation or authorized representation;
- Providing information to support the plan development by completing and returning worksheets and responding to other data and information requests;

- Providing status updates on the mitigation actions identified in the previous plan, and identifying additional mitigation actions;
- Reviewing and commenting on plan drafts;
- Informing the public, local officials, and other interested parties about the planning process and providing an opportunity for them to comment on the plan; and
- Formally adopting the mitigation plan.

The table below summarizes the participation jurisdictions' representation at plan-related meetings. A complete list of all representatives of the agencies and organizations that participated on the Polk County HMPC is provided in Appendix C.

**Table 1 – Jurisdictional Participation in Planning Process**

| Jurisdiction                 | Kickoff Meeting | HIRA Meeting | Strategy Meeting | Individual Meeting | Notes                                                                                                 |
|------------------------------|-----------------|--------------|------------------|--------------------|-------------------------------------------------------------------------------------------------------|
| Polk County (unincorporated) | X               | X            | X                | X                  | The Polk County EMA team met biweekly with the Witt O'Brien's team throughout the planning process    |
| City of Alleman              | X               |              | X                |                    |                                                                                                       |
| City of Altoona              | X               | X            | X                |                    |                                                                                                       |
| City of Ankeny               | X               |              | X                |                    |                                                                                                       |
| City of Bondurant            | X               |              | X                |                    |                                                                                                       |
| City of Clive                | X               | X            | X                |                    |                                                                                                       |
| City of Des Moines           | X               | X            | X                |                    |                                                                                                       |
| City of Elkhart              |                 |              | X                |                    |                                                                                                       |
| City of Grimes               |                 |              | X                |                    |                                                                                                       |
| City of Johnston             | X               |              | X                |                    |                                                                                                       |
| City of Mitchellville        | X               |              |                  |                    |                                                                                                       |
| City of Pleasant Hill        | X               | X            | X                |                    |                                                                                                       |
| City of Polk City            |                 |              | X                |                    |                                                                                                       |
| City of Runnells             |                 |              |                  | X                  | A representative from Runnells met 1:1 with a member of the Witt O'Brien's planning team on 3/20/2024 |
| City of Urbandale            | X               |              |                  |                    |                                                                                                       |
| City of West Des Moines      | X               | X            | X                |                    |                                                                                                       |
| City of Windsor Heights      | X               |              |                  |                    |                                                                                                       |
| Delaware Township            |                 |              |                  | X                  | A representative from the township met 1:1 with a member of the Polk County                           |

|                                             |   |  |   |   |                                                                                                                    |
|---------------------------------------------|---|--|---|---|--------------------------------------------------------------------------------------------------------------------|
|                                             |   |  |   |   | EMA leadership team on 4/10/2024                                                                                   |
| Saylor Township                             |   |  |   | X | A representative from the township met 1:1 with a member of the Polk County EMA leadership team on 4/11/2024       |
| Des Moines Water Works                      |   |  | X | X | A representative from DMWW met 1:1 with a member of the Witt O'Brien's planning team on 3/25/2024                  |
| Ankeny School District 261                  | X |  | X |   |                                                                                                                    |
| Bondurant-Farrar School District 720        |   |  |   | X | A representative from the district met 1:1 with a member of the Witt O'Brien's planning team on 4/4/2024           |
| Des Moines Independent School District 1737 |   |  |   | x | A representative from the district met 1:1 with a member of the Polk County leadership team via phone on 4/12/2024 |
| Johnston School District 3231               |   |  | X |   |                                                                                                                    |
| North Polk School District 6101             | X |  | X | X | A representative from the district met 1:1 with a member of the Witt O'Brien's planning team on 4/2/2024           |
| Southeast Polk School District 6101         |   |  | X |   |                                                                                                                    |
| Urbandale School District 6579              | X |  |   |   |                                                                                                                    |
| West Des Moines School District 6957        |   |  | X |   |                                                                                                                    |

## 1.4.2. PUBLIC ENGAGEMENT

Substantive public engagement is key to a successful planning process, and to developing a strategy that reflects the community's values and priorities. Members of the public were given the opportunity to participate throughout the development of this plan.

At the beginning of the planning process, the planning team published a survey asking for the public's input. The survey was advertised via Polk County Emergency Management Agency's website and Facebook page, the City of Johnston's website, and on the Polk County DisasterLAN page. This survey was available for responses from November 9, 2023, to December 8, 2023.

The survey asked a variety of questions, including:

- How concerned are you about your community being impacted by a natural disaster?

- How concerned are you about natural hazard impacts from climate change within your community?
- How well prepared do you think your city/town is for a natural disaster?
- What are the top 5 hazards that you think present the greatest threat to your community?
- What actions have you taken to make your home, business, or neighborhood more resilient to natural hazards?

On November 30, 2023, the planning team hosted a public meeting. This meeting included opportunities for both in-person and virtual participation, and it included an overview of hazard mitigation concepts and the function and purpose of a hazard mitigation plan. It served as a chance to further advertise the public survey that was still open for comment and allowed for input from and open discussion with community members. 21 people participated in this meeting.

Once the plan draft was completed, the public was given the opportunity to review the draft and provide feedback and comments. The draft was posted online on Friday, April 19<sup>th</sup>, 2024, alongside a survey that asked community members to provide feedback and rate the survey. The public review period lasted for two weeks, through Friday, May 3<sup>rd</sup>, 2024. Documentation related to public engagement with the planning process is available in Appendix C.

### 1.4.3. STAKEHOLDER ENGAGEMENT

A successful planning effort includes active participation and buy-in from community leaders, stakeholders, and the public. The National Mitigation Framework emphasizes the valuable role of collaboration among various sectors to ensure that mitigation capabilities continue to grow, and that comprehensive mitigation includes strategies for all community sectors. To that end, the planning team invited a wide variety of stakeholders to participate in meetings, provide input, and comment on the draft plan. These included neighboring communities, academic organizations, state agencies, agencies that regulate development, businesses, and community organizations. These entities were included in an attempt to incorporate feedback from a broad section of the community, including underserved populations such as those who have a disability, are economically distressed, minority populations, and others whose voices should not be excluded from planning efforts. Appendix C includes a complete list of those organizations invited to participate. Stakeholders invited to provide feedback included:

- Several non-participating school districts
- Neighboring communities' emergency managers
- Broadlawns Medical Center
- Children and Families of Iowa
- Corteva

- Des Moines Air National Guard Base
- Des Moines Area Community College
- Des Moines University
- Diocese of Des Moines
- Drake University
- EMC Insurance
- Grace United Methodist Church
- Grand View University
- Homeward Iowa
- Iowa Army National Guard
- Iowa Disaster Human Resource Council
- Jewish Federation of Greater Des Moines
- LifeServe Blood Center
- Madrid Community Schools
- MercyOne Des Moines Medical Center
- MidAmerican
- Northern Natural Gas
- Polk County Conservation
- UnityPoint Health

### 1.4.4. PROJECT TIMELINE

The planning team met formally three times to discuss the planning process, share information, review draft plan components, and identify strategies and actions to include in the new plan. A timeline of the planning process is as follows:

- September 2023:
  - Polk County Emergency Management worked with participating jurisdictions to solicit participation and identify planning team members
- October 2023:
  - Polk County contracted with Witt O'Brien's

- **October 4, 2023: Polk County Hazard Mitigation Plan Update Kickoff Meeting** - Hybrid virtual and in-person meeting, via Microsoft Teams and at the Polk County Emergency Management office. Discussion topics included:
  - Planning team introductions
  - Hazard mitigation overview
  - The mitigation planning process
  - Hazard identification data gathering exercises
  - Critical facility and asset identification
  - Questions and next steps
- Capability Assessment and Hazard Identification Exercise worksheets shared with planning team members
- November 2023:
  - Participating jurisdictions provided feedback on the hazards causing the greatest challenges for their communities by completing Hazard Identification Exercise worksheets
  - Participating jurisdictions began cataloguing their capabilities and resources, as outlined in the Capability Assessment Worksheet
  - Polk County works with the planning team to identify critical facilities and assets to use in the plan update.
  - The public was given the opportunity to provide input on the plan via the “Polk County Hazards Public Participation” survey, which was open from November 9, 2023, to December 8, 2023.
  - **November 30, 2023: Public Meeting - Polk County Multi-Jurisdictional Hazard Mitigation Plan** – Virtual and in-person hybrid meeting open to the public. Discussion topics included:
    - Hazard mitigation and mitigation planning overview
    - Availability of public survey
    - Opportunity for input and open discussion
    - Next steps and timeline

- December 2023
  - Critical facilities list was finalized
  - Witt O'Brien's began conducting hazard analysis and mapping for inclusion in the HIRA
- January 2024:
  - Mapping and modeling for the HIRA was substantively completed
- February 2024:
  - A wide variety of stakeholders (including non-government organizations, businesses, and neighboring communities) were invited to join the planning team, participate in future meetings, and comment on the draft plan.
  - **February 20, 2024: Polk County Mitigation Plan Update - HIRA Meeting** - Hybrid virtual and in-person meeting, via Microsoft Teams and at the Polk County Emergency Management office. Discussion topics included:
    - Plan process review
    - HIRA progress
    - Hazard maps developed to date
    - Results of the public survey
    - Brainstorming hazard mitigation actions
  - Strategy worksheets were shared with plan participants
- March 2024:
  - Plan participants provided feedback on the goals and objectives for the plan, reviewed their actions from the previous plan, determined which to keep in the new plan, and identified new actions (via the Strategy Worksheet).
  - **March 19, 2024: Polk County Mitigation Strategy Meeting** - Hybrid virtual and in-person meeting, via Microsoft Teams and at the Polk County Emergency Management office. Discussion topics included:
    - Plan status
    - Review and discussion of the proposed goals for the plan



- Mitigation action development updates, discussion, brainstorming, and problem-solving
  - Discussion of aligning mitigation actions with grant opportunities
  - Timeline, Next Steps, and Questions
- April 2024:
    - The Planning Team provided all remaining input, worksheets, and data, and the plan draft was finalized.
    - The draft plan was made available for public review online on **April 22, 2024**, and remained available for public comment through **May 6<sup>th</sup>, 2024**. An online form allowed plan participants to provide feedback on the draft, and on risk reduction in Polk County in general.

Documentation of the planning process (including presentations, meeting participation, surveys and results, and relevant communications) is available in Appendix C: Process and Participation Documentation.

### 1.4.5. INCORPORATING EXISTING DATA

In assembling the updated plan, the mitigation planning team consulted a wide variety of existing plans, studies, reports, and technical information, and incorporated relevant data into the document. These include the following:

- Iowa Hazard Mitigation Plan (September 2023);
- Polk County Multi-Jurisdictional Hazard Mitigation Plan (2018);
- Polk County Multi-Jurisdictional Hazard Mitigation Plan (July 2014);
- Federal Emergency Management Agency (FEMA);
- Iowa Department of Natural Resources;
- National Drought Mitigation Center Drought Reporter;
- US Department of Agriculture's (USDA) Risk Management Agency Crop Insurance Statistics;
- Data Collection Guides completed by each jurisdiction;
- Des Moines Area Regional GIS Partnership;
- Environmental Protection Agency;
- Flood Insurance Administration;
- Goods Movement in the Des Moines Metropolitan Area, 2002;

- Iowa Department of Agriculture and Land Stewardship, Division of Soil Conservation;
- Iowa Department of Education, Bureau of Information and Analysis Services;
- Iowa Department of Public Safety;
- Iowa Department of Transportation, Office of Traffic and Safety;
- Iowa Flood Center;
- Iowa State Fire Marshal Division;
- Iowa Utilities Board;
- National Fire Incident Reporting System (NFIRS);
- National Oceanic and Atmospheric Administration's (NOAA) National Climatic Data Center;
- National Oceanic and Atmospheric Administration's (NOAA) National Weather Service, Des Moines Weather Forecast Office;
- Pipeline and Hazardous Materials Safety Administration;
- Polk County Comprehensive Plan;
- Polk County Emergency Management;
- Polk County Preliminary Digital Flood Insurance Rate Map, FEMA;
- Polk County Preliminary Flood Insurance Study, FEMA;
- SILVIS Lab, Department of Forest Ecology and Management, University of Wisconsin;
- The Tomorrow Plan: Partnering for a Greater, Greener Des Moines, July 2013 Draft;
- U.S. Army Corps of Engineers;
- U.S. Department of Transportation;
- United States Geological Survey; and,
- Various online articles and publications (sources are indicated where data is cited).

# Chapter 2:

## Planning Area Profile and Capability Assessment



## 2. PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT

This chapter provides a general profile of Polk County followed by individual sections for each participating jurisdiction. The sections for each jurisdiction provide an overview profile as well as details on existing capabilities, plans, and programs that enhance their ability to implement mitigation strategies.

### 2.1. POLK COUNTY PLANNING AREA PROFILE

As of 2020, the United States Census Bureau estimates the total Polk County population to be 492,401. The 2020 population of Polk County increased by 14.3% since 2010, and this population growth rate is much higher than both the Iowa average rate of 4.7% and the national average rate of 7.4% during the same time span. In 2020, Polk County had 241,976 males (49%) and 250,425 females (51%). The ratio of males and females in Polk County remained virtually the same since the 2010 Census which reported 211,171 (49%) males and 219,469 (51%) females.

U.S. Census data from 2010 and 2020 shows that the racial profile of Polk County has changed. Overall, the percentage of the population within Polk County that identifies as White decreased from 84.7% in 2010 to 75.9% in 2020. Conversely, the percentage of the population within Polk County which identifies as Black or African American, American Indian or Alaska Native, Asian, or another minority race (other than native Hawaiian or Pacific Islander) increased. The percentage of the population which identifies as native Hawaiian or Pacific Islander remained the same between 2010 and 2020, although the count increased from 254 to 302. The portion of individuals identifying as and Asian and Black or African American increased the most between 2010 and 2020, growing by 1.5% and 1.2%, respectively. Additionally, the percentage of people in Polk County which identify as two or more races increased by 5.1% between 2010 and 2020.

**Table 2 - Racial Demographics of Polk County 2010-2020**

|                                         | 2010    |            | 2020    |            |
|-----------------------------------------|---------|------------|---------|------------|
|                                         | Count   | % of Total | Count   | % of Total |
| <b>Total Population</b>                 | 430,640 | 100%       | 492,401 | 100%       |
| <b>White</b>                            | 364,895 | 84.7%      | 373,903 | 75.9%      |
| <b>Black or African American</b>        | 25,853  | 6.0%       | 35,623  | 7.2%       |
| <b>American Indian or Alaska Native</b> | 1,384   | 0.3%       | 2,274   | 0.5%       |

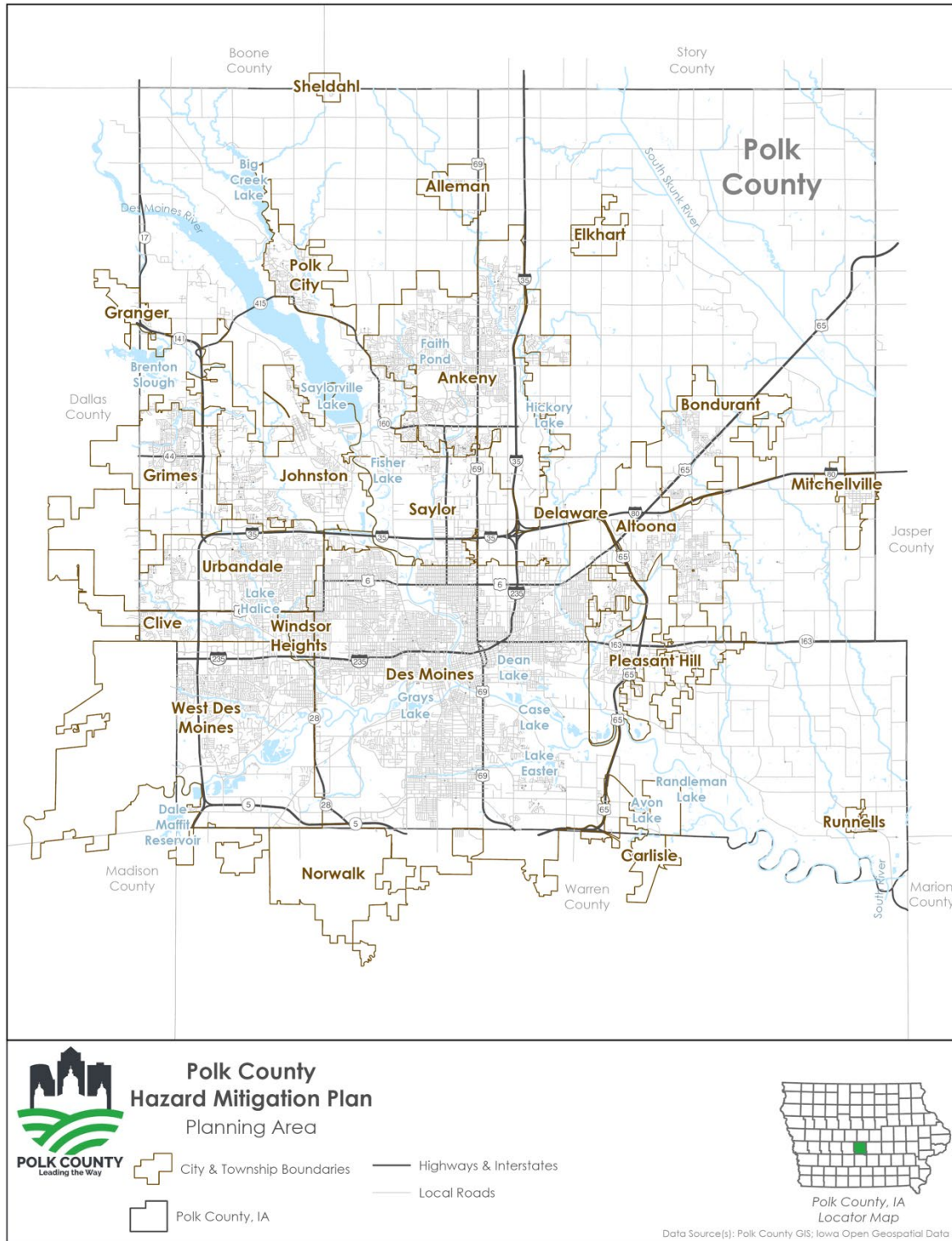
## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT

|                                           |        |      |        |      |
|-------------------------------------------|--------|------|--------|------|
| Asian                                     | 15,220 | 3.5% | 24,510 | 5.0% |
| Native Hawaiian or Other Pacific Islander | 254    | 0.1% | 302    | 0.1% |
| Some Other Race                           | 12,629 | 2.9% | 19,100 | 3.9% |
| Two or More Races                         | 10,405 | 2.4% | 36,689 | 7.5% |

According to 2017-2021 estimates from the U.S. Census Bureau, the median household income in Polk County is approximately \$73,015. For comparison, the median household income across all Iowa counties is estimated to be \$65,429.

The figure below provides a map of the Polk County planning area. The planning area boundaries include all portions (including portions in adjacent counties) of the city limits of the following incorporated cities: Alleman, Altoona, Ankeny, Bondurant, Clive, Des Moines, Elkhart, Grimes, Johnston, Mitchellville, Pleasant Hill, Polk City, Runnells, Urbandale, West Des Moines and Windsor Heights. The planning area also includes the Polk County portion only of the following multi-county cities: Carlisle, Granger, Norwalk and Sheldahl.

Figure 1 - Polk County Planning Area

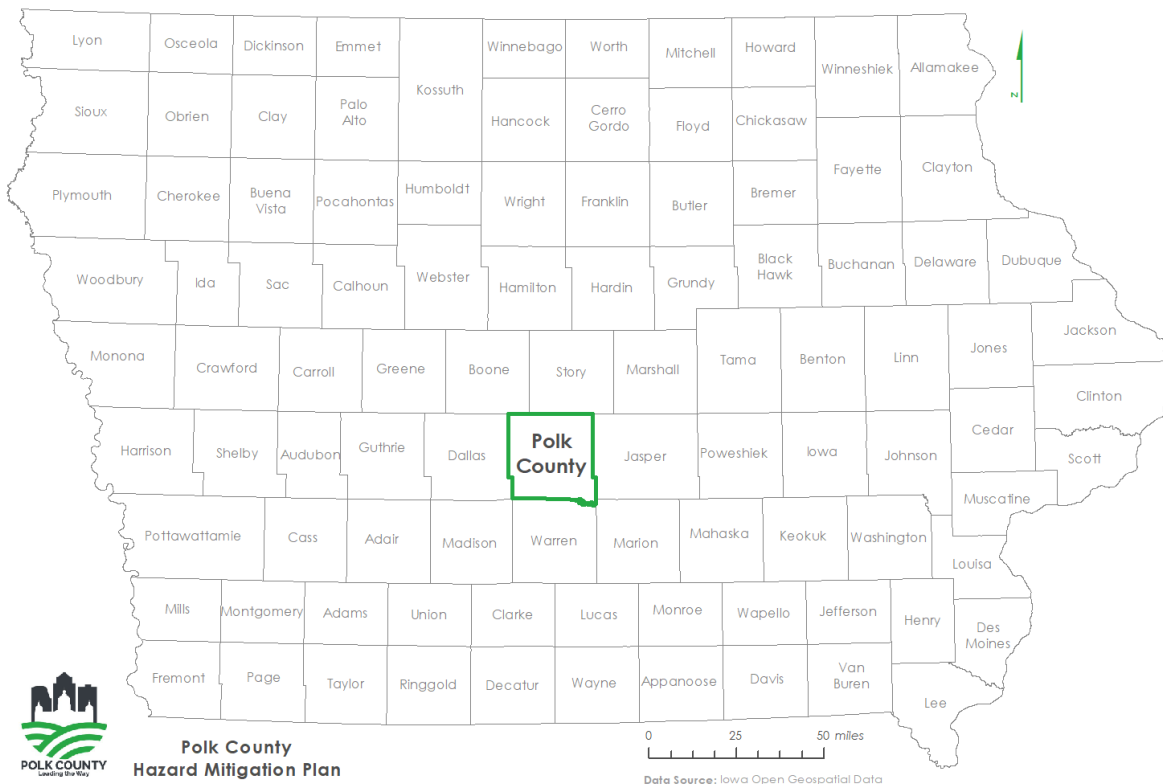




### 2.1.1. GEOGRAPHY, GEOLOGY, AND TOPOGRAPHY

Polk County, Iowa is home to Iowa's capital city, Des Moines, and is located just a few miles southwest of the center of the State. Polk County has 573.79 square miles of land area and 17.74 square miles of water area.

**Figure 2 – Location of Polk County in the State of Iowa**



While a large portion of Polk County is still mostly rural, the Des Moines metro area is continually expanding into the rest of the County to accommodate the ongoing population growth within Polk County. This has resulted in the development of many rural acreage properties and several subdivisions in previously rural areas. In addition, growth is occurring in other cities in Polk County that are outside of the Des Moines metropolitan area. Development along the I-35 north corridor is also altering the rural character of that portion of the county.

Polk County crosses 4 watersheds. A list of these watersheds (along with the cities that lie at least partially in those watersheds) is provided below:

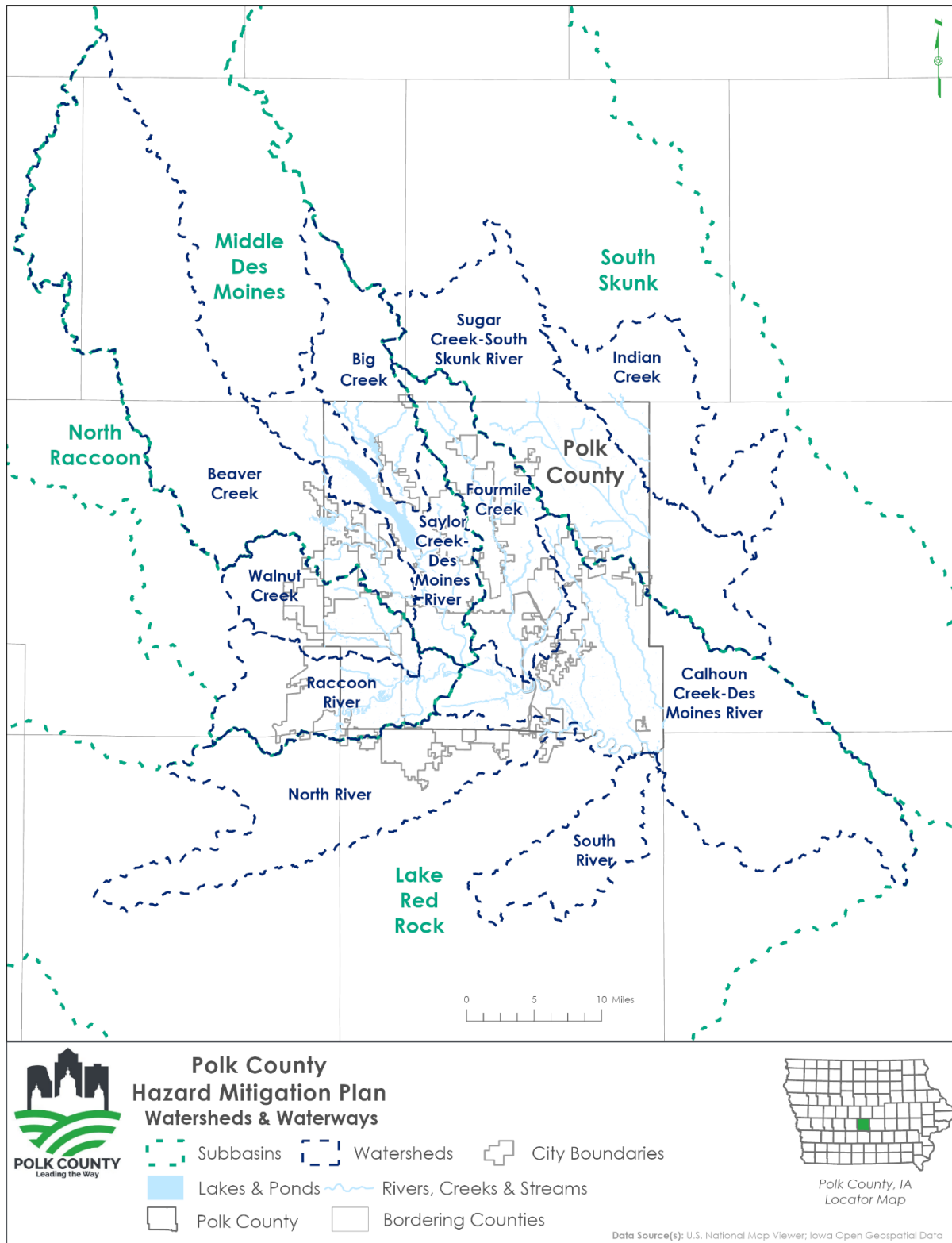
- South Skunk (07080105)
  - Elkhart

- Mitchellville
- Unincorporated Polk County
- North Raccoon (07100006)
  - West Des Moines
  - Urbandale
  - Clive
  - Windsor Heights
  - Grimes
  - Granger
  - Polk City
  - Alleman
  - Sheldahl
  - Unincorporated Polk County
- Middle Des Moines (07100004)
  - Des Moines
  - Johnston
  - Unincorporated Polk County
- Lake Red Rock (07100008)
  - Ankeny
  - Altoona
  - Carlisle
  - Bondurant
  - Pleasant Hill
  - Runnells
  - Unincorporated Polk County

The figure below shows the four watersheds in Polk County (South Skunk, Lake Red Rock, Middle Des Moines, and North Raccoon) (dark blue), as well as their subbasins (light blue).



Figure 3. Watersheds and Subbasins in Polk County



The North Raccoon River Watershed (NRRW) landscape is considered the most important and threatened waterfowl habitat in North America, supporting more than 300 migratory bird species. In 2013, the Iowa Nutrient Reduction Strategy named the NRRW a priority watershed. Many organizations are currently active in the watershed and existing projects will complement the activities of the Iowa Watershed Approach. A North Raccoon River Watershed Management Coalition (NRRWMC) was formed in 2016 to bring partners together to address watershed concerns.

The most extensive geological deposits in Polk County are those of glacial origin. The most recent of these was deposited by the Cary substage of the Wisconsin glacier about 12,000 to 13,500 years ago. This glacier deposited calcareous, loamy material 30 to 60 feet thick over the northern four-fifths of the county. Two other glaciers, the Kansan and Nebraskan, covered all of Polk County much earlier in the Pleistocene period. The till deposited by these glaciers is exposed in the southern part of the county. It can be found on the steeper side slopes but has been covered on the upland divides by a deposit of loess. The loess deposits are found in the same areas as the Kansan and Nebraskan till but most commonly on the rounded upland divides rather than the steep side slopes. The loess deposits are silty and are free of sand and gravel. They were deposited by the wind. In contrast, the glacial material contains many sand and gravel particles and some large boulders.

Alluvial materials are present throughout Polk County. These are water-deposited materials that range from gravel to silty clay in texture. Some of the material was glacial outwash deposited as the glacial ice was melting. In other areas the material was deposited by overflowing streams.

The entire county is underlain by bedrock of the Des Moines group, a shale formation of the Pennsylvanian system. This shale bedrock contains some thin seams of coal and some interbedded limestone or sandstone. Most of the bedrock is buried beneath several feet of glacial till, loess, or stream deposited material. The bedrock formations are exposed on a few slopes in the southern part of the county.

The uplands in the northern four-fifths of the county are, for the most part, nearly level to undulating, though there are some steeper areas along the major streams. This part of the county was covered by glacial material that has, in most places, been altered very little since the time of glaciation. The southern part of the county is much rougher and hillier than the northern part, and the glacial material is older and has been cut up extensively by streams. The river valleys are 1 to 3 miles wide, and there are many tributary streams.

### 2.1.2. CLIMATE

Over the past 10 years (2013 – 2023), the warmest average month in Polk County has been July (74.3°F) and the coldest average month has been January (22.0 F). Regarding precipitation, the wettest average month in Polk County over the past 10 years has been May (4.98 inches), although June is a close second (4.96 inches). The driest average month in Polk County has been January (1.03 inches), although the winter months can be quite snowy. According to the National Oceanic and Atmospheric Administration, one inch of precipitation is roughly equivalent to 13 inches of snow.<sup>1</sup>

Long-term data provided by the National Oceanic and Atmospheric Administration indicates that the average temperature in Polk County has increased at an approximate rate of 0.9 F per century since 1895. The coldest average year in Polk County is a tie between 1917 and 1951 (46.0 F), while the warmest average year in Polk County was 2012 (53.6 F). Over the same 128-year period, the driest year in Polk County was 1910 when only 18.83 inches of precipitation was recorded. Conversely, Polk County’s wettest year occurred exactly one century later when 54.75 inches of precipitation fell during 2010. Overall precipitation in Polk County appears to be increasing, as the average annual precipitation has increased at an approximate rate of 3.40 inches per century.

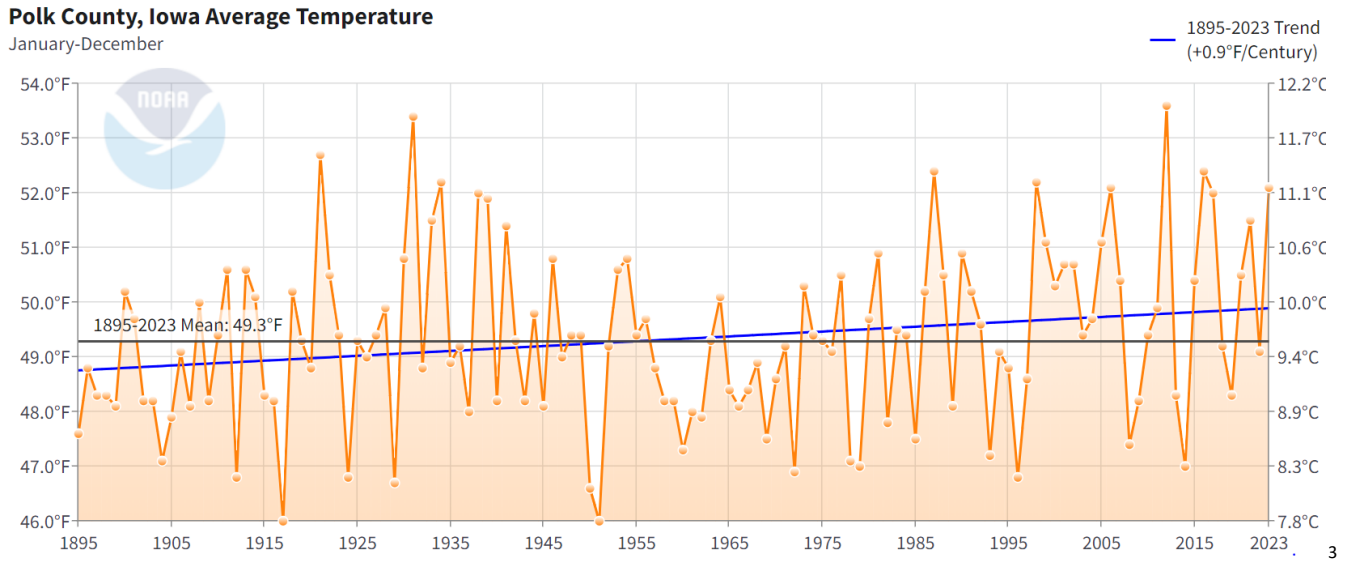
**Table 3 – Average Temperature and Precipitation per Month (2013-2023)<sup>2</sup>**

|                                         | Jan  | Feb  | Mar  | Apr  | May  | June | July | Aug  | Sept | Oct  | Nov  | Dec  |
|-----------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| <b>Average Temperature (Fahrenheit)</b> | 22.0 | 23.3 | 37.7 | 49.3 | 61.4 | 72.5 | 74.3 | 72.6 | 67.5 | 52.6 | 38.7 | 28.8 |
| <b>Average Precipitation (inches)</b>   | 1.03 | 1.10 | 2.06 | 3.07 | 4.98 | 4.96 | 3.56 | 3.97 | 4.18 | 3.14 | 1.46 | 1.53 |

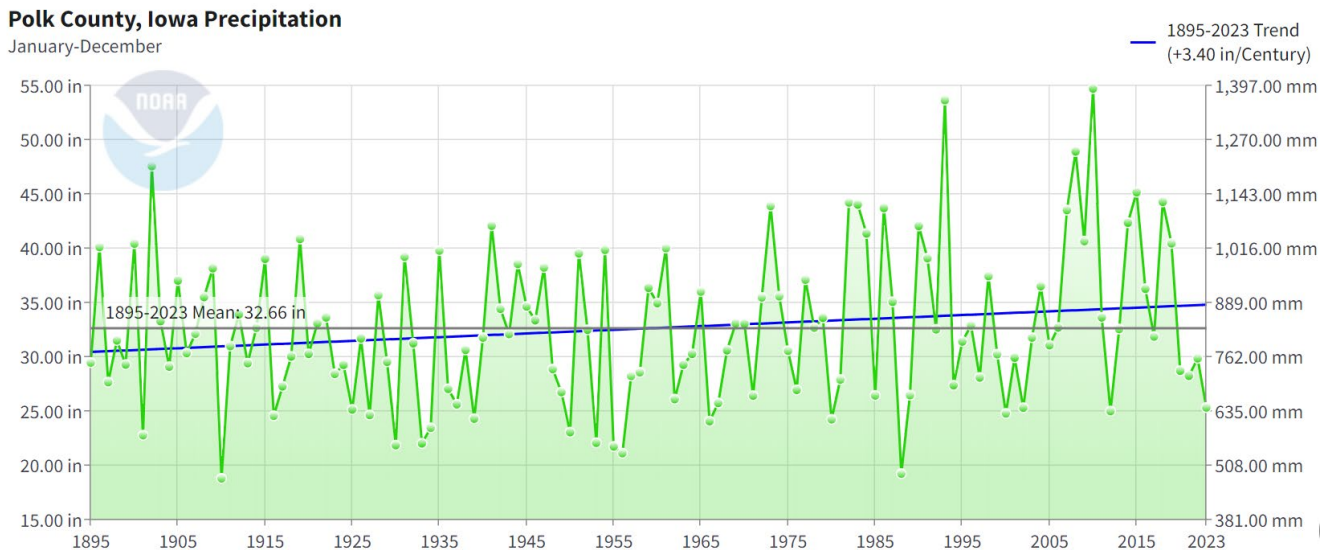
<sup>1</sup> National Oceanic and Atmospheric Administration. “Winter Weather FAQ.” nssl.noaa.gov. Accessed January 22, 2024. <https://www.nssl.noaa.gov/education/svrwx101/winter/faq/>.

<sup>2</sup> National Centers for Environmental Information. “County Time Series | Climate at a Glance.” ncei.noaa.gov, 2023. [https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/county/time-series/IA-153/pcp/1/12/2013-2023?base\\_prd=true&begbaseyear=2013&endbaseyear=2023](https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/county/time-series/IA-153/pcp/1/12/2013-2023?base_prd=true&begbaseyear=2013&endbaseyear=2023).

**Figure 4. Average Yearly Temperature for Polk County, Iowa 1895 - 2023**



**Figure 5. Average Yearly Precipitation for Polk County, Iowa 1895 - 2023**



<sup>3</sup> National Centers for Environmental Information. "County Time Series | Climate at a Glance." nssl.noaa.gov, 2024. [https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/county/time-series/IA-153/tavg/12/12/1895-2023?base\\_prd=true&begbaseyear=1895&endbaseyear=2023&trend=true&trend\\_base=100&begtrendyear=1895&endtrendyear=2023](https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/county/time-series/IA-153/tavg/12/12/1895-2023?base_prd=true&begbaseyear=1895&endbaseyear=2023&trend=true&trend_base=100&begtrendyear=1895&endtrendyear=2023).

### 2.1.3. POPULATION AND DEMOGRAPHICS

According to the latest Census, the overall population in Polk County was 492,401 as of 2020. Between 2010 and 2020, the population in Polk County increased by 61,761, which is by far the largest increase in population among all Iowa counties during that time. In terms of percent increase, Polk County is 3<sup>rd</sup> among all Iowa counties, behind only Dallas and Johnson counties. Among the incorporated communities in Polk County, the City of Ankeny experienced the largest numerical increase in population (22,305), while Bondurant had the largest percent increase in population (90.8%). Comparing Census data between 2010 and 2020 reveals that the populations of suburbs surrounding Des Moines – such as Clive, Grimes, Urbandale, and West Des Moines – have grown at a faster rate than the City of Des Moines itself. Several communities recorded a smaller population in 2020 than 2010, but these communities decreased by a combined total of less than 300 people.

**Table 4 - Population Change in Polk County Communities 2010 - 2020**

| <b>Jurisdiction</b> | <b>2010<br/>Population</b> | <b>2020<br/>Population</b> | <b>2010-2020 #<br/>Change</b> | <b>2010-2020 %<br/>Change</b> |
|---------------------|----------------------------|----------------------------|-------------------------------|-------------------------------|
| Alleman             | 432                        | 423                        | -9                            | -2.1%                         |
| Altoona             | 14,541                     | 19,565                     | 5,024                         | 34.6%                         |
| Ankeny              | 45,582                     | 67,887                     | 22,305                        | 48.9%                         |
| Bondurant           | 3,860                      | 7,365                      | 3,505                         | 90.8%                         |
| Carlisle            | 3,876                      | 4,160                      | 284                           | 7.3%                          |
| Clive               | 15,447                     | 18,601                     | 3,154                         | 20.4%                         |
| Delaware Township   | 6,204                      | 6,187                      | -17                           | -0.3%                         |
| Des Moines*         | 204,220                    | 214,133                    | 9,913                         | 4.9%                          |
| Elkhart             | 683                        | 882                        | 199                           | 29.1%                         |
| Granger             | 1,244                      | 1,654                      | 410                           | 33.0%                         |
| Grimes              | 8,246                      | 15,392                     | 7,146                         | 86.7%                         |
| Johnston            | 17,278                     | 24,064                     | 6,786                         | 39.3%                         |
| Mitchellville       | 2,254                      | 2,485                      | 231                           | 10.2%                         |
| Norwalk             | 8,941                      | 12,799                     | 3,858                         | 43.1%                         |
| Pleasant Hill       | 8,785                      | 10,147                     | 1,362                         | 15.5%                         |
| Polk City           | 3,418                      | 5,543                      | 2,125                         | 62.2%                         |
| Runnells            | 507                        | 457                        | -50                           | -9.9%                         |
| Sheldahl            | 319                        | 297                        | -22                           | -6.9%                         |
| Saylor Township     | 6,472                      | 6,287                      | -185                          | -2.9%                         |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT

| Jurisdiction               | 2010 Population                                                                        | 2020 Population | 2010-2020 # Change | 2010-2020 % Change |
|----------------------------|----------------------------------------------------------------------------------------|-----------------|--------------------|--------------------|
| Urbandale                  | 39,463                                                                                 | 45,580          | 6,117              | 15.5%              |
| West Des Moines            | 56,609                                                                                 | 68,723          | 12,114             | 21.4%              |
| Windsor Heights            | 4,860                                                                                  | 5,252           | 392                | 8.1%               |
| Unincorporated Polk County | Unavailable; U.S. Census data does not specifically address unincorporated Polk County |                 |                    |                    |
| Polk County Total          | 430,640                                                                                | 492,401         | 61,761             | 14.3%              |

Source: U.S. Bureau of the Census, 2010 and 2020 Censuses. Population includes the portions of these cities in adjacent counties. As a result of this, the sum of all communities is not equal to Polk County totals.

The Social Vulnerability Index (SVI) is a tool developed by the Center for Disease Control and Prevention (CDC) and the Agency for Toxic Substances and Disease Registry (ATSDR). The tool uses U.S. Census data to determine the social vulnerability of every census tract. The Geospatial Research, Analysis & Services Program (GRASP) maintains SVI to help public health officials and local planners better prepare for and respond to emergency events like hurricanes, disease outbreaks, or exposure to dangerous chemicals. The CDC/ATSDR SVI tool uses 16 different social factors grouped into 4 “themes” to assess the overall social vulnerability of census tracts and counties across the country. A percentile ranking represents the proportion of tracts (or counties) that are equal to or lower than a tract (or county) of interest in terms of social vulnerability. For example, an SVI ranking of 0.85 signifies that 85% of tracts (or counties) in the state or nation are less vulnerable than the tract (or county) of interest and that 15% of tracts (or counties) in the state or nation are more vulnerable. The figure below shows the sixteen different social factors, as well as the four themes, which are utilized in the SVI tool. Notably, many federal grant programs use SVI score as part of their decision making process, providing more favorable chances of support and funding to communities whose SVI scores show that they are more vulnerable.



Figure 6. Variables and Themes Used in the CDC/ATSDR Social Vulnerability Index

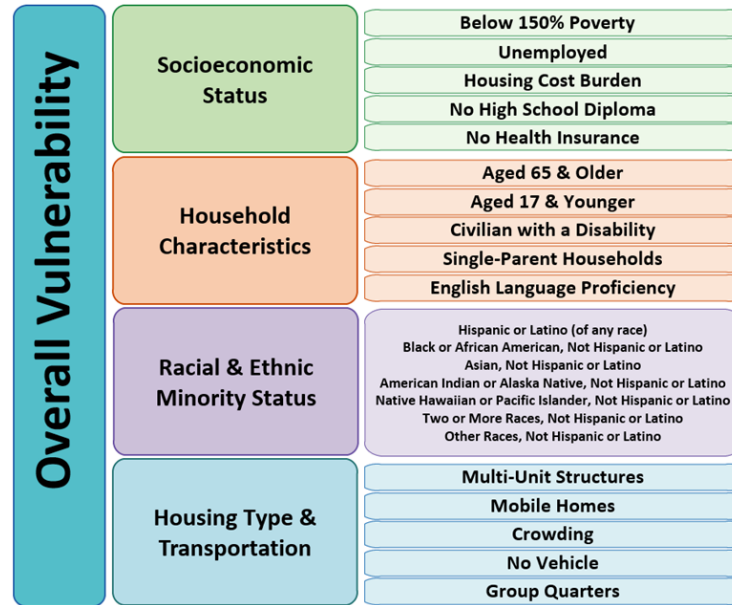


Figure 7. CDC/ATSDR SVI Map of Iowa Counties

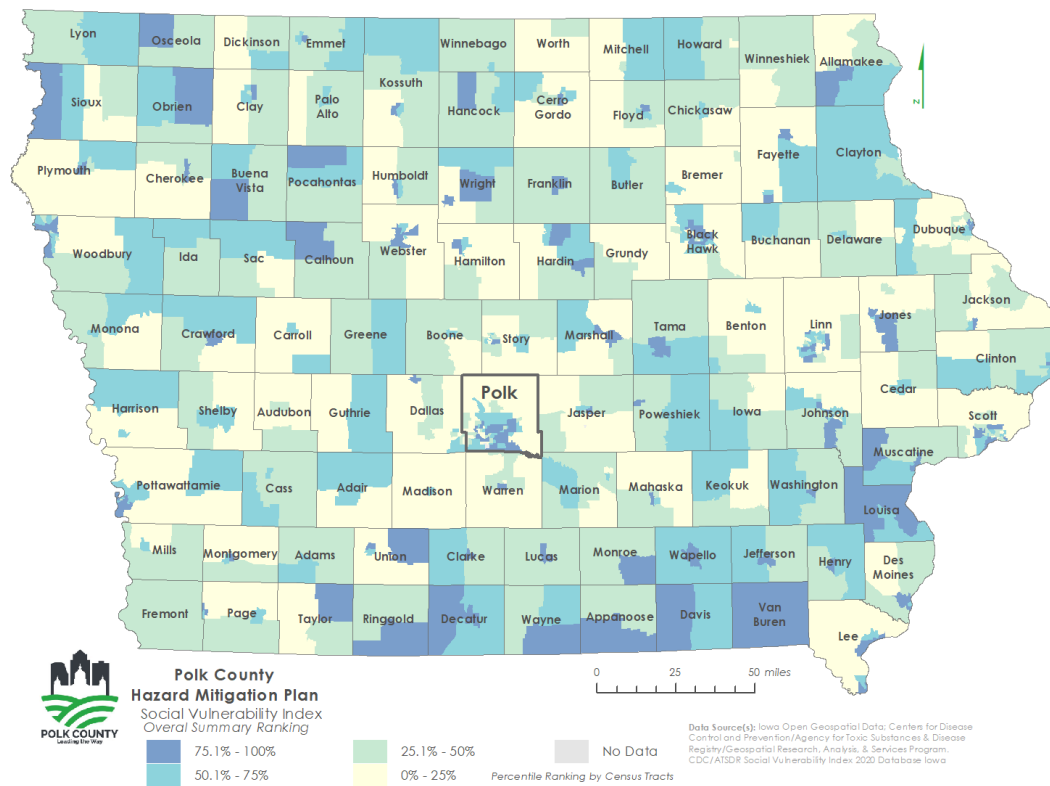
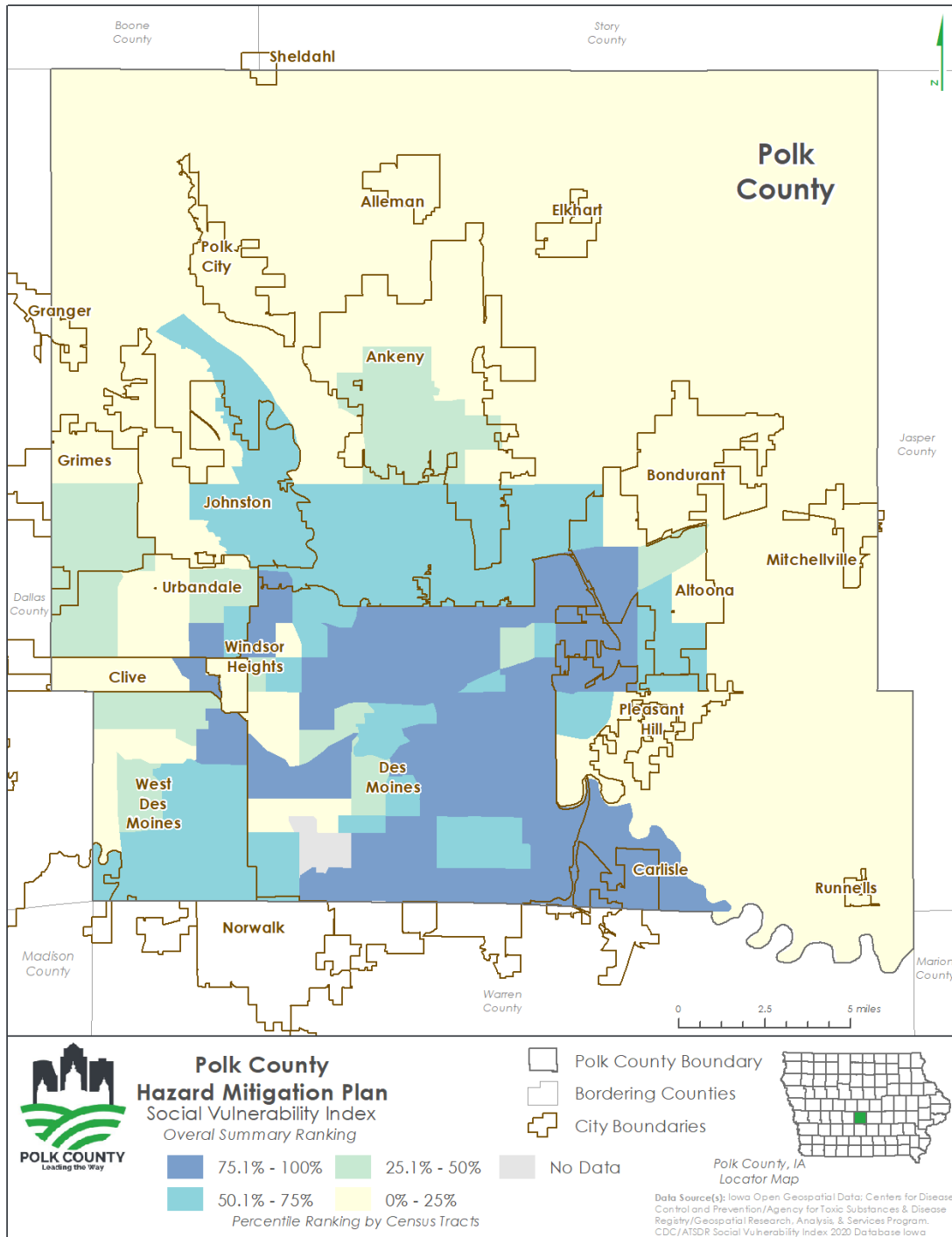


Figure 8. CDC/ATSDR SVI Map of Polk County Census Tracts



As of 2020, the CDC/ATSDR SVI tool gives Polk County, Iowa a score of 0.4574 nationally and 0.8469 statewide. Interestingly, the difference between the national and statewide SVI scores for Polk County indicates that the State of Iowa is a relatively resilient



## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT

state. When compared to the other 98 counties in Iowa, Polk County has a high level of social vulnerability, with only 15 counties receiving a higher SVI score. However, the relative vulnerability of Polk County is much lower when compared to all U.S. counties (and county equivalents). Nationally, approximately 56% of the 3,243 county and county equivalents in the U.S. are considered more vulnerable than Polk County according to the SVI tool.

Within Polk County, the most vulnerable census tracts are those in the south-central portion of the county, roughly corresponding to the Des Moines metro area. The vulnerability scores of census tracts in Polk County quickly decrease north of Interstate 80. Table 5 provides additional demographic and economic indicators for Polk County. The Polk County values are for all of Polk County, including the incorporated cities.

**Table 5 - 2022 Unemployment, Poverty, Education, and Language Percentage Demographics**

| <b>Jurisdiction</b>      | <b>Total in Labor Force</b>                     | <b>Percent of Population Unemployed</b> | <b>Percent of Families Below the Poverty Level</b> | <b>Percent of Population Aged 65 and Over</b> | <b>% of Population High School Graduate or Higher Education</b> | <b>% of Population Bachelor's Degree or Higher Education</b> | <b>% of population (spoken language other than English)</b> |
|--------------------------|-------------------------------------------------|-----------------------------------------|----------------------------------------------------|-----------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------|
| <b>Polk County</b>       | 275,129                                         | 4.5%                                    | 7.3%                                               | 13.5%                                         | 92.7%                                                           | 38.9%                                                        | 14.7%                                                       |
| <b>Alleman</b>           | 226                                             | 0.9%                                    | 0.0%                                               | 18.7%                                         | 98.2%                                                           | 45.4%                                                        | 1.1%                                                        |
| <b>Altoona</b>           | 10,996                                          | 6.7%                                    | 3.2%                                               | 14.1%                                         | 96.4%                                                           | 32.6%                                                        | 4.5%                                                        |
| <b>Ankeny</b>            | 39,513                                          | 2.6%                                    | 3.1%                                               | 11.3%                                         | 98.0%                                                           | 53.0%                                                        | 8.0%                                                        |
| <b>Bondurant</b>         | 4,358                                           | 0.7%                                    | 4.8%                                               | 7.3%                                          | 95.6%                                                           | 51.3%                                                        | 3.5%                                                        |
| <b>Carlisle</b>          | 2,265                                           | 5.5%                                    | 5.8%                                               | 15.4%                                         | 93.2%                                                           | 29.8%                                                        | 0.9%                                                        |
| <b>Clive</b>             | 10,461                                          | 2.8%                                    | 0.9%                                               | 15.7%                                         | 95.9%                                                           | 59.5%                                                        | 18.0%                                                       |
| <b>Delaware Township</b> | <i>Data not available at the township level</i> |                                         |                                                    |                                               |                                                                 |                                                              |                                                             |
| <b>Des Moines</b>        | 118,759                                         | 5.9%                                    | 11.2%                                              | 12.4%                                         | 87.6%                                                           | 28.7%                                                        | 20.5%                                                       |
| <b>Elkhart</b>           | 291                                             | 0.7%                                    | 6.3%                                               | 14.8%                                         | 92.9%                                                           | 24.0%                                                        | 1.3%                                                        |
| <b>Granger</b>           | 996                                             | 4.0%                                    | 1.8%                                               | 9.2%                                          | 96.9%                                                           | 36.1%                                                        | 1.6%                                                        |
| <b>Grimes</b>            | 8,801                                           | 6.4%                                    | 4.0%                                               | 8.1%                                          | 98.4%                                                           | 43.6%                                                        | 9.5%                                                        |
| <b>Johnston</b>          | 12,698                                          | 2.0%                                    | 7.4%                                               | 15.4%                                         | 96.6%                                                           | 54.4%                                                        | 12.0%                                                       |
| <b>Mitchellville</b>     | 1,019                                           | 1.0%                                    | 5.9%                                               | 11.5%                                         | 90.3%                                                           | 11.2%                                                        | 2.5%                                                        |
| <b>Norwalk</b>           | 7,330                                           | 3.1%                                    | 1.9%                                               | 12.4%                                         | 98.6%                                                           | 39.1%                                                        | 1.0%                                                        |
| <b>Pleasant Hill</b>     | 4,970                                           | 9.2%                                    | 6.7%                                               | 12.2%                                         | 96.7%                                                           | 31.1%                                                        | 7.5%                                                        |
| <b>Polk City</b>         | 3,328                                           | 3.8%                                    | 6.5%                                               | 10.7%                                         | 99.7%                                                           | 46.5%                                                        | 0.6%                                                        |
| <b>Runnells</b>          | 221                                             | 5.9%                                    | 0.0%                                               | 16.0%                                         | 95.0%                                                           | 16.7%                                                        | 2.2%                                                        |
| <b>Saylor Township</b>   | <i>Data not available at the township level</i> |                                         |                                                    |                                               |                                                                 |                                                              |                                                             |

|                        |        |       |      |       |       |       |       |
|------------------------|--------|-------|------|-------|-------|-------|-------|
| <b>Sheldahl</b>        | 197    | 14.2% | 7.1% | 12.3% | 92.5% | 29.4% | 0.6%  |
| <b>Urbandale</b>       | 24,903 | 2.1%  | 4.1% | 14.2% | 95.3% | 51.9% | 11.6% |
| <b>West Des Moines</b> | 41,428 | 2.8%  | 6.2% | 14.3% | 96.6% | 53.8% | 13.6% |
| <b>Windsor Heights</b> | 2,656  | 2.0%  | 6.8% | 18.5% | 98.0% | 42.8% | 16.0% |

Source: U.S. Census, 2022 American Community Survey, 5-year Estimates.

### 2.1.4. HISTORY

Captain James Allen and his company arrived at the present site of Des Moines in May of 1843. Captain Allen proposed the name of Fort Raccoon originally, but he settled with the name Fort Des Moines at the suggestion of General Winfield Scott. The term "des moines" refers to the principal river between the Mississippi and Missouri Rivers. Soon after arrival, a fort was erected consisting of 25 buildings, which included stables and a barracks. A trading post was built across the river by Indian traders.

The towns of Brooklyn, Polk City, Dudley, and Fort Des Moines competed for the county seat. They all sent representatives to the Iowa Territorial Legislature in 1845 to lobby the legislators to establish the boundaries of Polk County, named after James K. Polk, the 11th president of the United States. On January 13, 1845, the Legislature passed an Act establishing the boundaries of Polk County. The delegation from Brooklyn returned home confident that they had captured the county seat. The delegation from Fort Des Moines had other plans, however. Four days later they succeeded in securing an amendment to a supplementary bill that altered the boundaries of Polk County once more. This was done so that Fort Des Moines would be nearer to the geographical center than Brooklyn. It was accomplished by "borrowing" 144 square miles of territory from Warren County. Three commissioners were appointed to establish the county seat. Since Fort Des Moines was centrally located, it was chosen as the county seat on May 25, 1846. The town of Brooklyn is now part of Des Moines.

In 1849, when Warren County was organized, the residents of Warren County ordered the land "borrowed" by Polk County returned. In 1853 the Legislature did just that, except for a few sections in Camp Township, which is in the southeastern portion of Polk County.

### 2.1.5. OCCUPATIONS

Polk County is home to many industries and occupations. The combination of a healthy urban core surrounded by rich agricultural land enables Polk County to offer a wide variety of occupational prospects. The table below provides more detailed occupation statistics for the incorporated communities and Polk County as a whole.

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT

Table 6 - 2022 Occupation Statistics for Polk County, Iowa

| Place             | Management, Business, Science, and Arts Occupations | Service Occupations | Sales and Office Occupations | Natural Resources, Construction, and Maintenance Occupations | Production, Transportation, and Material Moving Occupations |
|-------------------|-----------------------------------------------------|---------------------|------------------------------|--------------------------------------------------------------|-------------------------------------------------------------|
| Polk County       | 44.0%                                               | 14.9%               | 21.3%                        | 7.3%                                                         | 12.5%                                                       |
| Alleman           | 54.0%                                               | 7.6%                | 19.2%                        | 9.8%                                                         | 9.4%                                                        |
| Altoona           | 43.5%                                               | 13.1%               | 24.7%                        | 6.0%                                                         | 12.7%                                                       |
| Ankeny            | 52.5%                                               | 11.2%               | 20.9%                        | 6.6%                                                         | 8.8%                                                        |
| Bondurant         | 51.4%                                               | 13.2%               | 21.0%                        | 7.0%                                                         | 7.4%                                                        |
| Carlisle          | 40.9%                                               | 12.3%               | 23.0%                        | 9.0%                                                         | 14.8%                                                       |
| Clive             | 53.1%                                               | 11.7%               | 23.2%                        | 2.7%                                                         | 9.5%                                                        |
| Delaware Township | Data not available at the township level            |                     |                              |                                                              |                                                             |
| Des Moines        | 36.2%                                               | 18.0%               | 21.2%                        | 8.5%                                                         | 16.0%                                                       |
| Elkhart           | 31.8%                                               | 17.6%               | 12.8%                        | 18.0%                                                        | 19.7%                                                       |
| Granger           | 55.8%                                               | 7.2%                | 21.1%                        | 9.0%                                                         | 7.0%                                                        |
| Grimes            | 53.1%                                               | 11.6%               | 18.6%                        | 7.7%                                                         | 9.1%                                                        |
| Johnston          | 59.6%                                               | 11.5%               | 17.5%                        | 6.3%                                                         | 5.2%                                                        |
| Mitchellville     | 30.7%                                               | 21.2%               | 16.7%                        | 16.2%                                                        | 15.2%                                                       |
| Norwalk           | 47.6%                                               | 13.3%               | 19.5%                        | 6.0%                                                         | 13.5%                                                       |
| Pleasant Hill     | 45.8%                                               | 15.4%               | 20.5%                        | 8.3%                                                         | 10.1%                                                       |
| Polk City         | 53.6%                                               | 8.2%                | 16.8%                        | 2.4%                                                         | 19.1%                                                       |
| Runnells          | 26.4%                                               | 12.0%               | 21.2%                        | 26.9%                                                        | 13.5%                                                       |
| Saylor Township   | Data not available at the township level            |                     |                              |                                                              |                                                             |
| Sheldahl          | 36.1%                                               | 23.1%               | 7.7%                         | 8.3%                                                         | 24.9%                                                       |
| Urbandale         | 52.4%                                               | 11.1%               | 22.2%                        | 4.7%                                                         | 9.6%                                                        |
| West Des Moines   | 54.5%                                               | 12.3%               | 20.7%                        | 3.6%                                                         | 8.8%                                                        |
| Windsor Heights   | 41.9%                                               | 14.0%               | 26.0%                        | 8.8%                                                         | 9.4%                                                        |

Source: U.S. Census, 2022 American Community Survey, 5-year Estimates

### 2.1.6. AGRICULTURE

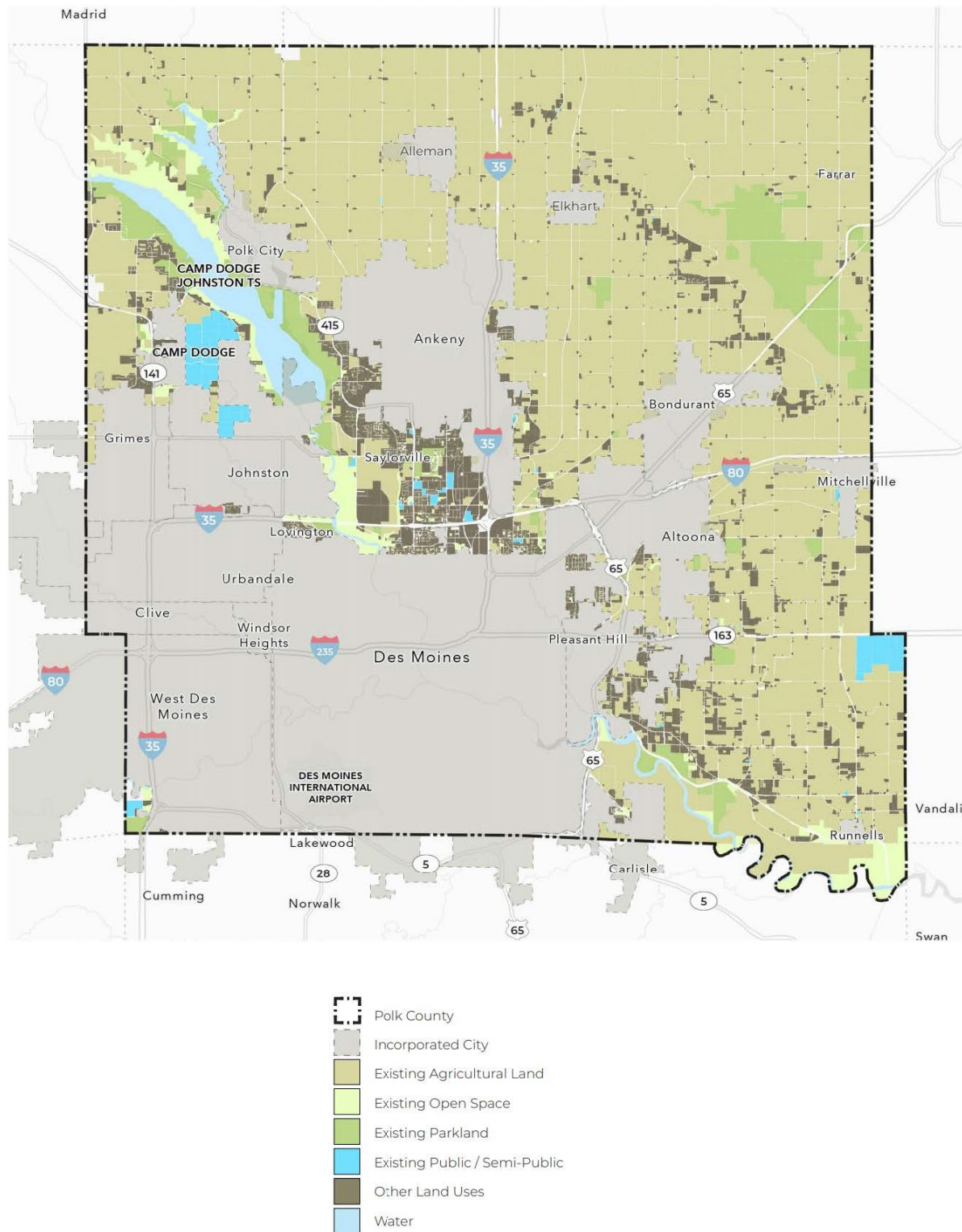
Although Polk County has a larger urban core than other counties in Iowa, agriculture is a key component of the county's character, economy, and history. According to the most recent edition of the U.S. Department of Agriculture's (USDA) Census of Agriculture 2022, there are an estimated 768 farms in Polk County which occupy approximately 179,322 acres of county land. The number of farms has remained relatively stable, with a slight increase. In 2017, there were 755 farms, and by 2022, this number had marginally risen to 768. Despite this steady number of farms, the average size of these farms in acres has experienced a slight decrease. In 2017, the average farm size was 257 acres, which reduced to 233 acres by 2022. Between 2017 and 2022, the county's agricultural sector witnessed substantial growth. Total sales escalated from \$110,888,000 to \$161,129,000, marking a significant increase. Simultaneously, the average sales per farm rose from \$146,872 to \$209,804, reflecting improved financial performance and productivity of individual farms over the five-year span.

**Table 7 - Polk County 2022 Census of Agriculture Selected Statistics**

|                                                    |             |
|----------------------------------------------------|-------------|
| <b>Number of Farms</b>                             | 768         |
| <b>Land in Farms (acres)</b>                       | 179,332     |
| <b>Average Size of Farm (acres)</b>                | 233         |
| <b>Market Value of Products Sold (\$)</b>          | 161,129,000 |
| <b>Market Value of Products Sold per Farm (\$)</b> | 209,804     |
| <b>Total Producers</b>                             | 1,520       |
| <b>Producers Aged 34 and under</b>                 | 156         |
| <b>Producers Aged 35-64</b>                        | 747         |
| <b>Producers Aged 65 and Older</b>                 | 526         |

Source: U.S. Department of Agriculture 2022 Census of Agriculture

Figure 9. Unincorporated Polk County Agriculture, Parks, and Open Space



### 2.2. COUNTY AND MUNICIPAL CAPABILITY ASSESSMENT

This section includes individual profiles for the county, municipalities, school districts, and utility that participated in this plan. Each jurisdiction was given a “capability assessment worksheet” that asked for both a self-assessment of their capability and specific details about the resources and expertise available to them in four areas:

- Staff and Technical Assistance
- Planning Mechanisms
- Regulatory Tools and Programs
- Fiscal Capacity

An important function of this assessment is identifying capabilities that these communities *do not* currently have access to. Items marked as “no” in each of the profiles represent opportunities for these communities to expand and improve upon their capabilities and increase the overall ability to achieve mitigation in Polk County. The unincorporated county is profiled first, followed by the incorporated cities, townships, Des Moines Water Works, and school districts.



### 2.2.1. UNINCORPORATED POLK COUNTY

The jurisdiction of Polk County includes all unincorporated areas within the County boundaries. The Polk County government structure is a County Board of Supervisors with five members.

Chapter 29C of the Code of Iowa creates the State Emergency Management Division and the local Emergency Management Commissions. The Polk County Emergency Management Commission is made up of the mayors of all the jurisdictions in Polk County, one member of the Polk County Board of Supervisors, and the Sheriff. The Commission appoints an Emergency Management Director to manage the agency and assist the Commission. In addition:

- Polk County has several outdoor warning sirens which are activated by the Polk County Sheriff's Office. Alert Iowa is the State of Iowa's official emergency notification system. Through Alert Iowa, State and local officials are able to utilize a single, statewide notification system that provides local control of how and when to disseminate emergency and public safety messages to residents. Residents can sign up for these voluntary alerts via text, email, and/or voice message.
- The County utilizes Alert Iowa system for alerting.

#### 2.2.1.1. STAFF AND TECHNICAL ASSISTANCE

| Staff or Personnel Resource                                                                             | Yes | No | Department or Single Staff Member | Comments                            |
|---------------------------------------------------------------------------------------------------------|-----|----|-----------------------------------|-------------------------------------|
| Emergency Manager                                                                                       | X   |    | Department                        | Emergency Management                |
| Engineers or professionals trained in construction practices related to buildings and/or infrastructure | X   |    | Department                        | Public Works                        |
| Environmental Justice Specialists                                                                       | X   |    |                                   | Allison Van Pelt                    |
| Fiscal Management or Procurement Specialists                                                            | X   |    | Department                        | Accounting and Procurement          |
| Floodplain Manager                                                                                      | X   |    | Department                        | Public Works                        |
| Housing Specialist(s)                                                                                   | X   |    | Department                        | Community Youth & Family Svcs       |
| Land Surveyors                                                                                          |     | X  |                                   |                                     |
| Land Use/Management/Development Planning                                                                | X   |    | Department                        | Public Works                        |
| Planners or engineers with an understanding of natural and/or human-caused hazards                      | X   |    | Department(s)                     | Public Works, EMA, PH, Conservation |
| Recreation/Green Space Specialist(s)                                                                    | X   |    | Department                        | Conservation                        |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Staff or Personnel Resource                                                          | Yes | No | Department or Single Staff Member | Comments                            |
|--------------------------------------------------------------------------------------|-----|----|-----------------------------------|-------------------------------------|
| Resource Development Staff or Grant-writing                                          | X   |    | Department(s)                     | EMA, HR, Public Works, Conservation |
| Scientists familiar with the hazards of the community                                | X   |    | Department                        | National Weather Service            |
| Staff experienced with Geographic Information Systems (GIS) or HAZUS                 | X   |    | Department(s)                     | County GIS, Public Works            |
| Staff with education or expertise to assess the community's vulnerability to hazards | X   |    | Department(s)                     | EMA, Public Works                   |
| Transportation Manager / Traffic Engineer                                            | X   |    | Department                        | Public Works                        |

### 2.2.1.2. PLANNING MECHANISMS

| Plans                                                    | In Place |   | Adopted/<br>Updated | Under Development |    | Expected Completion |
|----------------------------------------------------------|----------|---|---------------------|-------------------|----|---------------------|
|                                                          | Y        | N |                     | Yes               | No |                     |
| Comprehensive Plan (Polk 2050)                           | X        |   |                     |                   |    |                     |
| Climate Action Plan/Resiliency Plan                      |          | X |                     | X                 |    | 2024, 2025          |
| Community Wildfire Protection Plan (CWPP)                |          | X |                     |                   | X  |                     |
| Comprehensive Emergency Management Plan                  | X        |   |                     |                   |    |                     |
| General Plan                                             | X        |   |                     |                   |    |                     |
| Continuity of Operations Plan (COOP)                     | X        |   |                     |                   |    |                     |
| Disaster Recovery Plan                                   |          | X |                     | X                 |    |                     |
| Economic Development Plan                                | X        |   |                     |                   |    |                     |
| Emergency Operations Plan (EOP)                          | X        |   |                     |                   |    |                     |
| Environmental Impact Report (EIR)                        | X        |   |                     |                   |    |                     |
| Evacuation Plan                                          |          | X |                     |                   | X  |                     |
| Flood Response Plan                                      | X        |   |                     |                   |    |                     |
| Floodplain Management Plan/Flood Mitigation Plan         | X        |   |                     |                   |    |                     |
| Hazard Mitigation Plan                                   | X        |   |                     |                   |    |                     |
| Historic Preservation Plan                               |          | X |                     |                   | X  |                     |
| Natural Resource Protection Plan (NRPP)                  | X        |   |                     |                   |    |                     |
| Open Space Management Plan                               | X        |   |                     |                   |    |                     |
| Threat Hazard Identification and Risk Assessment (THIRA) | X        |   |                     |                   |    |                     |



### 2.2.1.3. REGULATORY TOOLS AND PROGRAMS

| Tool or Program                                           | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|-----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                           | Y        | N |                     | Yes               | No |                        |
| Building Codes                                            | X        |   |                     |                   |    |                        |
| Citizen Corps - Community Emergency Response Team         |          | X |                     |                   | X  |                        |
| Community Rating System (CRS Program of the NFIP)         |          | X |                     |                   | X  |                        |
| Emergency Management Accreditation Program (EMAP)         |          | X |                     |                   | X  |                        |
| Fire Code                                                 | X        |   |                     |                   |    |                        |
| Firewise Community                                        |          | X |                     |                   | X  |                        |
| Floodplain Management/Flood Damage Prevention Ordinance   | X        |   |                     |                   |    |                        |
| Land Use/Development Planning                             | X        |   |                     |                   |    |                        |
| National Flood Insurance Program (NFIP)                   | X        |   |                     |                   |    |                        |
| Post Disaster Redevelopment/Reconstruction Plan/Ordinance |          | X |                     |                   | X  |                        |
| Storm Ready                                               | X        |   |                     |                   |    |                        |
| Stormwater Management Plan/Ordinance                      |          | X |                     |                   | X  |                        |
| Subdivision Regulations/Ordinance                         |          | X |                     |                   | X  |                        |
| Unified Development Ordinance                             |          | X |                     |                   | X  |                        |
| Zoning Ordinance                                          | X        |   |                     |                   |    |                        |

### 2.2.1.4. FISCAL CAPACITY

| Fiscal Resource                                           | Never<br>Used | Previously<br>Used | Currently<br>Used | Comments     |
|-----------------------------------------------------------|---------------|--------------------|-------------------|--------------|
| Capital Improvement Programming                           |               | X                  | X                 |              |
| Community Development Block Grants (CDBG)                 |               | X                  | X                 |              |
| Development Impact Fees                                   |               |                    |                   | Not Provided |
| FEMA Hazard Mitigation Assistance Grants (HMGP, FMA, PDM) |               | X                  | X                 |              |
| Gas/Electric Utility Fees                                 | X             |                    |                   |              |
| General Obligation, Revenue, and/or Special Tax Bonds     |               | X                  | X                 |              |
| Homeland Security Grants (HSGP)                           |               | X                  | X                 |              |
| Infrastructure Investment and Jobs Act (IIJA)             |               | X                  | X                 |              |
| Infrastructure State Revolving Fund loan                  |               | X                  |                   |              |
| Partnering Agreements or Intergovernmental Agreements     |               | X                  | X                 |              |
| Sewer/Water Fees                                          | X             |                    |                   |              |
| Special Purpose Taxes (or taxing districts)               |               |                    | X                 |              |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Fiscal Resource                               | Never Used | Previously Used | Currently Used | Comments     |
|-----------------------------------------------|------------|-----------------|----------------|--------------|
| Stormwater Utility Fees                       |            |                 | X              |              |
| USDA Grants                                   |            | X               | X              |              |
| USDA Rural Development Agency Grants          |            | X               |                |              |
| US Economic Development Administration Grants |            |                 |                | Not Provided |

### 2.2.1.5. SELF-ASSESSMENT OF CAPABILITY

| Area                                    | Degree of Capability |            |        |
|-----------------------------------------|----------------------|------------|--------|
|                                         | Limited              | Moderate   | High   |
| Planning and Regulatory Capability      |                      | X          |        |
| Administrative and Technical Capability | X (Conservation)     | X (EMA/PH) | X (PW) |
| Fiscal Capability                       |                      | X          | X (PW) |
| Available Staff                         | X (Conservation/PW)  | X (EMA/PH) |        |
| Political Support/Interest              | X (Conservation)     | X          |        |
| Community Support                       | X (Public Health)    | X          |        |

### 2.2.2. CITY OF ALLEMAN

The City of Alleman is located in northern Polk County. It is governed by a Mayor and 5-member Council. According to the latest U.S. Census, the population of Alleman was approximately 423 persons in 2020. Census data indicates that the population of Alleman decreased by 9 people between 2010 and 2020.

Specific initiatives/capabilities include:

- Residents receive information regarding water use from Des Moines Water Works.
- Alleman has two outdoor warning sirens, one at each end of town. The sirens are activated through Polk County Dispatch.

#### 2.2.2.1. STAFF AND TECHNICAL ASSISTANCE

| Staff or Personnel Resource                                                                             | Yes | No | Department or Single Staff Member | Comments                             |
|---------------------------------------------------------------------------------------------------------|-----|----|-----------------------------------|--------------------------------------|
| Emergency Manager                                                                                       | X   |    | Single Staff Member               |                                      |
| Engineers or professionals trained in construction practices related to buildings and/or infrastructure | X   |    | Department                        | Third Party - Veenstra & Kimm, Inc   |
| Environmental Justice Specialists                                                                       | X   |    | Not Provided                      | Available through Polk County        |
| Fiscal Management or Procurement Specialists                                                            | X   |    | Department                        | Third Party – Schnurr & Company, LLP |
| Floodplain Manager                                                                                      | X   |    | Not Provided                      |                                      |
| Housing Specialist(s)                                                                                   |     | X  |                                   |                                      |
| Land Surveyors                                                                                          |     | X  |                                   |                                      |
| Land Use/Management/Development Planning                                                                | X   |    | Department                        | Third Party - Veenstra & Kimm, Inc   |
| Planners or engineers with an understanding of natural and/or human-caused hazards                      | X   |    | Department                        | Third Party - Veenstra & Kimm, Inc   |
| Recreation/Green Space Specialist(s)                                                                    | X   |    | Not Provided                      | Available through Polk County        |
| Resource Development Staff or Grant-writing                                                             | X   |    | Department                        | Mid-Iowa Council                     |
| Scientists familiar with the hazards of the community                                                   |     | X  |                                   |                                      |
| Staff experienced with Geographic Information Systems (GIS) or HAZUS                                    | X   |    | Department                        | Third Party - Veenstra & Kimm, Inc   |
| Staff with education or expertise to assess the community's vulnerability to hazards                    |     | X  |                                   |                                      |
| Transportation Manager / Traffic Engineer                                                               | X   |    | Department                        | Third Party - Veenstra & Kimm, Inc   |

### 2.2.2.2. PLANNING MECHANISMS

| Plans                                                    | In Place |   | Adopted/<br>Updated | Under Development |    | Expected<br>Completion |
|----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                          | Y        | N |                     | Yes               | No |                        |
| Comprehensive Plan (Polk 2050)                           |          | X |                     |                   | X  |                        |
| Climate Action Plan/Resiliency Plan                      |          | X |                     |                   | X  |                        |
| Community Wildfire Protection Plan (CWPP)                |          | X |                     |                   | X  |                        |
| Comprehensive Emergency Management Plan                  |          | X |                     |                   | X  |                        |
| General Plan                                             | X        |   | 2020                |                   |    |                        |
| Continuity of Operations Plan (COOP)                     |          | X |                     |                   | X  |                        |
| Disaster Recovery Plan                                   |          | X |                     |                   | X  |                        |
| Economic Development Plan                                |          | X |                     |                   | X  |                        |
| Emergency Operations Plan (EOP)                          |          | X |                     |                   | X  |                        |
| Environmental Impact Report (EIR)                        |          | X |                     |                   | X  |                        |
| Evacuation Plan                                          |          | X |                     |                   | X  |                        |
| Flood Response Plan                                      |          | X |                     |                   | X  |                        |
| Floodplain Management Plan/Flood Mitigation Plan         |          | X |                     |                   | X  |                        |
| Hazard Mitigation Plan                                   |          | X |                     |                   | X  |                        |
| Historic Preservation Plan                               |          | X |                     |                   | X  |                        |
| Natural Resource Protection Plan (NRPP)                  |          | X |                     |                   | X  |                        |
| Open Space Management Plan                               |          | X |                     |                   | X  |                        |
| Threat Hazard Identification and Risk Assessment (THIRA) |          | X |                     |                   | X  |                        |

### 2.2.2.3. REGULATORY TOOLS AND PROGRAMS

| Tool or Program                                         | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|---------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                         | Y        | N |                     | Yes               | No |                        |
| Building Codes (UBC)                                    | X        |   | 2020                |                   |    |                        |
| Citizen Corps - Community Emergency Response Team       |          | X |                     |                   | X  |                        |
| Community Rating System (CRS Program of the NFIP)       |          | X |                     |                   | X  |                        |
| Emergency Management Accreditation Program (EMAP)       |          | X |                     |                   | X  |                        |
| Fire Code                                               | X        |   |                     |                   |    |                        |
| Firewise Community                                      |          | X |                     |                   | X  |                        |
| Floodplain Management/Flood Damage Prevention Ordinance |          | X | 2020                |                   | X  |                        |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Tool or Program                                           | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|-----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                           | Y        | N |                     | Yes               | No |                        |
| Land Use/Development Planning                             | X        |   | 2020                |                   |    |                        |
| National Flood Insurance Program (NFIP)                   | X        |   |                     |                   |    |                        |
| Post Disaster Redevelopment/Reconstruction Plan/Ordinance |          | X |                     |                   | X  |                        |
| Storm Ready                                               |          | X |                     |                   | X  |                        |
| Stormwater Management Plan/Ordinance                      |          | X |                     |                   | X  |                        |
| Subdivision Regulations/Ordinance                         | X        |   | 2020                |                   |    |                        |
| Unified Development Ordinance                             |          | X |                     |                   | X  |                        |
| Zoning Ordinance                                          | X        |   | 2020                |                   |    |                        |

### 2.2.2.4. FISCAL CAPACITY

| Fiscal Resource                                           | Never<br>Used | Previously<br>Used | Currently<br>Used | Comments    |
|-----------------------------------------------------------|---------------|--------------------|-------------------|-------------|
| Capital Improvement Programming                           | X             |                    |                   |             |
| Community Development Block Grants (CDBG)                 | X             |                    |                   |             |
| Development Impact Fees                                   | X             |                    |                   |             |
| FEMA Hazard Mitigation Assistance Grants (HMGP, FMA, PDM) |               |                    | X                 | 2018        |
| Gas/Electric Utility Fees                                 |               |                    | X                 |             |
| General Obligation, Revenue, and/or Special Tax Bonds     | X             |                    |                   |             |
| Homeland Security Grants (HSGP)                           | X             |                    |                   |             |
| Infrastructure Investment and Jobs Act (IIJA)             | X             |                    |                   |             |
| Infrastructure State Revolving Fund loan                  |               |                    | X                 | Water Loans |
| Partnering Agreements or Intergovernmental Agreements     |               |                    | X                 |             |
| Sewer/Water Fees                                          | X             |                    |                   |             |
| Special Purpose Taxes (or taxing districts)               | X             |                    |                   |             |
| Stormwater Utility Fees                                   | X             |                    |                   |             |
| USDA Grants                                               | X             |                    |                   |             |
| USDA Rural Development Agency Grants                      | X             |                    |                   |             |
| US Economic Development Administration Grants             | X             |                    |                   |             |

### 2.2.2.5. SELF-ASSESSMENT OF CAPABILITY

| Area                               | Degree of Capability |          |      |
|------------------------------------|----------------------|----------|------|
|                                    | Limited              | Moderate | High |
| Planning and Regulatory Capability | X                    |          |      |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Area                                    | Degree of Capability |          |      |
|-----------------------------------------|----------------------|----------|------|
|                                         | Limited              | Moderate | High |
| Administrative and Technical Capability | X                    |          |      |
| Fiscal Capability                       | X                    |          |      |
| Available Staff                         | X                    |          |      |
| Political Support/Interest              | X                    |          |      |
| Community Support                       |                      |          | X    |

### 2.2.3. CITY OF ALTOONA

The City of Altoona is located in the eastern half of Polk County approximately 5 miles northeast of Des Moines. The community is governed by a Mayor, 5-member Council, and a City Administrator. As of 2020, the population of the City of Altoona was 19,565. The City of Altoona's population grew by 34.6% between 2010 and 2020, adding more than 5,000 individuals.

Specific initiatives/capabilities include:

- The City participates in the Metro Water group that promotes wise water use.
- The City publishes a newsletter and hosts a website that can be used for public information.
- The City participates in the Iowa Stormwater Education Partnership which provides public information.
- Altoona has 11 outdoor warning sirens which are activated by Polk County Dispatch.
- The City utilizes a reverse 911 system.
- The City has designated church basements and elementary schools as tornado shelters.

#### 2.2.3.1. STAFF AND TECHNICAL ASSISTANCE

| Staff or Personnel Resource                                                                             | Yes | No | Department or Single Staff Member | Comments                                                                       |
|---------------------------------------------------------------------------------------------------------|-----|----|-----------------------------------|--------------------------------------------------------------------------------|
| Emergency Manager                                                                                       | X   |    | Single Staff Member               | Fire Chief/Police Chief                                                        |
| Engineers or professionals trained in construction practices related to buildings and/or infrastructure | X   |    | Department(s)                     | Engineering; Building. Specialized structures would need an external engineer. |
| Environmental Justice Specialists                                                                       |     | X  |                                   |                                                                                |
| Fiscal Management or Procurement Specialists                                                            | X   |    | Department                        | Finance                                                                        |
| Floodplain Manager                                                                                      | X   |    | Department                        | Engineering                                                                    |
| Housing Specialist(s)                                                                                   | X   |    | Department                        | Building                                                                       |
| Land Surveyors                                                                                          |     | X  |                                   | Basic Topo                                                                     |
| Land Use/Management/Development Planning                                                                | X   |    | Department                        | Community Development                                                          |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Staff or Personnel Resource                                                          | Yes | No | Department or Single Staff Member | Comments    |
|--------------------------------------------------------------------------------------|-----|----|-----------------------------------|-------------|
| Planners or engineers with an understanding of natural and/or human-caused hazards   | X   |    | Department                        | Engineering |
| Recreation/Green Space Specialist(s)                                                 | X   |    | Department                        | Parks       |
| Resource Development Staff or Grant-writing                                          | X   |    | Department                        | Finance     |
| Scientists familiar with the hazards of the community                                |     | X  |                                   |             |
| Staff experienced with Geographic Information Systems (GIS) or HAZUS                 | X   |    | Department                        | IT          |
| Staff with education or expertise to assess the community's vulnerability to hazards | X   |    | Department                        | Fire        |
| Transportation Manager / Traffic Engineer                                            | X   |    | Department                        | Engineering |

### 2.2.3.2. PLANNING MECHANISMS

| Plans                                                    | In Place |   | Adopted/<br>Updated | Under Development |    | Expected Completion |
|----------------------------------------------------------|----------|---|---------------------|-------------------|----|---------------------|
|                                                          | Y        | N |                     | Yes               | No |                     |
| Comprehensive Plan (Polk 2050)                           |          | X |                     | X                 |    |                     |
| Climate Action Plan/Resiliency Plan                      |          | X |                     | X                 |    |                     |
| Community Wildfire Protection Plan (CWPP)                |          | X |                     |                   | X  |                     |
| Comprehensive Emergency Management Plan                  | X        |   |                     |                   |    |                     |
| General Plan                                             | X        |   |                     |                   |    |                     |
| Continuity of Operations Plan (COOP)                     | X        |   |                     |                   |    |                     |
| Disaster Recovery Plan                                   | X        |   |                     |                   |    |                     |
| Economic Development Plan                                | X        |   |                     |                   |    |                     |
| Emergency Operations Plan (EOP)                          | X        |   |                     |                   |    |                     |
| Environmental Impact Report (EIR)                        |          | X |                     |                   | X  |                     |
| Evacuation Plan                                          | X        |   |                     |                   |    |                     |
| Flood Response Plan                                      | X        |   |                     |                   |    |                     |
| Floodplain Management Plan/Flood Mitigation Plan         | X        |   |                     |                   |    |                     |
| Hazard Mitigation Plan                                   | X        |   |                     |                   |    |                     |
| Historic Preservation Plan                               |          | X |                     |                   | X  |                     |
| Natural Resource Protection Plan (NRPP)                  | X        |   |                     |                   |    |                     |
| Open Space Management Plan                               |          | X |                     |                   | X  |                     |
| Threat Hazard Identification and Risk Assessment (THIRA) | X        |   |                     |                   |    |                     |



### 2.2.3.3. REGULATORY TOOLS AND PROGRAMS

| Tool or Program                                           | In Place |   | Adopted/<br>Updated                                                            | Under Development |    | Expect to<br>Implement |
|-----------------------------------------------------------|----------|---|--------------------------------------------------------------------------------|-------------------|----|------------------------|
|                                                           | Y        | N |                                                                                | Yes               | No |                        |
| Building Codes                                            | X        |   | 2018 IPC,<br>IFC,<br>IPC/ZUPC,<br>IFCG, 2018<br>IMC, 2018<br>IEBC, 2020<br>NEC |                   |    |                        |
| Citizen Corps - Community Emergency Response Team         |          | X |                                                                                |                   | X  |                        |
| Community Rating System (CRS Program of the NFIP)         |          | X |                                                                                |                   | X  |                        |
| Emergency Management Accreditation Program (EMAP)         |          | X |                                                                                |                   | X  |                        |
| Fire Code                                                 | X        |   | 2018 IFC                                                                       |                   |    |                        |
| Firewise Community                                        |          | X |                                                                                |                   | X  |                        |
| Floodplain Management/Flood Damage Prevention Ordinance   | X        |   | Updated<br>6/19/2023                                                           |                   |    |                        |
| Land Use/Development Planning                             | X        |   |                                                                                |                   |    |                        |
| National Flood Insurance Program (NFIP)                   | X        |   |                                                                                |                   |    |                        |
| Post Disaster Redevelopment/Reconstruction Plan/Ordinance | X        |   |                                                                                |                   |    |                        |
| Storm Ready                                               |          | X |                                                                                |                   | X  |                        |
| Stormwater Management Plan/Ordinance                      | X        |   |                                                                                |                   |    |                        |
| Subdivision Regulations/Ordinance                         | X        |   |                                                                                |                   |    |                        |
| Unified Development Ordinance                             | X        |   |                                                                                |                   |    |                        |
| Zoning Ordinance                                          | X        |   |                                                                                |                   |    |                        |

### 2.2.3.4. FISCAL CAPACITY

| Fiscal Resource                                           | Never<br>Used | Previously<br>Used | Currently<br>Used | Comments                      |
|-----------------------------------------------------------|---------------|--------------------|-------------------|-------------------------------|
| Capital Improvement Programming                           |               |                    | X                 | Updated with annual<br>budget |
| Community Development Block Grants (CDBG)                 | X             |                    |                   |                               |
| Development Impact Fees                                   |               |                    | X                 |                               |
| FEMA Hazard Mitigation Assistance Grants (HMGP, FMA, PDM) |               | X                  |                   |                               |
| Gas/Electric Utility Fees                                 | X             |                    |                   |                               |
| General Obligation, Revenue, and/or Special Tax Bonds     |               |                    | X                 |                               |
| Homeland Security Grants (HSGP)                           |               | X                  |                   |                               |
| Infrastructure Investment and Jobs Act (IIJA)             |               |                    | X                 |                               |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Fiscal Resource                                       | Never Used | Previously Used | Currently Used | Comments |
|-------------------------------------------------------|------------|-----------------|----------------|----------|
| Infrastructure State Revolving Fund loan              |            | X               |                |          |
| Partnering Agreements or Intergovernmental Agreements |            |                 | X              |          |
| Sewer/Water Fees                                      |            |                 | X              |          |
| Special Purpose Taxes (or taxing districts)           | X          |                 |                |          |
| Stormwater Utility Fees                               |            |                 | X              |          |
| USDA Grants                                           | X          |                 |                |          |
| USDA Rural Development Agency Grants                  | X          |                 |                |          |
| US Economic Development Administration Grants         | X          |                 |                |          |

### 2.2.3.5. SELF-ASSESSMENT OF CAPABILITY

| Area                                    | Degree of Capability |          |      |
|-----------------------------------------|----------------------|----------|------|
|                                         | Limited              | Moderate | High |
| Planning and Regulatory Capability      |                      | X        |      |
| Administrative and Technical Capability |                      | X        |      |
| Fiscal Capability                       |                      | X        |      |
| Available Staff                         |                      | X        |      |
| Political Support/Interest              |                      | X        |      |
| Community Support                       |                      | X        |      |

### 2.2.4. CITY OF ANKENY

The City of Ankeny is roughly in the center of Polk County. It is governed by a mayor and 5-member council. The City of Ankeny had a 2020 population of 67,877, which is an increase of 22,305 from the community's 2010 population. The City of Ankeny is one of several communities in the Des Moines metropolitan area which have experienced significant population growth in recent decades.

Specific initiatives/capabilities include:

- Ankeny provides periodic public notices and educational articles on fire prevention.
- The Police Department provides both bicycle safety programs and Child Safety Seat training.
- Ankeny Communication Office, Polk County EMA and Polk County Health Department provide media articles on winter storms, heat, health, and infectious control awareness.
- Ankeny completed the Westwind Reconstruction Project for storm sewer erosion control.
- The City of Ankeny has 21 outdoor warning sirens.

#### 2.2.4.1. STAFF AND TECHNICAL ASSISTANCE

| Staff or Personnel Resource                                                                             | Yes | No | Department or Single Staff Member | Comments                        |
|---------------------------------------------------------------------------------------------------------|-----|----|-----------------------------------|---------------------------------|
| Emergency Manager                                                                                       |     | X  |                                   | No dedicated Emergency Manager. |
| Engineers or professionals trained in construction practices related to buildings and/or infrastructure | X   |    | Not Provided                      |                                 |
| Environmental Justice Specialists                                                                       |     | X  |                                   |                                 |
| Fiscal Management or Procurement Specialists                                                            | X   |    | Not Provided                      |                                 |
| Floodplain Manager                                                                                      | X   |    | Not Provided                      |                                 |
| Housing Specialist(s)                                                                                   | X   |    | Department                        | Rental Housing Inspectors       |
| Land Surveyors                                                                                          | X   |    | Not Provided                      | Not Licensed                    |
| Land Use/Management/Development Planning                                                                | X   |    | Not Provided                      |                                 |
| Planners or engineers with an understanding of natural and/or human-caused hazards                      | X   |    | Not Provided                      |                                 |
| Recreation/Green Space Specialist(s)                                                                    | X   |    | Department                        | Parks and Recreation            |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Staff or Personnel Resource                                                          | Yes | No | Department or Single Staff Member | Comments |
|--------------------------------------------------------------------------------------|-----|----|-----------------------------------|----------|
| Resource Development Staff or Grant-writing                                          | X   |    | Not Provided                      |          |
| Scientists familiar with the hazards of the community                                |     | X  |                                   |          |
| Staff experienced with Geographic Information Systems (GIS) or HAZUS                 | X   |    | Not Provided                      |          |
| Staff with education or expertise to assess the community's vulnerability to hazards | X   |    | Not Provided                      |          |
| Transportation Manager / Traffic Engineer                                            | X   |    | Not Provided                      |          |

### 2.2.4.2. PLANNING MECHANISMS

| Plans                                                    | In Place |   | Adopted/<br>Updated | Under Development |    | Expected Completion |
|----------------------------------------------------------|----------|---|---------------------|-------------------|----|---------------------|
|                                                          | Y        | N |                     | Yes               | No |                     |
| Comprehensive Plan (Polk 2050)                           | X        |   | 3/2018              |                   |    |                     |
| Climate Action Plan/Resiliency Plan                      |          | X |                     |                   | X  |                     |
| Community Wildfire Protection Plan (CWPP)                |          | X |                     |                   | X  |                     |
| Comprehensive Emergency Management Plan                  | X        |   | 7/2021              |                   |    |                     |
| General Plan                                             | X        |   |                     |                   |    |                     |
| Continuity of Operations Plan (COOP)                     | X        |   |                     |                   |    |                     |
| Disaster Recovery Plan                                   | X        |   |                     |                   |    |                     |
| Economic Development Plan                                | X        |   |                     |                   |    |                     |
| Emergency Operations Plan (EOP)                          | X        |   | 7/2021              |                   |    |                     |
| Environmental Impact Report (EIR)                        |          | X |                     |                   | X  |                     |
| Evacuation Plan                                          |          | X |                     |                   | X  |                     |
| Flood Response Plan                                      |          | X |                     |                   | X  |                     |
| Floodplain Management Plan/Flood Mitigation Plan         | X        |   |                     |                   |    |                     |
| Hazard Mitigation Plan                                   |          | X |                     |                   | X  |                     |
| Historic Preservation Plan                               |          | X |                     |                   | X  |                     |
| Natural Resource Protection Plan (NRPP)                  |          | X |                     |                   | X  |                     |
| Open Space Management Plan                               | X        |   | Parks Master Plan   |                   |    |                     |
| Threat Hazard Identification and Risk Assessment (THIRA) | X        |   |                     |                   |    |                     |

### 2.2.4.3. REGULATORY TOOLS AND PROGRAMS

| Tool or Program                                           | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|-----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                           | Y        | N |                     | Yes               | No |                        |
| Building Codes                                            | X        |   | UBC 2021            |                   |    |                        |
| Citizen Corps - Community Emergency Response Team         |          | X |                     |                   | X  |                        |
| Community Rating System (CRS Program of the NFIP)         |          | X |                     | X                 |    | 2024                   |
| Emergency Management Accreditation Program (EMAP)         |          | X |                     |                   | X  |                        |
| Fire Code                                                 | X        |   | IFC 2021            |                   |    |                        |
| Firewise Community                                        |          | X |                     |                   | X  |                        |
| Floodplain Management/Flood Damage Prevention Ordinance   | X        |   | 2022                |                   |    |                        |
| Land Use/Development Planning                             | X        |   |                     | X                 |    | 2024                   |
| National Flood Insurance Program (NFIP)                   | X        |   |                     |                   |    |                        |
| Post Disaster Redevelopment/Reconstruction Plan/Ordinance |          | X |                     |                   | X  |                        |
| Storm Ready                                               |          | X |                     |                   | X  |                        |
| Stormwater Management Plan/Ordinance                      | X        |   |                     |                   |    | Not fully adopted      |
| Subdivision Regulations/Ordinance                         | X        |   |                     |                   |    |                        |
| Unified Development Ordinance                             |          | X |                     |                   | X  |                        |
| Zoning Ordinance                                          | X        |   |                     | X                 |    | 2024                   |

### 2.2.4.4. FISCAL CAPACITY

| Fiscal Resource                                           | Never Used | Previously Used | Currently Used | Comments                    |
|-----------------------------------------------------------|------------|-----------------|----------------|-----------------------------|
| Capital Improvement Programming                           |            |                 | X              |                             |
| Community Development Block Grants (CDBG)                 | X          |                 |                |                             |
| Development Impact Fees                                   | X          |                 |                | Water and Sewer Connections |
| FEMA Hazard Mitigation Assistance Grants (HMGP, FMA, PDM) |            | X               |                |                             |
| Gas/Electric Utility Fees                                 |            |                 | X              |                             |
| General Obligation, Revenue, and/or Special Tax Bonds     |            |                 | X              |                             |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Fiscal Resource                                       | Never Used | Previously Used | Currently Used | Comments |
|-------------------------------------------------------|------------|-----------------|----------------|----------|
| Homeland Security Grants (HSGP)                       | X          |                 |                |          |
| Infrastructure Investment and Jobs Act (IIJA)         | X          |                 |                |          |
| Infrastructure State Revolving Fund loan              |            |                 | X              |          |
| Partnering Agreements or Intergovernmental Agreements |            |                 | X              |          |
| Sewer/Water Fees                                      |            |                 | X              |          |
| Special Purpose Taxes (or taxing districts)           | X          |                 |                |          |
| Stormwater Utility Fees                               |            |                 | X              |          |
| USDA Grants                                           | X          |                 |                |          |
| USDA Rural Development Agency Grants                  | X          |                 |                |          |
| US Economic Development Administration Grants         | X          |                 |                |          |

### 2.2.4.5. SELF-ASSESSMENT OF CAPABILITY

| Area                                    | Degree of Capability |          |      |
|-----------------------------------------|----------------------|----------|------|
|                                         | Limited              | Moderate | High |
| Planning and Regulatory Capability      |                      |          | X    |
| Administrative and Technical Capability |                      |          | X    |
| Fiscal Capability                       |                      |          | X    |
| Available Staff                         |                      | X        |      |
| Political Support/Interest              |                      | X        |      |
| Community Support                       |                      | X        |      |

### 2.2.5. CITY OF BONDURANT

The City of Bondurant is located in the eastern half of Polk County, roughly north of Altoona and East of Ankeny. The community is governed by a Mayor and 5-member council. The 2020 population of the City of Bondurant was 7,365, and Bondurant's population growth rate of 90.8% between 2010 and 2020 is the highest among all incorporated Polk County communities during that time.

Specific initiatives/capabilities include:

- The Fire Department conducts safety sessions annually, primarily at school facilities.
- Bondurant has 4 outdoor warning sirens which are activated by the Polk County Dispatch.
- The City has a designated public tornado shelter/safe room located at the Bondurant Recreation Sports Complex.

#### 2.2.5.1. STAFF AND TECHNICAL ASSISTANCE

| Staff or Personnel Resource                                                                             | Yes | No | Department or Single Staff Member | Comments                       |
|---------------------------------------------------------------------------------------------------------|-----|----|-----------------------------------|--------------------------------|
| Emergency Manager                                                                                       |     | X  |                                   | We rely heavily on Polk County |
| Engineers or professionals trained in construction practices related to buildings and/or infrastructure |     | X  |                                   | Contract service               |
| Environmental Justice Specialists                                                                       | X   |    | Single Staff                      |                                |
| Fiscal Management or Procurement Specialists                                                            | X   |    | Department                        |                                |
| Floodplain Manager                                                                                      | X   |    | Department                        | Also contracted service        |
| Housing Specialist(s)                                                                                   |     | X  |                                   |                                |
| Land Surveyors                                                                                          |     | X  |                                   | Contracted service             |
| Land Use/Management/Development Planning                                                                | X   |    | Department                        |                                |
| Planners or engineers with an understanding of natural and/or human-caused hazards                      | X   |    | Department                        |                                |
| Recreation/Green Space Specialist(s)                                                                    | X   |    | Department                        |                                |
| Resource Development Staff or Grant-writing                                                             | X   |    | Single Staff                      |                                |
| Scientists familiar with the hazards of the community                                                   |     | X  |                                   |                                |
| Staff experienced with Geographic Information Systems (GIS) or HAZUS                                    |     | X  |                                   | Contracted service             |
| Staff with education or expertise to assess the community's vulnerability to hazards                    | X   |    | Department                        |                                |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Staff or Personnel Resource               | Yes | No | Department or Single Staff Member | Comments           |
|-------------------------------------------|-----|----|-----------------------------------|--------------------|
| Transportation Manager / Traffic Engineer |     | X  |                                   | Contracted service |

### 2.2.5.2. PLANNING MECHANISMS

| Plans                                                    | In Place |   | Adopted/<br>Updated | Under Development |    | Expected Completion |
|----------------------------------------------------------|----------|---|---------------------|-------------------|----|---------------------|
|                                                          | Y        | N |                     | Yes               | No |                     |
| Comprehensive Plan (Polk 2050)                           | X        |   |                     |                   |    |                     |
| Climate Action Plan/Resiliency Plan                      | X        |   |                     |                   |    |                     |
| Community Wildfire Protection Plan (CWPP)                | X        |   |                     |                   |    |                     |
| Comprehensive Emergency Management Plan                  | X        |   |                     |                   |    |                     |
| General Plan                                             | X        |   |                     |                   |    |                     |
| Continuity of Operations Plan (COOP)                     | X        |   |                     |                   |    |                     |
| Disaster Recovery Plan                                   | X        |   |                     |                   |    |                     |
| Economic Development Plan                                | X        |   |                     |                   |    |                     |
| Emergency Operations Plan (EOP)                          | X        |   |                     |                   |    |                     |
| Environmental Impact Report (EIR)                        | X        |   |                     |                   |    |                     |
| Evacuation Plan                                          | X        |   |                     |                   |    |                     |
| Flood Response Plan                                      | X        |   |                     |                   |    |                     |
| Floodplain Management Plan/Flood Mitigation Plan         | X        |   |                     |                   |    |                     |
| Hazard Mitigation Plan                                   | X        |   |                     |                   |    |                     |
| Historic Preservation Plan                               | X        |   |                     |                   |    |                     |
| Natural Resource Protection Plan (NRPP)                  | X        |   |                     |                   |    |                     |
| Open Space Management Plan                               | X        |   |                     |                   |    |                     |
| Threat Hazard Identification and Risk Assessment (THIRA) | X        |   |                     |                   |    |                     |

### 2.2.5.3. REGULATORY TOOLS AND PROGRAMS

| Tool or Program                                   | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to Implement |
|---------------------------------------------------|----------|---|---------------------|-------------------|----|---------------------|
|                                                   | Y        | N |                     | Yes               | No |                     |
| Building Codes                                    | X        |   | <u>2023</u>         |                   |    |                     |
| Citizen Corps - Community Emergency Response Team |          | X |                     |                   | X  |                     |
| Community Rating System (CRS Program of the NFIP) | X        |   |                     |                   |    |                     |
| Emergency Management Accreditation Program (EMAP) | X        |   |                     |                   |    |                     |



## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Tool or Program                                           | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|-----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                           | Y        | N |                     | Yes               | No |                        |
| Fire Code                                                 | X        |   | 2023                |                   |    |                        |
| Firewise Community                                        |          | X |                     |                   | X  |                        |
| Floodplain Management/Flood Damage Prevention Ordinance   | X        |   |                     |                   |    |                        |
| Land Use/Development Planning                             | X        |   | 2023                |                   |    |                        |
| National Flood Insurance Program (NFIP)                   | X        |   |                     |                   |    |                        |
| Post Disaster Redevelopment/Reconstruction Plan/Ordinance | X        |   |                     |                   |    |                        |
| Storm Ready                                               | X        |   |                     |                   |    |                        |
| Stormwater Management Plan/Ordinance                      | X        |   | 2023                |                   |    |                        |
| Subdivision Regulations/Ordinance                         | X        |   |                     |                   |    |                        |
| Unified Development Ordinance                             | X        |   |                     |                   |    |                        |
| Zoning Ordinance                                          | X        |   |                     |                   |    |                        |

### 2.2.5.4. FISCAL CAPACITY

| Fiscal Resource                                           | Never<br>Used | Previously<br>Used | Currently<br>Used | Comments |
|-----------------------------------------------------------|---------------|--------------------|-------------------|----------|
| Capital Improvement Programming                           |               |                    | X                 |          |
| Community Development Block Grants (CDBG)                 |               |                    | X                 |          |
| Development Impact Fees                                   |               |                    | X                 |          |
| FEMA Hazard Mitigation Assistance Grants (HMGP, FMA, PDM) |               | X                  |                   |          |
| Gas/Electric Utility Fees                                 |               |                    | X                 |          |
| General Obligation, Revenue, and/or Special Tax Bonds     |               |                    | X                 |          |
| Homeland Security Grants (HSGP)                           |               | X                  |                   |          |
| Infrastructure Investment and Jobs Act (IIJA)             |               |                    |                   |          |
| Infrastructure State Revolving Fund loan                  |               | X                  | X                 |          |
| Partnering Agreements or Intergovernmental Agreements     |               |                    | X                 |          |
| Sewer/Water Fees                                          |               |                    | X                 |          |
| Special Purpose Taxes (or taxing districts)               |               |                    | X                 |          |
| Stormwater Utility Fees                                   |               |                    | X                 |          |
| USDA Grants                                               |               | X                  |                   |          |
| USDA Rural Development Agency Grants                      |               | X                  |                   |          |
| US Economic Development Administration Grants             |               | X                  |                   |          |



2.2.5.5. SELF-ASSESSMENT OF CAPABILITY

| Area                                    | Degree of Capability |          |      |
|-----------------------------------------|----------------------|----------|------|
|                                         | Limited              | Moderate | High |
| Planning and Regulatory Capability      |                      | X        |      |
| Administrative and Technical Capability |                      | X        |      |
| Fiscal Capability                       |                      | X        |      |
| Available Staff                         | X                    |          |      |
| Political Support/Interest              |                      | X        |      |
| Community Support                       |                      | X        |      |

### 2.2.6. CITY OF CLIVE

The City of Clive is roughly located along the southwestern boundary of Polk County between Urbandale and West Des Moines. The community is governed by a Mayor and 5-member council. The population of the City of Clive in 2020 was 18,601 (7,576 in Dallas County and 11,025 in Polk County). The Population of Clive increased by 3,154 between 2010 and 2020, with growth taking primarily in the portions of the city in Dallas County.

Specific initiatives/capabilities include:

- The City provides public education through newsletters, bill stuffers and brochures that cover the effects of storm water to include flooding and water quality.
- The City is actively engaged in the acquisition of flood-prone properties as part of the Greenbelt Park expansion. The city currently owns approximately 49% of the land within the SFHA. 21 at-risk buildings have been removed since 2018, with 48 remaining.
- Clive built a concrete flood protection wall around its distribution pumping station on University Boulevard, has purchased several water bladders to aid in restraining Walnut Creek flood water at University Boulevard, and has purchased a flat bottom shallow water rescue boat.
- The Clive EOC has redundant internet and electrical systems (including backup generator).
- Clive has 10 outdoor warning sirens. Seven are specific to Clive, one is shared with and located in the city of Urbandale, and one is shared with and located in Waukee.
- Clive is a partner in the Early Warning Flood Alert System along Walnut Creek, which is the basis of the City's Flood Response Plan.
- Clive uses Reverse 911 system governed by AlertIowa.
- The City has a variety of mutual aid agreements to augment emergency response operations.
- The city has multiple source water connections supplying it from several feeds.
- The City is an active participant in the Community Rating System (CRS) program, and is a class 5 community, maintaining an active floodplain

management program and providing flood insurance policyholders within Clive with ongoing cost savings.

- The City has undertaken a wide variety of infrastructure studies in the past ten years, including:
  - RDG Planning & Design Watershed Stream Condition Assessment Report (2014)
  - RDG Planning & Design Walnut Creek Watershed Plan (2016)
  - City of Clive Comprehensive Plan Update (2016)
  - RDG Planning & Design Greenbelt Master Plan (2016)
  - Snyder & Associates Municipal Water Systems Study (2016)
  - Fire/EMS Standards of Coverage Study (2016/17)
  - HR Green City Street Pavement and Specification Study/Plan (2017/18)
  - FEMA Community Rating System Analysis (2018)
  - FEMA Flood Insurance Rate Map Update (2019)
  - Army Corps of Engineers/FEMA-Walnut Creek Flood Loss Avoidance Analysis (2019)
  - McClure Engineering Municipal Sanitary Sewer System Study (2019) Walnut Creek
  - Applied Ecological Services - Greenbelt Vegetation Management Plan (2020)
  - Interfluve Watershed Stream Condition Assessment Report (2020)
  - Indian Hills Sub-Watershed Assessment (2020)
  - Water Resources Master Plan (2022)
  - University Boulevard Flood Mitigation Plan (2022)
  - University Avenue Corridor Master Plan (2023)
  - Silver Jackets- Walnut Creek Flood Loss Avoidance (2023)

### 2.2.6.1. STAFF AND TECHNICAL ASSISTANCE

| Staff or Personnel Resource                                                                             | Yes | No | Department or Single Staff Member | Comments                                     |
|---------------------------------------------------------------------------------------------------------|-----|----|-----------------------------------|----------------------------------------------|
| Emergency Manager                                                                                       | X   |    | Single Staff Member               | Fire Chief                                   |
| Engineers or professionals trained in construction practices related to buildings and/or infrastructure | X   |    | Department                        | Public Works                                 |
| Environmental Justice Specialists                                                                       |     | X  |                                   |                                              |
| Fiscal Management or Procurement Specialists                                                            | X   |    | Department                        | Administration                               |
| Floodplain Manager                                                                                      | X   |    | Department                        | Community Development                        |
| Housing Specialist(s)                                                                                   |     | X  |                                   |                                              |
| Land Surveyors                                                                                          |     | X  |                                   |                                              |
| Land Use/Management/Development Planning                                                                | X   |    | Department                        | Community Development                        |
| Planners or engineers with an understanding of natural and/or human-caused hazards                      | X   |    | Department                        | Community Development                        |
| Recreation/Green Space Specialist(s)                                                                    | X   |    | Department                        | Leisure Services                             |
| Resource Development Staff or Grant-writing                                                             | X   |    | Department                        | Multiple Departments                         |
| Scientists familiar with the hazards of the community                                                   |     | X  |                                   |                                              |
| Staff experienced with Geographic Information Systems (GIS) or HAZUS                                    | X   |    | Department                        | Community Development; GIS Coordinator in IT |
| Staff with education or expertise to assess the community's vulnerability to hazards                    | X   |    | Department                        | Community Development                        |
| Transportation Manager / Traffic Engineer                                                               |     | X  |                                   |                                              |

### 2.2.6.2. PLANNING MECHANISMS

| Plans                                     | In Place |   | Adopted/Updated | Under Development |    | Expected Completion |
|-------------------------------------------|----------|---|-----------------|-------------------|----|---------------------|
|                                           | Y        | N |                 | Yes               | No |                     |
| Comprehensive Plan (Polk 2050)            | X        |   | 2016            |                   |    |                     |
| Climate Action Plan/Resiliency Plan       |          | X |                 |                   | X  |                     |
| Community Wildfire Protection Plan (CWPP) |          | X |                 |                   | X  |                     |
| Comprehensive Emergency Management Plan   |          | X |                 |                   | X  |                     |
| General Plan                              |          | X |                 |                   | X  |                     |
| Continuity of Operations Plan (COOP)      | X        |   | (IT-specific)   |                   |    |                     |
| Disaster Recovery Plan                    |          | X |                 |                   | X  |                     |
| Economic Development Plan                 | X        |   | 2013            |                   |    |                     |
| Emergency Operations Plan (EOP)           |          | X |                 |                   | X  |                     |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Plans                                                    | In Place |   | Adopted/<br>Updated | Under Development |    | Expected<br>Completion |
|----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                          | Y        | N |                     | Yes               | No |                        |
| Environmental Impact Report (EIR)                        |          | X |                     |                   | X  |                        |
| Evacuation Plan                                          |          | X |                     |                   | X  |                        |
| Flood Response Plan                                      | X        |   | Annually            |                   |    |                        |
| Floodplain Management Plan/Flood Mitigation Plan         | X        |   | 2023                |                   |    |                        |
| Hazard Mitigation Plan                                   | X        |   | 2019                |                   |    |                        |
| Historic Preservation Plan                               |          | X |                     |                   | X  |                        |
| Natural Resource Protection Plan (NRPP)                  | X        |   | Various             |                   |    |                        |
| Open Space Management Plan                               | X        |   | 2016                |                   |    |                        |
| Threat Hazard Identification and Risk Assessment (THIRA) |          | X |                     |                   | X  |                        |

### 2.2.6.3. REGULATORY TOOLS AND PROGRAMS

| Tool or Program                                           | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|-----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                           | Y        | N |                     | Yes               | No |                        |
| Building Codes                                            | X        |   | 2021                |                   |    |                        |
| Citizen Corps - Community Emergency Response Team         |          | X |                     |                   | X  |                        |
| Community Rating System (CRS Program of the NFIP)         | X        |   |                     |                   |    |                        |
| Emergency Management Accreditation Program (EMAP)         |          | X |                     |                   | X  |                        |
| Fire Code                                                 | X        |   | 2021                |                   |    |                        |
| Firewise Community                                        |          | X |                     |                   | X  |                        |
| Floodplain Management/Flood Damage Prevention Ordinance   | X        |   | 2021                |                   |    |                        |
| Land Use/Development Planning                             | X        |   | Ongoing             |                   |    |                        |
| National Flood Insurance Program (NFIP)                   | X        |   | 1978                |                   |    |                        |
| Post Disaster Redevelopment/Reconstruction Plan/Ordinance |          | X |                     |                   | X  |                        |
| Storm Ready                                               | X        |   | County              |                   |    |                        |
| Stormwater Management Plan/Ordinance                      | X        |   | 2021                |                   |    |                        |
| Subdivision Regulations/Ordinance                         | X        |   |                     |                   |    |                        |
| Unified Development Ordinance                             |          | X |                     |                   | X  |                        |
| Zoning Ordinance                                          | X        |   | 2008                |                   |    |                        |

### 2.2.6.4. FISCAL CAPACITY

| Fiscal Resource                                           | Never Used | Previously Used | Currently Used | Comments                  |
|-----------------------------------------------------------|------------|-----------------|----------------|---------------------------|
| Capital Improvement Programming                           |            |                 | X              | Reviewed annually         |
| Community Development Block Grants (CDBG)                 | X          |                 |                |                           |
| Development Impact Fees                                   | X          |                 |                | Not allowed under statute |
| FEMA Hazard Mitigation Assistance Grants (HMGP, FMA, PDM) |            |                 | X              | HMGP, FMA, BRIC           |
| Gas/Electric Utility Fees                                 |            |                 | X              | Franchise Fee             |
| General Obligation, Revenue, and/or Special Tax Bonds     |            |                 | X              | GO Bonds                  |
| Homeland Security Grants (HSGP)                           | X          |                 |                |                           |
| Infrastructure Investment and Jobs Act (IIJA)             |            |                 | X              |                           |
| Infrastructure State Revolving Fund loan                  | X          |                 |                |                           |
| Partnering Agreements or Intergovernmental Agreements     |            |                 | X              | Extensively leveraged     |
| Sewer/Water Fees                                          |            |                 | X              |                           |
| Special Purpose Taxes (or taxing districts)               |            |                 | X              | Urban Renewal - TF        |
| Stormwater Utility Fees                                   |            |                 | X              |                           |
| USDA Grants                                               | X          |                 |                |                           |
| USDA Rural Development Agency Grants                      | X          |                 |                |                           |
| US Economic Development Administration Grants             | X          |                 |                |                           |

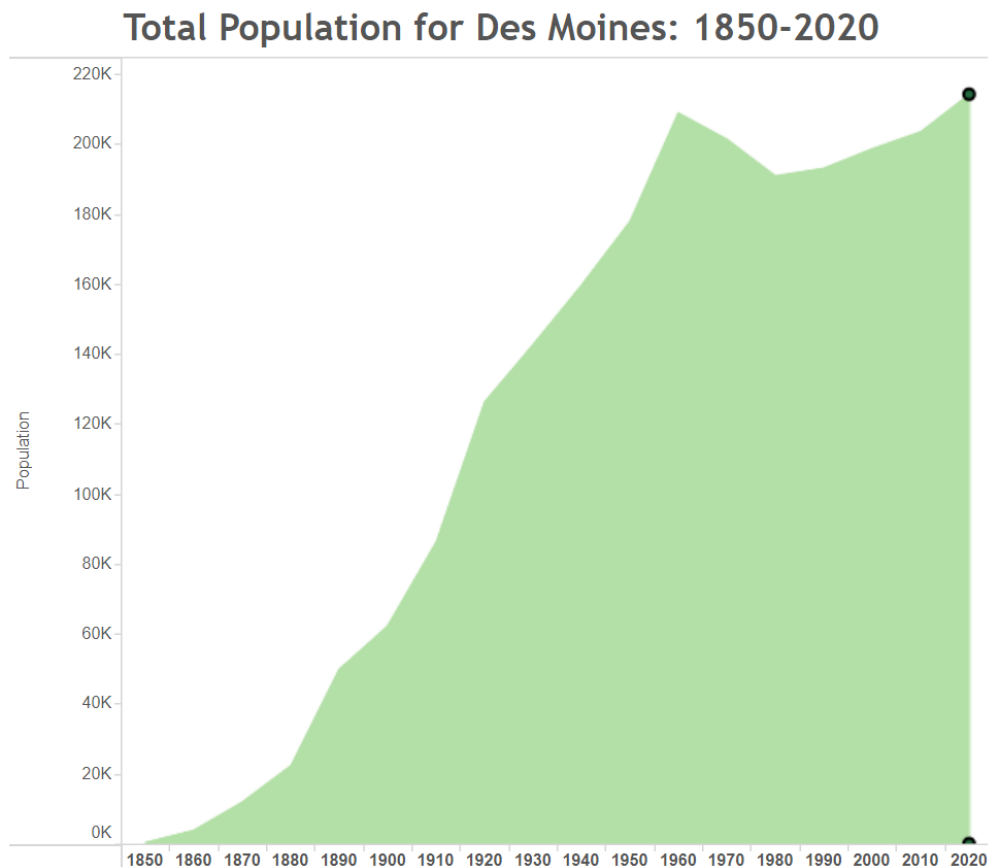
### 2.2.6.5. SELF-ASSESSMENT OF CAPABILITY

| Area                                    | Degree of Capability |          |      |
|-----------------------------------------|----------------------|----------|------|
|                                         | Limited              | Moderate | High |
| Planning and Regulatory Capability      |                      |          | X    |
| Administrative and Technical Capability |                      | X        |      |
| Fiscal Capability                       |                      | X        |      |
| Available Staff                         |                      | X        |      |
| Political Support/Interest              |                      |          | X    |
| Community Support                       |                      | X        |      |

### 2.2.7. CITY OF DES MOINES

The City of Des Moines is the capital of Iowa and the state's most populous city. In 2020, the estimated population of Des Moines was 214,133, which is an increase of 9,913 since 2010. Des Moines' 5% growth between 2010 and 2020 may look modest when compared to several surrounding communities, but the City's 2020 population estimate is the largest ever documented for the community. Prior to 2020, the largest estimated population for Des Moines across all decennial U.S. censuses since 1850 was in 1960 when the population of Des Moines was estimated to be 208,982. Des Moines is governed by a 7-member council which consists of the City's mayor, two at-large members, and four members representing each of the four wards of the city.

Figure 10. Population of Des Moines 1850 - 2020



Specific initiatives/capabilities include:

- Fire safety/public education programs are provided to schools, senior citizen groups and businesses throughout each year.



- The Des Moines Municipal Housing agency provides periodic fire safety educational sessions to tenants within multi-family units.
- The Des Moines Municipal Housing Agency has a provision within HUD and an approved Agency Plan for both Public Housing and Section 8 to provide pro-rated rental assistance to families that would lose their housing due to natural disasters or through no fault of their own. Additionally, the Des Moines Community Action Agency has historically assisted with income verification and distribution of disaster assistance funds to low-income families, providing referral services and staffing a booth at the FEMA designated command center.
- Des Moines has 28 outdoor warning sirens which are activated by the Polk County.
- Des Moines Public Safety Dispatch has reverse 911 capabilities and Alert Iowa for mass communication by telephone for emergency information.
- The City has a FEMA certified tornado shelter/safe room at the Iowa State Fairgrounds.
- The City is an active participant in the Community Rating System (CRS) program, and is a class 6 community, maintaining an active floodplain management program and providing flood insurance policyholders within Des Moines with ongoing cost savings.
- The City has instituted a Stormwater Master Plan Program that will fund the stormwater needs of the City related to levels of service for flood mitigation, sustainable asset management and water quality improvement. It is a risk-based approach to proactively inspect the City's stormwater infrastructure, prioritized ranking of issues identified, development of projects based on the likelihood and consequence of failure of the assets, and a long-term sustainable program to renew the stormwater infrastructure at the lowest lifecycle cost.

### 2.2.7.1. STAFF AND TECHNICAL ASSISTANCE

| Staff or Personnel Resource | Yes | No | Department or Single Staff Member | Comments                            |
|-----------------------------|-----|----|-----------------------------------|-------------------------------------|
| Emergency Manager           | X   |    | Department                        | City Manager, Public Works Director |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



|                                                                                                         |   |   |                      |                                                                  |
|---------------------------------------------------------------------------------------------------------|---|---|----------------------|------------------------------------------------------------------|
| Engineers or professionals trained in construction practices related to buildings and/or infrastructure | X |   | Multiple departments | Engineering, Development Services, Fire & Public Works           |
| Environmental Justice Specialists                                                                       |   | X |                      |                                                                  |
| Fiscal Management or Procurement Specialists                                                            | X |   | Department           | Finance                                                          |
| Floodplain Manager                                                                                      | X |   | Department           | Engineering                                                      |
| Housing Specialist(s)                                                                                   | X |   | Department           | Neighborhood services                                            |
| Land Surveyors                                                                                          | X |   | Department           | Engineering                                                      |
| Land Use/Management/Development Planning                                                                | X |   | Department           | Development services                                             |
| Planners or engineers with an understanding of natural and/or human-caused hazards                      |   | X |                      |                                                                  |
| Recreation/Green Space Specialist(s)                                                                    | X |   | Department           | Parks                                                            |
| Resource Development Staff or Grant-writing                                                             | X |   | Multiple departments | Neighborhood Services, Development Services, City Manager Office |
| Scientists familiar with the hazards of the community                                                   |   | X |                      |                                                                  |
| Staff experienced with Geographic Information Systems (GIS) or HAZUS                                    | X |   | Multiple departments | IT, Development Services, Fire                                   |
| Staff with education or expertise to assess the community's vulnerability to hazards                    | X |   | Multiple Departments | Engineering, Development Services, Fire, Police & Public Works   |
| Transportation Manager / Traffic Engineer                                                               | X |   | Multiple Departments | Engineering                                                      |

### 2.2.7.2. PLANNING MECHANISMS

| Plans                                            | In Place |   | Adopted/<br>Updated | Under Development |    | Expected Completion |
|--------------------------------------------------|----------|---|---------------------|-------------------|----|---------------------|
|                                                  | Y        | N |                     | Yes               | No |                     |
| Comprehensive Plan (Polk 2050)                   | X        |   | 2016                | X                 |    | 2025                |
| Climate Action Plan/Resiliency Plan              | X        |   | 2024                |                   | X  |                     |
| Community Wildfire Protection Plan (CWPP)        |          | X |                     |                   | X  |                     |
| Comprehensive Emergency Management Plan          | X        |   | Ongoing             | X                 |    | Ongoing             |
| General Plan                                     |          | X |                     |                   | X  |                     |
| Continuity of Operations Plan (COOP)             |          | X |                     |                   | X  | 2025 (IT)           |
| Disaster Recovery Plan                           | X        |   | ESF 14              |                   | X  |                     |
| Economic Development Plan                        |          | X |                     |                   | X  |                     |
| Emergency Operations Plan (EOP)                  |          | X |                     |                   | X  |                     |
| Environmental Impact Report (EIR)                |          | X |                     |                   | X  |                     |
| Evacuation Plan                                  |          | X |                     |                   | X  |                     |
| Flood Response Plan                              | X        |   | Annually            | X                 |    | Annually            |
| Floodplain Management Plan/Flood Mitigation Plan |          | X |                     |                   | X  |                     |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Plans                                                    | In Place |   | Adopted/<br>Updated                  | Under Development |    | Expected<br>Completion |
|----------------------------------------------------------|----------|---|--------------------------------------|-------------------|----|------------------------|
|                                                          | Y        | N |                                      | Yes               | No |                        |
| Hazard Mitigation Plan                                   | X        |   | 2019                                 | X                 |    | 2024                   |
| Historic Preservation Plan                               | X        |   | 2023                                 |                   | X  |                        |
| Natural Resource Protection Plan (NRPP)                  |          | X |                                      |                   | X  |                        |
| Open Space Management Plan                               |          | X |                                      |                   | X  |                        |
| Threat Hazard Identification and Risk Assessment (THIRA) | X        |   | 2023 (Fire Risk Assessment Document) |                   |    |                        |

### 2.2.7.3. REGULATORY TOOLS AND PROGRAMS

| Tool or Program                                           | In Place |   | Adopted/<br>Updated                      | Under Development |    | Expect to<br>Implement |
|-----------------------------------------------------------|----------|---|------------------------------------------|-------------------|----|------------------------|
|                                                           | Y        | N |                                          | Yes               | No |                        |
| Building Codes                                            | X        |   | Current – 2021 IBC                       |                   |    |                        |
| Citizen Corps - Community Emergency Response Team         |          | X |                                          |                   | X  |                        |
| Community Rating System (CRS Program of the NFIP)         | X        |   | Joined in 1991, Moved to Class 5 in 2024 |                   |    |                        |
| Emergency Management Accreditation Program (EMAP)         |          | X |                                          |                   | X  |                        |
| Fire Code                                                 | X        |   | Current – 2021 IFC                       |                   |    |                        |
| Firewise Community                                        |          | X |                                          |                   | X  |                        |
| Floodplain Management/Flood Damage Prevention Ordinance   | X        |   | Updated 2021                             |                   |    |                        |
| Land Use/Development Planning                             | X        |   | Updated 2019                             |                   |    |                        |
| National Flood Insurance Program (NFIP)                   | X        |   | 1981                                     |                   |    |                        |
| Post Disaster Redevelopment/Reconstruction Plan/Ordinance |          | X |                                          |                   | X  |                        |
| Storm Ready                                               |          | X |                                          |                   | X  |                        |
| Stormwater Management Plan/Ordinance                      | X        |   | Updated 2022                             |                   |    |                        |
| Subdivision Regulations/Ordinance                         | X        |   | 1970's with ongoing updates              |                   |    |                        |
| Unified Development Ordinance                             |          | X |                                          |                   | X  |                        |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Tool or Program  | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|------------------|----------|---|---------------------|-------------------|----|------------------------|
|                  | Y        | N |                     | Yes               | No |                        |
| Zoning Ordinance | X        |   | Updated<br>2019     | X                 |    | Ongoing<br>Updates     |

### 2.2.7.4. FISCAL CAPACITY

| Fiscal Resource                                           | Never<br>Used | Previousl<br>y Used | Currently<br>Used | Comments                                  |
|-----------------------------------------------------------|---------------|---------------------|-------------------|-------------------------------------------|
| Capital Improvement Programming                           |               |                     | X                 |                                           |
| Community Development Block Grants (CDBG)                 |               |                     | X                 |                                           |
| Development Impact Fees                                   | X             |                     |                   |                                           |
| FEMA Hazard Mitigation Assistance Grants (HMGP, FMA, PDM) |               |                     | X                 |                                           |
| Gas/Electric Utility Fees                                 | X             |                     |                   | No utilities under management by the city |
| General Obligation, Revenue, and/or Special Tax Bonds     |               |                     | X                 |                                           |
| Homeland Security Grants (HSGP)                           |               |                     | X                 |                                           |
| Infrastructure Investment and Jobs Act (IIJA)             |               |                     | X                 |                                           |
| Infrastructure State Revolving Fund loan                  |               |                     | X                 |                                           |
| Partnering Agreements or Intergovernmental Agreements     |               |                     | X                 |                                           |
| Sewer/Water Fees                                          |               |                     | X                 |                                           |
| Special Purpose Taxes (or taxing districts)               |               |                     | X                 |                                           |
| Stormwater Utility Fees                                   |               |                     | X                 |                                           |
| USDA Grants                                               |               |                     | X                 |                                           |
| USDA Rural Development Agency Grants                      | X             |                     |                   |                                           |
| US Economic Development Administration Grants             |               |                     | X                 |                                           |

### 2.2.7.5. SELF-ASSESSMENT OF CAPABILITY

| Area                                    | Degree of Capability |          |      |
|-----------------------------------------|----------------------|----------|------|
|                                         | Limited              | Moderate | High |
| Planning and Regulatory Capability      |                      |          | X    |
| Administrative and Technical Capability |                      |          | X    |
| Fiscal Capability                       |                      | X        |      |
| Available Staff                         |                      | X        |      |
| Political Support/Interest              |                      | X        |      |
| Community Support                       |                      | X        |      |

### 2.2.8. CITY OF ELKHART

The City of Elkhart is a small city in northeast Polk County. It is governed by a Mayor and 5-member Council. In 2020, the estimated population of Elkhart was 882, which is an increase of 199 from the community's 2010 estimated population of 683.

Specific initiatives/capabilities include:

- The City produces monthly newsletters to property owners covering fire safety programs.
- The City has one outdoor warning siren that is activated remotely by Polk County Dispatch.

#### 2.2.8.1. STAFF AND TECHNICAL ASSISTANCE

| Staff or Personnel Resource                                                                             | Yes | No | Department or Single Staff Member | Comments |
|---------------------------------------------------------------------------------------------------------|-----|----|-----------------------------------|----------|
| Emergency Manager                                                                                       |     | X  |                                   |          |
| Engineers or professionals trained in construction practices related to buildings and/or infrastructure |     | X  |                                   |          |
| Environmental Justice Specialists                                                                       |     | X  |                                   |          |
| Fiscal Management or Procurement Specialists                                                            |     | X  |                                   |          |
| Floodplain Manager                                                                                      |     | X  |                                   |          |
| Housing Specialist(s)                                                                                   |     | X  |                                   |          |
| Land Surveyors                                                                                          |     | X  |                                   |          |
| Land Use/Management/Development Planning                                                                |     | X  |                                   |          |
| Planners or engineers with an understanding of natural and/or human-caused hazards                      |     | X  |                                   |          |
| Recreation/Green Space Specialist(s)                                                                    |     | X  |                                   |          |
| Resource Development Staff or Grant-writing                                                             |     | X  |                                   |          |
| Scientists familiar with the hazards of the community                                                   |     | X  |                                   |          |
| Staff experienced with Geographic Information Systems (GIS) or HAZUS                                    |     | X  |                                   |          |
| Staff with education or expertise to assess the community's vulnerability to hazards                    |     | X  |                                   |          |
| Transportation Manager / Traffic Engineer                                                               |     | X  |                                   |          |

### 2.2.8.2. PLANNING MECHANISMS

| Plans                                                    | In Place |   | Adopted/<br>Updated | Under Development |    | Expected<br>Completion |
|----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                          | Y        | N |                     | Yes               | No |                        |
| Comprehensive Plan (Polk 2050)                           | X        |   |                     |                   |    |                        |
| Climate Action Plan/Resiliency Plan                      |          | X |                     |                   | X  |                        |
| Community Wildfire Protection Plan (CWPP)                |          | X |                     |                   | X  |                        |
| Comprehensive Emergency Management Plan                  | X        |   |                     |                   |    |                        |
| General Plan                                             | X        |   |                     |                   |    |                        |
| Continuity of Operations Plan (COOP)                     |          | X |                     |                   | X  |                        |
| Disaster Recovery Plan                                   | X        |   |                     |                   |    |                        |
| Economic Development Plan                                | X        |   |                     |                   |    |                        |
| Emergency Operations Plan (EOP)                          |          | X |                     |                   | X  |                        |
| Environmental Impact Report (EIR)                        | X        |   |                     |                   |    |                        |
| Evacuation Plan                                          | X        |   |                     |                   |    |                        |
| Flood Response Plan                                      | X        |   |                     |                   |    |                        |
| Floodplain Management Plan/Flood Mitigation Plan         |          | X |                     |                   | X  |                        |
| Hazard Mitigation Plan                                   | X        |   |                     |                   |    |                        |
| Historic Preservation Plan                               |          | X |                     |                   | X  |                        |
| Natural Resource Protection Plan (NRPP)                  |          | X |                     |                   | X  |                        |
| Open Space Management Plan                               |          | X |                     |                   | X  |                        |
| Threat Hazard Identification and Risk Assessment (THIRA) |          | X |                     |                   | X  |                        |

### 2.2.8.3. REGULATORY TOOLS AND PROGRAMS

| Tool or Program                                         | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|---------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                         | Y        | N |                     | Yes               | No |                        |
| Building Codes                                          | X        |   | IBC                 |                   |    |                        |
| Citizen Corps - Community Emergency Response Team       |          | X |                     |                   | X  |                        |
| Community Rating System (CRS Program of the NFIP)       |          | X |                     |                   | X  |                        |
| Emergency Management Accreditation Program (EMAP)       |          | X |                     |                   | X  |                        |
| Fire Code                                               | X        |   |                     |                   |    |                        |
| Firewise Community                                      |          | X |                     |                   | X  |                        |
| Floodplain Management/Flood Damage Prevention Ordinance |          | X |                     |                   | X  |                        |
| Land Use/Development Planning                           | X        |   |                     |                   |    |                        |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Tool or Program                                           | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|-----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                           | Y        | N |                     | Yes               | No |                        |
| National Flood Insurance Program (NFIP)                   |          | X |                     |                   | X  |                        |
| Post Disaster Redevelopment/Reconstruction Plan/Ordinance |          | X |                     |                   | X  |                        |
| Storm Ready                                               |          | X |                     |                   | X  |                        |
| Stormwater Management Plan/Ordinance                      | X        |   |                     |                   |    |                        |
| Subdivision Regulations/Ordinance                         | X        |   |                     |                   |    |                        |
| Unified Development Ordinance                             |          | X |                     |                   | X  |                        |
| Zoning Ordinance                                          | X        |   |                     |                   |    |                        |

### 2.2.8.4. FISCAL CAPACITY

| Fiscal Resource                                           | Never<br>Used | Previously<br>Used | Currently<br>Used | Comments |
|-----------------------------------------------------------|---------------|--------------------|-------------------|----------|
| Capital Improvement Programming                           |               |                    | X                 |          |
| Community Development Block Grants (CDBG)                 |               |                    | X                 |          |
| Development Impact Fees                                   | X             |                    |                   |          |
| FEMA Hazard Mitigation Assistance Grants (HMGP, FMA, PDM) |               |                    | X                 |          |
| Gas/Electric Utility Fees                                 |               |                    | X                 |          |
| General Obligation, Revenue, and/or Special Tax Bonds     |               |                    | X                 |          |
| Homeland Security Grants (HSGP)                           |               |                    | X                 |          |
| Infrastructure Investment and Jobs Act (IIJA)             | X             |                    |                   |          |
| Infrastructure State Revolving Fund loan                  | X             |                    |                   |          |
| Partnering Agreements or Intergovernmental Agreements     |               |                    | X                 |          |
| Sewer/Water Fees                                          |               |                    | X                 |          |
| Special Purpose Taxes (or taxing districts)               |               |                    | X                 |          |
| Stormwater Utility Fees                                   |               |                    | X                 |          |
| USDA Grants                                               |               |                    | X                 |          |
| USDA Rural Development Agency Grants                      |               |                    | X                 |          |
| US Economic Development Administration Grants             |               |                    | X                 |          |

### 2.2.8.5. SELF-ASSESSMENT OF CAPABILITY

| Area                                    | Degree of Capability |          |      |
|-----------------------------------------|----------------------|----------|------|
|                                         | Limited              | Moderate | High |
| Planning and Regulatory Capability      |                      |          | X    |
| Administrative and Technical Capability |                      |          | X    |

2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Area                       | Degree of Capability |          |      |
|----------------------------|----------------------|----------|------|
|                            | Limited              | Moderate | High |
| Fiscal Capability          |                      |          | X    |
| Available Staff            | X                    |          |      |
| Political Support/Interest |                      | X        |      |
| Community Support          |                      |          | X    |



### 2.2.9. CITY OF GRIMES

The City of Grimes is a small city in west-central Polk County, and a portion of the community's boundaries stretch into neighboring Dallas County. The City of Grimes is governed by a Mayor, City Administrator, and a 5-member Council. The population of Grimes was estimated to be 15,392 in 2020, and this is a significant increase over the 2010 estimated population of 8,246. Between 2010 and 2020 the population of Grimes increased by approximately 86.7%, which is the second highest growth rate among all incorporated Polk County communities during that time. Only the community of Bondurant grew at a faster rate than the City of Grimes between 2010 and 2020.

Specific initiatives/capabilities include:

- Fire Department provides annual fire prevention training.
- The City has three outdoor warning sirens which are activated by Polk County Dispatch.

#### 2.2.9.1. STAFF AND TECHNICAL ASSISTANCE

| Staff or Personnel Resource                                                                             | Yes | No | Department or Single Staff Member | Comments                                                   |
|---------------------------------------------------------------------------------------------------------|-----|----|-----------------------------------|------------------------------------------------------------|
| Emergency Manager                                                                                       | X   |    | Not Provided                      |                                                            |
| Engineers or professionals trained in construction practices related to buildings and/or infrastructure | X   |    | Not Provided                      |                                                            |
| Environmental Justice Specialists                                                                       |     | X  |                                   |                                                            |
| Fiscal Management or Procurement Specialists                                                            | X   |    | Not Provided                      |                                                            |
| Floodplain Manager                                                                                      | X   |    | Single Staff Member               | Development Services Director, Planning Division           |
| Housing Specialist(s)                                                                                   |     | X  |                                   |                                                            |
| Land Surveyors                                                                                          |     | X  |                                   |                                                            |
| Land Use/Management/Development Planning                                                                | X   |    | Not Provided                      |                                                            |
| Planners or engineers with an understanding of natural and/or human-caused hazards                      | X   |    | Not Provided                      |                                                            |
| Recreation/Green Space Specialist(s)                                                                    | X   |    | Not Provided                      |                                                            |
| Resource Development Staff or Grant-writing                                                             | X   |    | Department                        | Development Services Department and Impact7G (Third-Party) |
| Scientists familiar with the hazards of the community                                                   | X   |    | Not Provided                      |                                                            |
| Staff experienced with Geographic Information Systems (GIS) or HAZUS                                    | X   |    | Not Provided                      |                                                            |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Staff or Personnel Resource                                                          | Yes | No | Department or Single Staff Member | Comments |
|--------------------------------------------------------------------------------------|-----|----|-----------------------------------|----------|
| Staff with education or expertise to assess the community's vulnerability to hazards | X   |    | Not Provided                      |          |
| Transportation Manager / Traffic Engineer                                            | X   |    | Not Provided                      |          |

### 2.2.9.2. PLANNING MECHANISMS

| Plans                                                    | In Place     |   | Adopted/<br>Updated | Under Development |    | Expected Completion |
|----------------------------------------------------------|--------------|---|---------------------|-------------------|----|---------------------|
|                                                          | Y            | N |                     | Yes               | No |                     |
| Comprehensive Plan (Polk 2050)                           | X            |   |                     |                   |    |                     |
| Climate Action Plan/Resiliency Plan                      |              | X |                     |                   | X  |                     |
| Community Wildfire Protection Plan (CWPP)                |              | X |                     |                   | X  |                     |
| Comprehensive Emergency Management Plan                  | X            |   |                     | X                 |    |                     |
| General Plan                                             |              | X |                     |                   | X  |                     |
| Continuity of Operations Plan (COOP)                     | Not Provided |   |                     |                   |    |                     |
| Disaster Recovery Plan                                   | Not Provided |   |                     |                   |    |                     |
| Economic Development Plan                                | X            |   |                     |                   |    |                     |
| Emergency Operations Plan (EOP)                          | X            |   |                     |                   |    |                     |
| Environmental Impact Report (EIR)                        | Not Provided |   |                     |                   |    |                     |
| Evacuation Plan                                          |              | X |                     |                   | X  |                     |
| Flood Response Plan                                      | X            |   |                     |                   |    |                     |
| Floodplain Management Plan/Flood Mitigation Plan         | X            |   |                     |                   |    |                     |
| Hazard Mitigation Plan                                   | X            |   |                     |                   |    |                     |
| Historic Preservation Plan                               |              | X |                     |                   | X  |                     |
| Natural Resource Protection Plan (NRPP)                  |              | X |                     |                   | X  |                     |
| Open Space Management Plan                               |              | X |                     |                   | X  |                     |
| Threat Hazard Identification and Risk Assessment (THIRA) |              | X |                     |                   | X  |                     |

### 2.2.9.3. REGULATORY TOOLS AND PROGRAMS

| Tool or Program                                   | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to Implement       |
|---------------------------------------------------|----------|---|---------------------|-------------------|----|---------------------------|
|                                                   | Y        | N |                     | Yes               | No |                           |
| Building Codes                                    | X        |   | ICC 2018            | X                 |    | ICC 2021 Adoption in 2024 |
| Citizen Corps - Community Emergency Response Team |          | X |                     |                   | X  |                           |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Tool or Program                                           | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement     |
|-----------------------------------------------------------|----------|---|---------------------|-------------------|----|----------------------------|
|                                                           | Y        | N |                     | Yes               | No |                            |
| Community Rating System (CRS Program of the NFIP)         |          | X |                     |                   | X  |                            |
| Emergency Management Accreditation Program (EMAP)         |          | X |                     |                   | X  |                            |
| Fire Code                                                 | X        |   | IFC 2018            |                   |    | Adopting 2021 code in 2024 |
| Firewise Community                                        |          | X |                     |                   | X  |                            |
| Floodplain Management/Flood Damage Prevention Ordinance   | X        |   | 2019                |                   |    |                            |
| Land Use/Development Planning                             | X        |   |                     |                   |    |                            |
| National Flood Insurance Program (NFIP)                   | X        |   |                     |                   |    |                            |
| Post Disaster Redevelopment/Reconstruction Plan/Ordinance |          | X |                     |                   | X  |                            |
| Storm Ready                                               |          | X |                     |                   | X  |                            |
| Stormwater Management Plan/Ordinance                      | X        |   |                     |                   |    |                            |
| Subdivision Regulations/Ordinance                         | X        |   |                     |                   |    |                            |
| Unified Development Ordinance                             |          | X |                     |                   | X  |                            |
| Zoning Ordinance                                          | X        |   |                     |                   |    |                            |

### 2.2.9.4. FISCAL CAPACITY

| Fiscal Resource                                           | Never Used | Previously Used | Currently Used | Comments     |
|-----------------------------------------------------------|------------|-----------------|----------------|--------------|
| Capital Improvement Programming                           |            |                 | X              |              |
| Community Development Block Grants (CDBG)                 |            |                 | X              |              |
| Development Impact Fees                                   | X          |                 |                |              |
| FEMA Hazard Mitigation Assistance Grants (HMGP, FMA, PDM) | X          |                 |                |              |
| Gas/Electric Utility Fees                                 | X          |                 |                |              |
| General Obligation, Revenue, and/or Special Tax Bonds     |            |                 | X              |              |
| Homeland Security Grants (HSGP)                           |            | X               |                |              |
| Infrastructure Investment and Jobs Act (IIJA)             |            |                 |                | Not Provided |
| Infrastructure State Revolving Fund loan                  |            |                 | X              |              |
| Partnering Agreements or Intergovernmental Agreements     |            |                 | X              |              |
| Sewer/Water Fees                                          |            |                 | X              |              |
| Special Purpose Taxes (or taxing districts)               |            |                 |                | Not Provided |
| Stormwater Utility Fees                                   |            |                 | X              |              |
| USDA Grants                                               | X          |                 |                |              |
| USDA Rural Development Agency Grants                      | X          |                 |                |              |
| US Economic Development Administration Grants             | X          |                 |                |              |



2.2.9.5. SELF-ASSESSMENT OF CAPABILITY

| Area                                    | Degree of Capability |          |      |
|-----------------------------------------|----------------------|----------|------|
|                                         | Limited              | Moderate | High |
| Planning and Regulatory Capability      |                      | X        |      |
| Administrative and Technical Capability |                      | X        |      |
| Fiscal Capability                       |                      | X        |      |
| Available Staff                         | X                    |          |      |
| Political Support/Interest              | Not Provided         |          |      |
| Community Support                       |                      | X        |      |

### 2.2.10. CITY OF JOHNSTON

The City of Johnston sits northwest of the City of Des Moines in west-central Polk County. It is governed by a Mayor, a City Administrator, and a 5-member Council. The City of Johnston had an estimate population of 24,064 in 2020, and this is an increase of 39.3% over the City of Johnston's 2010 estimated population of 17,278.

Specific initiatives/capabilities include:

- Fire Department provides fire safety tips and home safety as part of open house and through the schools during fire prevention week.
- The City has eight outdoor warning sirens which are activated by Polk County Dispatch.

#### 2.2.10.1. STAFF AND TECHNICAL ASSISTANCE

| Staff or Personnel Resource                                                                             | Yes | No | Department or Single Staff Member | Comments |
|---------------------------------------------------------------------------------------------------------|-----|----|-----------------------------------|----------|
| Emergency Manager                                                                                       | X   |    | Not Provided                      |          |
| Engineers or professionals trained in construction practices related to buildings and/or infrastructure | X   |    | Not Provided                      |          |
| Environmental Justice Specialists                                                                       |     | X  |                                   |          |
| Fiscal Management or Procurement Specialists                                                            | X   |    | Not Provided                      |          |
| Floodplain Manager                                                                                      | X   |    | Not Provided                      |          |
| Housing Specialist(s)                                                                                   | X   |    | Not Provided                      |          |
| Land Surveyors                                                                                          |     | X  |                                   |          |
| Land Use/Management/Development Planning                                                                | X   |    | Not Provided                      |          |
| Planners or engineers with an understanding of natural and/or human-caused hazards                      | X   |    | Not Provided                      |          |
| Recreation/Green Space Specialist(s)                                                                    | X   |    | Not Provided                      |          |
| Resource Development Staff or Grant-writing                                                             | X   |    | Not Provided                      |          |
| Scientists familiar with the hazards of the community                                                   | X   |    | Not Provided                      |          |
| Staff experienced with Geographic Information Systems (GIS) or HAZUS                                    | X   |    | Not Provided                      |          |
| Staff with education or expertise to assess the community's vulnerability to hazards                    | X   |    | Not Provided                      |          |
| Transportation Manager / Traffic Engineer                                                               | X   |    | Not Provided                      |          |

### 2.2.10.2. PLANNING MECHANISMS

| Plans                                                    | In Place     |   | Adopted/<br>Updated | Under Development |    | Expected<br>Completion |
|----------------------------------------------------------|--------------|---|---------------------|-------------------|----|------------------------|
|                                                          | Y            | N |                     | Yes               | No |                        |
| Comprehensive Plan (Polk 2050)                           | X            |   |                     |                   |    |                        |
| Climate Action Plan/Resiliency Plan                      |              | X |                     |                   | X  |                        |
| Community Wildfire Protection Plan (CWPP)                |              | X |                     |                   | X  |                        |
| Comprehensive Emergency Management Plan                  | X            |   |                     |                   |    |                        |
| General Plan                                             | Not Provided |   |                     |                   |    |                        |
| Continuity of Operations Plan (COOP)                     | Not Provided |   |                     |                   |    |                        |
| Disaster Recovery Plan                                   | Not Provided |   |                     |                   |    |                        |
| Economic Development Plan                                | X            |   |                     |                   |    |                        |
| Emergency Operations Plan (EOP)                          | X            |   |                     |                   |    |                        |
| Environmental Impact Report (EIR)                        | Not Provided |   |                     |                   |    |                        |
| Evacuation Plan                                          |              | X |                     |                   | X  |                        |
| Flood Response Plan                                      | X            |   |                     |                   |    |                        |
| Floodplain Management Plan/Flood Mitigation Plan         | X            |   |                     |                   |    |                        |
| Hazard Mitigation Plan                                   | X            |   |                     |                   |    |                        |
| Historic Preservation Plan                               |              | X |                     |                   | X  |                        |
| Natural Resource Protection Plan (NRPP)                  |              | X |                     |                   | X  |                        |
| Open Space Management Plan                               |              | X |                     |                   | X  |                        |
| Threat Hazard Identification and Risk Assessment (THIRA) |              | X |                     |                   | X  |                        |

### 2.2.10.3. REGULATORY TOOLS AND PROGRAMS

| Tool or Program                                         | In Place |   | Adopted/<br>Updated              | Under Development |    | Expect to<br>Implement |
|---------------------------------------------------------|----------|---|----------------------------------|-------------------|----|------------------------|
|                                                         | Y        | N |                                  | Yes               | No |                        |
| Building Codes                                          | X        |   | 2021 IBC<br>and IRC              |                   |    |                        |
| Citizen Corps - Community Emergency Response Team       |          | X |                                  |                   | X  |                        |
| Community Rating System (CRS Program of the NFIP)       |          | X |                                  |                   | X  |                        |
| Emergency Management Accreditation Program (EMAP)       |          | X |                                  |                   | X  |                        |
| Fire Code                                               | X        |   | 2021 IFC<br>adopted<br>Nov. 2022 | X                 |    | 2024                   |
| Firewise Community                                      |          | X |                                  |                   | X  |                        |
| Floodplain Management/Flood Damage Prevention Ordinance | X        |   |                                  |                   |    |                        |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Tool or Program                                           | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|-----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                           | Y        | N |                     | Yes               | No |                        |
| Land Use/Development Planning                             | X        |   |                     |                   |    |                        |
| National Flood Insurance Program (NFIP)                   | X        |   |                     |                   |    |                        |
| Post Disaster Redevelopment/Reconstruction Plan/Ordinance |          | X |                     |                   | X  |                        |
| Storm Ready                                               |          | X |                     |                   | X  |                        |
| Stormwater Management Plan/Ordinance                      | X        |   |                     |                   |    |                        |
| Subdivision Regulations/Ordinance                         | X        |   |                     |                   |    |                        |
| Unified Development Ordinance                             |          | X |                     |                   | X  |                        |
| Zoning Ordinance                                          | X        |   |                     |                   |    |                        |

### 2.2.10.4. FISCAL CAPACITY

| Fiscal Resource                                           | Never<br>Used | Previously<br>Used | Currently<br>Used | Comments         |
|-----------------------------------------------------------|---------------|--------------------|-------------------|------------------|
| Capital Improvement Programming                           |               |                    | X                 |                  |
| Community Development Block Grants (CDBG)                 |               |                    | X                 |                  |
| Development Impact Fees                                   |               |                    | Not Provided      |                  |
| FEMA Hazard Mitigation Assistance Grants (HMGP, FMA, PDM) |               |                    | Not Provided      |                  |
| Gas/Electric Utility Fees                                 |               |                    | X                 | 1% franchise fee |
| General Obligation, Revenue, and/or Special Tax Bonds     |               |                    | X                 |                  |
| Homeland Security Grants (HSGP)                           |               | X                  |                   |                  |
| Infrastructure Investment and Jobs Act (IIJA)             |               |                    | Not Provided      |                  |
| Infrastructure State Revolving Fund loan                  |               |                    | X                 |                  |
| Partnering Agreements or Intergovernmental Agreements     |               |                    | X                 |                  |
| Sewer/Water Fees                                          |               |                    | X                 |                  |
| Special Purpose Taxes (or taxing districts)               |               |                    | Not Provided      |                  |
| Stormwater Utility Fees                                   |               |                    | X                 |                  |
| USDA Grants                                               |               |                    | Not Provided      |                  |
| USDA Rural Development Agency Grants                      |               |                    | Not Provided      |                  |
| US Economic Development Administration Grants             |               |                    | Not Provided      |                  |

### 2.2.10.5. SELF-ASSESSMENT OF CAPABILITY

| Area                               | Degree of Capability |          |      |
|------------------------------------|----------------------|----------|------|
|                                    | Limited              | Moderate | High |
| Planning and Regulatory Capability |                      | X        |      |

2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Area                                    | Degree of Capability |          |      |
|-----------------------------------------|----------------------|----------|------|
|                                         | Limited              | Moderate | High |
| Administrative and Technical Capability |                      | X        |      |
| Fiscal Capability                       |                      | X        |      |
| Available Staff                         | X                    |          |      |
| Political Support/Interest              | Not Provided         |          |      |
| Community Support                       |                      | X        |      |



### 2.2.11. CITY OF MITCHELLVILLE

The City of Mitchellville is located along the eastern edge of Polk County with a small portion stretching into neighboring Jasper County. The community is governed by a mayor and 5-member Council. Between 2010 and 2020, the population of Mitchellville increased from 2,254 to 2,485, which is an increase of approximately 10.2%.

Specific initiatives/capabilities include:

- The City has several programs to include Stop Drop and Roll, Smoke Detector Testing and Battery Replacement, and citizens' police academy.
- The City has one outdoor warning siren, and it is activated by the Polk County Dispatch.
- The City also uses Alert Iowa and Reverse 911.

#### 2.2.11.1. STAFF AND TECHNICAL ASSISTANCE

| Staff or Personnel Resource                                                                             | Yes | No | Department or Single Staff Member | Comments                                      |
|---------------------------------------------------------------------------------------------------------|-----|----|-----------------------------------|-----------------------------------------------|
| Emergency Manager                                                                                       |     | X  |                                   | Utilize County EMA                            |
| Engineers or professionals trained in construction practices related to buildings and/or infrastructure |     | X  |                                   | V&K                                           |
| Environmental Justice Specialists                                                                       |     | X  |                                   |                                               |
| Fiscal Management or Procurement Specialists                                                            |     | X  |                                   | Council/City Administrator                    |
| Floodplain Manager                                                                                      |     | X  |                                   |                                               |
| Housing Specialist(s)                                                                                   |     | X  |                                   |                                               |
| Land Surveyors                                                                                          |     | X  |                                   | V&K                                           |
| Land Use/Management/Development Planning                                                                | X   |    | Department                        | Planning & zoning Committee/ V&K/City Council |
| Planners or engineers with an understanding of natural and/or human-caused hazards                      |     | X  |                                   |                                               |
| Recreation/Green Space Specialist(s)                                                                    | X   |    | Single Staff                      | Plus 1 part time                              |
| Resource Development Staff or Grant-writing                                                             |     | X  |                                   |                                               |
| Scientists familiar with the hazards of the community                                                   |     | X  |                                   |                                               |
| Staff experienced with Geographic Information Systems (GIS) or HAZUS                                    | X   |    | Department                        | Public Works & City Clerk                     |
| Staff with education or expertise to assess the community's vulnerability to hazards                    | X   |    | Department                        | Police and Fire Departments                   |
| Transportation Manager / Traffic Engineer                                                               |     | X  |                                   | County Public Works                           |

### 2.2.11.2. PLANNING MECHANISMS

| Plans                                                    | In Place |   | Adopted/<br>Updated | Under Development |    | Expected<br>Completion |
|----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                          | Y        | N |                     | Yes               | No |                        |
| Comprehensive Plan (Polk 2050)                           |          | X |                     |                   | X  |                        |
| Climate Action Plan/Resiliency Plan                      |          | X |                     |                   | X  |                        |
| Community Wildfire Protection Plan (CWPP)                |          | X |                     | X                 |    |                        |
| Comprehensive Emergency Management Plan                  | X        |   |                     |                   |    |                        |
| General Plan                                             |          | X |                     |                   | X  |                        |
| Continuity of Operations Plan (COOP)                     | X        |   |                     |                   |    |                        |
| Disaster Recovery Plan                                   | X        |   |                     |                   |    | May not be formalized  |
| Economic Development Plan                                | X        |   |                     |                   |    |                        |
| Emergency Operations Plan (EOP)                          |          | X |                     |                   | X  |                        |
| Environmental Impact Report (EIR)                        |          | X |                     |                   | X  |                        |
| Evacuation Plan                                          |          | X |                     |                   | X  |                        |
| Flood Response Plan                                      |          | X |                     |                   | X  |                        |
| Floodplain Management Plan/Flood Mitigation Plan         |          | X |                     |                   | X  |                        |
| Hazard Mitigation Plan                                   | X        |   |                     |                   |    |                        |
| Historic Preservation Plan                               |          | X |                     |                   | X  |                        |
| Natural Resource Protection Plan (NRPP)                  |          | X |                     |                   | X  |                        |
| Open Space Management Plan                               | X        |   |                     |                   |    |                        |
| Threat Hazard Identification and Risk Assessment (THIRA) | X        |   |                     |                   |    |                        |

### 2.2.11.3. REGULATORY TOOLS AND PROGRAMS

| Tool or Program                                         | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|---------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                         | Y        | N |                     | Yes               | No |                        |
| Building Codes                                          | X        |   | 2018 IBC            |                   |    |                        |
| Citizen Corps - Community Emergency Response Team       |          | X |                     |                   | X  |                        |
| Community Rating System (CRS Program of the NFIP)       |          | X |                     |                   | X  |                        |
| Emergency Management Accreditation Program (EMAP)       |          | X |                     |                   | X  |                        |
| Fire Code                                               | X        |   |                     |                   |    |                        |
| Firewise Community                                      |          | X |                     |                   | X  |                        |
| Floodplain Management/Flood Damage Prevention Ordinance |          | X |                     |                   | X  |                        |
| Land Use/Development Planning                           | X        |   |                     |                   |    |                        |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Tool or Program                                           | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|-----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                           | Y        | N |                     | Yes               | No |                        |
| National Flood Insurance Program (NFIP)                   | X        |   |                     |                   |    |                        |
| Post Disaster Redevelopment/Reconstruction Plan/Ordinance |          | X |                     |                   | X  |                        |
| Storm Ready                                               | X        |   |                     |                   |    |                        |
| Stormwater Management Plan/Ordinance                      | X        |   |                     |                   |    |                        |
| Subdivision Regulations/Ordinance                         | X        |   |                     |                   |    |                        |
| Unified Development Ordinance                             | X        |   |                     |                   |    |                        |
| Zoning Ordinance                                          | X        |   |                     |                   |    |                        |

### 2.2.11.4. FISCAL CAPACITY

| Fiscal Resource                                           | Never<br>Used | Previously<br>Used | Currently<br>Used | Comments     |
|-----------------------------------------------------------|---------------|--------------------|-------------------|--------------|
| Capital Improvement Programming                           |               |                    | X                 |              |
| Community Development Block Grants (CDBG)                 |               | X                  |                   |              |
| Development Impact Fees                                   |               |                    |                   | Not Provided |
| FEMA Hazard Mitigation Assistance Grants (HMGP, FMA, PDM) |               |                    |                   | Not Provided |
| Gas/Electric Utility Fees                                 |               |                    | X                 |              |
| General Obligation, Revenue, and/or Special Tax Bonds     |               |                    | X                 |              |
| Homeland Security Grants (HSGP)                           | X             |                    |                   |              |
| Infrastructure Investment and Jobs Act (IIJA)             | X             |                    |                   |              |
| Infrastructure State Revolving Fund loan                  | X             |                    |                   |              |
| Partnering Agreements or Intergovernmental Agreements     |               |                    | X                 |              |
| Sewer/Water Fees                                          |               |                    | X                 |              |
| Special Purpose Taxes (or taxing districts)               |               |                    | X                 |              |
| Stormwater Utility Fees                                   |               |                    | X                 |              |
| USDA Grants                                               |               |                    |                   | Not Provided |
| USDA Rural Development Agency Grants                      |               |                    |                   | Not Provided |
| US Economic Development Administration Grants             |               |                    |                   | Not Provided |

### 2.2.11.5. SELF-ASSESSMENT OF CAPABILITY

| Area                                    | Degree of Capability |          |      |
|-----------------------------------------|----------------------|----------|------|
|                                         | Limited              | Moderate | High |
| Planning and Regulatory Capability      |                      |          | X    |
| Administrative and Technical Capability |                      |          | X    |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Area                       | Degree of Capability |          |      |
|----------------------------|----------------------|----------|------|
|                            | Limited              | Moderate | High |
| Fiscal Capability          |                      | X        |      |
| Available Staff            | X                    |          |      |
| Political Support/Interest |                      |          | X    |
| Community Support          |                      |          | X    |

### 2.2.12. CITY OF PLEASANT HILL

The City of Pleasant Hill is situated in the southeastern quadrant of Polk County along the eastern edge of Des Moines. It is governed by a Mayor, City Manager and 5-member Council. The population of Pleasant Hill was estimated to be 10,147 in 2020, and this is an increase of 1,362 over the community's 2010 estimated population of 8,785.

Specific initiatives/capabilities include:

- The Pleasant Hill Fire and Police Departments provide education on public safety issues. The Storm Water Coordinator also provides training in areas related to the environment and storm water.
- The City has installed back-up generators at their facilities including city hall, library, police station, fire station and Doanes Park Youth Center. New back-up generators have also been installed at two sanitary sewer lift stations.
- The City constructed a new culvert at 100 Sloans Way.
- The City has eight outdoor warning sirens.
- The City utilizes Reverse 911 as an additional community warning system.

#### 2.2.12.1. STAFF AND TECHNICAL ASSISTANCE

| Staff or Personnel Resource                                                                             | Yes | No | Department or Single Staff Member | Comments                                                                                     |
|---------------------------------------------------------------------------------------------------------|-----|----|-----------------------------------|----------------------------------------------------------------------------------------------|
| Emergency Manager                                                                                       |     | X  |                                   | Polk County EMA                                                                              |
| Engineers or professionals trained in construction practices related to buildings and/or infrastructure | X   |    | Department                        | Commercial and Residential building inspectors in Community Development Department           |
| Environmental Justice Specialists                                                                       |     | X  |                                   |                                                                                              |
| Fiscal Management or Procurement Specialists                                                            | X   |    | Not Provided                      |                                                                                              |
| Floodplain Manager                                                                                      | X   |    | Department                        | Floodplain manager assigned as Senior Building Inspector in Community Development Department |
| Housing Specialist(s)                                                                                   | X   |    | Not Provided                      |                                                                                              |
| Land Surveyors                                                                                          |     | X  |                                   |                                                                                              |
| Land Use/Management/Development Planning                                                                | X   |    | Department                        |                                                                                              |
| Planners or engineers with an understanding of natural and/or human-caused hazards                      | X   |    | Department                        | Community Development Department Staff                                                       |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Staff or Personnel Resource                                                          | Yes | No | Department or Single Staff Member | Comments                                    |
|--------------------------------------------------------------------------------------|-----|----|-----------------------------------|---------------------------------------------|
| Recreation/Green Space Specialist(s)                                                 | X   |    | Department                        | Parks and Recreation Division staffing      |
| Resource Development Staff or Grant-writing                                          | X   |    | Department                        | Various individuals across City departments |
| Scientists familiar with the hazards of the community                                |     | X  |                                   |                                             |
| Staff experienced with Geographic Information Systems (GIS) or HAZUS                 | X   |    | Department                        | Various individuals across city departments |
| Staff with education or expertise to assess the community's vulnerability to hazards | X   |    | Department                        | Building Inspectors                         |
| Transportation Manager / Traffic Engineer                                            |     | X  |                                   |                                             |

### 2.2.12.2. PLANNING MECHANISMS

| Plans                                                    | In Place |   | Adopted/<br>Updated | Under Development |    | Expected Completion |
|----------------------------------------------------------|----------|---|---------------------|-------------------|----|---------------------|
|                                                          | Y        | N |                     | Yes               | No |                     |
| Comprehensive Plan (Polk 2050)                           | X        |   |                     |                   |    |                     |
| Climate Action Plan/Resiliency Plan                      |          | X |                     |                   | X  |                     |
| Community Wildfire Protection Plan (CWPP)                | X        |   |                     |                   |    |                     |
| Comprehensive Emergency Management Plan                  | X        |   |                     |                   |    |                     |
| Pleasant Hill Comprehensive Plan                         | X        |   | 2015                | X                 |    | 2024                |
| Continuity of Operations Plan (COOP)                     |          | X |                     |                   | X  |                     |
| Disaster Recovery Plan                                   |          | X |                     |                   | X  |                     |
| Economic Development Plan                                |          |   |                     | X                 |    | 2024                |
| Emergency Operations Plan (EOP)                          |          | X |                     |                   | X  |                     |
| Environmental Impact Report (EIR)                        |          | X |                     |                   | X  |                     |
| Evacuation Plan                                          |          | X |                     |                   | X  |                     |
| Flood Response Plan                                      |          | X |                     |                   | X  |                     |
| Floodplain Management Plan/Flood Mitigation Plan         |          | X |                     |                   | X  |                     |
| Hazard Mitigation Plan                                   | X        |   | 2019                |                   |    |                     |
| Historic Preservation Plan                               |          | X |                     |                   | X  |                     |
| Natural Resource Protection Plan (NRPP)                  |          | X |                     |                   | X  |                     |
| Open Space Management Plan                               | X        |   | 2015                |                   |    |                     |
| Threat Hazard Identification and Risk Assessment (THIRA) |          | X |                     |                   | X  |                     |

### 2.2.12.3. REGULATORY TOOLS AND PROGRAMS

| Tool or Program                                           | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|-----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                           | Y        | N |                     | Yes               | No |                        |
| Building Codes                                            | X        |   | IBC 2021            |                   |    |                        |
| Citizen Corps - Community Emergency Response Team         |          | X |                     |                   | X  |                        |
| Community Rating System (CRS Program of the NFIP)         | X        |   |                     |                   |    |                        |
| Emergency Management Accreditation Program (EMAP)         |          | X |                     |                   | X  |                        |
| Fire Code                                                 | X        |   | IFC 2021            |                   |    |                        |
| Firewise Community                                        |          | X |                     |                   | X  |                        |
| Floodplain Management/Flood Damage Prevention Ordinance   | X        |   |                     |                   |    |                        |
| Land Use/Development Planning                             | X        |   |                     |                   |    |                        |
| National Flood Insurance Program (NFIP)                   | X        |   |                     |                   |    |                        |
| Post Disaster Redevelopment/Reconstruction Plan/Ordinance |          | X |                     |                   | X  |                        |
| Storm Ready                                               |          | X |                     |                   | X  |                        |
| Stormwater Management Plan/Ordinance                      | X        |   |                     |                   |    |                        |
| Subdivision Regulations/Ordinance                         | X        |   |                     |                   |    |                        |
| Unified Development Ordinance                             |          | X |                     |                   | X  |                        |
| Zoning Ordinance                                          | X        |   |                     |                   |    |                        |

### 2.2.12.4. FISCAL CAPACITY

| Fiscal Resource                                           | Never<br>Used | Previously<br>Used | Currently<br>Used | Comments |
|-----------------------------------------------------------|---------------|--------------------|-------------------|----------|
| Capital Improvement Programming                           |               |                    | X                 |          |
| Community Development Block Grants (CDBG)                 | X             |                    |                   |          |
| Development Impact Fees                                   | X             |                    |                   |          |
| FEMA Hazard Mitigation Assistance Grants (HMGP, FMA, PDM) |               |                    | X                 |          |
| Gas/Electric Utility Fees                                 |               |                    | X                 |          |
| General Obligation, Revenue, and/or Special Tax Bonds     |               |                    | X                 |          |
| Homeland Security Grants (HSGP)                           |               | X                  |                   |          |
| Infrastructure Investment and Jobs Act (IIJA)             | X             |                    |                   |          |
| Infrastructure State Revolving Fund loan                  | X             |                    |                   |          |
| Partnering Agreements or Intergovernmental Agreements     |               |                    | X                 |          |
| Sewer/Water Fees                                          |               |                    | X                 |          |
| Special Purpose Taxes (or taxing districts)               | X             |                    |                   |          |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Fiscal Resource                               | Never Used | Previously Used | Currently Used | Comments |
|-----------------------------------------------|------------|-----------------|----------------|----------|
| Stormwater Utility Fees                       |            |                 | X              |          |
| USDA Grants                                   | X          |                 |                |          |
| USDA Rural Development Agency Grants          | X          |                 |                |          |
| US Economic Development Administration Grants | X          |                 |                |          |

### 2.2.12.5. SELF-ASSESSMENT OF CAPABILITY

| Area                                    | Degree of Capability |          |      |
|-----------------------------------------|----------------------|----------|------|
|                                         | Limited              | Moderate | High |
| Planning and Regulatory Capability      |                      |          | X    |
| Administrative and Technical Capability |                      |          | X    |
| Fiscal Capability                       |                      | X        |      |
| Available Staff                         | X                    |          |      |
| Political Support/Interest              |                      | X        |      |
| Community Support                       |                      | X        |      |



### 2.2.13. CITY OF POLK CITY

The City of Polk City is located on the north side of Saylorville Lake in the northwest quadrant of Polk County. The community is governed by a mayor and 5-member Council, and it had an estimated 2020 population of 5,543. The community experienced significant growth between 2010 and 2020, gaining roughly 2,125 residents, and its growth rate of 62.2% during that period is 3<sup>rd</sup> most among incorporated communities in Polk County.

Specific initiatives/capabilities include:

- The City has one outdoor warning siren.

#### 2.2.13.1. STAFF AND TECHNICAL ASSISTANCE

| Staff or Personnel Resource                                                                             | Yes | No | Department or Single Staff Member | Comments |
|---------------------------------------------------------------------------------------------------------|-----|----|-----------------------------------|----------|
| Emergency Manager                                                                                       |     | X  |                                   |          |
| Engineers or professionals trained in construction practices related to buildings and/or infrastructure | X   |    | Single Staff Member               |          |
| Environmental Justice Specialists                                                                       |     | X  |                                   |          |
| Fiscal Management or Procurement Specialists                                                            |     | X  |                                   |          |
| Floodplain Manager                                                                                      |     | X  |                                   |          |
| Housing Specialist(s)                                                                                   |     | X  |                                   |          |
| Land Surveyors                                                                                          |     | X  |                                   |          |
| Land Use/Management/Development Planning                                                                |     | X  |                                   |          |
| Planners or engineers with an understanding of natural and/or human-caused hazards                      |     | X  |                                   |          |
| Recreation/Green Space Specialist(s)                                                                    |     | X  |                                   |          |
| Resource Development Staff or Grant-writing                                                             |     | X  |                                   |          |
| Scientists familiar with the hazards of the community                                                   |     | X  |                                   |          |
| Staff experienced with Geographic Information Systems (GIS) or HAZUS                                    |     | X  |                                   |          |
| Staff with education or expertise to assess the community's vulnerability to hazards                    |     | X  |                                   |          |
| Transportation Manager / Traffic Engineer                                                               |     | X  |                                   |          |

### 2.2.13.2. PLANNING MECHANISMS

| Plans                                                    | In Place |   | Adopted/<br>Updated | Under Development |    | Expected<br>Completion |
|----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                          | Y        | N |                     | Yes               | No |                        |
| Comprehensive Plan (Polk 2050)                           |          | X |                     |                   | X  |                        |
| Climate Action Plan/Resiliency Plan                      |          | X |                     |                   | X  |                        |
| Community Wildfire Protection Plan (CWPP)                |          | X |                     |                   | X  |                        |
| Comprehensive Emergency Management Plan                  |          | X |                     |                   | X  |                        |
| General Plan                                             |          | X |                     |                   | X  |                        |
| Continuity of Operations Plan (COOP)                     |          | X |                     |                   | X  |                        |
| Disaster Recovery Plan                                   |          | X |                     |                   | X  |                        |
| Economic Development Plan                                |          | X |                     |                   | X  |                        |
| Emergency Operations Plan (EOP)                          |          | X |                     |                   | X  |                        |
| Environmental Impact Report (EIR)                        |          | X |                     |                   | X  |                        |
| Evacuation Plan                                          |          | X |                     |                   | X  |                        |
| Flood Response Plan                                      |          | X |                     |                   | X  |                        |
| Floodplain Management Plan/Flood Mitigation Plan         |          | X |                     |                   | X  |                        |
| Hazard Mitigation Plan                                   |          | X |                     |                   | X  |                        |
| Historic Preservation Plan                               |          | X |                     |                   | X  |                        |
| Natural Resource Protection Plan (NRPP)                  |          | X |                     |                   | X  |                        |
| Open Space Management Plan                               |          | X |                     |                   | X  |                        |
| Threat Hazard Identification and Risk Assessment (THIRA) |          | X |                     |                   | X  |                        |

### 2.2.13.3. REGULATORY TOOLS AND PROGRAMS

| Tool or Program                                         | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|---------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                         | Y        | N |                     | Yes               | No |                        |
| Building Codes                                          | X        |   |                     |                   |    |                        |
| Citizen Corps - Community Emergency Response Team       |          | X |                     |                   | X  |                        |
| Community Rating System (CRS Program of the NFIP)       |          | X |                     |                   | X  |                        |
| Emergency Management Accreditation Program (EMAP)       |          | X |                     |                   | X  |                        |
| Fire Code                                               | X        |   |                     |                   |    |                        |
| Firewise Community                                      |          | X |                     |                   | X  |                        |
| Floodplain Management/Flood Damage Prevention Ordinance |          | X |                     |                   | X  |                        |
| Land Use/Development Planning                           | X        |   |                     |                   |    |                        |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Tool or Program                                           | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|-----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                           | Y        | N |                     | Yes               | No |                        |
| National Flood Insurance Program (NFIP)                   |          | X |                     |                   | X  |                        |
| Post Disaster Redevelopment/Reconstruction Plan/Ordinance |          | X |                     |                   | X  |                        |
| Storm Ready                                               |          | X |                     |                   | X  |                        |
| Stormwater Management Plan/Ordinance                      | X        |   |                     |                   |    |                        |
| Subdivision Regulations/Ordinance                         | X        |   |                     |                   |    |                        |
| Unified Development Ordinance                             |          | X |                     |                   | X  |                        |
| Zoning Ordinance                                          | X        |   |                     |                   |    |                        |

### 2.2.13.4. FISCAL CAPACITY

| Fiscal Resource                                           | Never<br>Used | Previously<br>Used | Currently<br>Used | Comments |
|-----------------------------------------------------------|---------------|--------------------|-------------------|----------|
| Capital Improvement Programming                           | X             |                    |                   |          |
| Community Development Block Grants (CDBG)                 | X             |                    |                   |          |
| Development Impact Fees                                   | X             |                    |                   |          |
| FEMA Hazard Mitigation Assistance Grants (HMGP, FMA, PDM) | X             |                    |                   |          |
| Gas/Electric Utility Fees                                 | X             |                    |                   |          |
| General Obligation, Revenue, and/or Special Tax Bonds     | X             |                    |                   |          |
| Homeland Security Grants (HSGP)                           | X             |                    |                   |          |
| Infrastructure Investment and Jobs Act (IIJA)             | X             |                    |                   |          |
| Infrastructure State Revolving Fund loan                  | X             |                    |                   |          |
| Partnering Agreements or Intergovernmental Agreements     | X             |                    |                   |          |
| Sewer/Water Fees                                          | X             |                    |                   |          |
| Special Purpose Taxes (or taxing districts)               | X             |                    |                   |          |
| Stormwater Utility Fees                                   | X             |                    |                   |          |
| USDA Grants                                               | X             |                    |                   |          |
| USDA Rural Development Agency Grants                      | X             |                    |                   |          |
| US Economic Development Administration Grants             | X             |                    |                   |          |

### 2.2.13.5. SELF-ASSESSMENT OF CAPABILITY

| Area                                    | Degree of Capability |          |      |
|-----------------------------------------|----------------------|----------|------|
|                                         | Limited              | Moderate | High |
| Planning and Regulatory Capability      | X                    |          |      |
| Administrative and Technical Capability | X                    |          |      |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Area                       | Degree of Capability |          |      |
|----------------------------|----------------------|----------|------|
|                            | Limited              | Moderate | High |
| Fiscal Capability          | X                    |          |      |
| Available Staff            | X                    |          |      |
| Political Support/Interest | X                    |          |      |
| Community Support          | X                    |          |      |

### 2.2.14. CITY OF RUNNELLS

The City of Runnells is a small city in the southeastern corner of Polk County. The community is governed by a mayor and 5-member Council. The community is among the least populated communities in Polk County, and recent census data reveals that it is one of three Polk County communities which decreased in population between 2010 and 2020. During that stretch, the population of the City of Runnells decreased from 507 to 457. However, the 2020 population of Runnells remains significantly larger than the community's 2000 population of 352.

Specific initiatives/capabilities include:

- The City has one outdoor warning siren.

#### 2.2.14.1. STAFF AND TECHNICAL ASSISTANCE

| Staff or Personnel Resource                                                                             | Yes    | No | Department or Single Staff Member | Comments            |
|---------------------------------------------------------------------------------------------------------|--------|----|-----------------------------------|---------------------|
| Emergency Manager                                                                                       | X      |    |                                   | County              |
| Engineers or professionals trained in construction practices related to buildings and/or infrastructure | X      |    |                                   | County              |
| Environmental Justice Specialists                                                                       | Unsure |    |                                   |                     |
| Fiscal Management or Procurement Specialists                                                            | Unsure |    |                                   |                     |
| Floodplain Manager                                                                                      | X      |    |                                   | DNR                 |
| Housing Specialist(s)                                                                                   |        | X  |                                   |                     |
| Land Surveyors                                                                                          |        | X  |                                   |                     |
| Land Use/Management/Development Planning                                                                | X      |    |                                   | County and Trustees |
| Planners or engineers with an understanding of natural and/or human-caused hazards                      | Unsure |    |                                   |                     |
| Recreation/Green Space Specialist(s)                                                                    |        | X  |                                   |                     |
| Resource Development Staff or Grant-writing                                                             | Unsure |    |                                   |                     |
| Scientists familiar with the hazards of the community                                                   |        | X  |                                   |                     |
| Staff experienced with Geographic Information Systems (GIS) or HAZUS                                    | X      |    |                                   | County              |
| Staff with education or expertise to assess the community's vulnerability to hazards                    | X      |    | Fire Dept                         | County as backup    |
| Transportation Manager / Traffic Engineer                                                               |        | X  |                                   |                     |

### 2.2.14.2. PLANNING MECHANISMS

| Plans                                                    | In Place |   | Adopted/<br>Updated | Under Development |    | Expected<br>Completion |
|----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                          | Y        | N |                     | Yes               | No |                        |
| Comprehensive Plan (Polk 2050)                           |          | X |                     |                   | X  |                        |
| Climate Action Plan/Resiliency Plan                      |          | X |                     |                   | X  |                        |
| Community Wildfire Protection Plan (CWPP)                |          | X |                     |                   | X  |                        |
| Comprehensive Emergency Management Plan                  | X        |   |                     |                   |    |                        |
| General Plan                                             | X        |   |                     |                   |    |                        |
| Continuity of Operations Plan (COOP)                     |          | X |                     |                   | X  |                        |
| Disaster Recovery Plan                                   | X        |   |                     |                   |    |                        |
| Economic Development Plan                                |          | X |                     |                   | X  |                        |
| Emergency Operations Plan (EOP)                          | X        |   |                     |                   |    |                        |
| Environmental Impact Report (EIR)                        |          | X |                     |                   | X  |                        |
| Evacuation Plan                                          |          | X |                     |                   | X  |                        |
| Flood Response Plan                                      |          | X |                     |                   | X  |                        |
| Floodplain Management Plan/Flood Mitigation Plan         |          | X |                     |                   | X  |                        |
| Hazard Mitigation Plan                                   |          | X |                     |                   | X  |                        |
| Historic Preservation Plan                               |          | X |                     |                   | X  |                        |
| Natural Resource Protection Plan (NRPP)                  |          | X |                     |                   | X  |                        |
| Open Space Management Plan                               |          | X |                     |                   | X  |                        |
| Threat Hazard Identification and Risk Assessment (THIRA) |          | X |                     |                   | X  |                        |

### 2.2.14.3. REGULATORY TOOLS AND PROGRAMS

| Tool or Program                                         | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|---------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                         | Y        | N |                     | Yes               | No |                        |
| Building Codes                                          | X        |   |                     |                   |    |                        |
| Citizen Corps - Community Emergency Response Team       |          | X |                     |                   | X  |                        |
| Community Rating System (CRS Program of the NFIP)       |          | X |                     |                   | X  |                        |
| Emergency Management Accreditation Program (EMAP)       | X        |   |                     |                   |    |                        |
| Fire Code                                               | X        |   |                     |                   |    |                        |
| Firewise Community                                      |          | X |                     |                   | X  |                        |
| Floodplain Management/Flood Damage Prevention Ordinance |          | X |                     |                   | X  |                        |
| Land Use/Development Planning                           |          | X |                     |                   | X  |                        |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Tool or Program                                           | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|-----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                           | Y        | N |                     | Yes               | No |                        |
| National Flood Insurance Program (NFIP)                   |          | X |                     |                   | X  |                        |
| Post Disaster Redevelopment/Reconstruction Plan/Ordinance |          | X |                     |                   | X  |                        |
| Storm Ready                                               |          | X |                     |                   | X  |                        |
| Stormwater Management Plan/Ordinance                      |          | X |                     |                   | X  |                        |
| Subdivision Regulations/Ordinance                         |          | X |                     |                   | X  |                        |
| Unified Development Ordinance                             |          | X |                     |                   | X  |                        |
| Zoning Ordinance                                          | X        |   |                     |                   |    |                        |

### 2.2.14.4. FISCAL CAPACITY

| Fiscal Resource                                           | Never<br>Used | Previously<br>Used | Currently<br>Used | Comments           |
|-----------------------------------------------------------|---------------|--------------------|-------------------|--------------------|
| Capital Improvement Programming                           | X             |                    |                   |                    |
| Community Development Block Grants (CDBG)                 | X             |                    |                   |                    |
| Development Impact Fees                                   | X             |                    |                   |                    |
| FEMA Hazard Mitigation Assistance Grants (HMGP, FMA, PDM) | Unsure        |                    |                   |                    |
| Gas/Electric Utility Fees                                 | X             |                    |                   |                    |
| General Obligation, Revenue, and/or Special Tax Bonds     | X             |                    |                   |                    |
| Homeland Security Grants (HSGP)                           | Unsure        |                    |                   |                    |
| Infrastructure Investment and Jobs Act (IIJA)             | X             |                    |                   |                    |
| Infrastructure State Revolving Fund loan                  | X             |                    |                   |                    |
| Partnering Agreements or Intergovernmental Agreements     |               |                    | X                 | Through the County |
| Sewer/Water Fees                                          | X             |                    |                   |                    |
| Special Purpose Taxes (or taxing districts)               | X             |                    |                   |                    |
| Stormwater Utility Fees                                   | X             |                    |                   |                    |
| USDA Grants                                               | X             |                    |                   |                    |
| USDA Rural Development Agency Grants                      | X             |                    |                   |                    |
| US Economic Development Administration Grants             | X             |                    |                   |                    |

### 2.2.14.5. SELF-ASSESSMENT OF CAPABILITY

| Area                                    | Degree of Capability |          |      |
|-----------------------------------------|----------------------|----------|------|
|                                         | Limited              | Moderate | High |
| Planning and Regulatory Capability      | X                    |          |      |
| Administrative and Technical Capability | X                    |          |      |

2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Area                       | Degree of Capability |          |      |
|----------------------------|----------------------|----------|------|
|                            | Limited              | Moderate | High |
| Fiscal Capability          | X                    |          |      |
| Available Staff            | X                    |          |      |
| Political Support/Interest | X                    |          |      |
| Community Support          | X                    |          |      |



### 2.2.15. CITY OF URBANDALE

The City of Urbandale is located roughly northwest of the City of Des Moines in south-central Polk County. The City of Urbandale is one of the larger cities in Polk County, and it had an estimated population of 45,580 in 2020. The population of Urbandale grew by 6,117 (15.5%) between 2010 and 2020, and the community is one of several around the Des Moines metropolitan area which experienced double-digit population growth during that decade. The City of Urbandale is governed by a mayor and a 5-member Council.

Specific initiatives/capabilities include:

- The City of Urbandale has numerous programs including fire safety checks, smoke detector replacement and battery replacement, Block Party and child birthday party appearances, Business Safety Inspections and preplan visits, emergency procedure development and planning, fire extinguisher training, Citizen Fire Academy, Kids Fire Academy, Fire Prevention Week Open House, EMS Week Open House, blood pressure checks, First Aid Training, Infant, Child, and Adult CPR & AED Training, car seat checks/installations, fire station tours, Fall & Fire Prevention for Older Adults, school, daycare, and business fire drills and safety presentations, and a Juvenile Fire Intervention Program.
- Urbandale is partnered with Des Moines Water Works to develop a conservation plan for peak usage periods.
- The City has implemented several projects to increase mitigation capabilities including purchase of fire apparatus, constructed a fire training facility, renovated the living quarters of fire station # 42, and constructed an access road for the police department and tornado shelter construction at Walker Johnson Park. Other projects are proposed or underway are: construction of new fire station in the NW area of Urbandale, public works/parks department satellite field maintenance facility, future fire truck replacement, traffic signal preemption, several bridge projects, storm sewer projects and street improvements including interchange projects. The City has twelve outdoor warning sirens. Two of those are shared with Clive and are activated by WestCom dispatch center.
- Urbandale had access to Alert Iowa and uses social media (Facebook, Twitter, LinkedIn) and text messaging alerting.

- The City has completed a tornado safe room at Walker Johnson Park – 8900 Douglas Ave. The intended use of the shelter is for the population of the Walker Johnson Park.
- The City is an active participant in the Community Rating System (CRS) program, and is a class 7 community, maintaining an active floodplain management program and providing flood insurance policyholders within Urbandale with ongoing cost savings.

### 2.2.15.1. STAFF AND TECHNICAL ASSISTANCE

| Staff or Personnel Resource                                                                             | Yes | No | Department or Single Staff Member | Comments                   |
|---------------------------------------------------------------------------------------------------------|-----|----|-----------------------------------|----------------------------|
| Emergency Manager                                                                                       | X   |    | Single Staff Member (2)           | Chief officers (2)         |
| Engineers or professionals trained in construction practices related to buildings and/or infrastructure | X   |    | Department                        | City Engineering           |
| Environmental Justice Specialists                                                                       |     | X  |                                   |                            |
| Fiscal Management or Procurement Specialists                                                            | X   |    | Department                        | City Finance Department    |
| Floodplain Manager                                                                                      | X   |    | Department                        | City GIS                   |
| Housing Specialist(s)                                                                                   | X   |    | Department                        | City Community Development |
| Land Surveyors                                                                                          |     | X  |                                   |                            |
| Land Use/Management/Development Planning                                                                | X   |    | Department                        | City Community Development |
| Planners or engineers with an understanding of natural and/or human-caused hazards                      |     | X  |                                   |                            |
| Recreation/Green Space Specialist(s)                                                                    | X   |    | Department                        | City Parks                 |
| Resource Development Staff or Grant-writing                                                             |     | X  |                                   |                            |
| Scientists familiar with the hazards of the community                                                   |     | X  |                                   |                            |
| Staff experienced with Geographic Information Systems (GIS) or HAZUS                                    | X   |    | Department                        | City GIS                   |
| Staff with education or expertise to assess the community's vulnerability to hazards                    | X   |    | Single Staff Member               | Fire Chief                 |
| Transportation Manager / Traffic Engineer                                                               | X   |    | Department                        | City Engineering           |

### 2.2.15.2. PLANNING MECHANISMS

| Plans                               | In Place |   | Adopted/Updated | Under Development |    | Expected Completion |
|-------------------------------------|----------|---|-----------------|-------------------|----|---------------------|
|                                     | Y        | N |                 | Yes               | No |                     |
| Comprehensive Plan (Polk 2050)      |          | X |                 | X                 |    | 1/2024              |
| Climate Action Plan/Resiliency Plan |          | X |                 |                   | X  |                     |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Plans                                                    | In Place |   | Adopted/<br>Updated | Under Development |    | Expected<br>Completion |
|----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                          | Y        | N |                     | Yes               | No |                        |
| Community Wildfire Protection Plan (CWPP)                |          | X |                     |                   | X  |                        |
| Comprehensive Emergency Management Plan                  | X        |   | 2019                |                   |    |                        |
| General Plan                                             |          | X |                     |                   | X  |                        |
| Continuity of Operations Plan (COOP)                     | X        |   | 5/2015              |                   |    |                        |
| Disaster Recovery Plan                                   |          | X |                     |                   | X  |                        |
| Economic Development Plan – “Urb. Comp. Plan”            | X        |   | 12/2023             |                   |    |                        |
| Emergency Operations Plan (EOP)                          | X        |   | 2019                |                   |    |                        |
| Environmental Impact Report (EIR)                        |          | X |                     |                   | X  |                        |
| Evacuation Plan                                          |          | X |                     |                   | X  |                        |
| Flood Response Plan                                      |          |   |                     |                   |    |                        |
| Floodplain Management Plan/Flood Mitigation Plan         |          | X |                     |                   | X  |                        |
| Hazard Mitigation Plan                                   | X        |   | EMA Plan            |                   |    |                        |
| Historic Preservation Plan                               |          | X |                     |                   | X  |                        |
| Natural Resource Protection Plan (NRPP)                  |          | X |                     |                   | X  |                        |
| Open Space Management Plan                               |          | X |                     |                   | X  |                        |
| Threat Hazard Identification and Risk Assessment (THIRA) |          | X |                     |                   | X  |                        |

### 2.2.15.3. REGULATORY TOOLS AND PROGRAMS

| Tool or Program                                           | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|-----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                           | Y        | N |                     | Yes               | No |                        |
| Building Codes                                            | X        |   | 2018                |                   |    |                        |
| Citizen Corps - Community Emergency Response Team         |          | X |                     |                   | X  |                        |
| Community Rating System (CRS Program of the NFIP)         | X        |   | 2020                |                   |    |                        |
| Emergency Management Accreditation Program (EMAP)         |          | X |                     |                   | X  |                        |
| Fire Code                                                 | X        |   | 2018                |                   |    |                        |
| Firewise Community                                        |          | X |                     |                   | X  |                        |
| Floodplain Management/Flood Damage Prevention Ordinance   | X        |   | 2/2019              |                   |    |                        |
| Land Use/Development Planning                             | X        |   |                     |                   |    |                        |
| National Flood Insurance Program (NFIP)                   | X        |   | 1979 / 2019         |                   |    |                        |
| Post Disaster Redevelopment/Reconstruction Plan/Ordinance |          | X |                     |                   | X  |                        |
| Storm Ready                                               |          | X |                     |                   | X  |                        |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Tool or Program                      | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|--------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                      | Y        | N |                     | Yes               | No |                        |
| Stormwater Management Plan/Ordinance | X        |   | 3/9/2021            |                   |    |                        |
| Subdivision Regulations/Ordinance    | X        |   | 12/2023             |                   |    |                        |
| Unified Development Ordinance        | X        |   | 12/2023             |                   |    |                        |
| Zoning Ordinance                     | X        |   | 12/2023             |                   |    |                        |

### 2.2.15.4. FISCAL CAPACITY

| Fiscal Resource                                           | Never<br>Used | Previously<br>Used | Currently<br>Used | Comments           |
|-----------------------------------------------------------|---------------|--------------------|-------------------|--------------------|
| Capital Improvement Programming                           |               |                    | X                 |                    |
| Community Development Block Grants (CDBG)                 |               |                    | X                 |                    |
| Development Impact Fees                                   |               |                    | X                 |                    |
| FEMA Hazard Mitigation Assistance Grants (HMGP, FMA, PDM) |               | X                  |                   | HMGP – 2018 Floods |
| Gas/Electric Utility Fees                                 |               |                    |                   | Unsure             |
| General Obligation, Revenue, and/or Special Tax Bonds     |               |                    | X                 |                    |
| Homeland Security Grants (HSGP)                           |               |                    | X                 |                    |
| Infrastructure Investment and Jobs Act (IIJA)             |               |                    |                   | Unsure             |
| Infrastructure State Revolving Fund loan                  |               |                    |                   | Unsure             |
| Partnering Agreements or Intergovernmental Agreements     |               |                    | X                 |                    |
| Sewer/Water Fees                                          |               |                    | X                 |                    |
| Special Purpose Taxes (or taxing districts)               |               |                    | X                 |                    |
| Stormwater Utility Fees                                   |               |                    | X                 |                    |
| USDA Grants                                               |               |                    |                   | Unsure             |
| USDA Rural Development Agency Grants                      |               |                    |                   | Unsure             |
| US Economic Development Administration Grants             |               |                    |                   | Unsure             |

### 2.2.15.5. SELF-ASSESSMENT OF CAPABILITY

| Area                                    | Degree of Capability |          |      |
|-----------------------------------------|----------------------|----------|------|
|                                         | Limited              | Moderate | High |
| Planning and Regulatory Capability      |                      |          | X    |
| Administrative and Technical Capability |                      |          | X    |
| Fiscal Capability                       |                      |          | X    |
| Available Staff                         |                      | X        |      |
| Political Support/Interest              |                      | X        |      |
| Community Support                       |                      | X        |      |

### 2.2.16. CITY OF WEST DES MOINES

The City of West Des Moines occupies space roughly in the southwestern portion of Polk County, and the community is the second largest city in Polk County. In 2020 the population of West Des Moines was estimated to be 68,723, and this is an increase of 12,114 over the community's 2010 population of 56,609. The City of West Des Moines is governed by a mayor, city manager, and 5-member Council.

Specific initiatives/capabilities include:

- The City utilizes newsletters, websites, emails, and presentations to educate the public on preparedness topics.
- The City has 14 outdoor warning sirens which are activated by the E911 center or Fire Station Headquarters.
- West Des Moines has cable override, Alert Iowa and e-mails alerting programs in place.

#### 2.2.16.1. STAFF AND TECHNICAL ASSISTANCE

| Staff or Personnel Resource                                                                             | Yes | No | Department or Single Staff Member | Comments                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------|-----|----|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Emergency Manager                                                                                       | X   |    | Single Staff Member               | Fire and EMS Chief                                                                                                                       |
| Engineers or professionals trained in construction practices related to buildings and/or infrastructure | X   |    | Department                        | Building Inspection Division; Chief Building Official and 7 Building Inspectors- Fire Marshal and 3 Fire inspectors                      |
| Environmental Justice Specialists                                                                       |     | X  |                                   |                                                                                                                                          |
| Fiscal Management or Procurement Specialists                                                            | X   |    | Department                        | Finance Dept.; Procurement Coordinator                                                                                                   |
| Floodplain Manager                                                                                      | X   |    | Single Staff Member               | Chief Building Official                                                                                                                  |
| Housing Specialist(s)                                                                                   | X   |    | Single Staff Member (2)           | Community and Economic Development; Two Staff Members in the Department: Housing and Community Development Manager and a Housing Planner |
| Land Surveyors                                                                                          |     | X  |                                   |                                                                                                                                          |
| Land Use/Management/Development Planning                                                                | X   |    | Department                        | Planning Division - 3 planning staff                                                                                                     |
| Planners or engineers with an understanding of natural and/or human-caused hazards                      | X   |    | Department                        | Planning Division - 3 planning staff                                                                                                     |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Staff or Personnel Resource                                                          | Yes | No | Department or Single Staff Member | Comments                                                 |
|--------------------------------------------------------------------------------------|-----|----|-----------------------------------|----------------------------------------------------------|
| Recreation/Green Space Specialist(s)                                                 | X   |    | Single Staff Member               | Park planner/Urban Forestry Supervisor                   |
| Resource Development Staff or Grant-writing                                          | X   |    | Single Staff Member               | Procurement Coordinator                                  |
| Scientists familiar with the hazards of the community                                |     | X  |                                   |                                                          |
| Staff experienced with Geographic Information Systems (GIS) or HAZUS                 | X   |    | Department                        | Planning Division –2 planning staff                      |
| Staff with education or expertise to assess the community's vulnerability to hazards | X   |    | Department                        | Fire, Engineering, Development services, Public Services |
| Transportation Manager / Traffic Engineer                                            | X   |    | Department                        | Engineering Dept                                         |

### 2.2.16.2. PLANNING MECHANISMS

| Plans                                                                                                               | In Place |   | Adopted/<br>Updated | Under Development |    | Expected Completion |
|---------------------------------------------------------------------------------------------------------------------|----------|---|---------------------|-------------------|----|---------------------|
|                                                                                                                     | Y        | N |                     | Yes               | No |                     |
| Comprehensive Plan (Polk 2050)                                                                                      |          | X |                     | X                 |    | UNK                 |
| Climate Action Plan/Resiliency Plan                                                                                 | X        |   |                     | X                 |    | 2024/2025           |
| Community Wildfire Protection Plan (CWPP)                                                                           |          | X |                     |                   | X  |                     |
| Comprehensive Emergency Management Plan                                                                             | X        |   | 2015                | X                 |    | January 2024        |
| General Plan ( <b>Comprehensive Plan</b> )                                                                          | X        |   | Nov. 2022           |                   |    |                     |
| Continuity of Operations Plan (COOP)                                                                                |          | X |                     |                   | X  |                     |
| Disaster Recovery Plan                                                                                              |          | X |                     |                   | X  |                     |
| Economic Development Plan                                                                                           |          | X |                     |                   | X  |                     |
| Emergency Operations Plan (EOP)                                                                                     | X        |   | 2015                | X                 |    | January 2024        |
| Environmental Impact Report (EIR)                                                                                   |          | X |                     |                   | X  |                     |
| Evacuation Plan                                                                                                     |          | X |                     |                   | X  |                     |
| Flood Response Plan                                                                                                 | X        |   |                     | X                 |    | 2024                |
| Floodplain Management Plan/Flood Mitigation Plan                                                                    | X        |   |                     | X                 |    | 2024                |
| Hazard Mitigation Plan                                                                                              |          | X |                     |                   | X  |                     |
| Historic Preservation Plan                                                                                          |          | X |                     |                   | X  |                     |
| Natural Resource Protection Plan (NRPP)                                                                             |          | X |                     |                   | X  |                     |
| Open Space Management Plan ( <b>Allowed uses and Bulk Regulations in Zoning Ordinance; updated multiple times</b> ) | X        |   | June 1996           |                   |    |                     |
| Threat Hazard Identification and Risk Assessment (THIRA)                                                            |          | X |                     |                   | X  |                     |

### 2.2.16.3. REGULATORY TOOLS AND PROGRAMS

| Tool or Program                                                   | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|-------------------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                                   | Y        | N |                     | Yes               | No |                        |
| Building Codes ( <b>2021 IBC</b> )                                | X        |   | July 2023           |                   |    |                        |
| Citizen Corps - Community Emergency Response Team                 |          | X |                     |                   | X  |                        |
| Community Rating System (CRS Program of the NFIP)                 | X        |   |                     |                   |    |                        |
| Emergency Management Accreditation Program (EMAP)                 |          | X |                     |                   | X  |                        |
| Fire Code ( <b>2021 IFC w/ Amendments</b> )                       | X        |   |                     |                   |    |                        |
| Firewise Community                                                |          | X |                     |                   | X  |                        |
| Floodplain Management/Flood Damage Prevention Ordinance           | X        |   | Jan 2019            |                   |    |                        |
| Land Use/Development Planning ( <b>Comprehensive Plan</b> )       | X        |   | Nov 2022            |                   |    |                        |
| National Flood Insurance Program (NFIP)                           | X        |   |                     |                   |    |                        |
| Post Disaster Redevelopment/Reconstruction Plan/Ordinance         |          | X |                     |                   | X  |                        |
| Storm Ready                                                       |          | X |                     |                   | X  |                        |
| Stormwater Management Plan/Ordinance                              | X        |   | 2007                |                   |    |                        |
| Subdivision Regulations/Ordinance                                 | X        |   | 2023                | X                 |    | 2024                   |
| Unified Development Ordinance                                     |          | X |                     |                   | X  |                        |
| Zoning Ordinance ( <b>updated multiple times since adoption</b> ) | X        |   | June 1996           | X                 |    | Summer 2024            |

### 2.2.16.4. FISCAL CAPACITY

| Fiscal Resource                                           | Never<br>Used | Previously<br>Used | Currently<br>Used | Comments                               |
|-----------------------------------------------------------|---------------|--------------------|-------------------|----------------------------------------|
| Capital Improvement Programming                           |               |                    | X                 |                                        |
| Community Development Block Grants (CDBG)                 |               | X                  | X                 | West Des Moines is an Entitlement City |
| Development Impact Fees                                   | X             |                    |                   |                                        |
| FEMA Hazard Mitigation Assistance Grants (HMGP, FMA, PDM) |               | X                  |                   |                                        |
| Gas/Electric Utility Fees                                 | X             |                    |                   | Cable TV Franchise Fee                 |
| General Obligation, Revenue, and/or Special Tax Bonds     |               |                    | X                 |                                        |
| Homeland Security Grants (HSGP)                           |               | X                  |                   |                                        |
| Infrastructure Investment and Jobs Act (IIJA)             |               | X                  |                   |                                        |
| Infrastructure State Revolving Fund loan                  |               | X                  | X                 |                                        |
| Partnering Agreements or Intergovernmental Agreements     |               |                    | X                 |                                        |
| Sewer/Water Fees                                          |               |                    | X                 |                                        |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Fiscal Resource                               | Never Used | Previously Used | Currently Used | Comments |
|-----------------------------------------------|------------|-----------------|----------------|----------|
| Special Purpose Taxes (or taxing districts)   |            |                 | X              |          |
| Stormwater Utility Fees                       |            |                 | X              |          |
| USDA Grants                                   | X          |                 |                |          |
| USDA Rural Development Agency Grants          | X          |                 |                |          |
| US Economic Development Administration Grants | X          |                 |                |          |

### 2.2.16.5. SELF-ASSESSMENT OF CAPABILITY

| Area                                    | Degree of Capability |          |      |
|-----------------------------------------|----------------------|----------|------|
|                                         | Limited              | Moderate | High |
| Planning and Regulatory Capability      |                      | X        |      |
| Administrative and Technical Capability |                      | X        |      |
| Fiscal Capability                       |                      | X        |      |
| Available Staff                         |                      | X        |      |
| Political Support/Interest              |                      | X        |      |
| Community Support                       |                      | X        |      |



### 2.2.17. CITY OF WINDSOR HEIGHTS

The City of Windsor Heights is located in central Polk County and is surrounded by the cities of Urbandale, Clive, West Des Moines, and Des Moines. The estimated population of the City of Windsor Heights was 5,252 in 2020, and the community grew by approximately 8.1% between 2010 and 2020. The community is governed by a Mayor, City Administrator, and 5-member Council.

Specific initiatives/capabilities include:

- The City participates in several training programs to include crime prevention, education outreach, NIXLE, Alert Iowa, environmental education.
- The City has one outdoor warning siren which is activated by the Polk County Dispatch.
- Windsor Height also utilizes Alert Iowa, NIXLE and the city website for alerting and notifications.

#### 2.2.17.1. STAFF AND TECHNICAL ASSISTANCE

| Staff or Personnel Resource                                                                             | Yes | No | Department or Single Staff Member | Comments                            |
|---------------------------------------------------------------------------------------------------------|-----|----|-----------------------------------|-------------------------------------|
| Emergency Manager                                                                                       | X   |    | Department                        | Fire Department                     |
| Engineers or professionals trained in construction practices related to buildings and/or infrastructure | X   |    | Department                        | Third Party – Bolton Menk           |
| Environmental Justice Specialists                                                                       |     | X  |                                   |                                     |
| Fiscal Management or Procurement Specialists                                                            | X   |    | Department                        | Finance                             |
| Floodplain Manager                                                                                      | X   |    | Department                        | Third Party – Bolton Menk           |
| Housing Specialist(s)                                                                                   | X   |    | Department                        | Third Party – Bolton Menk           |
| Land Surveyors                                                                                          | X   |    | Department                        | Third Party – Bolton Menk           |
| Land Use/Management/Development Planning                                                                |     | X  |                                   |                                     |
| Planners or engineers with an understanding of natural and/or human-caused hazards                      | X   |    | Department                        | Fire Department / Police Department |
| Recreation/Green Space Specialist(s)                                                                    |     | X  |                                   |                                     |
| Resource Development Staff or Grant-writing                                                             | X   |    | Department                        | Third Party – Bolton Menk           |
| Scientists familiar with the hazards of the community                                                   |     | X  |                                   |                                     |
| Staff experienced with Geographic Information Systems (GIS) or HAZUS                                    | X   |    | Single Staff Member               | Individual in Public Works          |
| Staff with education or expertise to assess the community's vulnerability to hazards                    | X   |    | Department                        | Fire Department / Police Department |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Staff or Personnel Resource               | Yes | No | Department or Single Staff Member | Comments                  |
|-------------------------------------------|-----|----|-----------------------------------|---------------------------|
| Transportation Manager / Traffic Engineer | X   |    | Department                        | Third Party – Bolton Menk |

### 2.2.17.2. PLANNING MECHANISMS

| Plans                                                    | In Place |   | Adopted/<br>Updated | Under Development |    | Expected Completion |
|----------------------------------------------------------|----------|---|---------------------|-------------------|----|---------------------|
|                                                          | Y        | N |                     | Yes               | No |                     |
| Comprehensive Plan                                       | X        |   | 2017                |                   | X  |                     |
| Climate Action Plan/Resiliency Plan                      | X        |   |                     |                   | X  |                     |
| Community Wildfire Protection Plan (CWPP)                | X        |   |                     |                   | X  |                     |
| Comprehensive Emergency Management Plan                  | X        |   |                     | X                 |    | Unknown             |
| General Plan                                             | X        |   |                     |                   | X  |                     |
| Continuity of Operations Plan (COOP)                     | X        |   |                     |                   | X  |                     |
| Disaster Recovery Plan                                   | X        |   |                     |                   | X  |                     |
| Economic Development Plan                                | X        |   |                     |                   | X  |                     |
| Emergency Operations Plan (EOP)                          | X        |   |                     |                   | X  |                     |
| Environmental Impact Report (EIR)                        | X        |   |                     |                   | X  |                     |
| Evacuation Plan                                          | X        |   |                     |                   | X  |                     |
| Flood Response Plan                                      | X        |   | March 2024          |                   |    |                     |
| Floodplain Management Plan/Flood Mitigation Plan         | X        |   |                     |                   | X  |                     |
| Hazard Mitigation Plan                                   | X        |   |                     |                   | X  |                     |
| Historic Preservation Plan                               | X        |   |                     |                   | X  |                     |
| Natural Resource Protection Plan (NRPP)                  | X        |   |                     |                   | X  |                     |
| Open Space Management Plan                               | X        |   |                     |                   | X  |                     |
| Threat Hazard Identification and Risk Assessment (THIRA) | X        |   |                     |                   | X  |                     |

### 2.2.17.3. REGULATORY TOOLS AND PROGRAMS

| Tool or Program                                   | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to Implement |
|---------------------------------------------------|----------|---|---------------------|-------------------|----|---------------------|
|                                                   | Y        | N |                     | Yes               | No |                     |
| Building Codes                                    | X        |   |                     |                   |    |                     |
| Citizen Corps - Community Emergency Response Team |          | X |                     |                   | X  |                     |
| Community Rating System (CRS Program of the NFIP) |          | X |                     | X                 |    | 2025                |
| Emergency Management Accreditation Program (EMAP) |          | X |                     |                   | X  |                     |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Tool or Program                                           | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|-----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                           | Y        | N |                     | Yes               | No |                        |
| Fire Code                                                 | X        |   |                     |                   |    |                        |
| Firewise Community                                        |          | X |                     |                   | X  |                        |
| Floodplain Management/Flood Damage Prevention Ordinance   | X        |   |                     |                   |    |                        |
| Land Use/Development Planning                             | X        |   |                     |                   |    |                        |
| National Flood Insurance Program (NFIP)                   | X        |   |                     |                   |    |                        |
| Post Disaster Redevelopment/Reconstruction Plan/Ordinance |          | X |                     |                   | X  |                        |
| Storm Ready                                               |          | X |                     |                   | X  |                        |
| Stormwater Management Plan/Ordinance                      |          | X |                     |                   | X  |                        |
| Subdivision Regulations/Ordinance                         |          | X |                     |                   | X  |                        |
| Unified Development Ordinance                             |          | X |                     |                   | X  |                        |
| Zoning Ordinance                                          | X        |   |                     |                   |    |                        |

### 2.2.17.4. FISCAL CAPACITY

| Fiscal Resource                                           | Never<br>Used | Previously<br>Used | Currently<br>Used | Comments |
|-----------------------------------------------------------|---------------|--------------------|-------------------|----------|
| Capital Improvement Programming                           |               |                    | X                 |          |
| Community Development Block Grants (CDBG)                 | X             |                    |                   |          |
| Development Impact Fees                                   | X             |                    |                   |          |
| FEMA Hazard Mitigation Assistance Grants (HMGP, FMA, PDM) | X             |                    |                   |          |
| Gas/Electric Utility Fees                                 |               |                    | X                 |          |
| General Obligation, Revenue, and/or Special Tax Bonds     | X             |                    |                   |          |
| Homeland Security Grants (HSGP)                           | Unsure        |                    |                   |          |
| Infrastructure Investment and Jobs Act (IIJA)             | X             |                    |                   |          |
| Infrastructure State Revolving Fund loan                  | X             |                    |                   |          |
| Partnering Agreements or Intergovernmental Agreements     |               |                    | X                 |          |
| Sewer/Water Fees                                          |               |                    | X                 |          |
| Special Purpose Taxes (or taxing districts)               | X             |                    |                   |          |
| Stormwater Utility Fees                                   |               |                    | X                 |          |
| USDA Grants                                               | X             |                    |                   |          |
| USDA Rural Development Agency Grants                      | X             |                    |                   |          |
| US Economic Development Administration Grants             | X             |                    |                   |          |



2.2.17.5. SELF-ASSESSMENT OF CAPABILITY

| Area                                    | Degree of Capability |          |      |
|-----------------------------------------|----------------------|----------|------|
|                                         | Limited              | Moderate | High |
| Planning and Regulatory Capability      |                      | X        |      |
| Administrative and Technical Capability |                      | X        |      |
| Fiscal Capability                       |                      | X        |      |
| Available Staff                         | X                    |          |      |
| Political Support/Interest              |                      |          | X    |
| Community Support                       |                      |          | X    |

### 2.2.18. DELAWARE TOWNSHIP

Delaware Township is in central Polk County, northeast of Des Moines. Between the 2010 and 2020 census, its population decreased by 17 people (0.3%) from 6,204 people to 6,187. It is governed by a 3 member trustees board and has a volunteer fire department.

#### 2.2.18.1. STAFF AND TECHNICAL ASSISTANCE

| Staff or Personnel Resource                                                                             | Yes | No | Department or Single Staff Member | Comments                 |
|---------------------------------------------------------------------------------------------------------|-----|----|-----------------------------------|--------------------------|
| Emergency Manager                                                                                       | X   |    | Department                        | Polk County EMA          |
| Engineers or professionals trained in construction practices related to buildings and/or infrastructure |     | X  |                                   |                          |
| Environmental Justice Specialists                                                                       |     | X  |                                   |                          |
| Fiscal Management or Procurement Specialists                                                            |     | X  |                                   |                          |
| Floodplain Manager                                                                                      |     | X  |                                   |                          |
| Housing Specialist(s)                                                                                   |     | X  |                                   |                          |
| Land Surveyors                                                                                          |     | X  |                                   |                          |
| Land Use/Management/Development Planning                                                                |     | X  |                                   |                          |
| Planners or engineers with an understanding of natural and/or human-caused hazards                      |     | X  |                                   |                          |
| Recreation/Green Space Specialist(s)                                                                    |     | X  |                                   |                          |
| Resource Development Staff or Grant-writing                                                             |     | X  |                                   |                          |
| Scientists familiar with the hazards of the community                                                   |     | X  |                                   |                          |
| Staff experienced with Geographic Information Systems (GIS) or HAZUS                                    | X   |    | Department                        | Polk County Public Works |
| Staff with education or expertise to assess the community's vulnerability to hazards                    |     | X  |                                   |                          |
| Transportation Manager / Traffic Engineer                                                               | X   |    | Department                        | Polk County Public Works |

#### 2.2.18.2. PLANNING MECHANISMS

| Plans                                     | In Place |   | Adopted/Updated | Under Development |    | Expected Completion |
|-------------------------------------------|----------|---|-----------------|-------------------|----|---------------------|
|                                           | Y        | N |                 | Yes               | No |                     |
| Comprehensive Plan (Polk 2050)            | X        |   |                 |                   |    |                     |
| Climate Action Plan/Resiliency Plan       |          | X |                 | X                 |    |                     |
| Community Wildfire Protection Plan (CWPP) |          | X |                 |                   | X  |                     |
| Comprehensive Emergency Management Plan   | X        |   |                 |                   |    |                     |
| General Plan                              | X        |   |                 |                   |    |                     |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Plans                                                             | In Place |   | Adopted/<br>Updated | Under Development |    | Expected<br>Completion |
|-------------------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                                   | Y        | N |                     | Yes               | No |                        |
| Continuity of Operations Plan (COOP)                              |          | X |                     |                   | X  |                        |
| Disaster Recovery Plan                                            |          | X |                     |                   | X  |                        |
| Economic Development Plan                                         |          | X |                     |                   | X  |                        |
| Emergency Operations Plan (EOP) (SOGs)                            | X        |   |                     |                   |    |                        |
| Environmental Impact Report (EIR)                                 |          | X |                     |                   | X  |                        |
| Evacuation Plan                                                   |          | X |                     |                   | X  |                        |
| Flood Response Plan                                               |          | X |                     |                   | X  |                        |
| Floodplain Management Plan/Flood Mitigation Plan                  |          | X |                     |                   | X  |                        |
| Hazard Mitigation Plan (County Plan)                              | X        |   |                     |                   |    |                        |
| Historic Preservation Plan                                        |          | X |                     |                   | X  |                        |
| Natural Resource Protection Plan (NRPP)                           |          | X |                     |                   | X  |                        |
| Open Space Management Plan                                        |          | X |                     |                   | X  |                        |
| Threat Hazard Identification and Risk Assessment (THIRA) (County) | X        |   |                     |                   |    |                        |

### 2.2.18.3. REGULATORY TOOLS AND PROGRAMS

| Tool or Program                                           | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|-----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                           | Y        | N |                     | Yes               | No |                        |
| Building Codes                                            | X        |   |                     |                   |    |                        |
| Citizen Corps - Community Emergency Response Team         |          | X |                     |                   | X  |                        |
| Community Rating System (CRS Program of the NFIP)         |          | X |                     |                   | X  |                        |
| Emergency Management Accreditation Program (EMAP)         |          | X |                     |                   | X  |                        |
| Fire Code                                                 | X        |   |                     |                   |    |                        |
| Firewise Community                                        |          | X |                     |                   | X  |                        |
| Floodplain Management/Flood Damage Prevention Ordinance   |          | X |                     |                   | X  |                        |
| Land Use/Development Planning                             |          | X |                     |                   | X  |                        |
| National Flood Insurance Program (NFIP)                   | X        |   |                     |                   |    |                        |
| Post Disaster Redevelopment/Reconstruction Plan/Ordinance |          | X |                     |                   | X  |                        |
| Storm Ready                                               | X        |   |                     |                   |    |                        |
| Stormwater Management Plan/Ordinance                      |          | X |                     |                   | X  |                        |
| Subdivision Regulations/Ordinance                         |          | X |                     |                   | X  |                        |
| Unified Development Ordinance                             |          | X |                     |                   | X  |                        |
| Zoning Ordinance                                          |          | X |                     |                   | X  |                        |

### 2.2.18.4. FISCAL CAPACITY

| Fiscal Resource                                           | Never Used | Previously Used | Currently Used | Comments |
|-----------------------------------------------------------|------------|-----------------|----------------|----------|
| Capital Improvement Programming                           | X          |                 |                |          |
| Community Development Block Grants (CDBG)                 | X          |                 |                |          |
| Development Impact Fees                                   | X          |                 |                |          |
| FEMA Hazard Mitigation Assistance Grants (HMGP, FMA, PDM) | X          |                 |                |          |
| Gas/Electric Utility Fees                                 | X          |                 |                |          |
| General Obligation, Revenue, and/or Special Tax Bonds     |            |                 | X              |          |
| Homeland Security Grants (HSGP)                           | X          |                 |                |          |
| Infrastructure Investment and Jobs Act (IIJA)             | X          |                 |                |          |
| Infrastructure State Revolving Fund loan                  | X          |                 |                |          |
| Partnering Agreements or Intergovernmental Agreements     | X          |                 |                |          |
| Sewer/Water Fees                                          | X          |                 |                |          |
| Special Purpose Taxes (or taxing districts)               | X          |                 |                |          |
| Stormwater Utility Fees                                   | X          |                 |                |          |
| USDA Grants                                               | X          |                 |                |          |
| USDA Rural Development Agency Grants                      | X          |                 |                |          |
| US Economic Development Administration Grants             | X          |                 |                |          |

### 2.2.18.5. SELF-ASSESSMENT OF CAPABILITY

| Area                                    | Degree of Capability |          |      |
|-----------------------------------------|----------------------|----------|------|
|                                         | Limited              | Moderate | High |
| Planning and Regulatory Capability      | X                    |          |      |
| Administrative and Technical Capability |                      | X        |      |
| Fiscal Capability                       | X                    |          |      |
| Available Staff                         | X                    |          |      |
| Political Support/Interest              | X                    |          |      |
| Community Support                       | Not Provided         |          |      |

### 2.2.19. SAYLOR TOWNSHIP

Saylor Township is in central Polk County, north of Des Moines. Between the 2010 and 2020 census, its population decreased by 185 people (-2.9%) from 6,472 to 6,287. The majority of the Township's capabilities noted below are provided through the county.

#### 2.2.19.1. STAFF AND TECHNICAL ASSISTANCE

| Staff or Personnel Resource                                                                             | Yes | No | Department or Single Staff Member | Comments        |
|---------------------------------------------------------------------------------------------------------|-----|----|-----------------------------------|-----------------|
| Emergency Manager                                                                                       | X   |    | Not Provided                      | Via Polk County |
| Engineers or professionals trained in construction practices related to buildings and/or infrastructure | X   |    |                                   |                 |
| Environmental Justice Specialists                                                                       | X   |    |                                   |                 |
| Fiscal Management or Procurement Specialists                                                            | X   |    |                                   |                 |
| Floodplain Manager                                                                                      | X   |    |                                   |                 |
| Housing Specialist(s)                                                                                   | X   |    |                                   |                 |
| Land Surveyors                                                                                          | X   |    |                                   |                 |
| Land Use/Management/Development Planning                                                                | X   |    |                                   |                 |
| Planners or engineers with an understanding of natural and/or human-caused hazards                      | X   |    |                                   |                 |
| Recreation/Green Space Specialist(s)                                                                    | X   |    |                                   |                 |
| Resource Development Staff or Grant-writing                                                             | X   |    |                                   |                 |
| Scientists familiar with the hazards of the community                                                   | X   |    |                                   |                 |
| Staff experienced with Geographic Information Systems (GIS) or HAZUS                                    | X   |    |                                   |                 |
| Staff with education or expertise to assess the community's vulnerability to hazards                    | X   |    |                                   |                 |
| Transportation Manager / Traffic Engineer                                                               | X   |    |                                   |                 |

#### 2.2.19.2. PLANNING MECHANISMS

| Plans                                     | In Place |   | Adopted/Updated | Under Development |    | Expected Completion |
|-------------------------------------------|----------|---|-----------------|-------------------|----|---------------------|
|                                           | Y        | N |                 | Yes               | No |                     |
| Comprehensive Plan (Polk 2050)            | X        |   |                 |                   |    |                     |
| Climate Action Plan/Resiliency Plan       | X        |   |                 |                   |    |                     |
| Community Wildfire Protection Plan (CWPP) | X        |   |                 |                   |    |                     |
| Comprehensive Emergency Management Plan   | X        |   |                 |                   |    |                     |
| General Plan                              | X        |   |                 |                   |    |                     |



## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Plans                                                    | In Place |   | Adopted/<br>Updated | Under Development |    | Expected<br>Completion |
|----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                          | Y        | N |                     | Yes               | No |                        |
| Continuity of Operations Plan (COOP)                     | X        |   |                     |                   |    |                        |
| Disaster Recovery Plan                                   | X        |   |                     |                   |    |                        |
| Economic Development Plan                                | X        |   |                     |                   |    |                        |
| Emergency Operations Plan (EOP)                          | X        |   |                     |                   |    |                        |
| Environmental Impact Report (EIR)                        | X        |   |                     |                   |    |                        |
| Evacuation Plan                                          | X        |   |                     |                   |    |                        |
| Flood Response Plan                                      | X        |   |                     |                   |    |                        |
| Floodplain Management Plan/Flood Mitigation Plan         | X        |   |                     |                   |    |                        |
| Hazard Mitigation Plan                                   | X        |   |                     |                   |    |                        |
| Historic Preservation Plan                               | X        |   |                     |                   |    |                        |
| Natural Resource Protection Plan (NRPP)                  | X        |   |                     |                   |    |                        |
| Open Space Management Plan                               | X        |   |                     |                   |    |                        |
| Threat Hazard Identification and Risk Assessment (THIRA) | X        |   |                     |                   |    |                        |

### 2.2.19.3. REGULATORY TOOLS AND PROGRAMS

| Tool or Program                                           | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|-----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                           | Y        | N |                     | Yes               | No |                        |
| Building Codes                                            | X        |   |                     |                   |    |                        |
| Citizen Corps - Community Emergency Response Team         | X        |   |                     |                   |    |                        |
| Community Rating System (CRS Program of the NFIP)         | X        |   |                     |                   |    |                        |
| Emergency Management Accreditation Program (EMAP)         | X        |   |                     |                   |    |                        |
| Fire Code                                                 | X        |   |                     |                   |    |                        |
| Firewise Community                                        | X        |   |                     |                   |    |                        |
| Floodplain Management/Flood Damage Prevention Ordinance   | X        |   |                     |                   |    |                        |
| Land Use/Development Planning                             | X        |   |                     |                   |    |                        |
| National Flood Insurance Program (NFIP)                   | X        |   |                     |                   |    |                        |
| Post Disaster Redevelopment/Reconstruction Plan/Ordinance | X        |   |                     |                   |    |                        |
| Storm Ready                                               | X        |   |                     |                   |    |                        |
| Stormwater Management Plan/Ordinance                      | X        |   |                     |                   |    |                        |
| Subdivision Regulations/Ordinance                         | X        |   |                     |                   |    |                        |
| Unified Development Ordinance                             | X        |   |                     |                   |    |                        |
| Zoning Ordinance                                          | X        |   |                     |                   |    |                        |

### 2.2.19.4. FISCAL CAPACITY

| Fiscal Resource                                           | Never Used | Previously Used | Currently Used | Comments |
|-----------------------------------------------------------|------------|-----------------|----------------|----------|
| Capital Improvement Programming                           | X          |                 |                |          |
| Community Development Block Grants (CDBG)                 | X          |                 |                |          |
| Development Impact Fees                                   | X          |                 |                |          |
| FEMA Hazard Mitigation Assistance Grants (HMGP, FMA, PDM) | X          |                 |                |          |
| Gas/Electric Utility Fees                                 | X          |                 |                |          |
| General Obligation, Revenue, and/or Special Tax Bonds     | X          |                 |                |          |
| Homeland Security Grants (HSGP)                           | X          |                 |                |          |
| Infrastructure Investment and Jobs Act (IIJA)             | X          |                 |                |          |
| Infrastructure State Revolving Fund loan                  | X          |                 |                |          |
| Partnering Agreements or Intergovernmental Agreements     | X          |                 |                |          |
| Sewer/Water Fees                                          | X          |                 |                |          |
| Special Purpose Taxes (or taxing districts)               | X          |                 |                |          |
| Stormwater Utility Fees                                   | X          |                 |                |          |
| USDA Grants                                               | X          |                 |                |          |
| USDA Rural Development Agency Grants                      | X          |                 |                |          |
| US Economic Development Administration Grants             | X          |                 |                |          |

### 2.2.19.5. SELF-ASSESSMENT OF CAPABILITY

| Area                                    | Degree of Capability |          |      |
|-----------------------------------------|----------------------|----------|------|
|                                         | Limited              | Moderate | High |
| Planning and Regulatory Capability      | X                    |          |      |
| Administrative and Technical Capability | X                    |          |      |
| Fiscal Capability                       | X                    |          |      |
| Available Staff                         | X                    |          |      |
| Political Support/Interest              | X                    |          |      |
| Community Support                       | X                    |          |      |

### 2.2.20. DES MOINES WATER WORKS

Des Moines Water Works (DMWW) is an independently operated, public utility providing drinking water to approximately 500,000 people in the Greater Des Moines area. DMWW is the largest water utility in Iowa and is among the largest 100 utilities in the country.

In 1919, Des Moines Water Works (DMWW) was formed as a public utility under a new Code of Iowa, Section 388. Under this Code, the water utility is operated by a five-member Board of Trustees, who are appointed by the Mayor of the City of Des Moines and approved by the City Council for a six-year term. The Board of Trustees has all the powers of the City Council to operate the utility except for levying taxes. The utility is owned by the water rate payers. The Board of Trustees hires a General Manager to operate the utility. The General Manager produces an annual budget for the operations of the utility using revenue from the sale of water as the primary income source. This budget is reviewed, modified, and approved by the Board of Trustees. The Board of Trustees is the only body of the utility which can enter into contracts, and the utility must comply with State of Iowa public improvement bidding laws.

Des Moines Water Works is, to some extent, a “non-traditional” plan participant, as they are not a municipal government and don’t have full-time residents. Many of the questions that plan participants were asked in the capability assessment (particularly those related to regulatory authority) are less relevant to a utility organization. However, they were provided with the same complete set of questions as the municipal and county governments so that no potential capabilities were overlooked.

Des Moines Water Works consists of the following departments:

- Customer Service;
- Information Technology;
- Human Resources;
- Water Distribution and Grounds;
- Engineering;
- Finance;
- Office of the CEO / General Manager/ Grounds; and,
- Water Production.

Past or ongoing projects or programs designed to reduce disaster losses include the following:

- Treatment plant levee raised 6 feet;
- Gate closure structure constructed at plant entrance;
- Storm water pumping facility constructed to protect operations center;
- Control Center moved to second floor;
- Second floor added to General Office facility with critical functions moved up;
- Constructed alternate (flood) entrance;
- River intake valve automation;
- Constructed two additional treatment plants (emergency backup & peak capacity);
- Constructed aquifer storage facilities (emergency backup & peak capacity); and,
- Riverbank protection.

Des Moines Water Works has the following mitigation-related capabilities:

- DMWW provides information to its customers on emergency water preparedness and encourages customers to store a three-day supply of water, including at least one gallon of water per person, per day to be prepared for any interruption of water supply that might occur.
- DMWW has a variety of resources available for educators and individuals interested in water supply, pollution prevention, and using water wisely on their website, [www.dmww.com](http://www.dmww.com).
- DMWW has an on-site warning siren that is activated by the Water Production Control Center Operator based on weather warnings received from the National Weather Service. DMWW has designated tornado shelters in each facility.
- Mutual Aid Agreements in place—DMWW participates in IOWARN.
- Critical Facilities Inventory.
- Engineer on Staff.
- Ability to fund projects through Capital Improvements Funding.
- Fees collected for water services.
- Financial Resources from Impact fees for new development.

- Ability to withhold spending in hazard prone areas.

### 2.2.20.1. STAFF AND TECHNICAL ASSISTANCE

| Staff or Personnel Resource                                                                             | Yes | No | Department or Single Staff Member | Comments |
|---------------------------------------------------------------------------------------------------------|-----|----|-----------------------------------|----------|
| Emergency Manager                                                                                       |     | X  |                                   |          |
| Engineers or professionals trained in construction practices related to buildings and/or infrastructure | X   |    | Single Staff Member               |          |
| Environmental Justice Specialists                                                                       |     | X  |                                   |          |
| Fiscal Management or Procurement Specialists                                                            | X   |    | Single Staff Member               |          |
| Floodplain Manager                                                                                      |     | X  |                                   |          |
| Housing Specialist(s)                                                                                   |     | X  |                                   |          |
| Land Surveyors                                                                                          |     | X  |                                   |          |
| Land Use/Management/Development Planning                                                                |     | X  |                                   |          |
| Planners or engineers with an understanding of natural and/or human-caused hazards                      |     | X  |                                   |          |
| Recreation/Green Space Specialist(s)                                                                    |     | X  |                                   |          |
| Resource Development Staff or Grant-writing                                                             | X   |    | Single Staff Member               |          |
| Scientists familiar with the hazards of the community                                                   |     | X  |                                   |          |
| Staff experienced with Geographic Information Systems (GIS) or HAZUS                                    |     | X  |                                   |          |
| Staff with education or expertise to assess the community's vulnerability to hazards                    |     | X  |                                   |          |
| Transportation Manager / Traffic Engineer                                                               |     | X  |                                   |          |

### 2.2.20.2. PLANNING MECHANISMS

| Plans                                     | In Place |   | Adopted/<br>Updated | Under Development |    | Expected Completion |
|-------------------------------------------|----------|---|---------------------|-------------------|----|---------------------|
|                                           | Y        | N |                     | Yes               | No |                     |
| Comprehensive Plan (Polk 2050)            |          | X |                     |                   | X  |                     |
| Climate Action Plan/Resiliency Plan       |          | X |                     |                   | X  |                     |
| Community Wildfire Protection Plan (CWPP) |          | X |                     |                   | X  |                     |
| Comprehensive Emergency Management Plan   |          | X |                     |                   | X  |                     |
| General Plan                              |          | X |                     |                   | X  |                     |
| Continuity of Operations Plan (COOP)      |          | X |                     |                   | X  |                     |
| Disaster Recovery Plan                    |          | X |                     |                   | X  |                     |
| Economic Development Plan                 |          | X |                     |                   | X  |                     |
| Emergency Operations Plan (EOP)           | X        |   | 2020                |                   |    |                     |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Plans                                                    | In Place |   | Adopted/<br>Updated | Under Development |    | Expected<br>Completion |
|----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                          | Y        | N |                     | Yes               | No |                        |
| Environmental Impact Report (EIR)                        |          | X |                     |                   | X  |                        |
| Evacuation Plan                                          |          | X |                     |                   | X  |                        |
| Flood Response Plan                                      | X        |   |                     |                   |    |                        |
| Floodplain Management Plan/Flood Mitigation Plan         |          | X |                     |                   | X  |                        |
| Hazard Mitigation Plan                                   |          | X |                     |                   | X  |                        |
| Historic Preservation Plan                               |          | X |                     |                   | X  |                        |
| Natural Resource Protection Plan (NRPP)                  |          | X |                     |                   | X  |                        |
| Open Space Management Plan                               |          | X |                     |                   | X  |                        |
| Threat Hazard Identification and Risk Assessment (THIRA) |          | X |                     |                   | X  |                        |

### 2.2.20.3. REGULATORY TOOLS AND PROGRAMS

| Tool or Program                                           | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|-----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                           | Y        | N |                     | Yes               | No |                        |
| Building Codes                                            | X        |   |                     |                   |    |                        |
| Citizen Corps - Community Emergency Response Team         |          | X |                     |                   | X  |                        |
| Community Rating System (CRS Program of the NFIP)         |          | X |                     |                   | X  |                        |
| Emergency Management Accreditation Program (EMAP)         |          | X |                     |                   | X  |                        |
| Fire Code                                                 |          | X |                     |                   | X  |                        |
| Firewise Community                                        |          | X |                     |                   | X  |                        |
| Floodplain Management/Flood Damage Prevention Ordinance   |          | X |                     |                   | X  |                        |
| Land Use/Development Planning                             |          | X |                     |                   | X  |                        |
| National Flood Insurance Program (NFIP)                   |          | X |                     |                   | X  |                        |
| Post Disaster Redevelopment/Reconstruction Plan/Ordinance |          | X |                     |                   | X  |                        |
| Storm Ready                                               |          | X |                     |                   | X  |                        |
| Stormwater Management Plan/Ordinance                      |          | X |                     |                   | X  |                        |
| Subdivision Regulations/Ordinance                         |          | X |                     |                   | X  |                        |
| Unified Development Ordinance                             |          | X |                     |                   | X  |                        |
| Zoning Ordinance                                          |          | X |                     |                   | X  |                        |

### 2.2.20.4. FISCAL CAPACITY

| Fiscal Resource                                           | Never Used | Previously Used | Currently Used | Comments |
|-----------------------------------------------------------|------------|-----------------|----------------|----------|
| Capital Improvement Programming                           |            | X               | X              |          |
| Community Development Block Grants (CDBG)                 | X          |                 |                |          |
| Development Impact Fees                                   | X          |                 |                |          |
| FEMA Hazard Mitigation Assistance Grants (HMGP, FMA, PDM) |            | X               |                |          |
| Gas/Electric Utility Fees                                 | X          |                 |                |          |
| General Obligation, Revenue, and/or Special Tax Bonds     | X          |                 |                |          |
| Homeland Security Grants (HSGP)                           | X          |                 |                |          |
| Infrastructure Investment and Jobs Act (IIJA)             | X          |                 |                |          |
| Infrastructure State Revolving Fund loan                  |            | X               | X              |          |
| Partnering Agreements or Intergovernmental Agreements     |            | X               |                |          |
| Sewer/Water Fees                                          |            | X               |                |          |
| Special Purpose Taxes (or taxing districts)               | X          |                 |                |          |
| Stormwater Utility Fees                                   | X          |                 |                |          |
| USDA Grants                                               | X          |                 |                |          |
| USDA Rural Development Agency Grants                      | X          |                 |                |          |
| US Economic Development Administration Grants             | X          |                 |                |          |

### 2.2.20.5. SELF-ASSESSMENT OF CAPABILITY

| Area                                    | Degree of Capability |          |      |
|-----------------------------------------|----------------------|----------|------|
|                                         | Limited              | Moderate | High |
| Planning and Regulatory Capability      | X                    |          |      |
| Administrative and Technical Capability | X                    |          |      |
| Fiscal Capability                       | X                    |          |      |
| Available Staff                         | X                    |          |      |
| Political Support/Interest              | X                    |          |      |
| Community Support                       | X                    |          |      |

2.3. PUBLIC SCHOOL DISTRICT PROFILES AND CAPABILITIES

This section includes general profile information for the eight Polk County school districts who participated in this plan. They are:

- Ankeny 261
- Bondurant-Farrar 720
- Des Moines Independent 1737
- Johnston 3231
- North Polk 4779
- Southeast Polk 6101
- Urbandale 6579
- West Des Moines 6957

There are also two Polk County school districts who were not able to participate in this plan. They are:

- Dallas Center-Grimes Community School District 1576
- Saydel Community School District 5805

Schools are, to some extent, “non-traditional” plan participants, as they are not municipal governments, and don’t have full-time residents. Many of the questions that plan participants were asked in the capability assessment (particularly those related to regulatory authority) are less relevant to the school districts. However, they were provided with the same complete set of questions as the municipal and county governments so that no potential capabilities were overlooked.

The table below provides location and enrollment information for each school district. For school districts that are in multiple counties, these numbers include students that do not reside in Polk County.

Table 8 - Polk County School District Enrollment Data, 2023-2024

| District Name | Enrollment |
|---------------|------------|
| Ankeny 261    | 12,177     |



## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| District Name               | Enrollment    |
|-----------------------------|---------------|
| Bondurant-Farrar 720        | 2,495         |
| Des Moines Independent 1737 | 28,018        |
| Johnston 3231               | 6,381         |
| North Polk 4779             | 2,059         |
| Southeast Polk 6101         | 6,748         |
| Urbandale 6579              | 3,179         |
| West Des Moines 6957        | 8,037         |
| <b>Total</b>                | <b>69,094</b> |

### 2.3.1. ANKENY COMMUNITY SCHOOL DISTRICT

#### 2.3.1.1. STAFF AND TECHNICAL ASSISTANCE

| Staff or Personnel Resource                                                                             | Yes | No | Department or Single Staff Member | Comments                            |
|---------------------------------------------------------------------------------------------------------|-----|----|-----------------------------------|-------------------------------------|
| Emergency Manager                                                                                       | X   |    | Single Staff Member               | Ancillary duty, not dedicated staff |
| Engineers or professionals trained in construction practices related to buildings and/or infrastructure | X   |    | Single Staff Member               | Dedicated staff                     |
| Environmental Justice Specialists                                                                       |     | X  |                                   |                                     |
| Fiscal Management or Procurement Specialists                                                            | X   |    | Department                        | Dedicated staff                     |
| Floodplain Manager                                                                                      |     | X  |                                   |                                     |
| Housing Specialist(s)                                                                                   |     | X  |                                   |                                     |
| Land Surveyors                                                                                          |     | X  |                                   |                                     |
| Land Use/Management/Development Planning                                                                |     | X  |                                   |                                     |
| Planners or engineers with an understanding of natural and/or human-caused hazards                      |     | X  |                                   |                                     |
| Recreation/Green Space Specialist(s)                                                                    |     | X  |                                   |                                     |
| Resource Development Staff or Grant-writing                                                             | X   |    | Single Staff Member               | Dedicated staff                     |
| Scientists familiar with the hazards of the community                                                   |     | X  |                                   |                                     |
| Staff experienced with Geographic Information Systems (GIS) or HAZUS                                    |     | X  |                                   |                                     |
| Staff with education or expertise to assess the community's vulnerability to hazards                    | X   |    | Single Staff Member               | Ancillary duty, not dedicated staff |
| Transportation Manager / Traffic Engineer                                                               | X   |    | Department                        | Contracted, not district employees  |

#### 2.3.1.2. PLANNING MECHANISMS

| Plans                                     | In Place |   | Adopted/Updated | Under Development |    | Expected Completion |
|-------------------------------------------|----------|---|-----------------|-------------------|----|---------------------|
|                                           | Y        | N |                 | Yes               | No |                     |
| Comprehensive Plan (Polk 2050)            |          | X |                 |                   | X  |                     |
| Climate Action Plan/Resiliency Plan       |          | X |                 |                   | X  |                     |
| Community Wildfire Protection Plan (CWPP) |          | X |                 |                   | X  |                     |
| Comprehensive Emergency Management Plan   | X        |   | 9/5/2023        |                   |    |                     |
| General Plan                              |          | X |                 |                   | X  |                     |
| Continuity of Operations Plan (COOP)      |          | X |                 |                   | X  |                     |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Plans                                                    | In Place |   | Adopted/<br>Updated | Under Development |    | Expected<br>Completion |
|----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                          | Y        | N |                     | Yes               | No |                        |
| Disaster Recovery Plan                                   |          | X |                     |                   | X  |                        |
| Economic Development Plan                                |          | X |                     |                   | X  |                        |
| Emergency Operations Plan (EOP)                          | X        |   | 9/5/2023            |                   |    |                        |
| Environmental Impact Report (EIR)                        |          | X |                     |                   | X  |                        |
| Evacuation Plan                                          | X        |   | 9/5/2023            |                   |    |                        |
| Flood Response Plan                                      |          | X |                     |                   | X  |                        |
| Floodplain Management Plan/Flood Mitigation Plan         |          | X |                     |                   | X  |                        |
| Hazard Mitigation Plan                                   |          | X |                     |                   | X  |                        |
| Historic Preservation Plan                               |          | X |                     |                   | X  |                        |
| Natural Resource Protection Plan (NRPP)                  |          | X |                     |                   | X  |                        |
| Open Space Management Plan                               |          | X |                     |                   | X  |                        |
| Threat Hazard Identification and Risk Assessment (THIRA) |          |   |                     | X                 |    | 5/24/2024              |

### 2.3.1.3. REGULATORY TOOLS AND PROGRAMS

| Tool or Program                                           | In Place |   | Adopted/<br>Updated | Under<br>Development |    | Expect to<br>Implement |
|-----------------------------------------------------------|----------|---|---------------------|----------------------|----|------------------------|
|                                                           | Y        | N |                     | Yes                  | No |                        |
| Building Codes                                            | X        |   | 12/20/2021          |                      | X  |                        |
| Citizen Corps - Community Emergency Response Team         |          | X |                     |                      | X  |                        |
| Community Rating System (CRS Program of the NFIP)         |          | X |                     |                      | X  |                        |
| Emergency Management Accreditation Program (EMAP)         |          | X |                     |                      | X  |                        |
| Fire Code                                                 | X        |   | 12/20/2021          |                      | X  |                        |
| Firewise Community                                        |          | X |                     |                      | X  |                        |
| Floodplain Management/Flood Damage Prevention Ordinance   |          | X |                     |                      | X  |                        |
| Land Use/Development Planning                             |          | X |                     |                      | X  |                        |
| National Flood Insurance Program (NFIP)                   |          | X |                     |                      | X  |                        |
| Post Disaster Redevelopment/Reconstruction Plan/Ordinance |          | X |                     |                      | X  |                        |
| Storm Ready                                               |          | X |                     |                      | X  |                        |
| Stormwater Management Plan/Ordinance                      |          | X |                     |                      | X  |                        |
| Subdivision Regulations/Ordinance                         |          | X |                     |                      | X  |                        |
| Unified Development Ordinance                             |          | X |                     |                      | X  |                        |
| Zoning Ordinance                                          |          | X |                     |                      | X  |                        |

### 2.3.1.4. FISCAL CAPACITY

| Fiscal Resource                                           | Never Used | Previously Used | Currently Used | Comments |
|-----------------------------------------------------------|------------|-----------------|----------------|----------|
| Capital Improvement Programming                           | X          |                 |                |          |
| Community Development Block Grants (CDBG)                 | X          |                 |                |          |
| Development Impact Fees                                   | X          |                 |                |          |
| FEMA Hazard Mitigation Assistance Grants (HMGP, FMA, PDM) | X          |                 |                |          |
| Gas/Electric Utility Fees                                 | X          |                 |                |          |
| General Obligation, Revenue, and/or Special Tax Bonds     |            | X               |                |          |
| Homeland Security Grants (HSGP)                           | X          |                 |                |          |
| Infrastructure Investment and Jobs Act (IIJA)             | X          |                 |                |          |
| Infrastructure State Revolving Fund loan                  | X          |                 |                |          |
| Partnering Agreements or Intergovernmental Agreements     | X          |                 |                |          |
| Sewer/Water Fees                                          | X          |                 |                |          |
| Special Purpose Taxes (or taxing districts)               | X          |                 |                |          |
| Stormwater Utility Fees                                   | X          |                 |                |          |
| USDA Grants                                               | X          |                 |                |          |
| USDA Rural Development Agency Grants                      | X          |                 |                |          |
| US Economic Development Administration Grants             | X          |                 |                |          |

### 2.3.1.5. SELF-ASSESSMENT OF CAPABILITY

| Area                                    | Degree of Capability |          |      |
|-----------------------------------------|----------------------|----------|------|
|                                         | Limited              | Moderate | High |
| Planning and Regulatory Capability      |                      | X        |      |
| Administrative and Technical Capability |                      | X        |      |
| Fiscal Capability                       |                      | X        |      |
| Available Staff                         |                      | X        |      |
| Political Support/Interest              |                      |          | X    |
| Community Support                       |                      |          | X    |

### 2.3.2. BONDURANT-FARRAR COMMUNITY SCHOOL DISTRICT

#### 2.3.2.1. STAFF AND TECHNICAL ASSISTANCE

| Staff or Personnel Resource                                                                             | Yes | No | Department or Single Staff Member | Comments                                  |
|---------------------------------------------------------------------------------------------------------|-----|----|-----------------------------------|-------------------------------------------|
| Emergency Manager                                                                                       |     | X  |                                   |                                           |
| Engineers or professionals trained in construction practices related to buildings and/or infrastructure | X   |    | Department                        | Third Party Contractor                    |
| Environmental Justice Specialists                                                                       |     | X  |                                   |                                           |
| Fiscal Management or Procurement Specialists                                                            | X   |    | Department                        | Business Office team and Grant Specialist |
| Floodplain Manager                                                                                      |     | X  |                                   |                                           |
| Housing Specialist(s)                                                                                   |     | X  |                                   |                                           |
| Land Surveyors                                                                                          | X   |    |                                   | Third Party Contractor                    |
| Land Use/Management/Development Planning                                                                | X   |    |                                   | Third Party Contractor                    |
| Planners or engineers with an understanding of natural and/or human-caused hazards                      | X   |    |                                   | Third Party Contractor                    |
| Recreation/Green Space Specialist(s)                                                                    |     | X  |                                   |                                           |
| Resource Development Staff or Grant-writing                                                             | X   |    |                                   |                                           |
| Scientists familiar with the hazards of the community                                                   |     | X  |                                   |                                           |
| Staff experienced with Geographic Information Systems (GIS) or HAZUS                                    |     | X  |                                   |                                           |
| Staff with education or expertise to assess the community's vulnerability to hazards                    |     | X  |                                   |                                           |
| Transportation Manager / Traffic Engineer                                                               | X   |    | Single Staff Member               | Transportation Manager                    |

#### 2.3.2.2. PLANNING MECHANISMS

| Plans                                     | In Place |   | Adopted/<br>Updated | Under Development |    | Expected<br>Completion |
|-------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                           | Y        | N |                     | Yes               | No |                        |
| Comprehensive Plan (Polk 2050)            |          | X |                     |                   | X  |                        |
| Climate Action Plan/Resiliency Plan       |          | X |                     |                   | X  |                        |
| Community Wildfire Protection Plan (CWPP) |          | X |                     |                   | X  |                        |
| Comprehensive Emergency Management Plan   | X        |   | 2023                |                   |    |                        |
| General Plan                              |          | X |                     |                   | X  |                        |
| Continuity of Operations Plan (COOP)      |          | X |                     |                   | X  |                        |
| Disaster Recovery Plan                    |          | X |                     |                   | X  |                        |
| Economic Development Plan                 |          | X |                     |                   | X  |                        |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Plans                                                    | In Place |   | Adopted/<br>Updated | Under Development |    | Expected<br>Completion |
|----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                          | Y        | N |                     | Yes               | No |                        |
| Emergency Operations Plan (EOP)                          | X        |   | 2023                |                   |    |                        |
| Environmental Impact Report (EIR)                        |          | X |                     |                   | X  |                        |
| Evacuation Plan                                          | X        |   | 2023 (EOP)          |                   |    |                        |
| Flood Response Plan                                      |          | X |                     |                   | X  |                        |
| Floodplain Management Plan/Flood Mitigation Plan         |          | X |                     |                   | X  |                        |
| Hazard Mitigation Plan                                   |          | X |                     |                   | X  |                        |
| Historic Preservation Plan                               |          | X |                     |                   | X  |                        |
| Natural Resource Protection Plan (NRPP)                  |          | X |                     |                   | X  |                        |
| Open Space Management Plan                               |          | X |                     |                   | X  |                        |
| Threat Hazard Identification and Risk Assessment (THIRA) | X        |   | 2023 (EOP)          |                   |    |                        |

### 2.3.2.3. REGULATORY TOOLS AND PROGRAMS

| Tool or Program                                           | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|-----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                           | Y        | N |                     | Yes               | No |                        |
| Building Codes                                            |          | X |                     |                   | X  |                        |
| Citizen Corps - Community Emergency Response Team         |          | X |                     |                   | X  |                        |
| Community Rating System (CRS Program of the NFIP)         |          | X |                     |                   | X  |                        |
| Emergency Management Accreditation Program (EMAP)         |          | X |                     |                   | X  |                        |
| Fire Code                                                 |          | X |                     |                   | X  |                        |
| Firewise Community                                        |          | X |                     |                   | X  |                        |
| Floodplain Management/Flood Damage Prevention Ordinance   |          | X |                     |                   | X  |                        |
| Land Use/Development Planning                             |          | X |                     |                   | X  |                        |
| National Flood Insurance Program (NFIP)                   |          | X |                     |                   | X  |                        |
| Post Disaster Redevelopment/Reconstruction Plan/Ordinance |          | X |                     |                   | X  |                        |
| Storm Ready                                               |          | X |                     |                   | X  |                        |
| Stormwater Management Plan/Ordinance                      |          | X |                     |                   | X  |                        |
| Subdivision Regulations/Ordinance                         |          | X |                     |                   | X  |                        |
| Unified Development Ordinance                             |          | X |                     |                   | X  |                        |
| Zoning Ordinance                                          |          | X |                     |                   | X  |                        |

### 2.3.2.4. FISCAL CAPACITY

| Fiscal Resource                                           | Never Used | Previously Used | Currently Used | Comments |
|-----------------------------------------------------------|------------|-----------------|----------------|----------|
| Capital Improvement Programming                           |            |                 | X              |          |
| Community Development Block Grants (CDBG)                 | X          |                 |                |          |
| Development Impact Fees                                   | Unsure     |                 |                |          |
| FEMA Hazard Mitigation Assistance Grants (HMGP, FMA, PDM) |            | X               |                |          |
| Gas/Electric Utility Fees                                 | Unsure     |                 |                |          |
| General Obligation, Revenue, and/or Special Tax Bonds     |            |                 | X              |          |
| Homeland Security Grants (HSGP)                           | X          |                 |                |          |
| Infrastructure Investment and Jobs Act (IIJA)             | X          |                 |                |          |
| Infrastructure State Revolving Fund loan                  | X          |                 |                |          |
| Partnering Agreements or Intergovernmental Agreements     |            | X               | X              |          |
| Sewer/Water Fees                                          | Unsure     |                 |                |          |
| Special Purpose Taxes (or taxing districts)               |            |                 | X              |          |
| Stormwater Utility Fees                                   | Unsure     |                 |                |          |
| USDA Grants                                               |            | X               |                |          |
| USDA Rural Development Agency Grants                      | X          |                 |                |          |
| US Economic Development Administration Grants             | X          |                 |                |          |

### 2.3.2.5. SELF-ASSESSMENT OF CAPABILITY

| Area                                    | Degree of Capability |          |      |
|-----------------------------------------|----------------------|----------|------|
|                                         | Limited              | Moderate | High |
| Planning and Regulatory Capability      |                      | X        |      |
| Administrative and Technical Capability |                      | X        |      |
| Fiscal Capability                       |                      | X        |      |
| Available Staff                         | X                    |          |      |
| Political Support/Interest              |                      | X        |      |
| Community Support                       |                      | X        |      |

### 2.3.3. DES MOINES INDEPENDENT SCHOOL DISTRICT

#### 2.3.3.1. STAFF AND TECHNICAL ASSISTANCE

| Staff or Personnel Resource                                                                             | Yes | No | Department or Single Staff Member | Comments               |
|---------------------------------------------------------------------------------------------------------|-----|----|-----------------------------------|------------------------|
| Emergency Manager                                                                                       | X   |    | Department                        |                        |
| Engineers or professionals trained in construction practices related to buildings and/or infrastructure | X   |    | Department                        | Third-party Contractor |
| Environmental Justice Specialists                                                                       | X   |    | Department                        |                        |
| Fiscal Management or Procurement Specialists                                                            | X   |    | Department                        |                        |
| Floodplain Manager                                                                                      |     | X  |                                   |                        |
| Housing Specialist(s)                                                                                   |     | X  |                                   |                        |
| Land Surveyors                                                                                          |     | X  |                                   |                        |
| Land Use/Management/Development Planning                                                                |     | X  |                                   |                        |
| Planners or engineers with an understanding of natural and/or human-caused hazards                      |     | X  |                                   |                        |
| Recreation/Green Space Specialist(s)                                                                    | X   |    | Department                        |                        |
| Resource Development Staff or Grant-writing                                                             | X   |    | Department                        |                        |
| Scientists familiar with the hazards of the community                                                   |     | X  |                                   |                        |
| Staff experienced with Geographic Information Systems (GIS) or HAZUS                                    |     | X  |                                   |                        |
| Staff with education or expertise to assess the community's vulnerability to hazards                    | X   |    | Department                        |                        |
| Transportation Manager / Traffic Engineer                                                               | X   |    | Department                        |                        |

#### 2.3.3.2. PLANNING MECHANISMS

| Plans                                     | In Place |   | Adopted/Updated | Under Development |    | Expected Completion |
|-------------------------------------------|----------|---|-----------------|-------------------|----|---------------------|
|                                           | Y        | N |                 | Yes               | No |                     |
| Comprehensive Plan (Polk 2050)            | X        |   |                 |                   |    |                     |
| Climate Action Plan/Resiliency Plan       |          | X |                 |                   | X  |                     |
| Community Wildfire Protection Plan (CWPP) |          | X |                 |                   | X  |                     |
| Comprehensive Emergency Management Plan   | X        |   | 2019            | X                 |    | 2025                |
| General Plan                              | X        |   | 2023            |                   |    |                     |
| Continuity of Operations Plan (COOP)      |          | X |                 |                   | X  |                     |
| Disaster Recovery Plan                    | X        |   |                 |                   |    |                     |



## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Plans                                                    | In Place |   | Adopted/<br>Updated | Under Development |    | Expected<br>Completion |
|----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                          | Y        | N |                     | Yes               | No |                        |
| Economic Development Plan                                |          | X |                     |                   | X  |                        |
| Emergency Operations Plan (EOP)                          | X        |   |                     |                   |    |                        |
| Environmental Impact Report (EIR)                        |          | X |                     |                   | X  |                        |
| Evacuation Plan                                          | X        |   |                     |                   |    |                        |
| Flood Response Plan                                      |          | X |                     |                   | X  |                        |
| Floodplain Management Plan/Flood Mitigation Plan         |          | X |                     |                   | X  |                        |
| Hazard Mitigation Plan                                   | X        |   |                     |                   |    |                        |
| Historic Preservation Plan                               |          | X |                     |                   | X  |                        |
| Natural Resource Protection Plan (NRPP)                  |          | X |                     |                   | X  |                        |
| Open Space Management Plan                               |          | X |                     |                   | X  |                        |
| Threat Hazard Identification and Risk Assessment (THIRA) | X        |   |                     |                   |    |                        |

### 2.3.3.3. REGULATORY TOOLS AND PROGRAMS

| Tool or Program                                           | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|-----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                           | Y        | N |                     | Yes               | No |                        |
| Building Codes                                            | Unsure   |   |                     |                   |    |                        |
| Citizen Corps - Community Emergency Response Team         | Unsure   |   |                     |                   |    |                        |
| Community Rating System (CRS Program of the NFIP)         |          | X |                     |                   | X  |                        |
| Emergency Management Accreditation Program (EMAP)         | Unsure   |   |                     |                   |    |                        |
| Fire Code                                                 | Unsure   |   |                     |                   |    |                        |
| Firewise Community                                        |          | X |                     |                   | X  |                        |
| Floodplain Management/Flood Damage Prevention Ordinance   |          | X |                     |                   | X  |                        |
| Land Use/Development Planning                             |          | X |                     |                   | X  |                        |
| National Flood Insurance Program (NFIP)                   |          | X |                     |                   | X  |                        |
| Post Disaster Redevelopment/Reconstruction Plan/Ordinance |          | X |                     |                   | X  |                        |
| Storm Ready                                               | X        |   |                     |                   |    |                        |
| Stormwater Management Plan/Ordinance                      | Unsure   |   |                     |                   |    |                        |
| Subdivision Regulations/Ordinance                         |          | X |                     |                   | X  |                        |
| Unified Development Ordinance                             |          | X |                     |                   | X  |                        |
| Zoning Ordinance                                          |          | X |                     |                   | X  |                        |

### 2.3.3.4. FISCAL CAPACITY

| Fiscal Resource                                           | Never Used | Previously Used | Currently Used | Comments |
|-----------------------------------------------------------|------------|-----------------|----------------|----------|
| Capital Improvement Programming                           |            |                 | X              |          |
| Community Development Block Grants (CDBG)                 | X          |                 |                |          |
| Development Impact Fees                                   |            |                 | X              |          |
| FEMA Hazard Mitigation Assistance Grants (HMGP, FMA, PDM) |            | X               |                |          |
| Gas/Electric Utility Fees                                 |            |                 | X              |          |
| General Obligation, Revenue, and/or Special Tax Bonds     |            |                 | X              |          |
| Homeland Security Grants (HSGP)                           |            | X               |                |          |
| Infrastructure Investment and Jobs Act (IIJA)             | Unsure     |                 |                |          |
| Infrastructure State Revolving Fund loan                  | Unsure     |                 |                |          |
| Partnering Agreements or Intergovernmental Agreements     |            |                 | X              |          |
| Sewer/Water Fees                                          |            |                 | X              |          |
| Special Purpose Taxes (or taxing districts)               | X          |                 |                |          |
| Stormwater Utility Fees                                   | X          |                 |                |          |
| USDA Grants                                               | X          |                 |                |          |
| USDA Rural Development Agency Grants                      | X          |                 |                |          |
| US Economic Development Administration Grants             | X          |                 |                |          |

### 2.3.3.5. SELF-ASSESSMENT OF CAPABILITY

| Area                                    | Degree of Capability |          |      |
|-----------------------------------------|----------------------|----------|------|
|                                         | Limited              | Moderate | High |
| Planning and Regulatory Capability      | X                    |          |      |
| Administrative and Technical Capability |                      |          | X    |
| Fiscal Capability                       |                      |          | X    |
| Available Staff                         |                      |          | X    |
| Political Support/Interest              |                      | X        |      |
| Community Support                       |                      |          | X    |

### 2.3.4. JOHNSTON COMMUNITY SCHOOL DISTRICT

#### 2.3.4.1. STAFF AND TECHNICAL ASSISTANCE

| Staff or Personnel Resource                                                                             | Yes | No | Department or Single Staff Member | Comments |
|---------------------------------------------------------------------------------------------------------|-----|----|-----------------------------------|----------|
| Emergency Manager                                                                                       | X   |    | Single Staff Member               |          |
| Engineers or professionals trained in construction practices related to buildings and/or infrastructure | X   |    | Single Staff Member               |          |
| Environmental Justice Specialists                                                                       |     | X  |                                   |          |
| Fiscal Management or Procurement Specialists                                                            |     | X  |                                   |          |
| Floodplain Manager                                                                                      |     | X  |                                   |          |
| Housing Specialist(s)                                                                                   |     | X  |                                   |          |
| Land Surveyors                                                                                          |     | X  |                                   |          |
| Land Use/Management/Development Planning                                                                |     | X  |                                   |          |
| Planners or engineers with an understanding of natural and/or human-caused hazards                      |     | X  |                                   |          |
| Recreation/Green Space Specialist(s)                                                                    |     | X  |                                   |          |
| Resource Development Staff or Grant-writing                                                             |     | X  |                                   |          |
| Scientists familiar with the hazards of the community                                                   |     | X  |                                   |          |
| Staff experienced with Geographic Information Systems (GIS) or HAZUS                                    |     | X  |                                   |          |
| Staff with education or expertise to assess the community's vulnerability to hazards                    | X   |    | Single Staff Member               |          |
| Transportation Manager / Traffic Engineer                                                               | X   |    | Department                        |          |

#### 2.3.4.2. PLANNING MECHANISMS

| Plans                                     | In Place |   | Adopted/<br>Updated | Under Development |    | Expected<br>Completion |
|-------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                           | Y        | N |                     | Yes               | No |                        |
| Comprehensive Plan (Polk 2050)            |          | X |                     |                   | X  |                        |
| Climate Action Plan/Resiliency Plan       |          | X |                     |                   | X  |                        |
| Community Wildfire Protection Plan (CWPP) |          | X |                     |                   | X  |                        |
| Comprehensive Emergency Management Plan   |          | X |                     |                   | X  |                        |
| General Plan                              |          | X |                     |                   | X  |                        |
| Continuity of Operations Plan (COOP)      |          | X |                     |                   | X  |                        |
| Disaster Recovery Plan                    |          | X |                     |                   | X  |                        |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Plans                                                    | In Place |   | Adopted/<br>Updated | Under Development |    | Expected<br>Completion |
|----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                          | Y        | N |                     | Yes               | No |                        |
| Economic Development Plan                                |          | X |                     |                   | X  |                        |
| Emergency Operations Plan (EOP)                          | X        |   | 7/28/2022           |                   |    |                        |
| Environmental Impact Report (EIR)                        |          | X |                     |                   | X  |                        |
| Evacuation Plan                                          | X        |   | 7/28/2022           |                   |    |                        |
| Flood Response Plan                                      |          | X |                     |                   | X  |                        |
| Floodplain Management Plan/Flood Mitigation Plan         |          | X |                     |                   | X  |                        |
| Hazard Mitigation Plan                                   |          | X |                     |                   | X  |                        |
| Historic Preservation Plan                               |          | X |                     |                   | X  |                        |
| Natural Resource Protection Plan (NRPP)                  |          | X |                     |                   | X  |                        |
| Open Space Management Plan                               |          | X |                     |                   | X  |                        |
| Threat Hazard Identification and Risk Assessment (THIRA) | X        |   | Nov. 2022           |                   |    |                        |

### 2.3.4.3. REGULATORY TOOLS AND PROGRAMS

| Tool or Program                                           | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|-----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                           | Y        | N |                     | Yes               | No |                        |
| Building Codes                                            |          | X |                     |                   | X  |                        |
| Citizen Corps - Community Emergency Response Team         |          | X |                     |                   | X  |                        |
| Community Rating System (CRS Program of the NFIP)         |          | X |                     |                   | X  |                        |
| Emergency Management Accreditation Program (EMAP)         |          | X |                     |                   | X  |                        |
| Fire Code                                                 |          | X |                     |                   | X  |                        |
| Firewise Community                                        |          | X |                     |                   | X  |                        |
| Floodplain Management/Flood Damage Prevention Ordinance   |          | X |                     |                   | X  |                        |
| Land Use/Development Planning                             |          | X |                     |                   | X  |                        |
| National Flood Insurance Program (NFIP)                   |          | X |                     |                   | X  |                        |
| Post Disaster Redevelopment/Reconstruction Plan/Ordinance |          | X |                     |                   | X  |                        |
| Storm Ready                                               |          | X |                     |                   | X  |                        |
| Stormwater Management Plan/Ordinance                      |          | X |                     |                   | X  |                        |
| Subdivision Regulations/Ordinance                         |          | X |                     |                   | X  |                        |
| Unified Development Ordinance                             |          | X |                     |                   | X  |                        |
| Zoning Ordinance                                          |          | X |                     |                   | X  |                        |

### 2.3.4.4. FISCAL CAPACITY

| Fiscal Resource                                           | Never Used | Previously Used | Currently Used | Comments |
|-----------------------------------------------------------|------------|-----------------|----------------|----------|
| Capital Improvement Programming                           |            |                 | X              |          |
| Community Development Block Grants (CDBG)                 | X          |                 |                |          |
| Development Impact Fees                                   | X          |                 |                |          |
| FEMA Hazard Mitigation Assistance Grants (HMGP, FMA, PDM) | X          |                 |                |          |
| Gas/Electric Utility Fees                                 | X          |                 |                |          |
| General Obligation, Revenue, and/or Special Tax Bonds     |            | X               |                |          |
| Homeland Security Grants (HSGP)                           |            | X               |                |          |
| Infrastructure Investment and Jobs Act (IIJA)             | X          |                 |                |          |
| Infrastructure State Revolving Fund loan                  | X          |                 |                |          |
| Partnering Agreements or Intergovernmental Agreements     |            | X               |                |          |
| Sewer/Water Fees                                          | X          |                 |                |          |
| Special Purpose Taxes (or taxing districts)               |            |                 | X              |          |
| Stormwater Utility Fees                                   | X          |                 |                |          |
| USDA Grants                                               |            | X               |                |          |
| USDA Rural Development Agency Grants                      | X          |                 |                |          |
| US Economic Development Administration Grants             | X          |                 |                |          |

### 2.3.4.5. SELF-ASSESSMENT OF CAPABILITY

| Area                                    | Degree of Capability |          |      |
|-----------------------------------------|----------------------|----------|------|
|                                         | Limited              | Moderate | High |
| Planning and Regulatory Capability      | X                    |          |      |
| Administrative and Technical Capability |                      | X        |      |
| Fiscal Capability                       |                      |          | X    |
| Available Staff                         | X                    |          |      |
| Political Support/Interest              | X                    |          |      |
| Community Support                       |                      |          | X    |

### 2.3.5. NORTH POLK COMMUNITY SCHOOL DISTRICT

#### 2.3.5.1. STAFF AND TECHNICAL ASSISTANCE

| Staff or Personnel Resource                                                                             | Yes | No | Department or Single Staff Member | Comments                |
|---------------------------------------------------------------------------------------------------------|-----|----|-----------------------------------|-------------------------|
| Emergency Manager                                                                                       |     | X  |                                   |                         |
| Engineers or professionals trained in construction practices related to buildings and/or infrastructure |     | X  |                                   |                         |
| Environmental Justice Specialists                                                                       |     | X  |                                   |                         |
| Fiscal Management or Procurement Specialists                                                            | X   |    | Department                        |                         |
| Floodplain Manager                                                                                      |     | X  |                                   |                         |
| Housing Specialist(s)                                                                                   |     | X  |                                   |                         |
| Land Surveyors                                                                                          |     | X  |                                   |                         |
| Land Use/Management/Development Planning                                                                |     | X  |                                   |                         |
| Planners or engineers with an understanding of natural and/or human-caused hazards                      |     | X  |                                   |                         |
| Recreation/Green Space Specialist(s)                                                                    |     | X  |                                   |                         |
| Resource Development Staff or Grant-writing                                                             |     | X  |                                   |                         |
| Scientists familiar with the hazards of the community                                                   |     | X  |                                   |                         |
| Staff experienced with Geographic Information Systems (GIS) or HAZUS                                    |     | X  |                                   |                         |
| Staff with education or expertise to assess the community's vulnerability to hazards                    |     | X  |                                   |                         |
| Transportation Manager / Traffic Engineer                                                               | X   |    | Single Staff Member               | Transportation Director |

#### 2.3.5.2. PLANNING MECHANISMS

| Plans                                     | In Place |   | Adopted/<br>Updated | Under Development |    | Expected<br>Completion |
|-------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                           | Y        | N |                     | Yes               | No |                        |
| Comprehensive Plan (Polk 2050)            |          | X |                     |                   | X  |                        |
| Climate Action Plan/Resiliency Plan       |          | X |                     |                   | X  |                        |
| Community Wildfire Protection Plan (CWPP) |          | X |                     |                   | X  |                        |
| Comprehensive Emergency Management Plan   |          | X |                     |                   | X  |                        |
| General Plan                              |          | X |                     |                   | X  |                        |
| Continuity of Operations Plan (COOP)      |          | X |                     |                   | X  |                        |
| Disaster Recovery Plan                    |          | X |                     |                   | X  |                        |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Plans                                                    | In Place |   | Adopted/<br>Updated | Under Development |    | Expected<br>Completion |
|----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                          | Y        | N |                     | Yes               | No |                        |
| Economic Development Plan                                |          | X |                     |                   | X  |                        |
| Emergency Operations Plan (EOP)                          | X        |   |                     |                   |    |                        |
| Environmental Impact Report (EIR)                        |          | X |                     |                   | X  |                        |
| Evacuation Plan                                          | X        |   |                     |                   |    |                        |
| Flood Response Plan                                      |          | X |                     |                   | X  |                        |
| Floodplain Management Plan/Flood Mitigation Plan         |          | X |                     |                   | X  |                        |
| Hazard Mitigation Plan                                   |          | X |                     |                   | X  |                        |
| Historic Preservation Plan                               |          | X |                     |                   | X  |                        |
| Natural Resource Protection Plan (NRPP)                  |          | X |                     |                   | X  |                        |
| Open Space Management Plan                               |          | X |                     |                   | X  |                        |
| Threat Hazard Identification and Risk Assessment (THIRA) |          | X |                     |                   | X  |                        |

### 2.3.5.3. REGULATORY TOOLS AND PROGRAMS

| Tool or Program                                           | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|-----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                           | Y        | N |                     | Yes               | No |                        |
| Building Codes                                            |          | X |                     |                   | X  |                        |
| Citizen Corps - Community Emergency Response Team         |          | X |                     |                   | X  |                        |
| Community Rating System (CRS Program of the NFIP)         |          | X |                     |                   | X  |                        |
| Emergency Management Accreditation Program (EMAP)         |          | X |                     |                   | X  |                        |
| Fire Code                                                 |          | X |                     |                   | X  |                        |
| Firewise Community                                        |          | X |                     |                   | X  |                        |
| Floodplain Management/Flood Damage Prevention Ordinance   |          | X |                     |                   | X  |                        |
| Land Use/Development Planning                             |          | X |                     |                   | X  |                        |
| National Flood Insurance Program (NFIP)                   |          | X |                     |                   | X  |                        |
| Post Disaster Redevelopment/Reconstruction Plan/Ordinance |          | X |                     |                   | X  |                        |
| Storm Ready                                               |          | X |                     |                   | X  |                        |
| Stormwater Management Plan/Ordinance                      |          | X |                     |                   | X  |                        |
| Subdivision Regulations/Ordinance                         |          | X |                     |                   | X  |                        |
| Unified Development Ordinance                             |          | X |                     |                   | X  |                        |
| Zoning Ordinance                                          |          | X |                     |                   | X  |                        |

### 2.3.5.4. FISCAL CAPACITY

| Fiscal Resource                                           | Never Used | Previously Used | Currently Used | Comments |
|-----------------------------------------------------------|------------|-----------------|----------------|----------|
| Capital Improvement Programming                           |            | X               |                |          |
| Community Development Block Grants (CDBG)                 | X          |                 |                |          |
| Development Impact Fees                                   |            | X               |                |          |
| FEMA Hazard Mitigation Assistance Grants (HMGP, FMA, PDM) |            | X               |                |          |
| Gas/Electric Utility Fees                                 | X          |                 |                |          |
| General Obligation, Revenue, and/or Special Tax Bonds     |            |                 | X              |          |
| Homeland Security Grants (HSGP)                           |            |                 | X              |          |
| Infrastructure Investment and Jobs Act (IIJA)             | X          |                 |                |          |
| Infrastructure State Revolving Fund loan                  | X          |                 |                |          |
| Partnering Agreements or Intergovernmental Agreements     |            |                 | X              |          |
| Sewer/Water Fees                                          | X          |                 |                |          |
| Special Purpose Taxes (or taxing districts)               |            | X               |                |          |
| Stormwater Utility Fees                                   | X          |                 |                |          |
| USDA Grants                                               |            |                 | X              |          |
| USDA Rural Development Agency Grants                      | X          |                 |                |          |
| US Economic Development Administration Grants             | X          |                 |                |          |

### 2.3.5.5. SELF-ASSESSMENT OF CAPABILITY

| Area                                    | Degree of Capability |          |      |
|-----------------------------------------|----------------------|----------|------|
|                                         | Limited              | Moderate | High |
| Planning and Regulatory Capability      |                      | X        |      |
| Administrative and Technical Capability | X                    |          |      |
| Fiscal Capability                       | X                    |          |      |
| Available Staff                         | X                    |          |      |
| Political Support/Interest              |                      | X        |      |
| Community Support                       |                      | X        |      |



### 2.3.6. SOUTHEAST POLK COMMUNITY SCHOOL DISTRICT

#### 2.3.6.1. STAFF AND TECHNICAL ASSISTANCE

| Staff or Personnel Resource                                                                             | Yes | No | Department or Single Staff Member | Comments |
|---------------------------------------------------------------------------------------------------------|-----|----|-----------------------------------|----------|
| Emergency Manager                                                                                       |     | X  |                                   |          |
| Engineers or professionals trained in construction practices related to buildings and/or infrastructure |     | X  |                                   |          |
| Environmental Justice Specialists                                                                       |     | X  |                                   |          |
| Fiscal Management or Procurement Specialists                                                            | X   |    | Not Provided                      |          |
| Floodplain Manager                                                                                      |     | X  |                                   |          |
| Housing Specialist(s)                                                                                   |     | X  |                                   |          |
| Land Surveyors                                                                                          |     | X  |                                   |          |
| Land Use/Management/Development Planning                                                                |     | X  |                                   |          |
| Planners or engineers with an understanding of natural and/or human-caused hazards                      |     | X  |                                   |          |
| Recreation/Green Space Specialist(s)                                                                    |     | X  |                                   |          |
| Resource Development Staff or Grant-writing                                                             | X   |    | Not Provided                      |          |
| Scientists familiar with the hazards of the community                                                   |     | X  |                                   |          |
| Staff experienced with Geographic Information Systems (GIS) or HAZUS                                    |     | X  |                                   |          |
| Staff with education or expertise to assess the community's vulnerability to hazards                    |     | X  |                                   |          |
| Transportation Manager / Traffic Engineer                                                               | X   |    | Not Provided                      |          |

#### 2.3.6.2. PLANNING MECHANISMS

| Plans                                     | In Place |   | Adopted/<br>Updated | Under Development |    | Expected<br>Completion |
|-------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                           | Y        | N |                     | Yes               | No |                        |
| Comprehensive Plan (Polk 2050)            |          | X |                     |                   | X  |                        |
| Climate Action Plan/Resiliency Plan       |          | X |                     |                   | X  |                        |
| Community Wildfire Protection Plan (CWPP) |          | X |                     |                   | X  |                        |
| Comprehensive Emergency Management Plan   |          | X |                     |                   | X  |                        |
| General Plan                              |          | X |                     |                   | X  |                        |
| Continuity of Operations Plan (COOP)      |          | X |                     |                   | X  |                        |
| Disaster Recovery Plan                    |          | X |                     |                   | X  |                        |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Plans                                                    | In Place |   | Adopted/<br>Updated | Under Development |    | Expected<br>Completion |
|----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                          | Y        | N |                     | Yes               | No |                        |
| Economic Development Plan                                |          | X |                     |                   | X  |                        |
| Emergency Operations Plan (EOP)                          | X        |   |                     |                   |    |                        |
| Environmental Impact Report (EIR)                        |          | X |                     |                   | X  |                        |
| Evacuation Plan                                          | X        |   |                     |                   |    |                        |
| Flood Response Plan                                      |          | X |                     |                   | X  |                        |
| Floodplain Management Plan/Flood Mitigation Plan         |          | X |                     |                   | X  |                        |
| Hazard Mitigation Plan                                   |          | X |                     |                   | X  |                        |
| Historic Preservation Plan                               |          | X |                     |                   | X  |                        |
| Natural Resource Protection Plan (NRPP)                  |          | X |                     |                   | X  |                        |
| Open Space Management Plan                               |          | X |                     |                   | X  |                        |
| Threat Hazard Identification and Risk Assessment (THIRA) |          | X |                     |                   | X  |                        |

### 2.3.6.3. REGULATORY TOOLS AND PROGRAMS

| Tool or Program                                           | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|-----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                           | Y        | N |                     | Yes               | No |                        |
| Building Codes                                            | X        |   |                     |                   |    |                        |
| Citizen Corps - Community Emergency Response Team         |          | X |                     |                   | X  |                        |
| Community Rating System (CRS Program of the NFIP)         |          | X |                     |                   | X  |                        |
| Emergency Management Accreditation Program (EMAP)         |          | X |                     |                   | X  |                        |
| Fire Code                                                 | X        |   |                     |                   |    |                        |
| Firewise Community                                        |          | X |                     |                   | X  |                        |
| Floodplain Management/Flood Damage Prevention Ordinance   |          | X |                     |                   | X  |                        |
| Land Use/Development Planning                             | X        |   |                     |                   |    |                        |
| National Flood Insurance Program (NFIP)                   |          | X |                     |                   | X  |                        |
| Post Disaster Redevelopment/Reconstruction Plan/Ordinance |          | X |                     |                   | X  |                        |
| Storm Ready                                               |          | X |                     |                   | X  |                        |
| Stormwater Management Plan/Ordinance                      |          | X |                     |                   | X  |                        |
| Subdivision Regulations/Ordinance                         |          | X |                     |                   | X  |                        |
| Unified Development Ordinance                             |          | X |                     |                   | X  |                        |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Tool or Program  | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|------------------|----------|---|---------------------|-------------------|----|------------------------|
|                  | Y        | N |                     | Yes               | No |                        |
| Zoning Ordinance |          | X |                     |                   | X  |                        |

### 2.3.6.4. FISCAL CAPACITY

| Fiscal Resource                                           | Never<br>Used | Previously<br>Used | Currently<br>Used | Comments |
|-----------------------------------------------------------|---------------|--------------------|-------------------|----------|
| Capital Improvement Programming                           | X             |                    |                   |          |
| Community Development Block Grants (CDBG)                 | X             |                    |                   |          |
| Development Impact Fees                                   | X             |                    |                   |          |
| FEMA Hazard Mitigation Assistance Grants (HMGP, FMA, PDM) |               | X                  |                   |          |
| Gas/Electric Utility Fees                                 | X             |                    |                   |          |
| General Obligation, Revenue, and/or Special Tax Bonds     |               |                    | X                 |          |
| Homeland Security Grants (HSGP)                           |               |                    | X                 |          |
| Infrastructure Investment and Jobs Act (IIJA)             | X             |                    |                   |          |
| Infrastructure State Revolving Fund loan                  | X             |                    |                   |          |
| Partnering Agreements or Intergovernmental Agreements     | X             |                    |                   |          |
| Sewer/Water Fees                                          | X             |                    |                   |          |
| Special Purpose Taxes (or taxing districts)               |               | X                  |                   |          |
| Stormwater Utility Fees                                   | X             |                    |                   |          |
| USDA Grants                                               |               | X                  |                   |          |
| USDA Rural Development Agency Grants                      | X             |                    |                   |          |
| US Economic Development Administration Grants             | X             |                    |                   |          |

### 2.3.6.5. SELF-ASSESSMENT OF CAPABILITY

| Area                                    | Degree of Capability |          |      |
|-----------------------------------------|----------------------|----------|------|
|                                         | Limited              | Moderate | High |
| Planning and Regulatory Capability      |                      | X        |      |
| Administrative and Technical Capability |                      | X        |      |
| Fiscal Capability                       |                      | X        |      |
| Available Staff                         |                      | X        |      |
| Political Support/Interest              |                      | X        |      |
| Community Support                       |                      | X        |      |

### 2.3.7. URBANDALE COMMUNITY SCHOOL DISTRICT

#### 2.3.7.1. STAFF AND TECHNICAL ASSISTANCE

| Staff or Personnel Resource                                                                             | Yes | No | Department or Single Staff Member | Comments |
|---------------------------------------------------------------------------------------------------------|-----|----|-----------------------------------|----------|
| Emergency Manager                                                                                       |     | X  |                                   |          |
| Engineers or professionals trained in construction practices related to buildings and/or infrastructure |     | X  |                                   |          |
| Environmental Justice Specialists                                                                       |     | X  |                                   |          |
| Fiscal Management or Procurement Specialists                                                            |     | X  |                                   |          |
| Floodplain Manager                                                                                      |     | X  |                                   |          |
| Housing Specialist(s)                                                                                   |     | X  |                                   |          |
| Land Surveyors                                                                                          |     | X  |                                   |          |
| Land Use/Management/Development Planning                                                                |     | X  |                                   |          |
| Planners or engineers with an understanding of natural and/or human-caused hazards                      |     | X  |                                   |          |
| Recreation/Green Space Specialist(s)                                                                    |     | X  |                                   |          |
| Resource Development Staff or Grant-writing                                                             |     | X  |                                   |          |
| Scientists familiar with the hazards of the community                                                   |     | X  |                                   |          |
| Staff experienced with Geographic Information Systems (GIS) or HAZUS                                    |     | X  |                                   |          |
| Staff with education or expertise to assess the community's vulnerability to hazards                    |     | X  |                                   |          |
| Transportation Manager / Traffic Engineer                                                               |     | X  |                                   |          |

#### 2.3.7.2. PLANNING MECHANISMS

| Plans                                     | In Place |   | Adopted/Updated | Under Development |    | Expected Completion |
|-------------------------------------------|----------|---|-----------------|-------------------|----|---------------------|
|                                           | Y        | N |                 | Yes               | No |                     |
| Comprehensive Plan (Polk 2050)            |          | X |                 |                   | X  |                     |
| Climate Action Plan/Resiliency Plan       |          | X |                 |                   | X  |                     |
| Community Wildfire Protection Plan (CWPP) |          | X |                 |                   | X  |                     |
| Comprehensive Emergency Management Plan   |          | X |                 |                   | X  |                     |
| General Plan                              |          | X |                 |                   | X  |                     |
| Continuity of Operations Plan (COOP)      |          | X |                 |                   | X  |                     |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Plans                                                    | In Place |   | Adopted/<br>Updated | Under Development |    | Expected<br>Completion |
|----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                          | Y        | N |                     | Yes               | No |                        |
| Disaster Recovery Plan                                   |          | X |                     |                   | X  |                        |
| Economic Development Plan                                |          | X |                     |                   | X  |                        |
| Emergency Operations Plan (EOP)                          | X        |   |                     |                   |    |                        |
| Environmental Impact Report (EIR)                        |          | X |                     |                   | X  |                        |
| Evacuation Plan                                          | X        |   |                     |                   |    |                        |
| Flood Response Plan                                      |          | X |                     |                   | X  |                        |
| Floodplain Management Plan/Flood Mitigation Plan         |          | X |                     |                   | X  |                        |
| Hazard Mitigation Plan                                   |          | X |                     |                   | X  |                        |
| Historic Preservation Plan                               |          | X |                     |                   | X  |                        |
| Natural Resource Protection Plan (NRPP)                  |          | X |                     |                   | X  |                        |
| Open Space Management Plan                               |          | X |                     |                   | X  |                        |
| Threat Hazard Identification and Risk Assessment (THIRA) |          | X |                     |                   | X  |                        |

### 2.3.7.3. REGULATORY TOOLS AND PROGRAMS

| Tool or Program                                           | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|-----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                           | Y        | N |                     | Yes               | No |                        |
| Building Codes                                            |          | X |                     |                   | X  |                        |
| Citizen Corps - Community Emergency Response Team         |          | X |                     |                   | X  |                        |
| Community Rating System (CRS Program of the NFIP)         |          | X |                     |                   | X  |                        |
| Emergency Management Accreditation Program (EMAP)         |          | X |                     |                   | X  |                        |
| Fire Code                                                 | X        |   |                     |                   |    |                        |
| Firewise Community                                        |          | X |                     |                   | X  |                        |
| Floodplain Management/Flood Damage Prevention Ordinance   |          | X |                     |                   | X  |                        |
| Land Use/Development Planning                             |          | X |                     |                   | X  |                        |
| National Flood Insurance Program (NFIP)                   |          | X |                     |                   | X  |                        |
| Post Disaster Redevelopment/Reconstruction Plan/Ordinance |          | X |                     |                   | X  |                        |
| Storm Ready                                               |          | X |                     |                   | X  |                        |
| Stormwater Management Plan/Ordinance                      | X        |   |                     |                   |    |                        |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Tool or Program                   | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|-----------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                   | Y        | N |                     | Yes               | No |                        |
| Subdivision Regulations/Ordinance |          | X |                     |                   | X  |                        |
| Unified Development Ordinance     |          | X |                     |                   | X  |                        |
| Zoning Ordinance                  | X        |   |                     |                   |    |                        |

### 2.3.7.4. FISCAL CAPACITY

| Fiscal Resource                                           | Never<br>Used | Previously<br>Used | Currently<br>Used | Comments             |
|-----------------------------------------------------------|---------------|--------------------|-------------------|----------------------|
| Capital Improvement Programming                           |               |                    | X                 | 10 Year Capital Plan |
| Community Development Block Grants (CDBG)                 | X             |                    |                   |                      |
| Development Impact Fees                                   | X             |                    |                   |                      |
| FEMA Hazard Mitigation Assistance Grants (HMGP, FMA, PDM) | X             |                    |                   |                      |
| Gas/Electric Utility Fees                                 | X             |                    |                   |                      |
| General Obligation, Revenue, and/or Special Tax Bonds     |               |                    | X                 | New Buildings        |
| Homeland Security Grants (HSGP)                           | X             |                    |                   |                      |
| Infrastructure Investment and Jobs Act (IIJA)             | X             |                    |                   |                      |
| Infrastructure State Revolving Fund loan                  | X             |                    |                   |                      |
| Partnering Agreements or Intergovernmental Agreements     |               |                    | X                 | 28E Agreements       |
| Sewer/Water Fees                                          | X             |                    |                   |                      |
| Special Purpose Taxes (or taxing districts)               | X             |                    |                   |                      |
| Stormwater Utility Fees                                   | X             |                    |                   |                      |
| USDA Grants                                               | X             |                    |                   |                      |
| USDA Rural Development Agency Grants                      | X             |                    |                   |                      |
| US Economic Development Administration Grants             | X             |                    |                   |                      |

### 2.3.7.5. SELF-ASSESSMENT OF CAPABILITY

| Area                                    | Degree of Capability |          |      |
|-----------------------------------------|----------------------|----------|------|
|                                         | Limited              | Moderate | High |
| Planning and Regulatory Capability      |                      | X        |      |
| Administrative and Technical Capability |                      | X        |      |
| Fiscal Capability                       |                      | X        |      |
| Available Staff                         |                      | X        |      |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Area                       | Degree of Capability |          |      |
|----------------------------|----------------------|----------|------|
|                            | Limited              | Moderate | High |
| Political Support/Interest | X                    |          |      |
| Community Support          |                      | X        |      |

### 2.3.8. WEST DES MOINES COMMUNITY SCHOOL DISTRICT

#### 2.3.8.1. STAFF AND TECHNICAL ASSISTANCE

| Staff or Personnel Resource                                                                             | Yes | No | Department or Single Staff Member | Comments               |
|---------------------------------------------------------------------------------------------------------|-----|----|-----------------------------------|------------------------|
| Emergency Manager                                                                                       | X   |    | Single Staff                      | Security Specialist    |
| Engineers or professionals trained in construction practices related to buildings and/or infrastructure | X   |    |                                   | Third Party Contractor |
| Environmental Justice Specialists                                                                       |     |    | Unknown                           |                        |
| Fiscal Management or Procurement Specialists                                                            | X   |    | Department                        |                        |
| Floodplain Manager                                                                                      |     |    | Unknown                           |                        |
| Housing Specialist(s)                                                                                   |     |    | Unknown                           |                        |
| Land Surveyors                                                                                          | X   |    |                                   | Third Party Contractor |
| Land Use/Management/Development Planning                                                                | X   |    |                                   | Third Party Contractor |
| Planners or engineers with an understanding of natural and/or human-caused hazards                      | X   |    |                                   | Third Party Contractor |
| Recreation/Green Space Specialist(s)                                                                    |     |    | Unknown                           |                        |
| Resource Development Staff or Grant-writing                                                             |     |    | Unknown                           |                        |
| Scientists familiar with the hazards of the community                                                   |     |    | Unknown                           |                        |
| Staff experienced with Geographic Information Systems (GIS) or HAZUS                                    |     |    | Unknown                           |                        |
| Staff with education or expertise to assess the community's vulnerability to hazards                    |     |    | Unknown                           |                        |
| Transportation Manager / Traffic Engineer                                                               | X   |    | Single Staff                      |                        |

#### 2.3.8.2. PLANNING MECHANISMS

| Plans                                     | In Place |   | Adopted/Updated | Under Development |    | Expected Completion |
|-------------------------------------------|----------|---|-----------------|-------------------|----|---------------------|
|                                           | Y        | N |                 | Yes               | No |                     |
| Comprehensive Plan (Polk 2050)            |          | X |                 |                   | X  |                     |
| Climate Action Plan/Resiliency Plan       |          | X |                 |                   | X  |                     |
| Community Wildfire Protection Plan (CWPP) |          | X |                 |                   | X  |                     |
| Comprehensive Emergency Management Plan   | X        |   |                 | X                 |    | Late 2025           |
| General Plan                              | X        |   |                 |                   |    |                     |
| Continuity of Operations Plan (COOP)      | X        |   |                 |                   |    |                     |



## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Plans                                                    | In Place |   | Adopted/<br>Updated | Under Development |    | Expected<br>Completion                |
|----------------------------------------------------------|----------|---|---------------------|-------------------|----|---------------------------------------|
|                                                          | Y        | N |                     | Yes               | No |                                       |
| Disaster Recovery Plan                                   |          | X |                     |                   | X  |                                       |
| Economic Development Plan                                | Unknown  |   |                     |                   |    |                                       |
| Emergency Operations Plan (EOP)                          | X        |   |                     |                   |    |                                       |
| Environmental Impact Report (EIR)                        |          | X |                     |                   | X  |                                       |
| Evacuation Plan                                          | X        |   |                     |                   |    |                                       |
| Flood Response Plan                                      | Unknown  |   |                     |                   |    |                                       |
| Floodplain Management Plan/Flood Mitigation Plan         |          | X |                     |                   | X  |                                       |
| Hazard Mitigation Plan                                   |          | X |                     |                   | X  |                                       |
| Historic Preservation Plan                               |          | X |                     |                   | X  |                                       |
| Natural Resource Protection Plan (NRPP)                  |          | X |                     |                   | X  |                                       |
| Open Space Management Plan                               |          | X |                     |                   | X  |                                       |
| Threat Hazard Identification and Risk Assessment (THIRA) | X        |   |                     | X                 |    | Vulnerability Assessments – Late 2025 |

### 2.3.8.3. REGULATORY TOOLS AND PROGRAMS

| Tool or Program                                           | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|-----------------------------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                                           | Y        | N |                     | Yes               | No |                        |
| Building Codes                                            | X        |   |                     |                   |    |                        |
| Citizen Corps - Community Emergency Response Team         | Unknown  |   |                     |                   |    |                        |
| Community Rating System (CRS Program of the NFIP)         | Unknown  |   |                     |                   |    |                        |
| Emergency Management Accreditation Program (EMAP)         | Unknown  |   |                     |                   |    |                        |
| Fire Code                                                 | X        |   |                     |                   |    |                        |
| Firewise Community                                        | Unknown  |   |                     |                   |    |                        |
| Floodplain Management/Flood Damage Prevention Ordinance   | Unknown  |   |                     |                   |    |                        |
| Land Use/Development Planning                             | Unknown  |   |                     |                   |    |                        |
| National Flood Insurance Program (NFIP)                   | Unknown  |   |                     |                   |    |                        |
| Post Disaster Redevelopment/Reconstruction Plan/Ordinance | Unknown  |   |                     |                   |    |                        |
| Storm Ready                                               | Unknown  |   |                     |                   |    |                        |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Tool or Program                      | In Place |   | Adopted/<br>Updated | Under Development |    | Expect to<br>Implement |
|--------------------------------------|----------|---|---------------------|-------------------|----|------------------------|
|                                      | Y        | N |                     | Yes               | No |                        |
| Stormwater Management Plan/Ordinance |          |   |                     |                   |    | Unknown                |
| Subdivision Regulations/Ordinance    |          |   |                     |                   |    | Unknown                |
| Unified Development Ordinance        |          |   |                     |                   |    | Unknown                |
| Zoning Ordinance                     |          |   |                     |                   |    | Unknown                |

### 2.3.8.4. FISCAL CAPACITY

| Fiscal Resource                                           | Never<br>Used | Previously<br>Used | Currently<br>Used | Comments       |
|-----------------------------------------------------------|---------------|--------------------|-------------------|----------------|
| Capital Improvement Programming                           | X             |                    |                   | Not Applicable |
| Community Development Block Grants (CDBG)                 | X             |                    |                   | Not Applicable |
| Development Impact Fees                                   | X             |                    |                   | Not Applicable |
| FEMA Hazard Mitigation Assistance Grants (HMGP, FMA, PDM) |               | X                  |                   |                |
| Gas/Electric Utility Fees                                 | X             |                    |                   | Not Applicable |
| General Obligation, Revenue, and/or Special Tax Bonds     |               |                    | X                 |                |
| Homeland Security Grants (HSGP)                           |               |                    | X                 |                |
| Infrastructure Investment and Jobs Act (IIJA)             | X             |                    |                   | Not Applicable |
| Infrastructure State Revolving Fund loan                  | X             |                    |                   | Not Applicable |
| Partnering Agreements or Intergovernmental Agreements     |               |                    | X                 |                |
| Sewer/Water Fees                                          | X             |                    |                   | Not Applicable |
| Special Purpose Taxes (or taxing districts)               | X             |                    |                   | Not Applicable |
| Stormwater Utility Fees                                   | X             |                    | 4                 | Not Applicable |
| USDA Grants                                               | X             |                    |                   | Not Applicable |
| USDA Rural Development Agency Grants                      | X             |                    |                   | Not Applicable |
| US Economic Development Administration Grants             | X             |                    |                   | Not Applicable |

### 2.3.8.5. SELF-ASSESSMENT OF CAPABILITY

| Area                                    | Degree of Capability |          |      |
|-----------------------------------------|----------------------|----------|------|
|                                         | Limited              | Moderate | High |
| Planning and Regulatory Capability      |                      |          | X    |
| Administrative and Technical Capability |                      |          | X    |
| Fiscal Capability                       |                      |          | X    |

| Area                       | Degree of Capability |          |      |
|----------------------------|----------------------|----------|------|
|                            | Limited              | Moderate | High |
| Available Staff            |                      | X        |      |
| Political Support/Interest |                      | X        |      |
| Community Support          |                      |          | X    |

## 2.4. NFIP PARTICIPATION AND COMPLIANCE

The National Flood Insurance Program (NFIP) provides flood insurance to property owners, renters, and businesses in flood prone areas across the country. NFIP participating communities agree to adopt, implement, and enforce local flood plain regulations to protect lives and reduce the risk from future flooding. Participation in the NFIP is voluntary; the following communities in Polk County currently do not participate in the NFIP:

- Alleman
- Delaware Township
- Saylor Township

The City of Alleman expects to adopt its flood plan in Summer 2024, and local officials anticipate that the community will begin participating in the NFIP shortly after the adoption of the flood plan. Delaware Township and Saylor Township have not expressed an expectation that either community will participate in the NFIP in the near future, mainly due to funding, logistical, and administrative constraints. The following plan participants are not municipal governments and do not have residents, and thus are ineligible to participate in the NFIP:

- Des Moines Water Works
- Ankeny School District 261
- Bondurant-Farrar School District 720
- Des Moines Independent School District 1737
- Johnston School District 3231
- North Polk School District 4779
- Southeast Polk School District 6101
- Urbandale School District 6579
- West Des Moines School District 6957

The table below addresses participating jurisdictions continued compliance with NFIP requirements:

**Table 9- NFIP Participation and Compliance**

| <b>Jurisdiction</b>        | <b>Has your community adopted a floodplain management ordinance that meets NFIP Minimum criteria?</b> | <b>Has your community adopted the latest effective Flood Insurance Rate Map (FIRM)?</b> | <b>Do you regulate/ permit development in the Special Flood Hazard Area (SFHA)?</b> | <b>Which position or agency is in charge of NFIP compliance for your community?</b> | <b>How do you implement the substantial improvement / substantial damage provisions of your floodplain management ordinance?</b> |
|----------------------------|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Unincorporated Polk County | Yes                                                                                                   | Yes                                                                                     | Yes                                                                                 | Polk County Public Works – Planning and Development                                 | Yes; via building permit process                                                                                                 |
| Altoona                    | Yes                                                                                                   | Yes                                                                                     | Yes                                                                                 | City Engineer                                                                       | Yes; via building permit process                                                                                                 |
| Ankeny                     | Yes                                                                                                   | Yes                                                                                     | Yes                                                                                 | Senior Planner, Community Development Department                                    | N/A; no projects have met requirement in planning period                                                                         |
| Bondurant                  | Yes; adopted 1/7/19                                                                                   | Yes                                                                                     | Yes                                                                                 | City Administrator                                                                  | Yes; regulated via ordinance 190107-200                                                                                          |
| Clive                      | Yes; adopted 2021                                                                                     | Yes; adopted 2019                                                                       | Yes                                                                                 | Community Development Department                                                    | Yes; Review of Floodplain Development Permit application prior to issuance of any building permit request in SFHA                |
| Des Moines                 | Yes                                                                                                   | Yes                                                                                     | Yes                                                                                 | Civil Engineer with Permit & Development Division of Engineering Department         | Yes; via chapter 50 of city's municipal code                                                                                     |
| Elkhart                    | No                                                                                                    | No                                                                                      | No                                                                                  | Not Specified                                                                       | Not Specified                                                                                                                    |

## 2: PLANNING AREA PROFILE AND CAPABILITY ASSESSMENT



| Jurisdiction    | Has your community adopted a floodplain management ordinance that meets NFIP Minimum criteria? | Has your community adopted the latest effective Flood Insurance Rate Map (FIRM)? | Do you regulate/ permit development in the Special Flood Hazard Area (SFHA)? | Which position or agency is in charge of NFIP compliance for your community? | How do you implement the substantial improvement / substantial damage provisions of your floodplain management ordinance? |
|-----------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| Grimes          | Yes                                                                                            | Yes                                                                              | Yes                                                                          | Development Services Director                                                | Yes; projects evaluated relative to estimated market valuation at time of permit                                          |
| Johnston        | Yes                                                                                            | Yes                                                                              | Yes                                                                          | Community Development Director                                               | Yes; projects evaluated relative to estimated market valuation at time of permit                                          |
| Mitchellville   | Yes                                                                                            | Yes                                                                              | Yes                                                                          | Zoning Administrator                                                         | Yes; via building permit process                                                                                          |
| Pleasant Hill   | Yes                                                                                            | Yes                                                                              | Yes                                                                          | Senior Building Inspector                                                    | Via Chapter 160 of the City's Municipal code and building permit process                                                  |
| Polk City       | Yes                                                                                            | Yes                                                                              | Yes                                                                          | City Manager                                                                 | Yes; via building permit process                                                                                          |
| Runnells        | Yes                                                                                            | Yes                                                                              | Yes                                                                          | City Clerk                                                                   | Yes; via section 156.05 of the municipal code                                                                             |
| Urbandale       | Yes                                                                                            | Yes                                                                              | Yes                                                                          | City Engineer                                                                | Yes; via a dedicated Floodplain Development Permit process                                                                |
| West Des Moines | Yes                                                                                            | Yes                                                                              | Yes                                                                          | Floodplain Administrator                                                     | Yes; outlined in city ordinance                                                                                           |
| Windsor Heights | Yes                                                                                            | Yes                                                                              | Yes                                                                          | Floodplain Administrator                                                     | Yes; via section 185.07 of the municipal code                                                                             |

# Chapter 3:

## Risk Assessment



## 3. HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

---

**44 CFR Requirement §201.6(c)(2): [The plan shall include] A risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards**

---

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

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

- Step 1—Identify Hazards
- Step 2—Profile Hazard Events
- Step 3—Inventory Assets
- Step 4—Estimate Losses

### 3.1 HAZARD IDENTIFICATION

The 22 hazards identified for this plan update are listed below in alphabetical order.

- Animal/Crop/Plant Disease
- Climate Change
- Cyberattacks
- Dam Failure
- Drought

- Earthquake
- Expansive Soils
- Extreme Temperature
- Flash Flooding
- Grass or Wildland Fire
- Hazardous Materials
- Human Disease
- Infrastructure Failure
- Levee Failure
- River Flooding
- Sinkholes/Landslide
- Structural Fire
- Thunderstorm with lightning/hail
- Tornado
- Transportation Incident
- Windstorm
- Winter Storm

#### 3.1.1 REVIEW OF EXISTING MITIGATION PLANS

Prior to 2009, Hazard Mitigation Planning in Polk County was accomplished on a jurisdictional basis. In 2009, the unincorporated county and incorporated municipalities came together to coordinate mitigation planning for the entire Polk County planning area. This coordinated effort resulted in the Polk County Multi-jurisdictional Hazard Mitigation Plan, approved by FEMA on July 9, 2009 (hereafter referred to as the 2009 Polk County Hazard Mitigation Plan). In 2014, the first update of the Polk County Multi-Jurisdictional Hazard Mitigation Plan was completed, approved, and adopted as was the subsequent update in 2019.

After a review of the hazards, it was agreed that the hazards/hazard naming for this update will be consistent with the 2023 Iowa State Hazard Mitigation Plan with the following exceptions:

- Climate change will be added as a hazard to be profiled
- Cyberattacks will be added as a hazard to be profiled
- Extreme Heat is now Extreme Temperature
- Flooding Hazard will be separated into separate sections: Flash Flooding and Flooding



- Sinkholes and landslides will be combined into one hazard
- Structural Fire will be profiled separate from Infrastructure Failure
- Dam and Levee failure will be combined into one hazard
- Terrorism will not be included as a profiled hazard
- Radiological Incident will not be included as a profiled hazard

The rational for the hazards not including in this 2024 plan update is provided below:

Terrorism: Polk County utilizes other planning mechanisms to perform risk assessment for terrorism in the planning area. In addition, since the Hazard Mitigation Plan has a strong emphasis on public participation, it was determined that discussion of vulnerabilities to terrorism should not be included in this public document.

Radiological Incident: Polk County is not within the Emergency Planning Zone of any nuclear power plant facilities. Therefore, it was determined that Radiological Incident would not be analyzed as a separate hazard. However, transportation incidents involving radioactive materials can occur within the planning area. The Transportation Incident Hazard will include assessment of this component of radiological incidents.

#### 3.1.2 DISASTER DECLARATION HISTORY

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

FEMA also issues emergency declarations, which are more limited in scope and do not include the long-term federal recovery programs of major disaster declarations. Determinations for declaration type are based on scale and type of damages and institutions or industrial sectors affected. The table below provides additional information on federal disaster declarations which applied to Polk County from 1953 to 2024.

**Table 10 - FEMA Disaster Declarations that included Polk County, Iowa, 1953-2024**

| Disaster Number | Description   | Declaration Date & Incident Period    | Individual Assistance (IA)<br>Public Assistance (PA) |
|-----------------|---------------|---------------------------------------|------------------------------------------------------|
| DR-4784         | Severe storms | 05-24-2024<br>05-20-2024 – 05-21-2024 | IA                                                   |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

| Disaster Number | Description                                               | Declaration Date & Incident Period    | Individual Assistance (IA)<br>Public Assistance (PA) |
|-----------------|-----------------------------------------------------------|---------------------------------------|------------------------------------------------------|
| DR-4779         | Tornado                                                   | 05-14-2024<br>04-26-2024 – 04-27-2024 | IA                                                   |
| DR-4557         | Severe storms                                             | 08-17-2020<br>08-10-2020              | IA & PA                                              |
| DR-4483         | COVID-19                                                  | 03-23-2020<br>03-17-2020 – 05-11-2023 | IA & PA                                              |
| EM-3480         | COVID-19                                                  | 03-13-2020<br>01-20-2020 – 05-11-2023 | N/A                                                  |
| DR-4421         | Severe storms, Flooding                                   | 03-23-2019<br>03-12-2019 – continuing | IA & PA                                              |
| DR-4386         | Severe Storms, Tornadoes, Straight Line Winds, & Flooding | 8-20-2018<br>6-6-2018 to 7-2-2018     | PA                                                   |
| DR-1930         | Severe Storms, Flooding, & Tornadoes                      | 7-29-2010<br>6-1-2010 to 8-31-2010    | IA & PA                                              |
| DR-1763         | Severe Storms, Tornadoes, & Flooding                      | 5-27-2008<br>5-25-2008 to 8-13-2008   | IA & PA                                              |
| DR-1688         | Severe Winter Storms                                      | 3-14-2007<br>2-23-2007 to 3-2-2007    | PA                                                   |
| DR-1518         | Severe Storms, Tornadoes, & Flooding                      | 5-25-2004<br>5-19-2004 to 6-24-2004   | IA                                                   |
| DR-1230         | Severe Weather, Tornadoes, & Flooding                     | 7-2-1998<br>6-13-1998 to 7-15-1998    | IA & PA                                              |
| DR-1191         | Severe Snow Storm                                         | 11-20-1997<br>10-26-97 to 10-28-1997  | PA                                                   |
| DR-996          | Flooding, Severe Storm                                    | 7-9-1993<br>4-13-1993 to 10-1-1993    | IA & PA                                              |
| DR-868          | Flooding, Severe Storm                                    | 5-26-1990<br>5-18-1990 to 7-6-1990    | IA & PA                                              |
| DR-443          | Flooding, Severe Storm                                    | 6-24-1974 / 6-24-1974                 | IA & PA                                              |
| DR-269          | Heavy Rains, Flooding                                     | 8-14-69 / 8-14-69                     | IA & PA                                              |
| DR-259          | Flooding                                                  | 4-25-1969<br>4-25-1969 to 4-25-1969   | IA & PA                                              |
| DR-193          | Flooding                                                  | 4-22-1965<br>4-22-1965 to 4-22-1965   | IA & PA                                              |

Source: Federal Emergency Management Agency, [www.fema.gov/](https://www.fema.gov/)

In addition to FEMA Disaster Declarations, aid can also be made available through disaster proclamations from the Governor of the State of Iowa. The following table details the five State disaster proclamations covering Polk County since the County's previous plan (2018).

Table 11. Iowa State Disaster Proclamations Since 2018

| Disaster Proclamation Date | Hazard Description                                                                                                                                                                                                                                                                      |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 04/29/2024                 | Severe weather, including damaging winds, straight-line winds, tornadoes, heavy rains, thunderstorms, and flash flooding, resulted in significant damage to public and private property, power outages, and large debris piles.                                                         |
| 03/07/2022                 | A storm system caused severe weather, including damaging winds, heavy rains, thunderstorms, and tornadoes, resulted in death, personal injury, significant damage to public and private property, and power outages.                                                                    |
| 09/15/2020                 | The World Health Organization reported an outbreak of Novel Coronavirus 2019 (COVID-19) in multiple countries, causing illness and death, and the United States Department of Health Services declared a national public health emergency.                                              |
| 09/09/2020                 | A storm system caused severe weather, including damaging winds, straight-line winds, heavy rains, thunderstorms, and flash flooding, resulting in significant damage to public and private property, power outages, large debris piles, and damage to emergency communications systems. |
| 08/11/2020                 | A storm system caused severe weather, including damaging winds, straight-line winds, heavy rains, thunderstorms, and flash flooding, resulting in significant damage to public and private property, power outages, large debris piles, and damage to emergency communications systems. |

3.1.3 RESEARCH AND ADDITIONAL SOURCES

Additional data on locations and past impacts of hazards in the planning area was collected from the following sources:

- Iowa Hazard Mitigation Plan (September 2023);
- Polk County Multi-Jurisdictional Hazard Mitigation Plan (2018);

- Polk County Multi-Jurisdictional Hazard Mitigation Plan (July 2014);
- Federal Emergency Management Agency (FEMA);
- Iowa Department of Natural Resources;
- National Drought Mitigation Center Drought Reporter;
- US Department of Agriculture's (USDA) Risk Management Agency Crop Insurance Statistics;
- Data Collection Guides completed by each jurisdiction;
- Des Moines Area Regional GIS Partnership;
- Environmental Protection Agency;
- Flood Insurance Administration;
- Goods Movement in the Des Moines Metropolitan Area, 2002;
- Iowa Department of Agriculture and Land Stewardship, Division of Soil Conservation;
- Iowa Department of Education, Bureau of Information and Analysis Services;
- Iowa Department of Public Safety;
- Iowa Department of Transportation, Office of Traffic and Safety;
- Iowa Flood Center;
- Iowa State Fire Marshal Division;
- Iowa Utilities Board;
- National Fire Incident Reporting System (NFIRS);
- National Oceanic and Atmospheric Administration's (NOAA) National Climatic Data Center;
- National Oceanic and Atmospheric Administration's (NOAA) National Weather Service, Des Moines Weather Forecast Office;
- Pipeline and Hazardous Materials Safety Administration;
- Polk County Comprehensive Plan;
- Polk County Emergency Management;
- Polk County Preliminary Digital Flood Insurance Rate Map, FEMA;
- Polk County Preliminary Flood Insurance Study, FEMA;
- SILVIS Lab, Department of Forest Ecology and Management, University of Wisconsin;
- The Tomorrow Plan: Partnering for a Greater, Greener Des Moines, July 2013 Draft;

- U.S. Army Corps of Engineers;
- U.S. Department of Transportation;
- United States Geological Survey; and,
- Various online articles and publications (sources are indicated where data is cited).
- North Raccoon Watershed Management Plan 2020
- City of Clive Mitigation Benefits Estimator Study 2017 – 2021
- City of Ankeny Stormwater Management Plan 2017- 2020
- Walnut Creek Watershed Management Plan, June 2016
- Mud, Camp, and Spring Creek Watershed Management Plan, April 2016
- Fourmile Creek Watershed Management Plan, April 2015
- Fourmile Creek Watershed Study, December 2013
- 2010 West Des Moines Watershed Assessment
- 2009 City of Johnston Watershed Assessment, Stormwater Management and Action Plan
- Flood Protection Study: Grand Avenue to Jordan Creek, 2008
- Fairmeadows Creek Study, 1997
- Grand Avenue River Bottom Area Stormwater Drainage Study, 1989
- Jordan Creek Floodplain Study, 1980
- Jordan Creek Unsteady Flow Analysis, April 1996
- Jordan Creek Watershed Stormwater Master Plan, 1992
- West Des Moines Storm Drainage Study 1975

#### 3.1.4 HAZARDS IDENTIFIED

Through the hazard identification review process, 22 natural and human-caused/technological hazards that have the potential to significantly affect the planning area were chosen for further analysis in the risk assessment. The hazards identified for this plan update are listed below in alphabetical order

- Animal/Crop/Plant Disease
- Climate Change
- Cyberattacks
- Dam Failure
- Drought

- Earthquake
- Expansive Soils
- Extreme Temperature
- Flash Flooding
- Grass or Wildland Fire
- Hazardous Materials
- Human Disease
- Infrastructure Failure
- Levee Failure
- River Flooding
- Sinkholes/Landslide
- Structural Fire
- Thunderstorm with lightning/hail
- Tornado
- Transportation Incident
- Windstorm
- Winter Storm

Although 22 hazards with the potential to significantly affect the planning area were identified and selected for additional analysis, not all hazards impact every jurisdiction. The hazards which pose an acute risk to specific jurisdictions are dam failure and levee failure. The particular impacts of the other 20 hazards profiled may vary slightly depending on the characteristics of the affected jurisdiction(s), but the overall vulnerability of Polk County jurisdictions to these hazards is considered to be equal. Table 12 provides a summary of the jurisdictions impacted by each hazard. An “x” indicates the jurisdiction is impacted by the hazard. A “-” indicates the hazard is not applicable to that jurisdiction.

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

Table 12 - Hazards Identified for Each Jurisdiction

| Jurisdiction          | Animal/Plant/Crop Disease | Climate Change | Cyberattacks | Dam Failure | Drought | Earthquake | Expansive Soils | Extreme Temperature | Flash Flooding | Grass/Wildland Fire | HAZMAT incident | Human Disease | Infrastructure Failure | Levee Failure | River Flooding | Sinkholes/Landslide | Structural Fire | Thunderstorm/Lightning/Hail | Tornado | Transportation Incident | Windstorm | Winter Storm |
|-----------------------|---------------------------|----------------|--------------|-------------|---------|------------|-----------------|---------------------|----------------|---------------------|-----------------|---------------|------------------------|---------------|----------------|---------------------|-----------------|-----------------------------|---------|-------------------------|-----------|--------------|
| Polk County           | X                         | X              | X            | X           | X       | X          | X               | X                   | X              | X                   | X               | X             | X                      | X             | X              | X                   | X               | X                           | X       | X                       | X         | X            |
| City of Alleman       | X                         | X              | X            | -           | X       | X          | X               | X                   | X              | X                   | X               | X             | X                      | -             | X              | X                   | X               | X                           | X       | X                       | X         | X            |
| City of Altoona       | X                         | X              | X            | -           | X       | X          | X               | X                   | X              | X                   | X               | X             | X                      | -             | X              | X                   | X               | X                           | X       | X                       | X         | X            |
| City of Ankeny        | X                         | X              | X            | -           | X       | X          | X               | X                   | X              | X                   | X               | X             | X                      | -             | X              | X                   | X               | X                           | X       | X                       | X         | X            |
| City of Bondurant     | X                         | X              | X            | -           | X       | X          | X               | X                   | X              | X                   | X               | X             | X                      | -             | X              | X                   | X               | X                           | X       | X                       | X         | X            |
| City of Clive         | X                         | X              | X            | X           | X       | X          | X               | X                   | X              | X                   | X               | X             | X                      | -             | X              | X                   | X               | X                           | X       | X                       | X         | X            |
| Deleware Township     | X                         | X              | X            | X           | X       | X          | X               | X                   | X              | X                   | X               | X             | X                      | -             | X              | X                   | X               | X                           | X       | X                       | X         | X            |
| City of Des Moines    | X                         | X              | X            | X           | X       | X          | X               | X                   | X              | X                   | X               | X             | X                      | X             | X              | X                   | X               | X                           | X       | X                       | X         | X            |
| City of Elkhart       | X                         | X              | X            | -           | X       | X          | X               | X                   | X              | X                   | X               | X             | X                      | -             | X              | X                   | X               | X                           | X       | X                       | X         | X            |
| City of Grimes        | X                         | X              | X            | X           | X       | X          | X               | X                   | X              | X                   | X               | X             | X                      | -             | X              | X                   | X               | X                           | X       | X                       | X         | X            |
| City of Johnston      | X                         | X              | X            | X           | X       | X          | X               | X                   | X              | X                   | X               | X             | X                      | -             | X              | X                   | X               | X                           | X       | X                       | X         | X            |
| City of Mitchellville | X                         | X              | X            | -           | X       | X          | X               | X                   | X              | X                   | X               | X             | X                      | -             | X              | X                   | X               | X                           | X       | X                       | X         | X            |
| City of Pleasant Hill | X                         | X              | X            | -           | X       | X          | X               | X                   | X              | X                   | X               | X             | X                      | X             | X              | X                   | X               | X                           | X       | X                       | X         | X            |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

| <b>Jurisdiction</b>          | <b>Animal/Plant/Crop Disease</b> | <b>Climate Change</b> | <b>Cyberattacks</b> | <b>Dam Failure</b> | <b>Drought</b> | <b>Earthquake</b> | <b>Expansive Soils</b> | <b>Extreme Temperature</b> | <b>Flash Flooding</b> | <b>Grass/Wildland Fire</b> | <b>HAZMAT Incident</b> | <b>Human Disease</b> | <b>Infrastructure Failure</b> | <b>Levee Failure</b> | <b>River Flooding</b> | <b>Sinkholes/Landslide</b> | <b>Structural Fire</b> | <b>Thunderstorm/Lightning/Hail</b> | <b>Tornado</b> | <b>Transportation Incident</b> | <b>Windstorm</b> | <b>Winter Storm</b> |
|------------------------------|----------------------------------|-----------------------|---------------------|--------------------|----------------|-------------------|------------------------|----------------------------|-----------------------|----------------------------|------------------------|----------------------|-------------------------------|----------------------|-----------------------|----------------------------|------------------------|------------------------------------|----------------|--------------------------------|------------------|---------------------|
| City of Polk City            | X                                | X                     | X                   | X                  | X              | X                 | X                      | X                          | X                     | X                          | X                      | X                    | X                             | -                    | X                     | X                          | X                      | X                                  | X              | X                              | X                | X                   |
| City of Runnells             | X                                | X                     | X                   | X                  | X              | X                 | X                      | X                          | X                     | X                          | X                      | X                    | X                             | -                    | X                     | X                          | X                      | X                                  | X              | X                              | X                | X                   |
| Saylor Township              | X                                | X                     | X                   | X                  | X              | X                 | X                      | X                          | X                     | X                          | X                      | X                    | X                             | -                    | X                     | X                          | X                      | X                                  | X              | X                              | X                | X                   |
| City of Urbandale            | X                                | X                     | X                   | X                  | X              | X                 | X                      | X                          | X                     | -                          | X                      | X                    | X                             | -                    | X                     | X                          | X                      | X                                  | X              | X                              | X                | X                   |
| City of West Des Moines      | X                                | X                     | X                   | X                  | X              | X                 | X                      | X                          | X                     | X                          | X                      | X                    | X                             | X                    | X                     | X                          | X                      | X                                  | X              | X                              | X                | X                   |
| City of Windsor Heights      | X                                | X                     | X                   | X                  | X              | X                 | X                      | X                          | X                     | -                          | X                      | X                    | X                             | -                    | X                     | X                          | X                      | X                                  | X              | X                              | X                | X                   |
| Des Moines Water Works       | X                                | X                     | X                   | -                  | X              | X                 | X                      | X                          | X                     | X                          | X                      | X                    | X                             | X                    | X                     | X                          | X                      | X                                  | X              | X                              | X                | X                   |
| <b>School Districts</b>      |                                  |                       |                     |                    |                |                   |                        |                            |                       |                            |                        |                      |                               |                      |                       |                            |                        |                                    |                |                                |                  |                     |
| Ankeny, 261                  | X                                | X                     | X                   | -                  | X              | X                 | X                      | X                          | X                     | X                          | X                      | X                    | X                             | -                    | X                     | X                          | X                      | X                                  | X              | X                              | X                | X                   |
| Bondurant-Farrar, 720        | X                                | X                     | X                   | -                  | X              | X                 | X                      | X                          | X                     | X                          | X                      | X                    | X                             | -                    | X                     | X                          | X                      | X                                  | X              | X                              | X                | X                   |
| Des Moines Independent, 1737 | X                                | X                     | X                   | X                  | X              | X                 | X                      | X                          | X                     | X                          | X                      | X                    | X                             | X                    | X                     | X                          | X                      | X                                  | X              | X                              | X                | X                   |
| Johnston, 3231               | X                                | X                     | X                   | X                  | X              | X                 | X                      | X                          | X                     | X                          | X                      | X                    | X                             | -                    | X                     | X                          | X                      | X                                  | X              | X                              | X                | X                   |
| North Polk, 4779             | X                                | X                     | X                   | -                  | X              | X                 | X                      | X                          | X                     | X                          | X                      | X                    | X                             | -                    | X                     | X                          | X                      | X                                  | X              | X                              | X                | X                   |
| Saydel, 5805                 | X                                | X                     | X                   | X                  | X              | X                 | X                      | X                          | X                     | X                          | X                      | X                    | X                             | -                    | X                     | X                          | X                      | X                                  | X              | X                              | X                | X                   |
| Southeast Polk, 6101         | X                                | X                     | X                   | -                  | X              | X                 | X                      | X                          | X                     | X                          | X                      | X                    | X                             | -                    | X                     | X                          | X                      | X                                  | X              | X                              | X                | X                   |



### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

| <b>Jurisdiction</b>   | <b>Animal/Plant/Crop Disease</b> | <b>Climate Change</b> | <b>Cyberattacks</b> | <b>Dam Failure</b> | <b>Drought</b> | <b>Earthquake</b> | <b>Expansive Soils</b> | <b>Extreme Temperature</b> | <b>Flash Flooding</b> | <b>Grass/Wildland Fire</b> | <b>HAZMAT incident</b> | <b>Human Disease</b> | <b>Infrastructure Failure</b> | <b>Levee Failure</b> | <b>River Flooding</b> | <b>Sinkholes/Landslide</b> | <b>Structural Fire</b> | <b>Thunderstorm/Lightning/Hail</b> | <b>Tornado</b> | <b>Transportation Incident</b> | <b>Windstorm</b> | <b>Winter Storm</b> |
|-----------------------|----------------------------------|-----------------------|---------------------|--------------------|----------------|-------------------|------------------------|----------------------------|-----------------------|----------------------------|------------------------|----------------------|-------------------------------|----------------------|-----------------------|----------------------------|------------------------|------------------------------------|----------------|--------------------------------|------------------|---------------------|
| Urbandale, 6579       | X                                | X                     | X                   | X                  | X              | X                 | X                      | X                          | X                     | X                          | X                      | X                    | X                             | -                    | X                     | X                          | X                      | X                                  | X              | X                              | X                | X                   |
| West Des Moines, 6957 | X                                | X                     | X                   | X                  | X              | X                 | X                      | X                          | X                     | X                          | X                      | X                    | X                             | X                    | X                     | X                          | X                      | X                                  | X              | X                              | X                | X                   |

3.2 MULTI-JURISDICTIONAL RISK ASSESSMENT

For this multi-jurisdictional plan, the risks are assessed for each jurisdiction where they deviate from the risks facing the entire planning area. The planning area is fairly uniform in terms of climate and topography as well as building construction characteristics. Accordingly, the geographic areas of occurrence for weather-related hazards do not vary substantially across the planning area for most hazards. Regarding vulnerability, the more urbanized parts of the county, like the Des Moines metropolitan area, generally have more assets which are vulnerable to weather-related hazards. Rural parts of Polk County tend to have fewer vulnerable assets simply due to the smaller sizes of these communities. However, it may be more difficult for emergency services to reach the rural parts of the county, particularly following tornadoes, severe winter storms, and other hazards which can obstruct vehicular access. Similarly, rural areas tend to have more assets (crops/livestock) which are vulnerable to animal/plant/crop disease. The vulnerability differences across participating jurisdictions are discussed in greater detail in the vulnerability sections of each hazard.

3.2.1 PROBABILITY SCORING METHODOLOGY

The Polk County Hazard Mitigation Planning Committee used the same methodology to score and prioritize the hazards as was used in the previous iteration of this plan. This prioritization was based on a hazard scoring system that considers four elements of risk: probability, magnitude/severity, warning time, and duration. The table below provides definitions for each of the four elements along with associated rating levels.

Table 13 - Probability Score Scale and Definitions

| Probability                                                                                                                                                                                                   | Definitions                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Probability: Reflects the likelihood of the hazard occurring again in the future, considering both the hazard's historical occurrence and the projected likelihood of the hazard occurring in any given year. |                                                                                                                                                                                                   |
| Unlikely                                                                                                                                                                                                      | Less than 10% probability in any given year (up to 1 in 10 chance of occurring), history of events is less than 10% likely or the event is unlikely but there is a possibility of its occurrence. |
| Occasional                                                                                                                                                                                                    | Between 10% and 20% probability in any given year (up to 1 in 5 chance of occurring), history of events is greater than 10% but less than 20% or the event could possibly occur.                  |
| Likely                                                                                                                                                                                                        | Between 20% and 33% probability in any given year (up to 1 in 3 chance of occurring), history of events is greater than 20% but less than 33% or the event is likely to occur.                    |
| Highly Likely                                                                                                                                                                                                 | More than 33% probability in any given year (event has up to a 1 in 1 chance of occurring), history of events is greater than 33% likely or the event is highly likely to occur.                  |

Table 14 - Polk County Planning Area Probability Results

| Hazard                    | Probability   |
|---------------------------|---------------|
| Animal/Plant/Crop Disease | Unlikely      |
| Climate Change            | Highly Likely |

|                                      |               |
|--------------------------------------|---------------|
| Cyber Attacks                        | Likely        |
| Dam Failure                          | Unlikely      |
| Drought                              | Highly Likely |
| Earthquakes                          | Unlikely      |
| Expansive Soils                      | Unlikely      |
| Extreme Temperature                  | Occasional    |
| Flash Flooding                       | Highly Likely |
| Grass or Wildland Fire               | Occassional   |
| Hazardous Materials Incident         | Highly Likely |
| Human Disease                        | Highly Likely |
| Infrastructure Failure               | Highly Likely |
| Levee Failure                        | Unlikely      |
| River Flooding                       | Highly Likely |
| Sinkholes/Landslide                  | Occasional    |
| Structural Fire                      | Highly Likely |
| Thunderstorm with Lightning and Hail | Highly Likely |
| Tornado                              | Highly Likely |
| Transportation Incident              | Highly Likely |
| Windstorm                            | Likely        |
| Winter Storm                         | Highly Likely |

#### 3.2.2 HEALTH HAZARD PRIORITIZATION ASSESSMENT

Starting with the 2018 update, this plan update has incorporated a health hazard assessment for each of the hazards, based on the Health Hazard Assessment and Prioritization (hHAP) tool created by the Los Angeles County Department of Public Health (LACDPH) in 2013. Representatives from Polk County Public Health, Broadlawns Medical Center, MercyOne Des Moines Medical Center, Primary Health Care, and UnityPoint Health Des Moines reviewed the previous hHAP ranking results, updated them to reflect changes in risk since the previous plan, and completed the assessment for the two hazards added since 2018 (climate change and cyberattack).

This process scored hazards for four criteria: health severity, community impact, public health system impact, and healthcare system impact. The results of this evaluation, along with the criteria and how they are scored, are found in the tables below. The scores provided by five area healthcare providers were averaged and rounded to the nearest whole number. Scores from three UnityPoint administrators were first averaged amongst themselves to ensure each participating organization's voice had equal weight. The hHAP scores for each individual hazard are also shown in the Hazard Risk Score tables found at the bottom of each hazard profile.

**Table 15. Health Hazard Assessment and Prioritization Score Element Definitions and Rating Scales**

| Element/Score                                                                                                                                                                                                                                                                      | Definitions                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Health Severity:</b> Potential for increase in morbidity, hospitalizations, and/or mortality.                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                       |
| 0 – Not Applicable                                                                                                                                                                                                                                                                 | There is no elevated health or medical impact associated with this hazard.                                                                                                                                                                                                                                                                                                            |
| 1 – Marginal                                                                                                                                                                                                                                                                       | The hazard presents a minimal threat to safety, health, and wellbeing of the surrounding community.                                                                                                                                                                                                                                                                                   |
| 2 – Limited                                                                                                                                                                                                                                                                        | May result in moderately elevated rates of severe disease, injury, hospitalizations, and deaths.                                                                                                                                                                                                                                                                                      |
| 3 – Critical                                                                                                                                                                                                                                                                       | May result in considerably elevated rates of severe disease, injury, hospitalizations, and deaths.                                                                                                                                                                                                                                                                                    |
| 4 – Catastrophic                                                                                                                                                                                                                                                                   | May result in significantly elevated rates of severe disease, injury, hospitalizations, and deaths.                                                                                                                                                                                                                                                                                   |
| <b>Community Impact:</b> Potential for disruption of routine community activities (schooling, employment, religious services, sports, entertainment), damage or disruption of communication or infrastructure systems, and interruption of critical social services and resources) |                                                                                                                                                                                                                                                                                                                                                                                       |
| 0 – Not Applicable                                                                                                                                                                                                                                                                 | There is no potential impact associated with this hazard.                                                                                                                                                                                                                                                                                                                             |
| 1 – Low                                                                                                                                                                                                                                                                            | The hazard presents a low threat to the safety, health, and well-being of the surrounding community. Negligible potential to disrupt normal day-to-day activities.                                                                                                                                                                                                                    |
| 2 – Moderate                                                                                                                                                                                                                                                                       | May result in moderate impacts and disruptions of normal activities and functions, including communication functionality and capabilities. May cause delay or suspension of social services and resources.                                                                                                                                                                            |
| 3 – High                                                                                                                                                                                                                                                                           | Considerable disruption to normal activities and functions, including communication functionality and capabilities. Delay or suspension of social services, resources, and public infrastructure.                                                                                                                                                                                     |
| 4 – Extreme                                                                                                                                                                                                                                                                        | Significant disruption to normal activities and functions, including communication functionality and capabilities. Destruction or significant delay and/or suspension of social services, resources, and public infrastructure.                                                                                                                                                       |
| <b>Public Health System Impact:</b> Potential for staff illness, injury, or death; Business interruption; Employees unable to report to work; Interruption of critical supplies and resources; Facilities damaged and unusable; Facilities damaged and/or temporarily relocated    |                                                                                                                                                                                                                                                                                                                                                                                       |
| 0 – Not Applicable                                                                                                                                                                                                                                                                 | No potential to disrupt normal day-to-day public health operations. No projected impact on public health personnel, resources, and/or facilities.                                                                                                                                                                                                                                     |
| 1 – Negligible                                                                                                                                                                                                                                                                     | Negligible potential to disrupt normal day-to-day public health operations. Negligible projected impact on public health personnel, resources, and/or facilities.                                                                                                                                                                                                                     |
| 2 – Limited                                                                                                                                                                                                                                                                        | Limited potential to disrupt normal day-to-day public health operations. There is limited projected impact on public health personnel, resources, and/or facilities (small adjustments may be made to staff schedules and work locations; procurement of some additional services and supplies through normal channels).                                                              |
| 3 – Critical                                                                                                                                                                                                                                                                       | Disruption of the day-to-day public health operations would require deferring all non-essential services. Public health personnel and/or facilities are impacted: high absenteeism due to injury, illness, death; infrastructure and building damage. All available personnel, resources, and facilities would be dedicated to performing essential public health emergency services. |
| 4 – Catastrophic                                                                                                                                                                                                                                                                   | Immediate deferment of all non-essential services. Public health resources would be rapidly overwhelmed due to the impact on personnel and/or facilities: extreme absenteeism, illness, death; infrastructure and building damage. All available personnel, resources, and facilities would be dedicated to performing essential emergency services.                                  |
| <b>Healthcare System Impact:</b> Potential for staff illness, injury, or death; Business interruption; Employees unable to report to work; Interruption of critical supplies and resources; Facilities damaged and unusable; Facilities damaged and/or temporarily relocated       |                                                                                                                                                                                                                                                                                                                                                                                       |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0 – Not Applicable | No potential to disrupt normal day-to-day operations. No projected impact on personnel, resources, and/or facilities.                                                                                                                                                                                                                                                                                                           |
| 1 – Negligible     | Negligible potential to disrupt normal day-to-day operations. Negligible projected impact on personnel, resources, and/or facilities.                                                                                                                                                                                                                                                                                           |
| 2 – Limited        | Limited potential to disrupt normal day-to-day operations. There is limited projected impact on personnel, resources, and/or facilities (small adjustments may be made to staff schedules and work locations; procurement of some additional services and supplies through normal channels).                                                                                                                                    |
| 3 – Critical       | Disruption of the day-to-day operations would require deferring all non-essential services. Personnel and/or facilities are impacted: high absenteeism due to injury, illness, death; infrastructure and building damage. All available personnel, resources, and facilities would be dedicated to performing essential emergency services.                                                                                     |
| 4 – Catastrophic   | Immediate deferment of all non-essential services. Suspension of state regulations and statutes necessary to maintain service capabilities. Resources would be rapidly overwhelmed due to the impact on personnel and/or facilities: extreme absenteeism, illness, death; infrastructure and building damage. All available personnel, resources, and facilities would be dedicated to performing essential emergency services. |

Table 16 - Polk County Health Hazard Assessment and Prioritization Ranking Results

| Hazard                       | Health Severity | Community Impact | Public Health System Impact | Healthcare System Impact | Total Health Hazard Score |
|------------------------------|-----------------|------------------|-----------------------------|--------------------------|---------------------------|
| Animal/Plant/ Crop Disease   | 2               | 0                | 2                           | 0                        | 4                         |
| Climate Change               | 1               | 1                | 1                           | 1                        | 4                         |
| Cyber Attacks                | 2               | 3                | 2                           | 3                        | 10                        |
| Dam Failure                  | 3               | 1                | 1                           | 2                        | 7                         |
| Drought                      | 1               | 0                | 1                           | 1                        | 3                         |
| Earthquake                   | 1               | 1                | 1                           | 3                        | 6                         |
| Expansive Soils              | 1               | 0                | 0                           | 2                        | 3                         |
| Extreme Temperature          | 2               | 2                | 2                           | 2                        | 8                         |
| Flash Flooding               | 2               | 3                | 1                           | 2                        | 8                         |
| Grass/Wildland Fire          | 0               | 0                | 0                           | 0                        | 0                         |
| Hazardous Materials Incident | 2               | 1                | 3                           | 2                        | 8                         |
| Human Disease                | 3               | 3                | 4                           | 3                        | 13                        |
| Infrastructure Failure       | 4               | 3                | 2                           | 4                        | 13                        |
| Levee Failure                | 1               | 2                | 1                           | 1                        | 5                         |
| River Flooding               | 1               | 3                | 1                           | 2                        | 7                         |
| Sinkholes/Landslide          | 0               | 0                | 0                           | 2                        | 2                         |
| Structural Fire              | 2               | 1                | 2                           | 2                        | 7                         |

|                                 |   |   |   |   |    |
|---------------------------------|---|---|---|---|----|
| Thunderstorm/<br>Lightning/Hail | 2 | 1 | 1 | 1 | 5  |
| Tornado                         | 1 | 3 | 3 | 2 | 9  |
| Transportation<br>Incident      | 2 | 1 | 1 | 3 | 7  |
| Windstorm                       | 1 | 0 | 0 | 1 | 2  |
| Winter Storm                    | 2 | 4 | 2 | 3 | 11 |

3.2.3 ASSETS AT RISK

This section assesses the structures, infrastructure, and other important assets in the planning area that may be at risk to hazards. For a complete listing of the critical facilities in Polk County that were considered in the development of this hazard analysis, see Appendix B – Critical Facilities.

Assessing the vulnerability of the planning area to disaster also involves inventorying the natural, historic, cultural, and economic assets of the area. This is important for the following reasons:

- The plan participants may decide that these types of resources warrant a greater degree of protection due to their unique and irreplaceable nature and contribution to the overall economy;
- If these resources are impacted by a disaster, knowing about them ahead of time allows for more prudent care in the immediate aftermath, when the potential for additional impacts is higher;
- The rules for reconstruction, restoration, rehabilitation, and/or replacement are often different for these types of designated resources;
- Natural resources can have beneficial functions that reduce the impacts of natural hazards, such as wetlands and riparian habitat, which help absorb and attenuate floodwaters; and,
- Losses to economic assets (e.g., major employers or primary economic sectors) could have severe impacts on a community and its ability to recover from disaster.

In the planning area, natural, historic, cultural, and economic assets include the following:

3.2.3.1 THREATENED AND ENDANGERED SPECIES

Currently there are nine different species of flora and fauna which inhabit parts of Polk County and are identified as Threatened, Endangered, Proposed, or Candidate species. The common name, scientific name, and status of these nine species are listed in Table 17.

Table 17 - Threatened and Endangered Species in Polk County

| Common Name                   | Scientific Name        | Status     |
|-------------------------------|------------------------|------------|
| Eastern prairie winged orchid | Platanthera leucophaea | Threatened |

|                                |                        |            |
|--------------------------------|------------------------|------------|
| Indiana bat                    | Myotis sodalist        | Endangered |
| Mead's milkweed                | Asclepias meadii       | Threatened |
| Monarch butterfly              | Danaus plexippus       | Candidate  |
| Northern long-eared bat        | Myotis septentrionalis | Threatened |
| Rusty patched bumble bee       | Bombus affinis         | Endangered |
| Topeka shiner                  | Notropis topeka        | Endangered |
| Tricolor bat                   | Perimyotis subflavus   | Proposed   |
| Western prairie fringed orchid | Platanthera praeclara  | Threatened |

Source: Center for Biological Diversity [https://www.biologicaldiversity.org/programs/population\\_and\\_sustainability/T\\_and\\_E\\_map/](https://www.biologicaldiversity.org/programs/population_and_sustainability/T_and_E_map/)

#### 3.2.3.2 NATURAL RESOURCES

The Polk County Conservation Board manages 23 parks and natural areas encompassing over 16,000 acres. Table 18 provides the names and locations of parks and conservation areas in Polk County.

**Table 18. Parks in Polk County**

| Park Name                               | Address                        | City            |
|-----------------------------------------|--------------------------------|-----------------|
| Beaver Creek Greenbelt                  | 9631 NW 121 <sup>st</sup>      | Granger         |
| Brown's Woods                           | 195 SE Brown's Woods Ct.       | West Des Moines |
| Carney Marsh                            | 698 SE 65 <sup>th</sup> St.    | Ankeny          |
| Chichaqua Bottoms Greenbelt             | 8700 NE 126 Avenue             | Maxwell         |
| Chichaqua Valley Trail                  | 8123 NEW 88 <sup>th</sup> St.  | Bondurant       |
| Easter Lake Park                        | 2830 Easter Lake Drive         | Des Moines      |
| Eagle Roost Wildlife Area               | Highway 65                     | Des Moines      |
| Engeldinger Marsh                       | 11821 NE 118 Ave.              | Maxwell         |
| Fort Des Moines Park                    | 7200 SE 5 <sup>th</sup> St     | Des Moines      |
| Foumle Creek Greenway                   | 3769 NE 38 <sup>th</sup> St.   | Des Moines      |
| Gay Lea Wilson Trail                    | University Avenue              | Pleasant Hill   |
| Great Western Trail                     | George Flagg Parkway           | Des Moines      |
| High Testle Trail                       | W First St.                    | Ankeny          |
| Jester Park                             | 12130 NW 128 <sup>th</sup> St. | Granger         |
| Lauridsen Skatepark                     | 901 2nd Avenue                 | Des Moines      |
| Mally's Park / Trails End Wildlife Area | 5792 NE Berwick Dr.            | Berwick         |
| Mark C. Ackelson Trail                  | 2830 Easter Lake Drive         | Des Moines      |
| Oralabor Gateway Trail                  | 2803 SW Glenbrooke Blvd        | Ankeny          |
| Strasser Woods State Preserve           | 1552 E 36 <sup>th</sup> Street | Des Moines      |
| Sycamore Trails                         | Euclid Avenue                  | Des Moines      |

|                          |                   |               |
|--------------------------|-------------------|---------------|
| Thomas Mitchell Park     | 4520 NE 108 St.   | Mitchellville |
| Trestle to Trestle Trail | 2309 Euclid       | Des Moines    |
| Yellow Banks Park        | 6801 SE 32nd Ave. | Pleasant Hill |

Source: Polk County Parks and Trails website accessed 2/20/2024, <https://www.polkcountyiowa.gov/conservation/parks-trails/>

In addition to the assets listed in the table above, Polk County contains a considerable amount of wetlands. Wetlands support a diverse range of flora and fauna and are an integral part of healthy ecosystems in Polk County. The following table lists the acres of wetlands in the different participating jurisdictions.

**Table 19. Wetlands in Polk County**

| Jurisdiction               | Acres of Wetlands |
|----------------------------|-------------------|
| Alleman                    | 6.07              |
| Altoona                    | 122.81            |
| Ankeny                     | 257.02            |
| Bondurant                  | 17.94             |
| Clive                      | 228.28            |
| Delaware Township          | 189.34            |
| Des Moines                 | 2,094.44          |
| Elkhart                    | 13.32             |
| Grimes                     | 45.28             |
| Johnston                   | 811.43            |
| Mitchellville              | 4.78              |
| Pleasant Hill              | 372.80            |
| Polk City                  | 134.32            |
| Runnells                   | 2.26              |
| Saylor Township            | 960.04            |
| Urbandale                  | 203.73            |
| West Des Moines            | 1,418.88          |
| Windsor Heights            | 8.29              |
| Unincorporated Polk County | 8,498.68          |

#### 3.2.3.3 HISTORIC RESOURCES

The National Register of Historic Places is the official list of the Nation's cultural resources worthy of preservation. Authorized under the National Historic Preservation Act of 1966, the National Register is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect our historic and archeological resources.

The National Register is administered by the National Park Service under the Secretary of the Interior. Properties listed in the National Register include districts, sites, buildings, structures and



objects that are significant in American history, architecture, archeology, engineering, and culture. The properties in Polk County that are on the National Register of Historic Places are identified in Table 20.

**Table 20 - Polk County, Iowa Properties on the National Register of Historic Places**

| Property                                                  | Address                                               | City       | Date Listed |
|-----------------------------------------------------------|-------------------------------------------------------|------------|-------------|
| Abraham Lincoln High School                               | 2600 SW 9 <sup>th</sup> Street                        | Des Moines | 10/24/2002  |
| Acadian Manor Historic District                           | 2801-2815 Grand Ave.                                  | Des Moines | 9/25/2020   |
| Ainsworth William W. and Elizabeth J. House               | 1310 7 <sup>th</sup> St.                              | Des Moines | 10/22/1998  |
| Alleman, Richard L. and Verda M. Farm District            | 2701 NW. 158 <sup>th</sup> Ave.                       | Slater     | 5/1/2015    |
| American Republic Insurance Company Headquarters Buildign | 601 6 <sup>th</sup> Ave.                              | Des Moines | 12/22/2015  |
| Andrews Josiah House                                      | 1128 27 <sup>th</sup> Street                          | Des Moines | 11/1/1988   |
| Apperson-Iowa Motor Car Company Building                  | 1420 Locust Street                                    | Des Moines | 4/29/2016   |
| Argonne Building                                          | 1723 Grand Ave.                                       | Des Moines | 9/25/2020   |
| Ashby Manor Historic District                             | Roughly bounded by Beaver Ave. and Ashby Park         | Des Moines | 9/4/1992    |
| Ayrshire Apartments                                       | 1815 6 <sup>th</sup> Ave.                             | Des Moines | 10/25/1996  |
| Bailey William H. and Alice House                         | 1810 6 <sup>th</sup> Ave.                             | Des Moines | 10/25/1996  |
| Baker C. H. Double House                                  | 1700–1702 6 <sup>th</sup> Ave.                        | Des Moines | 10/25/1996  |
| Baker–DeVotie–Hollingsworth Block                         | 516-526 E Grand Ave.                                  | Des Moines | 1/10/2008   |
| Bartlett Walter M. Double House                           | 1416-1418 6 <sup>th</sup> Ave.                        | Des Moines | 10/22/1998  |
| Bates Park Historic District                              | 4 <sup>th</sup> Street between Orchard and Clark Sts. | Des Moines | 10/25/1996  |
| Baum, William A. and Etta Cottage                         | 1604 8 <sup>th</sup> Street                           | Des Moines | 10/25/1996  |
| Beeson Byron A. House                                     | 1503 5 <sup>th</sup> Ave.                             | Des Moines | 10/25/1996  |
| Bell Hill McClelland House                                | 1091 26 <sup>th</sup> Street                          | Des Moines | 11/1/1988   |
| Benham F. A. House                                        | 716 19 <sup>th</sup> St.                              | Des Moines | 11/05/98    |
| Big Creek Schoolhouse                                     | 112 3 <sup>rd</sup> Street                            | Polk City  | 8/11/2004   |
| Boyd, Byron and Ivan House                                | 304 42 <sup>nd</sup> Street                           | Des Moines | 4/6/2004    |
| Boyt Company Building                                     | 210 Court Ave.                                        | Des Moines | 3/10/2009   |
| Bryn Mawr Apartments                                      | 511 29 <sup>th</sup> Street                           | Des Moines | 10/12/2017  |
| Burns United Methodist Church                             | 811 Crocker Street                                    | Des Moines | 6/15/1977   |
| Camp Dodge Pool District                                  | Buildings A22–A24 Camp Dodge                          | Johnston   | 2/17/1995   |
| Case Larnerd House                                        | 3111 Easton Blvd.                                     | Des Moines | 6/21/1982   |
| Chaffee–Hunter House                                      | 1821 8 <sup>th</sup> St.                              | Des Moines | 10/22/1998  |
| Chamberlain, D.S., Building                               | 1312 Locust St.                                       | Des Moines | 6/28/2007   |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)



| Property                                                                      | Address                                                                     | City       | Date Listed |
|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------|------------|-------------|
| Carpenter James Sansom House                                                  | 3320 Kinsey Ave.                                                            | Des Moines | 4/23/1998   |
| Chautauqua Park Historic District                                             | Roughly bounded by 16 <sup>th</sup> Street Hickman Rd. and Chautauqua Pkwy. | Des Moines | 3/22/1990   |
| Civic Center Historic District                                                | Des Moines River Center Street Dam to Scott Ave. Dam including both banks   | Des Moines | 12/7/1988   |
| Clemens Automobile Company Building                                           | 200 10 <sup>th</sup> St.                                                    | Des Moines | 5/6/2009    |
| College Corner Commercial Historic Business District                          | Euclid Ave. between Second and Third Aves.                                  | Des Moines | 4/23/1998   |
| Cottage Grove Avenue Presbyterian Church                                      | 1050 24 <sup>th</sup> Street                                                | Des Moines | 9/12/2016   |
| Court Avenue Bridge                                                           | Court Ave. over Des Moines River                                            | Des Moines | 5/15/1998   |
| Crane Building                                                                | 1440 Walnut                                                                 | Des Moines | 8/30/2001   |
| Crawford House                                                                | 2203 Grand Ave.                                                             | Des Moines | 1/27/1983   |
| Cummins Albert Baird House                                                    | 2404 Forest Dr.                                                             | Des Moines | 6/30/1982   |
| Darling Jay Norwood and Genevieve Pendleton House                             | 2320 Terrace Rd.                                                            | Des Moines | 9/30/1992   |
| Denny Professor Charles O. House                                              | 1084 Twenty-fifth Street                                                    | Des Moines | 9/8/1988    |
| Des Moines Art Center                                                         | 4700 Grand Avenue                                                           | Des Moines | 12/6/2004   |
| Des Moines Building                                                           | 405 6 <sup>th</sup> Ave.                                                    | Des Moines | 10/16/2013  |
| Des Moines Fire Department Headquarters— Fire Station No. 1 and Shop Building | 900 Mulberry St., 100 9 <sup>th</sup> St.                                   | Des Moines | 4/7/2014    |
| Des Moines Saddlery Company Building                                          | 307–311 Court Ave.                                                          | Des Moines | 6/27/1985   |
| Des Moines Western Railway Freight House                                      | 625 E. Court Ave.                                                           | Des Moines | 7/10/2008   |
| Drake University Campus Historic District                                     | Roughly two blks. Along University Ave. near Twenty-fifth Street            | Des Moines | 9/8/1988    |
| Earle & LeBosquet Block                                                       | 407-409 Court Ave.                                                          | Des Moines | 6/11/2009   |
| East Des Moines Commercial Historic District                                  | Roughly bounded by E. 4th, Des Moines, E. 6th, and E. Locust Sts.           | Des Moines | 3/29/2019   |
| East Des Moines Industrial Historic District                                  | Roughly E. 2nd to E. 5th & E. Walnut to E. Market Sts.                      | Des Moines | 10/5/2017   |
| Elliot Furniture Company                                                      | 424 E. Locust Street                                                        | Des Moines | 1/14/2015   |
| Elmwood, The- The Oaks-The Birches                                            | 2315 Grand Ave.                                                             | Des Moines | 2/19/2021   |
| Equitable Life Insurance Company of Iowa Building                             | 604 Locust St. & 316 6th Ave.                                               | Des Moines | 4/21/2015   |
| Evans, Edward B. and Nettie E., House                                         | 1410 19 <sup>th</sup> St.                                                   | Des Moines | 4/1/2002    |
| Farmhouse, Olmsted Family                                                     | 4010 70 <sup>th</sup> Street                                                | Urbandale  | 8/9/2019    |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)



| Property                                                             | Address                                                                                                                | City             | Date Listed |
|----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|------------------|-------------|
| Fire Station No. 4                                                   | 1041 8 <sup>th</sup> Street                                                                                            | Des Moines       | 6/27/1979   |
| Firestone District Office and Warehouse                              | 1775 East Euclid Street                                                                                                | Des Moines       | 12/9/2022   |
| First Methodist Episcopal Church                                     | 10 <sup>th</sup> and Pleasant Sts.                                                                                     | Des Moines       | 4/12/1984   |
| Fish and Game Pavilion and Aquarium                                  | Iowa State Fairgrounds                                                                                                 | Des Moines       | 12/23/1991  |
| Fitch, F.W., Company Historic District                               | 300-306 15 <sup>th</sup> & 1510-1526 Walnut Sts.                                                                       | Des Moines       | 4/9/2013    |
| Fleming Building                                                     | 218 6 <sup>th</sup> Avenue                                                                                             | Des Moines       | 5/22/2002   |
| Flynn Farm, Mansion, and Barn                                        | 2600 111 <sup>th</sup> Street                                                                                          | Des Moines       | 11/30/1973  |
| Flynn-Griffin Building                                               | 319 7 <sup>th</sup> Street                                                                                             | Des Moines       | 5/3/2016    |
| Fort Des Moines Provisional Army Officer Training School             | Fort Des Moines Military Reservation                                                                                   | Des Moines       | 5/30/1974   |
| Franklin Apartments                                                  | 1811 6 <sup>th</sup> Ave.                                                                                              | Des Moines       | 10/25/1996  |
| Gabriel Rees House                                                   | 1701 Pennsylvania Ave.                                                                                                 | Des Moines       | 12/1/1978   |
| Goddard Bungalow Court Historic District                             | 1410-21 Goddard Court, 1232 14 <sup>th</sup> Street                                                                    | Des Moines       | 11/21/2000  |
| Goode, Lowry W. and Hattie N. First North Des Moines House           | 1813 7 <sup>th</sup> St.                                                                                               | Des Moines       | 10/22/1998  |
| Grand View College (Old Main)                                        | 1200 Grandview Ave.                                                                                                    | Des Moines       | 5/23/1978   |
| Greek Orthodox Church of Saint George                                | 1118 35 <sup>th</sup> Street                                                                                           | Des Moines       | 2/28/1997   |
| Greenwood Park Plats Historic District                               | Roughly 39 <sup>th</sup> to 42 <sup>nd</sup> Sts., approx. Grand Ave. to Center & Pleasant Sts., 4006, 4024 Grand Ave. | Des Moines       | 4/24/2013   |
| Grocers Wholesale Company Building                                   | 22 West Ninth Street                                                                                                   | Des Moines       | 4/25/2008   |
| Haley F.E. Double House                                              | 1233-1235 7 <sup>th</sup> St.                                                                                          | Des Moines       | 10/22/1998  |
| Hallett Flat—Rawson & Co. Apartment Building                         | 1301-1307 Locust St.                                                                                                   | Des Moines       | 12/1/2000   |
| Harbach, L. and Sons Furniture Warehouse and Factory Company         | 300-316 SW. 5 <sup>th</sup> Street                                                                                     | Des Moines       | 12/21/2015  |
| Hatton Dr. John B. and Anna M. House                                 | 1730 7 <sup>th</sup> Street                                                                                            | Des Moines       | 4/23/1998   |
| Hawkeye Insurance Company Building                                   | 209 Fourth Street                                                                                                      | Des Moines       | 4/28/1986   |
| Hawkeye Transfer Company Warehouse                                   | 702 Elm St.                                                                                                            | Des Moines       | 3/22/2010   |
| Hayes, William B. House                                              | 1547 Arlington Ave.                                                                                                    | Des Moines       | 10/25/1996  |
| Hazen, Allen Water Tower                                             | 4800 Hickman Road                                                                                                      | Des Moines       | 8/11/2004   |
| Henshie-Briggs Row House                                             | 1106 High Street                                                                                                       | Des Moines       | 8/8/2001    |
| Herndon Hall                                                         | 2000 Grand Ave.                                                                                                        | Des Moines       | 7/27/1977   |
| Herring Motor Car Company Building                                   | 110 W. 10 <sup>th</sup> Street                                                                                         | Des Moines       | 12/6/2004   |
| Herrold Bridge                                                       | NW 88 <sup>th</sup> Ave. over Beaver Creek                                                                             | Herrold Vicinity | 5/15/1998   |
| Highland Park Historic Business District at Euclid and Sixth Avenues | Roughly jct. of Euclid Ave. and Sixth Ave.                                                                             | Des Moines       | 7/15/1998   |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)



| Property                                                         | Address                                                                                | City            | Date Listed |
|------------------------------------------------------------------|----------------------------------------------------------------------------------------|-----------------|-------------|
| Hippee Building                                                  | 206 6 <sup>th</sup> Ave.                                                               | Des Moines      | 4/20/2018   |
| Hohberger Building                                               | 502-506 E. Locust St.                                                                  | Des Moines      | 9/12/2002   |
| Home Federal Savings and Loan Association of Des Moines Building | 601 Grand Ave.                                                                         | Des Moines      | 2/1/2017    |
| Home of Marshall's Horseradish                                   | 1546 2 <sup>nd</sup> Place                                                             | Des Moines      | 10/22/1998  |
| Homestead Building                                               | 303 Locust Street                                                                      | Des Moines      | 3/5/1982    |
| Hotel Fort Des Moines                                            | 10 <sup>th</sup> and Walnut Sts.                                                       | Des Moines      | 9/16/1982   |
| Hotel Kirkwood                                                   | 400 4 <sup>th</sup> Street, a.k.a. 400 Walnut Street                                   | Des Moines      | 12/10/2003  |
| Hotel Randolph                                                   | 200-204 4 <sup>th</sup> St.                                                            | Des Moines      | 6/11/2009   |
| Hubbell Building                                                 | 904 Walnut Street                                                                      | Des Moines      | 8/11/2004   |
| Hubbell Warehouse                                                | 340 SW 5 <sup>th</sup> Street                                                          | Des Moines      | 11/12/2010  |
| I.O.O.F. (International Order of Fellows) Valley Junction        | 216-218 5 <sup>th</sup> Street                                                         | West Des Moines | 11/9/2017   |
| Ingersoll Place Plat Historic District                           | 28 <sup>th</sup> St., Linden and High Sts.                                             | Des Moines      | 11/21/2000  |
| Iowa Commission for the Blind Building                           | 524 4 <sup>th</sup> St                                                                 | Des Moines      | 7/1/2010    |
| Iowa-Des Moines National Bank Building                           | 520 Walnut Street                                                                      | Des Moines      | 7/10/1979   |
| Iowa Ford Tractor Company Repair and Warehouse Building          | 213 13 <sup>th</sup> Street                                                            | Des Moines      | 3/12/2021   |
| Iowa State Capitol                                               | Grand Ave. and E. 12 <sup>th</sup> Street                                              | Des Moines      | 10/21/1976  |
| Iowa State Fair and Exposition Grounds Historic District         | E. Thirtieth Street and Grand Ave.                                                     | Des Moines      | 9/14/1987   |
| Iowa State Historical Building                                   | E. 12 <sup>th</sup> and Grand Ave.                                                     | Des Moines      | 11/14/1978  |
| Johnson, Capt. Nicholas W. and Emma House                        | Jct. of 21 <sup>st</sup> Street and University Ave.                                    | Des Moines      | 12/6/1990   |
| Johnstone, Dr. Anna E. and Andrew A. House                       | 1810 8 <sup>th</sup> Street                                                            | Des Moines      | 10/25/1996  |
| Jones, G.W., Building                                            | 1430 Locust Street                                                                     | Des Moines      | 4/29/2016   |
| Jordan House                                                     | 2251 Fuller Rd.                                                                        | West Des Moines | 12/10/1973  |
| Keeler, Rev. R. W. and Fannie E. House                           | 1430 10 <sup>th</sup> Street                                                           | Des Moines      | 11/4/1993   |
| Kingman Place Historic District                                  | 27 <sup>th</sup> to 31 <sup>st</sup> Sts., Kingman Blvd., Rutland St. and Cottage Ave. | Des Moines      | 11/21/2000  |
| Kirkham, Francis M. House                                        | 1026 Twenty-fourth Street                                                              | Des Moines      | 9/8/1988    |
| Knotts, Nellie and Thomas House                                  | 1021 Twenty-sixth Street                                                               | Des Moines      | 9/8/1988    |
| Kromer Flats                                                     | 1433–1439 6 <sup>th</sup> Ave.                                                         | Des Moines      | 10/25/1996  |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)



| Property                                               | Address                                                                                          | City            | Date Listed |
|--------------------------------------------------------|--------------------------------------------------------------------------------------------------|-----------------|-------------|
| Lexington, The                                         | The 1721 Pleasant Street                                                                         | Des Moines      | 12/12/1976  |
| Liberty Building                                       | 418 Sixth Ave                                                                                    | Des Moines      | 7/22/2010   |
| Linden Heights Historic District                       | Foster Drive, Glenview Drive, Woodlawn,<br>Park Hill Drive west of SW<br>42 <sup>nd</sup> Street | Des Moines      | 12/10/2003  |
| Lord Richard T. C. and William V.<br>Wilcox House      | 2416 Kingman Blvd.                                                                               | Des Moines      | 9/8/1988    |
| Luston-House #02437                                    | 1440 63 <sup>rd</sup> Street                                                                     | Windsor Heights | 6/12/2020   |
| Mack-International Motor Truck<br>Corporation Building | 121 12 <sup>th</sup> Street                                                                      | Des Moines      | 1/25/2017   |
| Mahnke House                                           | 2707 High Street                                                                                 | Des Moines      | 10/13/1983  |
| Maine, The                                             | 1635 6 <sup>th</sup> Ave.                                                                        | Des Moines      | 10/25/1996  |
| Maish House                                            | 1623 Center Street                                                                               | Des Moines      | 4/11/1977   |
| Masonic Temple of Des Moines                           | 1011 Locust Street                                                                               | Des Moines      | 8/29/1997   |
| Mattes, Minnie Y. and Frank P. House                   | 1305 34 <sup>th</sup> St.                                                                        | Des Moines      | 12/16/2009  |
| Methodist Deaconess Institute–Esther<br>Hall           | 921 Pleasant St.                                                                                 | Des Moines      | 3/4/2009    |
| Middlesex Plat Historic District                       | Center to Woodland Ave., 31 <sup>st</sup> to 35 <sup>th</sup><br>Sts.                            | Des Moines      | 11/21/2000  |
| Municipal Building                                     | E. 1 <sup>st</sup> and Locust Sts.                                                               | Des Moines      | 11/10/1977  |
| Murillo Flats                                          | 605 16 <sup>th</sup> St.                                                                         | Des Moines      | 6/9/2009    |
| National Biscuit Company Building                      | 1001 Cherry St.                                                                                  | Des Moines      | 5/6/2009    |
| Naylor House                                           | 944 W. 9 <sup>th</sup> Street                                                                    | Des Moines      | 7/10/1974   |
| New Lawn, The                                          | 1245 6 <sup>th</sup> Ave.                                                                        | Des Moines      | 10/25/1996  |
| Newens Sanitary Dairy Historic District                | 2300-2312 University Avenue                                                                      | Des Moines      | 12/17/2003  |
| Norman Apartment Building                              | 3103 University Ave.                                                                             | Des Moines      | 9/8/1988    |
| Northwestern Hotel                                     | 321 E. Walnut                                                                                    | Des Moines      | 1/12/1984   |
| Oaklands, The Historic District                        | Oakland and Arlington Aves. Between<br>Franklin and College Aves.                                | Des Moines      | 10/25/1996  |
| Odenweller F. F.–James P. and Nettie<br>Morey House    | 1115 27 <sup>th</sup> Street                                                                     | Des Moines      | 11/1/1988   |
| Olmstead-Urban House                                   | 4010 70 <sup>th</sup> Street                                                                     | Urbandale       | 8/2/2019    |
| Owl's Head Historic District                           | Ridge Rd. Forest Dr. 28 <sup>th</sup> and 29 <sup>th</sup> Sts.                                  | Des Moines      | 10/11/1978  |
| Peak, George B. House                                  | 1080 22 <sup>nd</sup> Street                                                                     | Des Moines      | 11/14/1978  |
| Perry and Brainard Block                               | 1601 6 <sup>th</sup> Ave.                                                                        | Des Moines      | 10/25/1996  |
| Plymouth Place                                         | 4111 Ingersoll Ave.                                                                              | Des Moines      | 4/14/2015   |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)



| Property                                                           | Address                                                                                                       | City       | Date Listed |
|--------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|------------|-------------|
| Polk County Courthouse                                             | 6 <sup>th</sup> and Mulberry Sts.                                                                             | Des Moines | 4/30/1979   |
| Polk County Homestead and Trust Company Addition Historic District | Both sides of 7 <sup>th</sup> & 8 <sup>th</sup> Sts., S. of Franklin & N. of College Aves.                    | Des Moines | 10/4/2016   |
| Prospect Park Second Plat Historic District                        | Roughly along the Des Moines River S to Franklin Ave. between 6 <sup>th</sup> Ave. and 9 <sup>th</sup> Street | Des Moines | 4/23/1998   |
| Public Library of Des Moines                                       | Locust Street                                                                                                 | Des Moines | 7/25/1977   |
| Register and Tribune Building                                      | 715 Locust Street                                                                                             | Des Moines | 6/20/2016   |
| Reynolds, Anson O. House                                           | 1022 Twenty-sixth Street                                                                                      | Des Moines | 9/8/1988    |
| Riverview Park Plat Historic District                              | Arlington Ave. between Franklin and 6 <sup>th</sup> Aves.                                                     | Des Moines | 10/25/1996  |
| Rollins, Ralph House                                               | 2801 Fleur Dr.                                                                                                | Des Moines | 11/14/1978  |
| Rumely-Des Moines Drug Company Building                            | 110 SW. Fourth Street                                                                                         | Des Moines | 11/16/1989  |
| Saint John's Roman Catholic Church                                 | 1915 University Ave.                                                                                          | Des Moines | 9/8/1987    |
| Salisbury House                                                    | 4025 Tonawanda Dr.                                                                                            | Des Moines | 7/20/1977   |
| Sargent's Garage                                                   | 510 College Ave.                                                                                              | Des Moines | 10/22/1998  |
| Savery Hotel                                                       | 401 Locust St.                                                                                                | Des Moines | 11/5/1998   |
| Scheibe, Julius Cottage                                            | 815 College Ave.                                                                                              | Des Moines | 10/22/1998  |
| Scott, Mary A. and Caleb D. House                                  | 1014 Twenty-sixth Street                                                                                      | Des Moines | 9/8/1988    |
| Schmitt and Henry Manufacturing Company                            | 309 SW 8 <sup>th</sup> St.                                                                                    | Des Moines | 3/17/2010   |
| Scottish Rite Consistory Building                                  | 6 <sup>th</sup> Ave. and Park Street                                                                          | Des Moines | 9/29/1983   |
| Seth Richards Commercial Block                                     | 300-310 Court Avenue                                                                                          | Des Moines | 3/11/2005   |
| Sherman Hill Historic District (Boundary Increase and Decrease)    | Generally between 15 <sup>th</sup> St., Woodland Ave., MLK Pkwy., & I-235                                     | Des Moines | 3/7/2012    |
| Sherman, Hoyt Place                                                | 1501 Woodland Ave.                                                                                            | Des Moines | 9/19/1977   |
| Sherman, Lampson P. House                                          | 1052 Twenty-sixth Street                                                                                      | Des Moines | 9/8/1988    |
| Simmons, John P. House                                             | 1113 27 <sup>th</sup> Street                                                                                  | Des Moines | 11/1/1988   |
| Southwest Fifth Street Bridge                                      | SW Fifth Street over Raccoon River                                                                            | Des Moines | 5/15/1998   |
| Sixth and Forest Historic District                                 | Jct. of 6 <sup>th</sup> and Forest Aves. NE and NW corners                                                    | Des Moines | 10/25/1996  |
| Smouse, David W., Opportunity School                               | 2820 Center Street                                                                                            | Des Moines | 10/24/2002  |
| Southeast Water Trough                                             | SE 11 <sup>th</sup> and Scott Street                                                                          | Des Moines | 10/8/1976   |
| St. Ambrose Cathedral and Rectory                                  | 607 High Street                                                                                               | Des Moines | 3/30/1979   |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)



| Property                                                   | Address                                                                                  | City            | Date Listed |
|------------------------------------------------------------|------------------------------------------------------------------------------------------|-----------------|-------------|
| St. Anthony's Church                                       | 15 Indianola Road                                                                        | Des Moines      | 7/23/2021   |
| St. Paul's Episcopal Church                                | 815 High St.                                                                             | Des Moines      | 3/31/2010   |
| Standard Glass and Paint Company Building                  | 112 10 <sup>th</sup> Street                                                              | Des Moines      | 12/6/2004   |
| Stevenson, Samuel A. and Margaret, House                   | 2940 Cottage Grove Ave.                                                                  | Des Moines      | 1/3/1985    |
| Stoner, Thomas I., House                                   | 1030 56 <sup>th</sup> Street                                                             | Des Moines      | 2/12/1992   |
| Stuart, Dr. Richard and Paulina, House                     | 1060 Twenty-fifth Street                                                                 | Des Moines      | 9/8/1988    |
| Studebaker Corporation Branch Office Building              | 1436-42 Locust Street                                                                    | Des Moines      | 12/15/2015  |
| Studio Building                                            | 524 E. Grand Ave.                                                                        | Des Moines      | 11/14/1978  |
| Sylvan Theater Historic District                           | In Greenwood Park on W side of 45 <sup>th</sup> Street 1 block S of jct. with Grand Ave. | Des Moines      | 8/15/1995   |
| Syndicate Block                                            | 501 E. Locust                                                                            | Des Moines      | 10/1/2001   |
| Taft-West Warehouse                                        | 215-222 Court Avenue                                                                     | Des Moines      | 12/20/2006  |
| Teachout Building                                          | 500-502 E. Locust St.                                                                    | Des Moines      | 4/29/1999   |
| Terrace Hill                                               | 2300 Grand Ave.                                                                          | Des Moines      | 6/14/1972   |
| Theodore Roosevelt High School                             | 4419 Center Street                                                                       | Des Moines      | 10/24/2002  |
| Trent-Beaver House                                         | 1802 6 <sup>th</sup> Ave.                                                                | Des Moines      | 10/25/1996  |
| Trier, Paul J. and Ida, House                              | 6880 N.W. Beaver Dr.                                                                     | Johnston        | 11/9/1988   |
| Trinity Methodist Episcopal Church                         | 1548 8 <sup>th</sup> Street                                                              | Des Moines      | 4/23/1998   |
| Turner, Susie P., Double House                             | 1420-1422 8 <sup>th</sup> St.                                                            | Des Moines      | 10/22/1998  |
| Universalist Church                                        | 420 4 <sup>th</sup> Street                                                               | Mitchellville   | 9/6/2005    |
| U.S. Post Office                                           | 2 <sup>nd</sup> and Walnut Sts.                                                          | Des Moines      | 11/19/1974  |
| Vail, Mrs. Marian D.-Prof. Charles Noyes Kinney House      | 1056 26 <sup>th</sup> Street                                                             | Des Moines      | 11/1/1988   |
| Val-Air Ballroom                                           | 301 Ashworth Road                                                                        | West Des Moines | 10/28/2022  |
| Valley Auto Co.-Morgan Auto Co. Garage                     | 333 5 <sup>th</sup> Street                                                               | West Des Moines | 5/21/2021   |
| Valley Junction Commercial Historic District               | 100-318 5 <sup>th</sup> St. (even side 300 only) & cross streets                         | West Des Moines | 10/12/2017  |
| Valley Junction-West Des Moines City Hall and Engine House | 137 5 <sup>th</sup> Street                                                               | West Des Moines | 2/17/1983   |
| Veneman's Bungalow Court Historic District                 | 1101-115 Droukas Court, 1228, 1232 E. 12 <sup>th</sup> St.                               | Des Moines      | 11/21/2000  |
| Wallace, Henry, House                                      | 756 16 <sup>th</sup> Street                                                              | Des Moines      | 5/14/1993   |



| Property                                                                      | Address                                                              | City       | Date Listed |
|-------------------------------------------------------------------------------|----------------------------------------------------------------------|------------|-------------|
| Walnut Tire and Battery Co.-Globe Publishing Company Building                 | 1417-1425 Walnut Street                                              | Des Moines | 1/25/2017   |
| Warfield, Pratt and Howell Company Warehouse                                  | 100 West Court Ave.                                                  | Des Moines | 5/15/1985   |
| Washington and Elizabeth Miller Tract-Center-Soll Community Historic District | Roughly 35th to 38th Sts. between 3500-3607 Grand Ave. to Center St. | Des Moines | 1/25/2017   |
| Weitz, Charles H. and Lena May, House                                         | 1424 5 <sup>th</sup> Ave.                                            | Des Moines | 10/22/1998  |
| West Chester                                                                  | 3520 Grand Ave.                                                      | Des Moines | 1/19/1984   |
| West Ninth Streetcar Line Historic District                                   | W. Ninth Street from University Ave. to Hickman Rd.                  | Des Moines | 4/23/1998   |
| Wherry Block                                                                  | 1600-1602 6 <sup>th</sup> Ave.                                       | Des Moines | 10/22/1998  |
| Woodland Place Historic District                                              | 25 <sup>th</sup> to 27 <sup>th</sup> St. to Woodland Ave.            | Des Moines | 11/21/2000  |
| Youngerman Block                                                              | 206-208 4 <sup>th</sup> St.                                          | Des Moines | 6/10/2009   |
| Yunker Brothers Department Store                                              | 713 Walnut St.                                                       | Des Moines | 3/17/2010   |

Sources: State Historical Society of Iowa; National Register of Historic Places

#### 3.2.3.4 ECONOMIC RESOURCES

Polk County has emerged as an attractive location for both businesses and individuals in search of economic opportunity. This is reflected through several recent national rankings including<sup>1</sup>:

- (#1) Top 10 Places for Young Professionals to Live – *Forbes*, 2023
- (#4) Best U.S. Cities for Young Adults – *Homebuyer.com*, 2024
- (#8) Top Places to Start a Small Business – *LendingTree*, 2023
- (#16) Top 25 Up-and-Coming Tech Markets – *CBRE*, 2023
- (#19) Best Places to Live in the U.S. – *U.S. News & World Report*, 2023

Because of Polk County’s attractive economic qualities, new businesses have moved to the region, and existing businesses have expanded their operations. Table 21 provides details on major employers in the planning area as identified by the Greater Des Moines Partnership.

**Table 21 - Major Non-Government Employers in Polk County and Greater Des Moines Region**

| Employer Name | Main Locations  | Product or Service    | Employees |
|---------------|-----------------|-----------------------|-----------|
| Hy-Vee, Inc.  | West Des Moines | Midwest grocery store | 11,782    |

<sup>1</sup> Greater Des Moines Partnership. “Greater Des Moines Top Rankings and Ratings,” 2024.  
<https://www.dsmpartnership.com/news-media/rankings>.



### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

| Employer Name                                                                  | Main Locations              | Product or Service                                                                                                                                             | Employees        |
|--------------------------------------------------------------------------------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Wells Fargo & Company                                                          | Des Moines, West Des Moines | Financial services                                                                                                                                             | More than 11,000 |
| MercyOne                                                                       | Metro-wide                  | Healthcare (includes hospitals and home care)                                                                                                                  | 5,641            |
| Principal                                                                      | Des Moines                  | Global investment management, retirement, insurance and group benefits                                                                                         | 5,595            |
| UnityPoint Health                                                              | Des Moines, West Des Moines | Healthcare                                                                                                                                                     | 5,147            |
| Amazon                                                                         | Bondurant, Grimes, Ankeny   | Distribution                                                                                                                                                   | 4,100            |
| John Deere: Des Moines Works, Financial, and Intelligent Solutions Group (ISG) | Ankeny, Johnston, Urbandale | Agricultural machinery, GPS/ag equipment software, consumer financial services                                                                                 | 3,800            |
| Vermeer Corporation                                                            | Pella                       | Agriculture, construction, and mining equipment manufacturing                                                                                                  | 3,600            |
| Nationwide                                                                     | Des Moines                  | Insurance                                                                                                                                                      | 3,300            |
| JBS USA                                                                        | Marshalltown                | Pork Processing and Packaging                                                                                                                                  | 2,300            |
| Corteva Agriscience                                                            | Johnston                    | U.S.-based leading global agriculture company                                                                                                                  | 2,255            |
| Pella Corporation                                                              | Pella                       | Windows, doors, and skylights                                                                                                                                  | 2,224            |
| Maverik/Kum & Go                                                               | Des Moines                  | Convenience store chain                                                                                                                                        | 2,000            |
| Mercer Health & Benefits, LLC                                                  | Urbandale                   | Strategic consulting & brokerage services for group medical, dental, life, ST/LT disability, vision flex, retirement, communications and investment consulting | 1,800            |
| Casey's General Stores, Inc                                                    | Ankeny                      | Gasoline, prepared food, fountain items, groceries, and other merchandise                                                                                      | 1,750            |
| UPS                                                                            | Des Moines                  | Logistics and distribution, transportation and freight, customers brokerage                                                                                    | 1,721            |
| Wellmark Blue Cross Blue Shield of Iowa                                        | Des Moines                  | Health insurance, Medicare PDP/PPO/supplement/Advantage, dental insurance, flex benefits, HSAs/HRAs                                                            | 1,700            |
| Bridgestone Americas Tire Operations                                           | Des Moines                  | Agricultural tires                                                                                                                                             | 1,600            |
| Athene                                                                         | West Des Moines             | Fixed indexed annuities                                                                                                                                        | 1,600            |
| Lumen                                                                          | Des Moines                  | Telecommunications, ISP                                                                                                                                        | 1,500            |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)



| Employer Name                       | Main Locations            | Product or Service                                                                                                                             | Employees |
|-------------------------------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Tyson Fresh Meats, Inc.             | Perry                     | Processor and marketer of chicken, beef, and pork                                                                                              | 1,200     |
| Baker Group                         | Ankeny                    | Commercial and industrial design-build HVAC, electrical, plumbing, piping, sheet metal, automation, card access, video, fire alarm and service | 1,176     |
| Emerson – Fisher Division           | Marshalltown              | Control valves and systems – divisional headquarters                                                                                           | 1,135     |
| Farm Bureau Financial Services      | West Des Moines           | Insurance, investments, and wealth management                                                                                                  | 1,111     |
| EMC Insurance Companies             | Des Moines                | All lines property/casualty commercial insurance and life insurance across the U.S., plus reinsurance worldwide                                | 1,100     |
| The Iowa Clinic, P.C.               | West Des Moines           | Independent physician owned multi-specialty clinic with 250+ providers                                                                         | 1,100     |
| The Waldinger Corporation           | Des Moines                | Complete mechanical, sheet metal, electrical, structured cabling and service contractor                                                        | 1,100     |
| Dee Zee, Inc.                       | Des Moines, Pleasant Hill | Aftermarket automotive accessories                                                                                                             | 1,054     |
| MidAmerican Energy Company          | Des Moines                | Energy and complementary services                                                                                                              | 1,000     |
| <b>500 to 999 employees</b>         |                           |                                                                                                                                                |           |
| CDS Global                          | Des Moines                | Business process outsourcing for magazine media companies, nonprofits, and consumer products companies                                         | 994       |
| Drake University                    | Des Moines                | Higher education                                                                                                                               | 983       |
| Lennox                              | Marshalltown              | Heating, air conditioners                                                                                                                      | 915       |
| Sammons Financial Group             | West Des Moines           | Life insurance, annuities and retirement planning solutions                                                                                    | 901       |
| Atlantic Coca-Cola Bottling Company | Des Moines                | Coca-Cola products including Powerade, BODYARMOR, Monster Energy                                                                               | 880       |
| Prairie Meadows                     | Altoona                   | 24-hour casino, horse racing, hotel, events center, concerts, steakhouse, café, Sports Book                                                    | 878       |
| ChildServe                          | Johnston                  | Children's and young adults' special health care needs                                                                                         | 851       |
| Grinnel Mutual Reinsurance Company  | Grinnell                  | Personal auto, recreational vehicle, home, farm and small business insurance products; reinsurance                                             | 800       |
| Smithfield Food Inc.                | Des Moines                | Fresh pork products                                                                                                                            | 750       |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)



| Employer Name                                                | Main Locations           | Product or Service                                                                                                                        | Employees |
|--------------------------------------------------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| JELD-WEN                                                     | Grinnell                 | Manufacture of wooden, steel and patio sliding doors and vinyl windows                                                                    | 725       |
| Bronwell's                                                   | Montezuma, Grinnell      | Top firearms supplier – warehouse and retail                                                                                              | 715       |
| Katecho                                                      | Des Moines               | Medical device contract manufacturing                                                                                                     | 700       |
| Dotdash Meredith                                             | Des Moines               | Media and marketing company                                                                                                               | 697       |
| American Equity Investment Life Holding Company              | West Des Moines          | Fixed index and fixed rate annuity products                                                                                               | 688       |
| Grinnell College                                             | Grinnell                 | Higher education                                                                                                                          | 680       |
| Kemin Industries, Inc.                                       | Des Moines               | Global ingredient manufacturer                                                                                                            | 600       |
| Titan International, Inc                                     | Des Moines               | Manufacture of agricultural and off road tires                                                                                            | 600       |
| Businessolver                                                | West Des Moines          | Benefits technology company                                                                                                               | 595       |
| LSI (Lutheran Services in Iowa)                              | Des Moines               | Human services                                                                                                                            | 582       |
| F&G                                                          | Des Moines               | Fixed index annuities, fixed annuities and indexed universal life insurance                                                               | 571       |
| 3M Company                                                   | Knoxville                | Scotch brand pressure-sensitive industrial tapes                                                                                          | 550       |
| Wittern Group                                                | Clive                    | Automated dispensing and controlled access equipment manufacture and design                                                               | 550       |
| Cognizant                                                    | Des Moines               | Consulting/information technology and business process services                                                                           | 550       |
| Windsor Windows and Doors                                    | West Des Moines, Norwalk | Window and door products for residential and light commercial construction                                                                | 550       |
| Optimae LifeServices, Inc.                                   | Des Moines               | Community, behavioral health, residential and rehabilitation services; supported employment services                                      | 525       |
| GuideOne Insurance                                           | West Des Moines          | Full commercial P&C product suite for churches, schools and education facilities, senior living centers, non-profits and small businesses | 509       |
| Precision, Inc.                                              | Pella                    | Headquarters and convey component manufacturing                                                                                           | 500       |
| Musco Sports Lighting, LLC                                   | Oskaloosa                | Headquarters, mobile large area lighting, signage                                                                                         | 500       |
| DGS Foods                                                    | Des Moines               | Retail food markets                                                                                                                       | 500       |
| Cardinal IG Co., Division of Cardinal Glass Industries, Inc. | Greenfield               | Insulated glass units                                                                                                                     | 500       |
| 300 to 499 employees                                         |                          |                                                                                                                                           |           |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

| Employer Name                     | Main Locations        | Product or Service                                                                       | Employees |
|-----------------------------------|-----------------------|------------------------------------------------------------------------------------------|-----------|
| Bankers Trust                     | Des Moines            | Commercial and consumer banking services, wealth management and investment management    | 470       |
| The Weitz Company                 | Des Moines            | General contractor, construction manager, design builder                                 | 452       |
| Andersen Windows and Doors        | Des Moines            | EMCO brand storm doors                                                                   | 450       |
| Holmes Murphy                     | Waukee                | Property casualty, employee benefits                                                     | 444       |
| ITA Group, Inc.                   | West Des Moines       | Provider of customer loyalty solutions                                                   | 440       |
| Weiler, Inc.                      | Knoxville             | Manufacture asphalt paving mixtures and blocks                                           | 420       |
| Baker Electric Inc.               | Des Moines            | Design/build electrical and technology cabling                                           | 405       |
| B&G Foods, Inc                    | Ankeny                | Spices, herbs, seasonings, dry mixes                                                     | 400       |
| EFCO Corp.                        | Des Moines            | Forming and shoring systems for concrete construction                                    | 400       |
| Meta                              | Altoona               | Data centers                                                                             | 400       |
| Mittera                           | Des Moines, Urbandale | Printed brochures, mailing, fulfillment, digital media                                   | 375       |
| Orchard Place                     | Des Moines            | Mental health and substance abuse services                                               | 372       |
| Unite Private Networks            | West Des Moines       | Internet, point to point, dark fiber and wave                                            | 370       |
| Quality Manufacturing Corporation | Urbandale             | Full-service metal fabricator                                                            | 360       |
| LCS                               | Des Moines            | Senior living development, real estate, management and group purchasing                  | 360       |
| QCI                               | West Des Moines       | Networks, storage, servers, virtualization, collaboration, DR, backup/recovery, security | 355       |
| Clow Valve Co.                    | Oskalooska            | Headquarters and valves, hydrants, cast iron gates                                       | 350       |
| RSM US LLP                        | Des Moines            | Audit, tax and consulting services                                                       | 337       |
| LifeServe Blood Center            | Des Moines            | Blood bank                                                                               | 333       |
| Collins Aerospace                 | West Des Moines       | Turbine engine fuel nozzles and manifolds                                                | 325       |
| Turner Construction Company       | West Des Moines       | Construction management, general contracting, design building, CMAR                      | 315       |

| Employer Name         | Main Locations | Product or Service                                                                                        | Employees |
|-----------------------|----------------|-----------------------------------------------------------------------------------------------------------|-----------|
| Tri-City Electric Co. | Des Moines     | Electrical construction, renewable energy, power testing, engineering and integration, and other services | 302       |

Source: The Greater Des Moines Partnership; <https://www.dsmpartnership.com/growing-business-here/business-climate/major-employers>

3.2.4 PAST AND FUTURE LAND USE AND DEVELOPMENT

The following sections provide details regarding future growth, land use and development. The information in this section comes from information provided by each of the participating jurisdictions as well as other sources, cited throughout. Where available, maps are provided to facilitate consideration of hazard areas in future development plans as well as potential growth area.

Polk County is the most populous county in the state of Iowa, with a population of over 490,000. Population growth is not a new phenomena for Polk County as it has never recorded a population decrease over 17 decennial censuses between 1860 and 2020. Polk County is home to Des Moines, which is the capital of Iowa and the State’s largest city. The Des Moines Metropolitan area has generally been the center of population growth in Polk County. To this point, the population of many suburbs around Des Moines grew by more than 20% between 2010 and 2020. While growth and projected growth are indicators of the vitality of the area, growth can bring challenges which planners and community officials must address. Additional details on population growth in Polk County communities are provided in the following paragraphs, as well as in Table 22.

Much of northern Polk County is still primarily agricultural land. However, growth in Ankeny, Elkhart, and Polk City has increased urbanization growth in the northern section of the county, and future growth is likely to continue this trend. While urbanization is not expected to consume all of the surrounding agricultural lands, it does remove some of the critical ecosystem services (e.g. water infiltration into soil versus impervious surfaces and grey infrastructure). Furthermore, growth in Ankeny’s commercial districts will likely increase both personal and commercial traffic in the area. Already the city has found the need to expand interstate interchanges and widen roads to accommodate this traffic increase.

The eastern portion of Polk County is similar to the northern portion in that it is largely dominated by agricultural land. Although there are fewer communities dotting the eastern portion of Polk County, these communities have still experienced notable growth since 2010. The population of the City of Bondurant, in particular, grew by more than 90% between 2010 and 2020, which is the largest among all Polk County jurisdictions participating in the latest plan update. Altoona is another community in the eastern half the county which experienced notable growth, increasing by 34% between 2010 and 2020.

The western communities in Polk County have also grown in population since 2010, and several of these communities have experienced significant growth. Between 2010 and 2020, the cities of West Des Moines, Johnston, and Grimes grew by 21%, 39%, and 87%, respectively. Commercial and

industrial growth, is pushing to the western county boundary in West Des Moines, Urbandale, and Grimes.

The southern portion of Polk County has experienced growth as well, but not as great as the rest of the county. This portion of Polk County mainly consists of southern Des Moines, which grew by 4.8% between 2010 and 2020. The Des Moines International Airport, which is the largest airport in Iowa, is near the southern border of the county, and commercial and industrial development which is commonly found around large airports is also present in this part of Polk County.

According to the U.S. Census Bureau, Polk County's population increased by more than 14% from 2010 to 2020. Table 22 provides population growth statistics for all participating jurisdictions in Polk County, as well as for the county as a whole.

**Table 22 - Polk County Population Growth, 2010-2020**

| <b>Jurisdiction</b>       | <b>Total Population 2010</b> | <b>Total population 2020</b> | <b>2010-2020 # Change</b> | <b>2010-2020 % Change</b> |
|---------------------------|------------------------------|------------------------------|---------------------------|---------------------------|
| Alleman                   | 432                          | 423                          | -9                        | -2.08%                    |
| Altoona                   | 14,541                       | 19,565                       | 5,024                     | 34.55%                    |
| Ankeny                    | 45,582                       | 67,887                       | 22,305                    | 48.93%                    |
| Bondurant                 | 3,860                        | 7,365                        | 3,505                     | 90.80%                    |
| Clive                     | 15,447                       | 18,601                       | 3,154                     | 20.42%                    |
| Delaware Township         | 8,317                        | 9,758                        | 1,441                     | 17.33%                    |
| Des Moines                | 204,220                      | 214,133                      | 9,913                     | 4.85%                     |
| Elkhart                   | 683                          | 882                          | 199                       | 29.14%                    |
| Grimes                    | 8,246                        | 15,392                       | 7,146                     | 86.66%                    |
| Johnston                  | 17,278                       | 24,064                       | 6,786                     | 39.28%                    |
| Mitchellville             | 2,254                        | 2,485                        | 231                       | 10.25%                    |
| Pleasant Hill             | 8,785                        | 10,147                       | 1,362                     | 15.50%                    |
| Polk City                 | 3,418                        | 5,543                        | 2,125                     | 62.17%                    |
| Runnells                  | 507                          | 457                          | -50                       | -9.86%                    |
| Saylor Township           | 6,472                        | 6,287                        | -185                      | -2.86%                    |
| Urbandale                 | 39,463                       | 45,580                       | 6,117                     | 15.50%                    |
| West Des Moines           | 56,609                       | 68,723                       | 12,114                    | 21.40%                    |
| Windsor Heights           | 4,860                        | 5,252                        | 392                       | 8.07%                     |
| <b>Polk County Totals</b> | <b>430,640</b>               | <b>492,401</b>               | <b>61,761</b>             | <b>14.34%</b>             |

Source: U.S. Bureau of the Census, 2010 and 2020 Decennial Census; Population Statistics are for entire incorporated areas as reported by the U.S. Census Bureau

Along with population growth generally comes an increase in the number of housing units. Table 23 provides the change in numbers of housing units in the planning area from 2010 to 2020.

**Table 23 - Change in Housing Units, 2010-2020**

| <b>Jurisdiction</b>        | <b>Housing Units<br/>2010</b> | <b>Housing Units<br/>2020</b> | <b>2010-2020 #<br/>Change</b> | <b>2010-2020 %<br/>change</b> |
|----------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Alleman                    | 152                           | 157                           | 5                             | 3.29%                         |
| Altoona                    | 5,702                         | 8,007                         | 2,305                         | 40.42%                        |
| Ankeny                     | 18,339                        | 27,971                        | 9,632                         | 52.52%                        |
| Bondurant                  | 1,422                         | 2,376                         | 954                           | 67.09%                        |
| Clive                      | 6,077                         | 7,270                         | 1,193                         | 19.63%                        |
| Delaware Township          | N/A                           |                               |                               |                               |
| Des Moines                 | 89,052                        | 95,082                        | 6,030                         | 6.77%                         |
| Elkhart                    | 269                           | 359                           | 90                            | 33.46%                        |
| Grimes                     | 3,272                         | 6,062                         | 2,790                         | 85.27%                        |
| Johnston                   | 6,618                         | 9,896                         | 3,278                         | 49.53%                        |
| Mitchellville              | 693                           | 711                           | 18                            | 2.60%                         |
| Pleasant Hill              | 3,587                         | 4,155                         | 568                           | 15.83%                        |
| Polk City                  | 1,276                         | 2,015                         | 739                           | 57.92%                        |
| Runnells                   | 187                           | 189                           | 2                             | 1.07%                         |
| Saylor Township            | N/A                           |                               |                               |                               |
| Urbandale                  | 16,319                        | 18,366                        | 2,047                         | 12.54%                        |
| West Des Moines            | 26,219                        | 32,200                        | 5,981                         | 22.81%                        |
| Windsor Heights            | 2,289                         | 2,320                         | 31                            | 1.35%                         |
| <b>Polk County Totals*</b> | <b>182,262</b>                | <b>210,184</b>                | <b>27,922</b>                 | <b>15.32%</b>                 |

Source: U.S. Bureau of the Census, 2010 and 2020 Decennial Census; Housing statistics are for entire incorporated areas of participating jurisdictions as reported by the U.S. Census Bureau. Polk County total includes housing units in unincorporated parts of the county.

The remaining discussion in this section provides future growth and development information, where available, relative to each participating jurisdiction.

#### 3.2.4.1 ALLEMAN

The City of Alleman has not had significant residential growth for about five years. With the growth of North Polk Schools the City is hopeful that growth both commercial and residential may occur but the City is well aware it's borders are land locked by family owned Century Farms.

#### 3.2.4.2 ALTOONA

Between 2010 and 2020 the population of Altoona grew by nearly 35%. In 2014, Altoona's Comprehensive Plan suggested a 3.46% growth rate in forecasting a 2035 population of 33,693. If extended to 2050, the forecast population reaches 56,044. Commercial and Industrial growth has been strong in Altoona. In 2014, it was anticipated that approximately 700 acres of commercial and industrial ground would be needed to satisfy the growth of these land uses in the community through 2035. Today, commercial and industrial land development includes approximately 1,856 acres of improved land with 637 acres of that occurring since 2014. Altoona currently has approximately 414 acres of vacant commercial and industrial land. Figure 11. Altoona Zoning Map and Figure 12 below provide the Altoona Zoning Map and Altoona Future Land Use Map, respectively.



Figure 11. Altoona Zoning Map

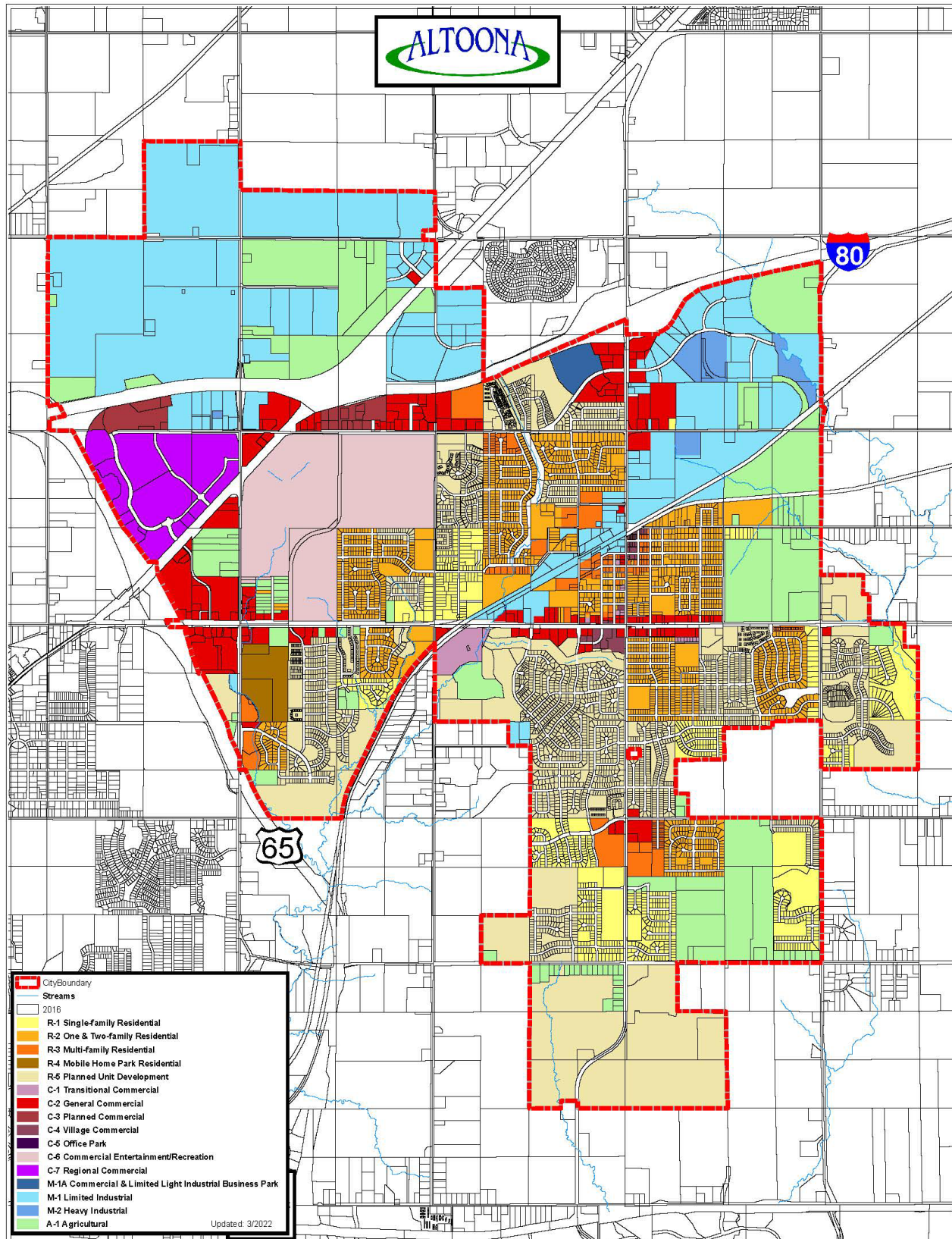
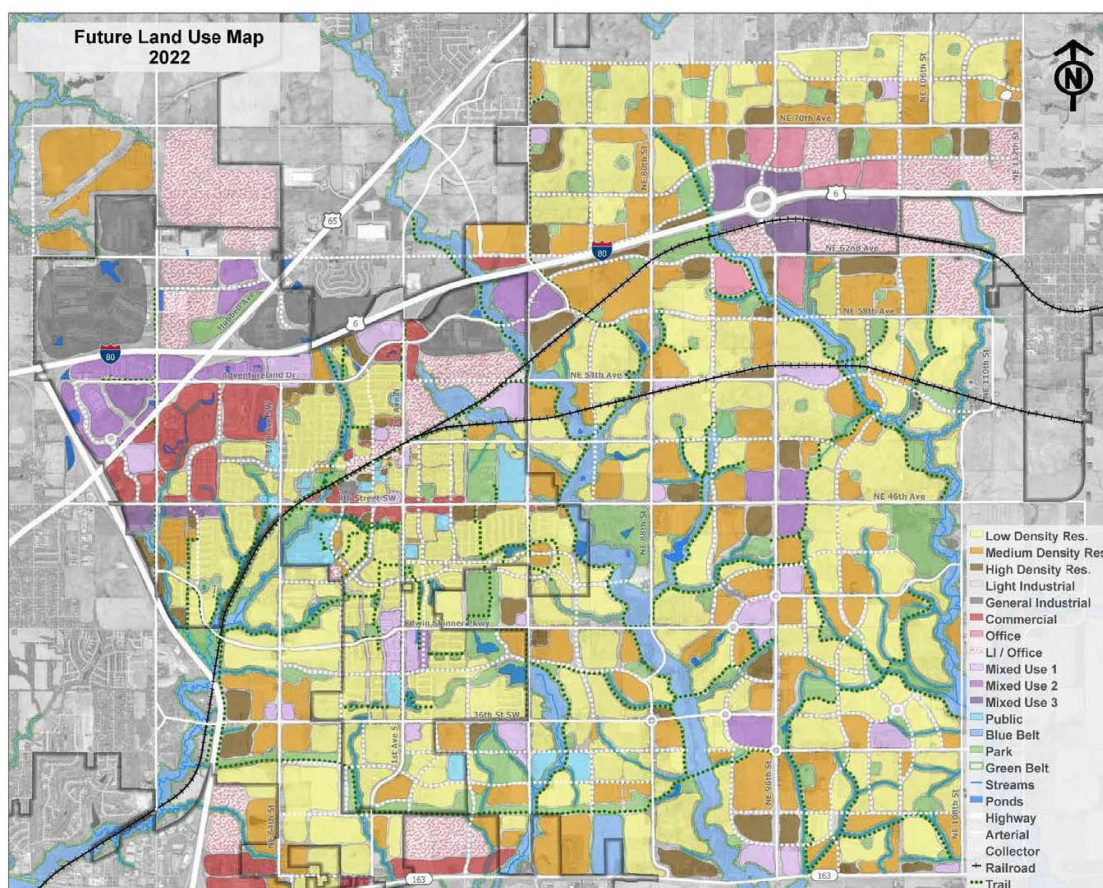


Figure 12. City of Altoona Future Land Use Map



#### 3.2.4.3 ANKENY

The Ankeny Plan 2040 considers existing land use characteristics and projects the amount of land needed to accommodate the City's projected population of 130,000 by the year 2040. While several variables may impact this growth positively or negatively, there are few limits to growth in the Ankeny area, such as generally flat terrain, adequate ability for public infrastructure extension, and significant development opportunities associated with the potential Northeast Beltway expansion.

Based on calculations of population growth, housing demand, and land requirements, it is possible that the City of Ankeny will need between 1,785 acres (2.78 square miles) and 3,871 acres (6.05 square miles) to address this residential demand caused by anticipated population growth. By 2040, this growth will generate a demand for approximately 21,714 dwelling units, or 987 dwelling units annually, between ownership and rental units combined.

With an increase of residential land area needed, the demand for parkland also increases. The Ankeny Plan 2040 recommends upwards of 1000 additional acres of parkland. The growth of the City of

3-37



Ankeny may also require up to 339 acres of commercial land area, 330 acres of industrial land area, 134 acres of office land area, and 79 acres of lodging land area. The figures below provide Ankeny's Existing Land Use Map, Future Growth Areas Map, and Generalized Development Concept Map.

Figure 13. Ankeny Existing Land Use Map

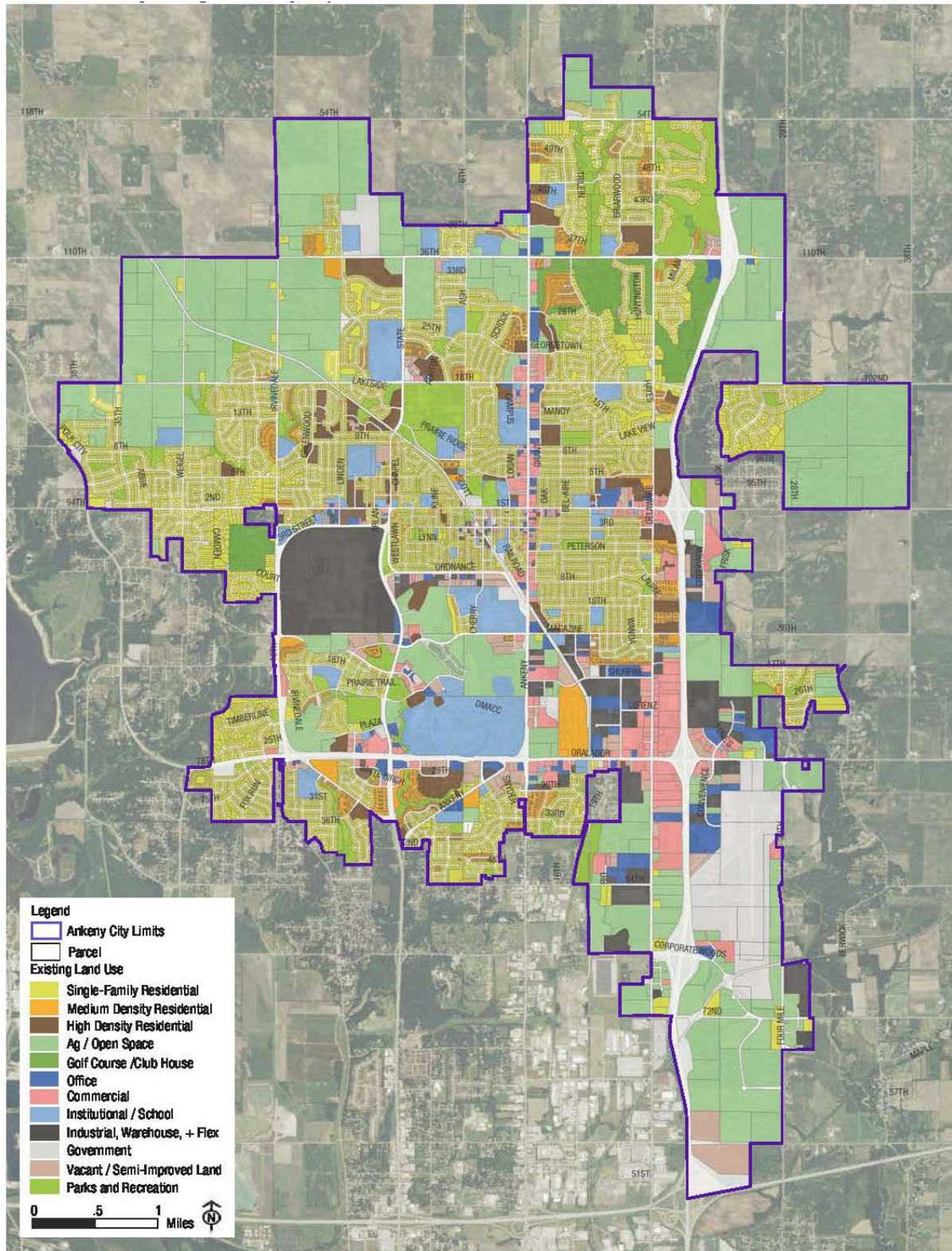




Figure 14. Ankeny Future Land Use Map

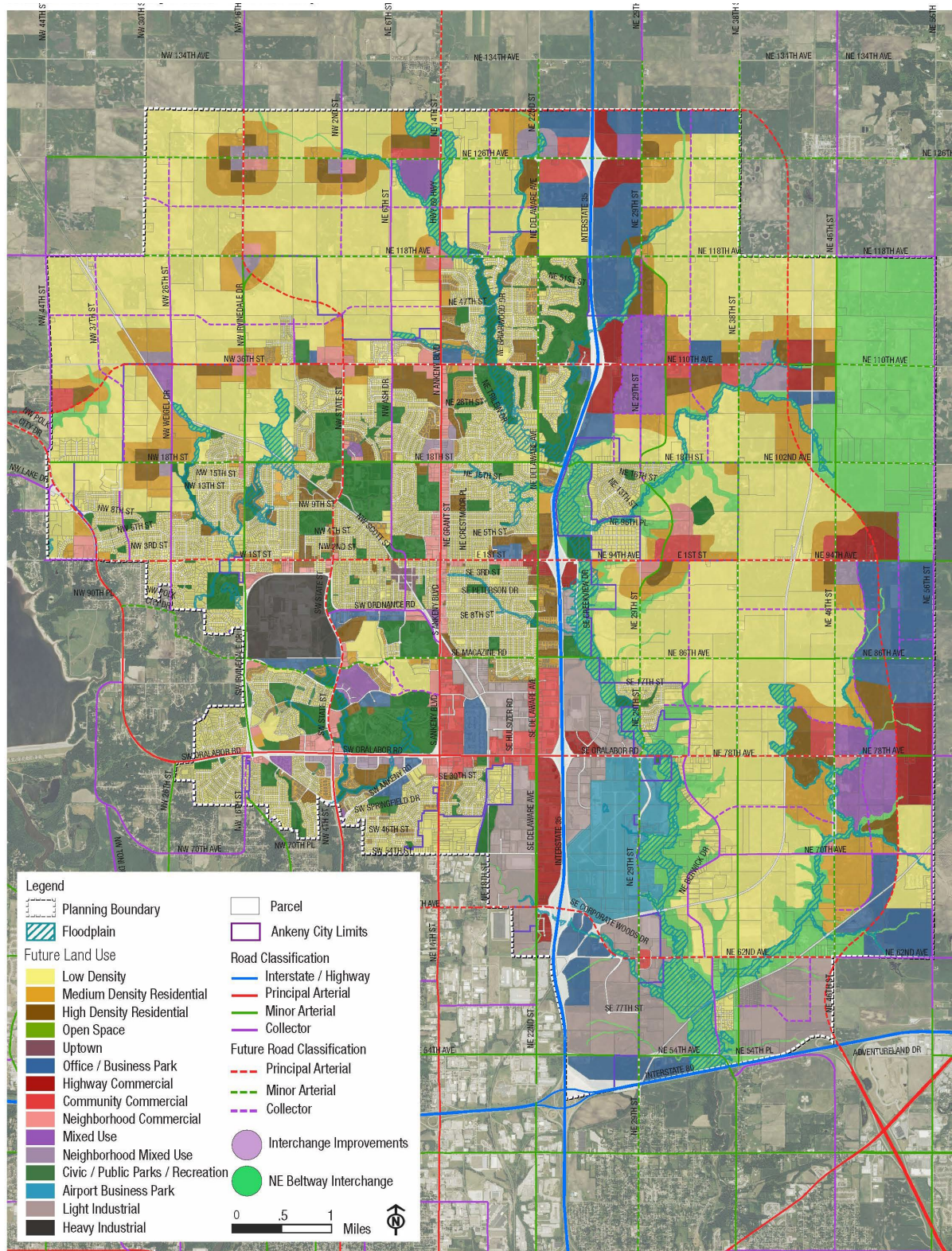
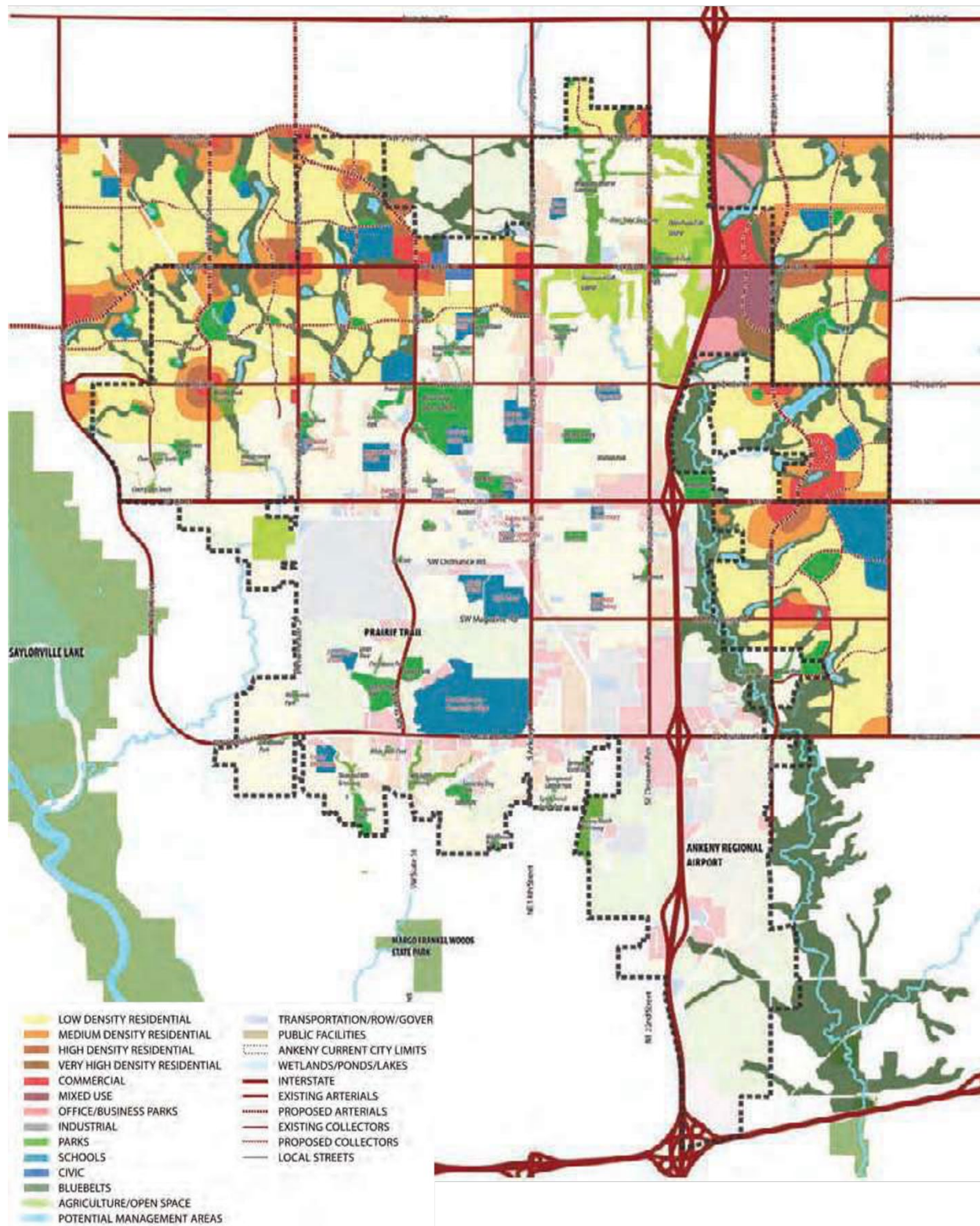




Figure 15. Ankeny Generalized Development Concept Map



#### 3.2.4.4 BONDURANT

The 2020 Census placed the community's population at 7,365 people. Between 2010 and 2020, the community saw a 91% increase in population, which was the second highest percent change in the state and the highest percent increase in Polk County. The City of Bondurant will be conducting a Special Census in 2024 to capture ongoing growth that has occurred since the 2020 Census. Given the sustained growth the community has been experiencing, community leaders feel the population will likely trend between 22,798 and 32,396 through 2050.

In addition to ongoing residential growth, the community has been experiencing rapid commercial and industrial development. Over 4,000 jobs have been created in Bondurant since 2019; a key contributor to this job growth has been Amazon. There are two Amazon facilities located in Bondurant – 500 32nd Street SW and 2300 Shiloh Rose Parkway SW.

Alongside the Building Bondurant Comprehensive Plan, the City of Bondurant has adopted a number of area-specific long-range planning documents, including the following:

- **Civic Campus Master Plan:** this plan provides guidance on how a series of public buildings can be constructed on the 46-acre Civic Campus site over a series of decades to meet both current and future demands of the City. The first building that will be constructed in the Civic Campus Master Plan area will be the new Bondurant Emergency Services Facility.
- **Grain District Downtown Redevelopment Plan:** This plan provides the framework for how a 25-acre former farmer's cooperative can be redeveloped in a way that is considered a cohesive extension of the community's downtown core area. This former farmer's cooperative site is host to several groupings of 140'-tall grain elevator structures, some of which may have sustained damage from the 2020 derecho.
- **Central District Stormwater Improvements Master Plan:** This plan provides guidance on how the currently unsafe intersection of Grant Street South and Highway 65 can be reconstructed in a way that will allow for the sufficient stacking of vehicles. This plan also identifies the potential to have a 30+ acre regional stormwater detention basin created to help mitigate existing and potential future flooding concerns of the area.



Figure 16 - Bondurant Existing Land Use

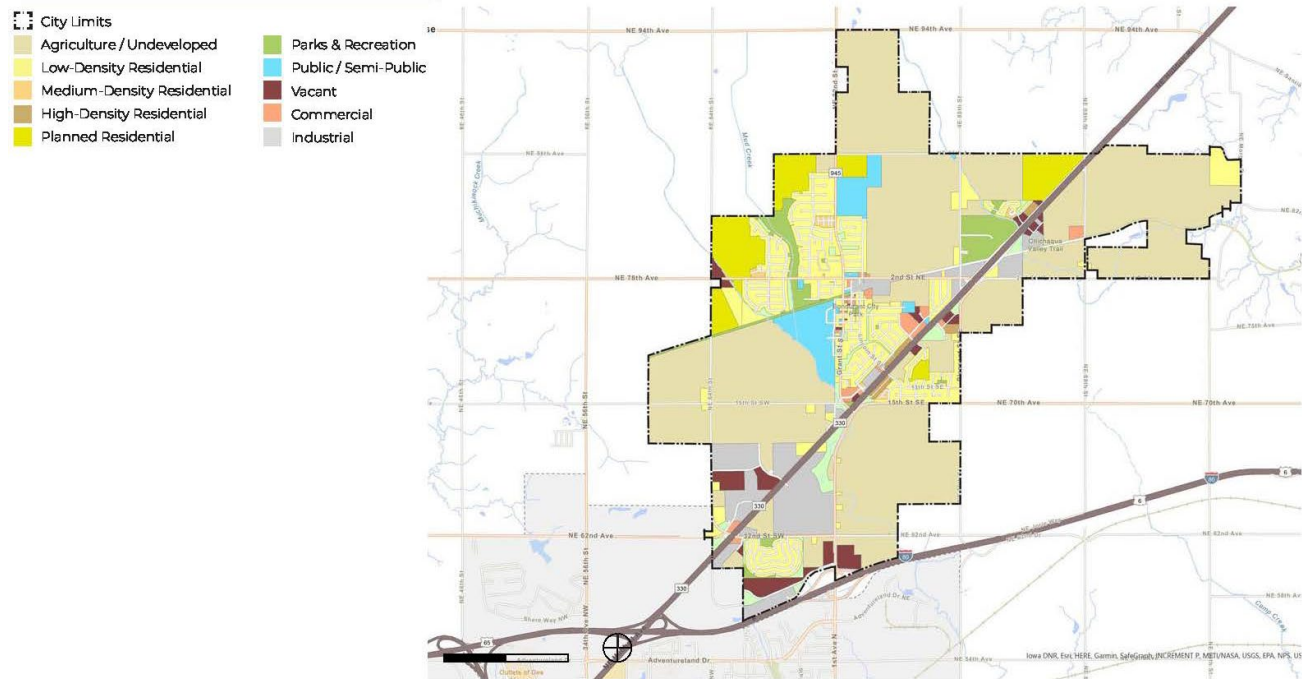
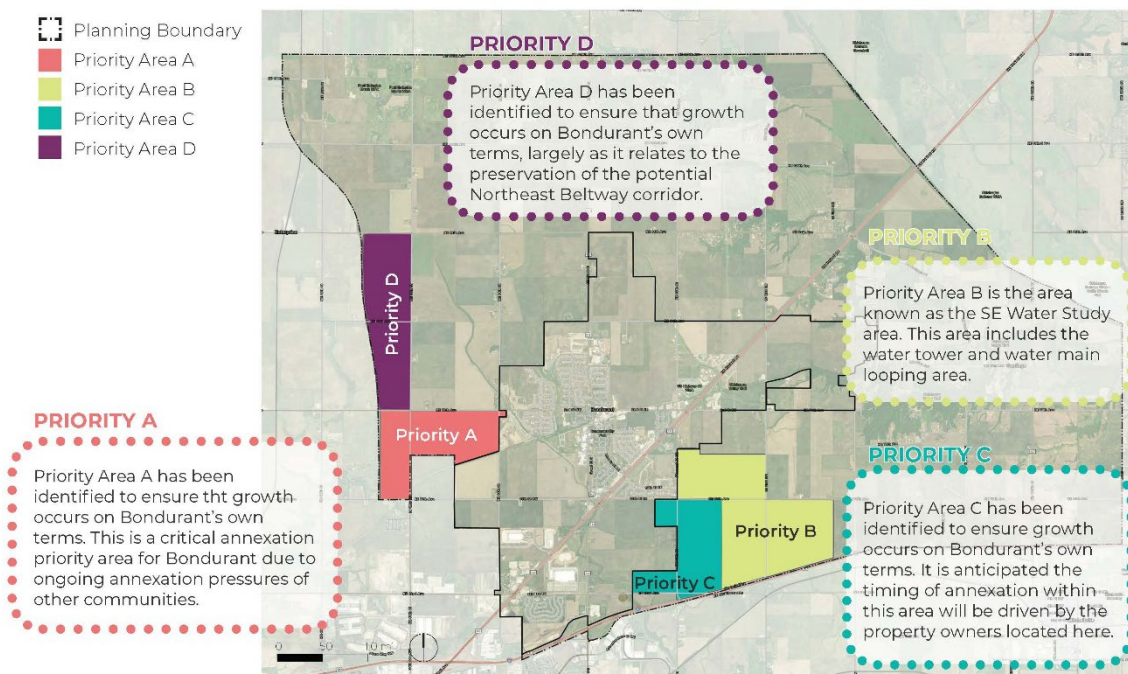


Figure 17. Bondurant Annexation Priority Map





[illegible]

#### 3.2.4.5 CLIVE

The City of Clive is a landlocked community nearing full build out. Clive is experiencing growth through greenfield development north of Hickman Road and east of NW 156<sup>th</sup> Street. The bulk of new development in this area is anticipated to be low density residential, with some opportunity for medium or high density residential. There are limited opportunities for neighborhood commercial and mixed use developments. In addition, there are planned extensions of the Clive Greenbelt in the area north of Douglas Parkway.

In addition to greenfield development, there are scattered infill sites throughout the community that provide opportunities for commercial development and some residential projects. Redevelopment opportunities exist primarily east of Interstate 35/80 along the NW 86<sup>th</sup> Street and Hickman Road Corridors. The Zoning Map and the Future Development Map for the City of Clive are shown in the figures below.

**Figure 19. Clive Zoning Map**

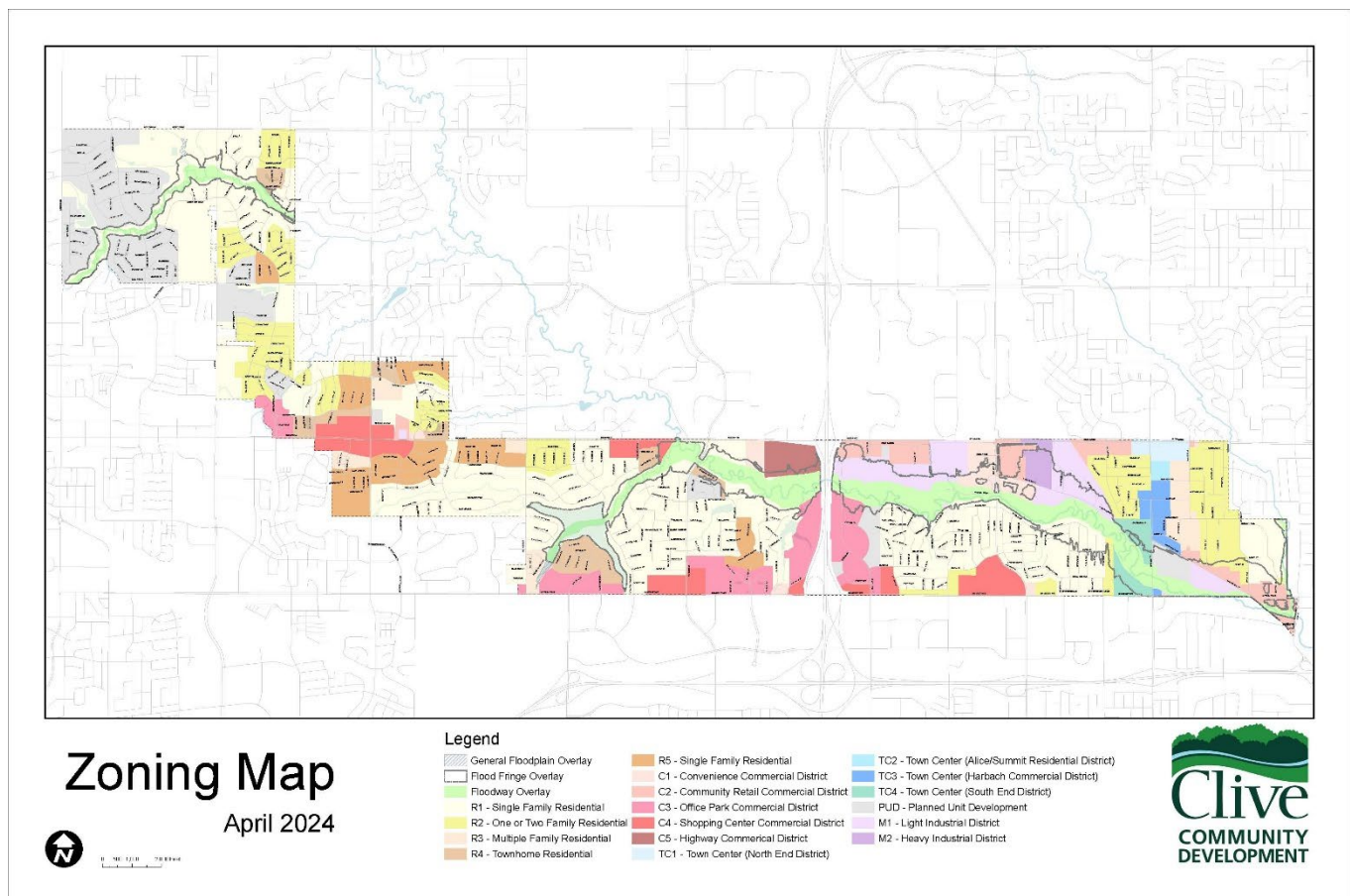
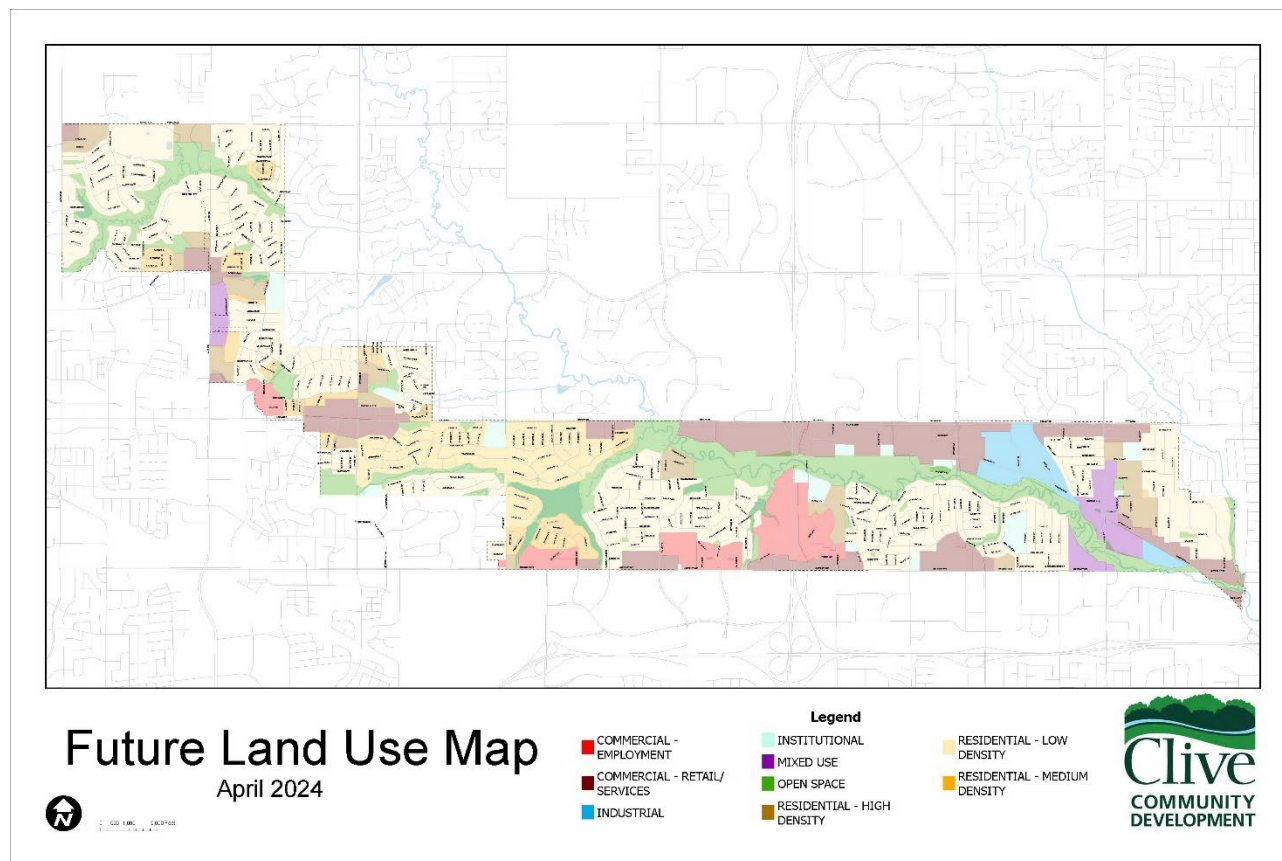


Figure 20. Clive Future Land Use Map



#### 3.2.4.6 DELAWARE TOWNSHIP

There is no anticipated future development in Delaware Township to report at this time.

#### 3.2.4.7 DES MOINES

Des Moines continues to be the economic center of the metropolitan area. It has experienced steady development during the past five years. A great deal of this development has gone into downtown Des Moines, significantly increasing the population density of this area and adding many new accommodations for residents. As a class 5 National Flood Insurance Program Community Rating System community, Des Moines maintains a proactive approach to reduce flood damage risks. The Planning and Zoning Ordinances prioritize durability and sustainable design in planning new development.



Figure 21. Des Moines Zoning Map

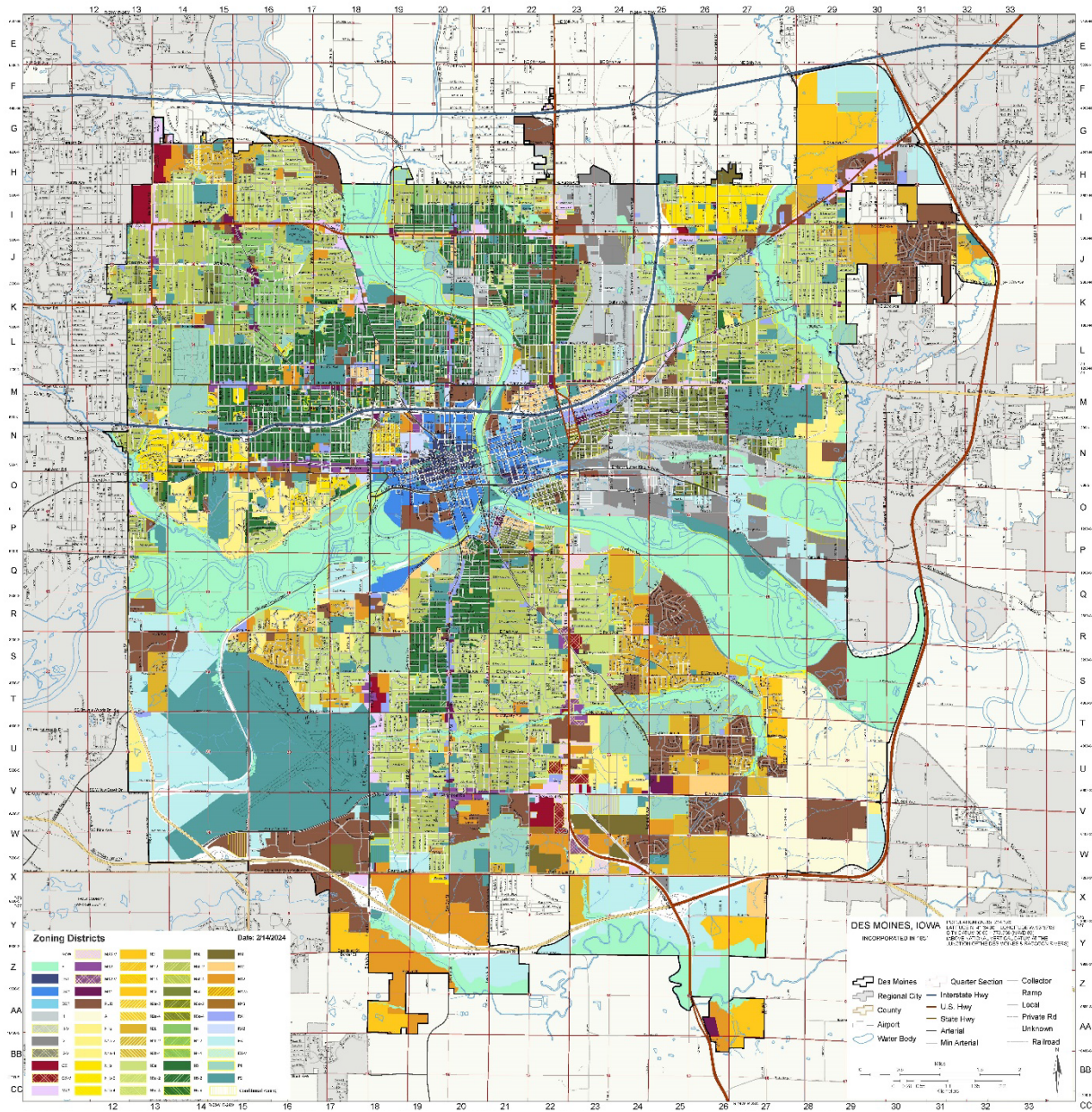
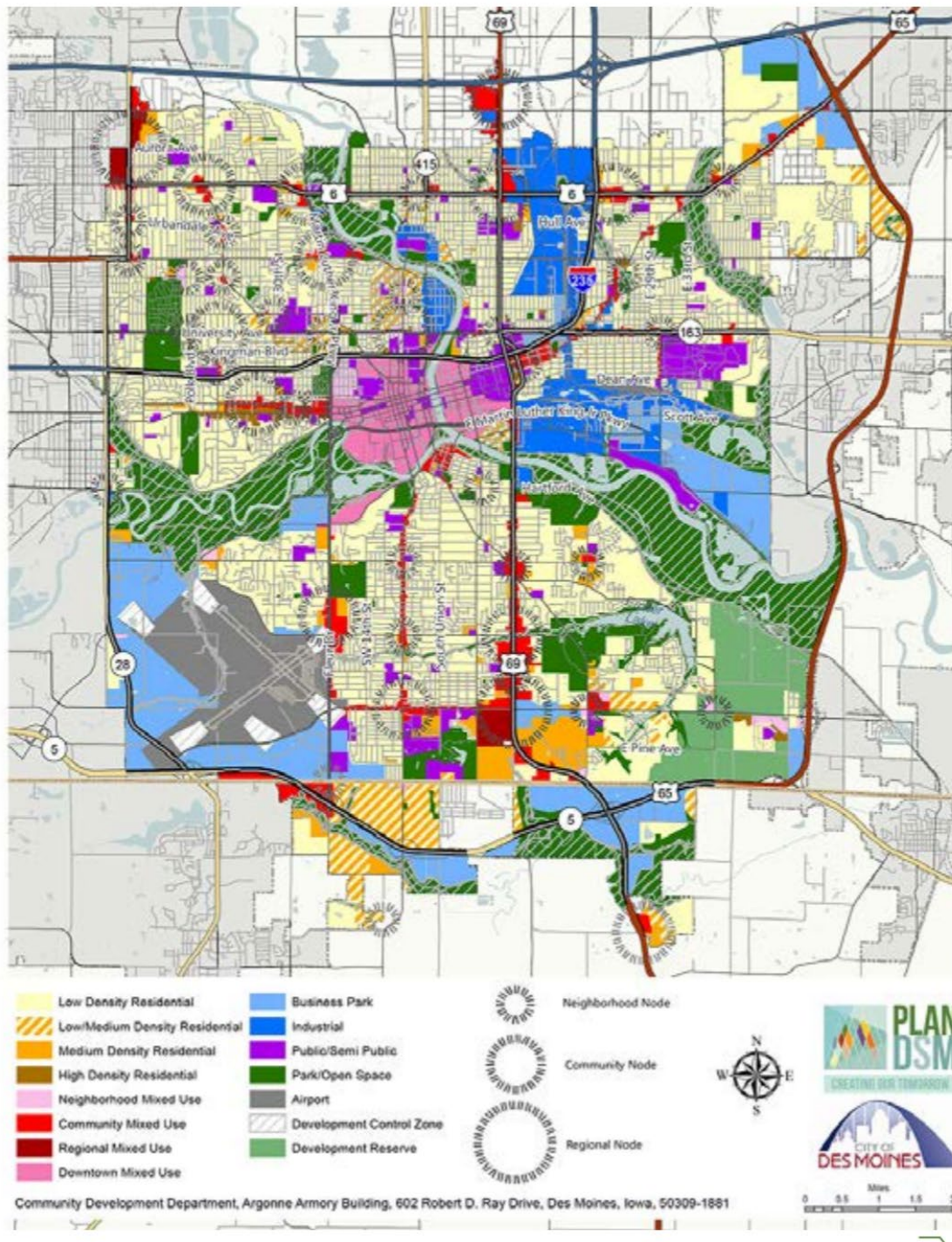




Figure 22 - Des Moines Future Land Use Map

PLANDSM FUTURE LAND USE MAP



#### 3.2.4.8 ELKHART

The City of Elkhart expects continued growth in East Elkhart Development and in North Elkhart. If proposed beltway is built, growth will occur in South Elkhart. The City is looking into building a new fire station, expanding ball fields and developing a new park in the east side of Elkhart.

#### 3.2.4.9 GRIMES

Grimes has experienced substantial growth in both the residential and commercial areas. Per the Grimes Comprehensive plan, this trend is expected to continue into the foreseeable future. The primary identified potential hazard areas in Grimes pertain to area floodplains. The City has adopted all appropriate flood plain ordinances in accordance with National Flood insurance program protocol in order to mitigate future flood problems.

Figure 23 - Grimes 2010 Existing Land Use

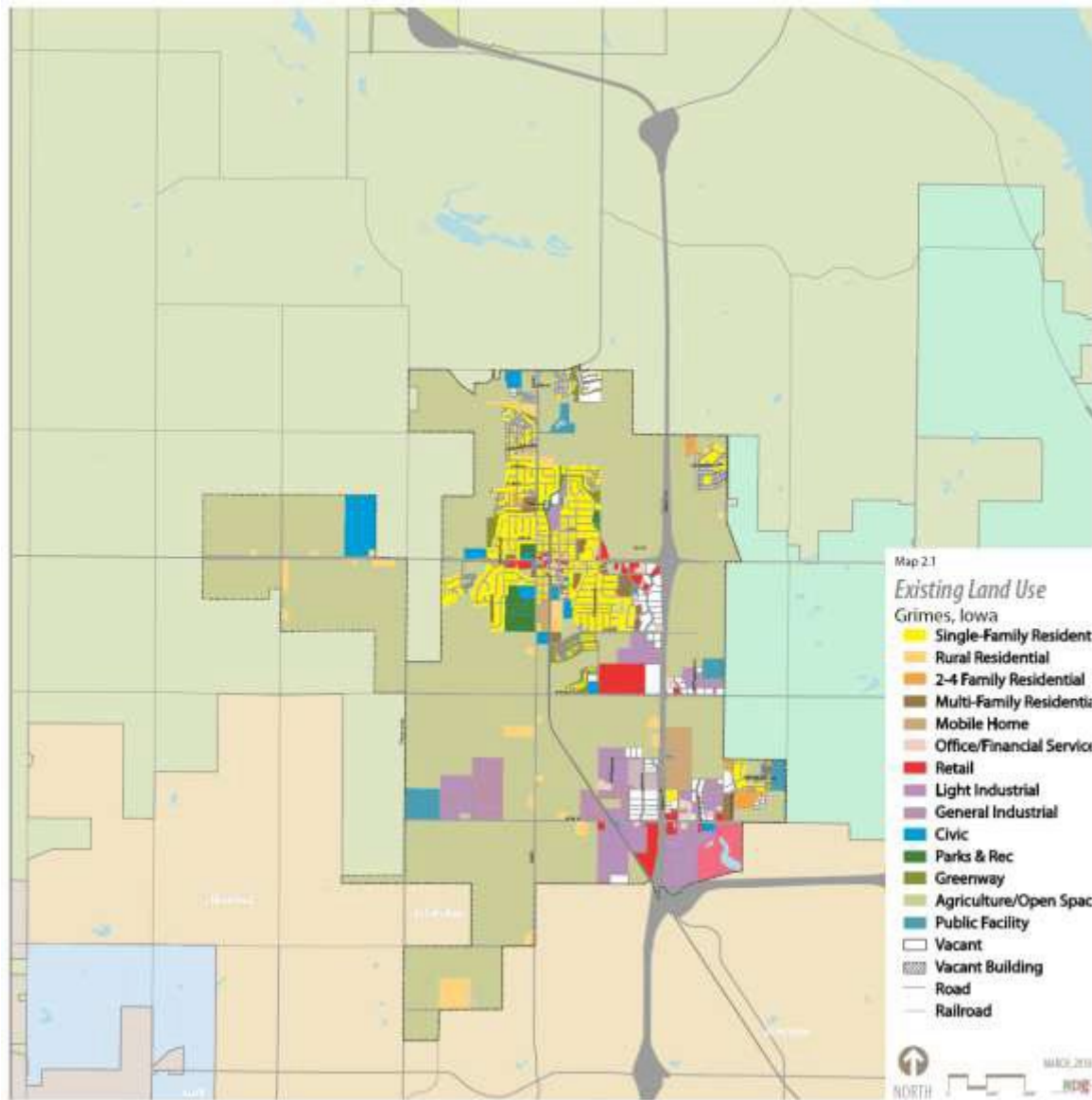




Figure 24 - Grimes Future Land Use

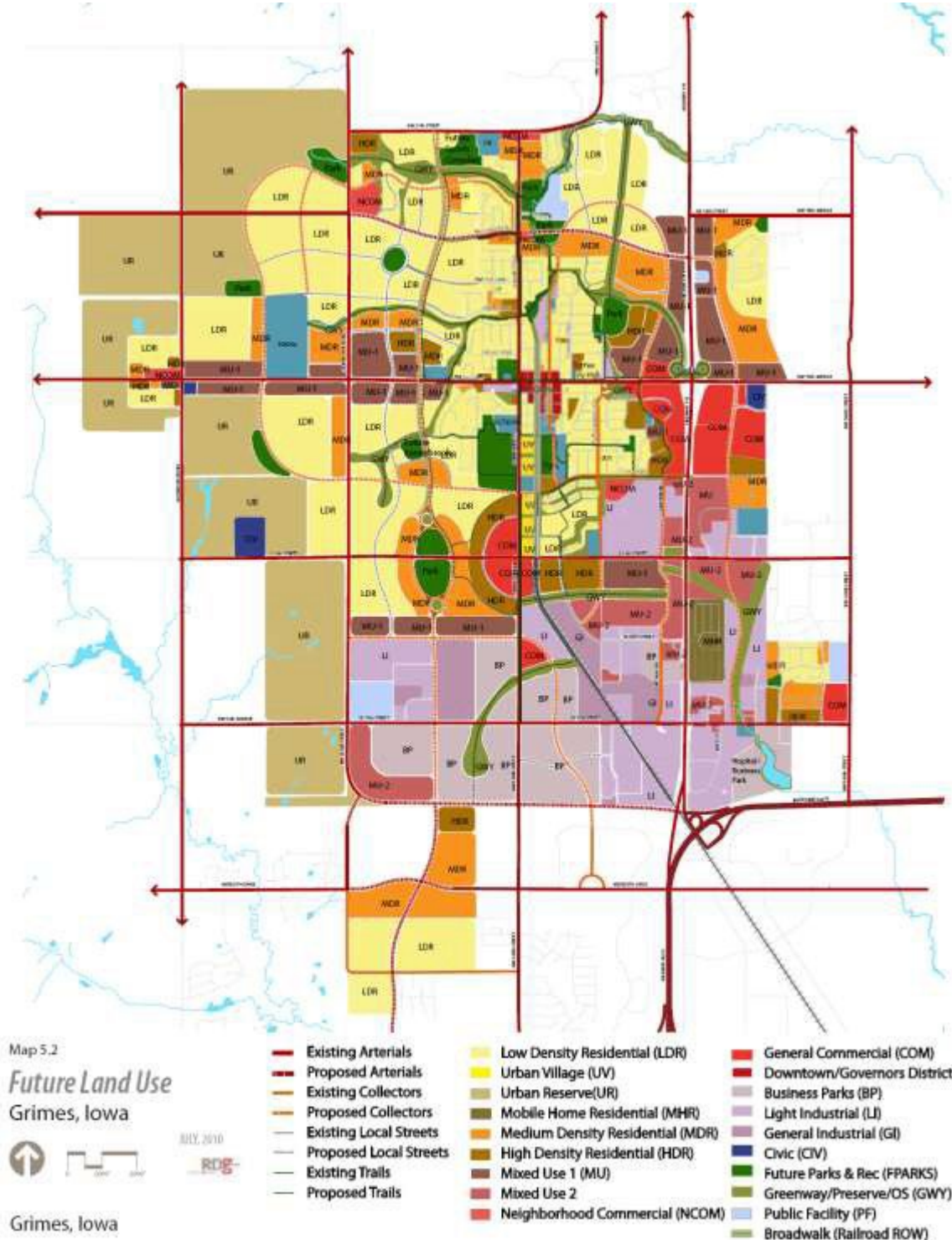




Figure 25 - Grimes Phased Annexation-Proposed



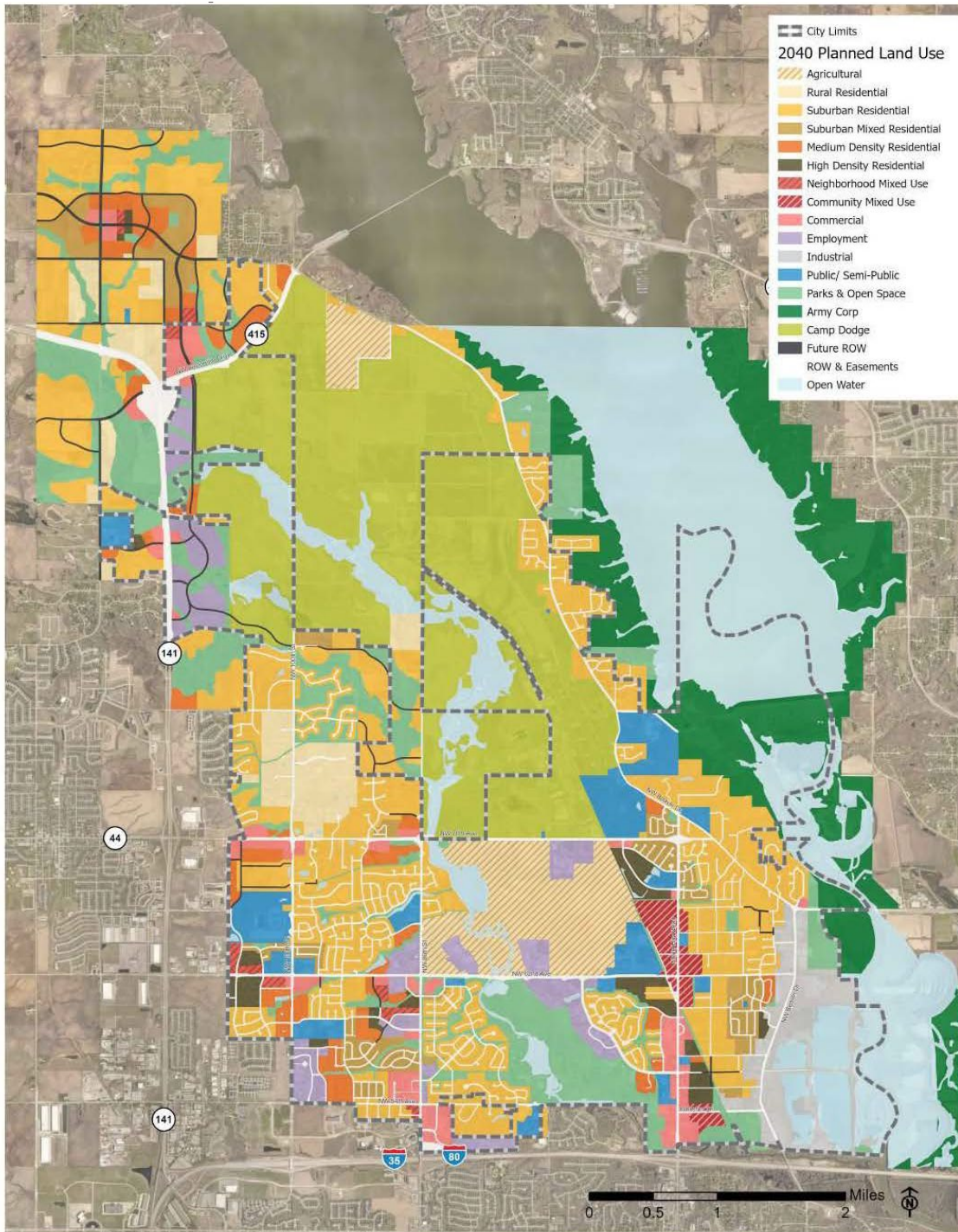
#### 3.2.4.10 JOHNSTON

The City's current land uses are reflected in the current Zoning Map, shown in Figure 26. Pursuant to the Thrive 2040 Comprehensive Plan, the primary growth areas within Johnston include several infill redevelopment areas, primarily along Merle Hay Road, and two growth areas to the northwest of the community, the first being generally west of NW 86th Street and north of NW 70th Avenue and the second being northerly along Highway 141 and Saylorville Drive. A copy of the Thrive 2040 Comprehensive Plan Future Land Use Map is shown in Figure 27. All three of the redevelopment/growth areas include areas which are impacted by floodplain from Beaver Creek and/or Little Beaver Creek. However, the City of Johnston does maintain floodplain overlay zoning districts as well as stream buffer regulations intended to preserve and protect these natural resource areas.

[illegible]



Figure 27. Johnston Future Land Use Map



#### 3.2.4.11 MITCHELLVILLE

The following is excerpted from the 2018 Mitchellville Comprehensive Plan:

The proposed land use map provides Mitchellville with future land uses that will allow the city to be competitive with the surrounding markets and meet the basic needs of the community according to the population projection.

New land should be allocated to the Iowa Correctional Institute for Women in order to allow the city to acquire land that is currently owned by the facility, with the intention of expanding Oak Avenue further south. This will strengthen Mitchellville's infrastructure network and will give the city more control of the development imposed by the Iowa Correctional Institute for Women as it increases its capacity to meet the growing needs of the state. This swap should also provide the city with a necessary connection with the facility to increase the exchange and collaboration between the city and the facility.

The area along the railroad should be zoned and marketed to provide light industrial venues that need interstate and rail access. This increase in light industrial use will increase the city's tax base and provide a much needed increase to the local employer base.

Land along the interstate is best marketed for use as heavy industrial and community commercial because it is an area where high exposure to an interstate network is a high demand for large employers including manufacturing companies, hotels, motels, and distributing companies. The direct access to the railroad is another positive feature to cater to businesses that may need or want this already existing commodity.

A mixed-use area should be created in conjunction with and extended central business district to make the highly traveled Center Avenue a unified business corridor linking and expanding upon the existing business corridor. The mixed-use area can provide a necessary buffer between the proposed area for increased light industrial and community commercial use with the existing residential community. The intent of the mixed-use area is to provide multi-family housing above commercial units. A new high- density residential area is proposed to the south of the new park/ open space in the northeast corner of the city. This area can be used to provide a more densely populated residential area as well as provide a space for a potential retirement home or assisted living community. This is based off its location with the established residential community and also its location relative to parks and open space.

The proposed land use should provide current and future residents with a land use layout that improves upon an already solid recreational, residential, commercial, and industrial base.



Figure 28 - Mitchellville Existing Land Use Map

## 6. Land Use and Infrastructure

Figure 6.1. Current Mitchellville Zoning Map

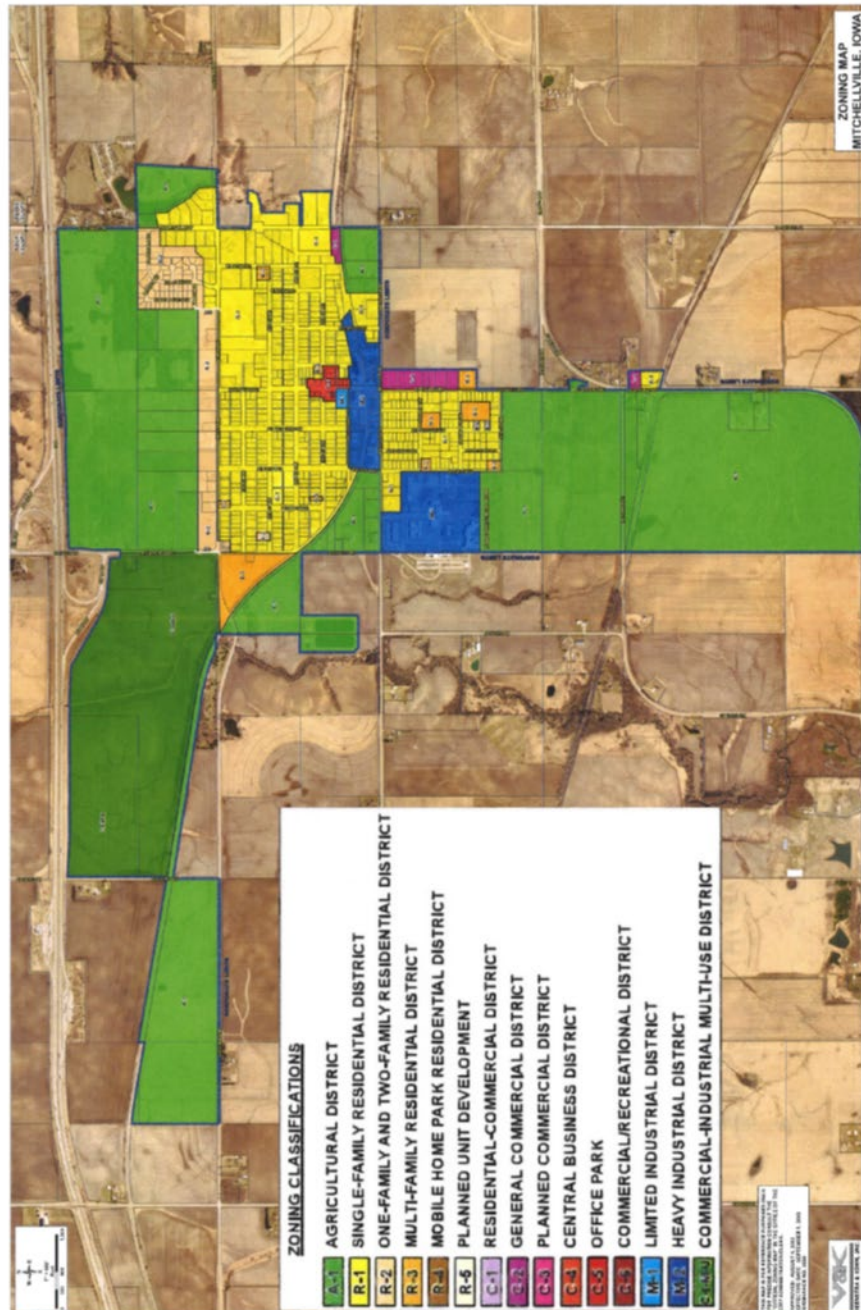


Figure 29 - Mitchellville Future Land Use Map

## 6. Land Use and Infrastructure

Figure 6.2. Mitchellville Future Land Use Map

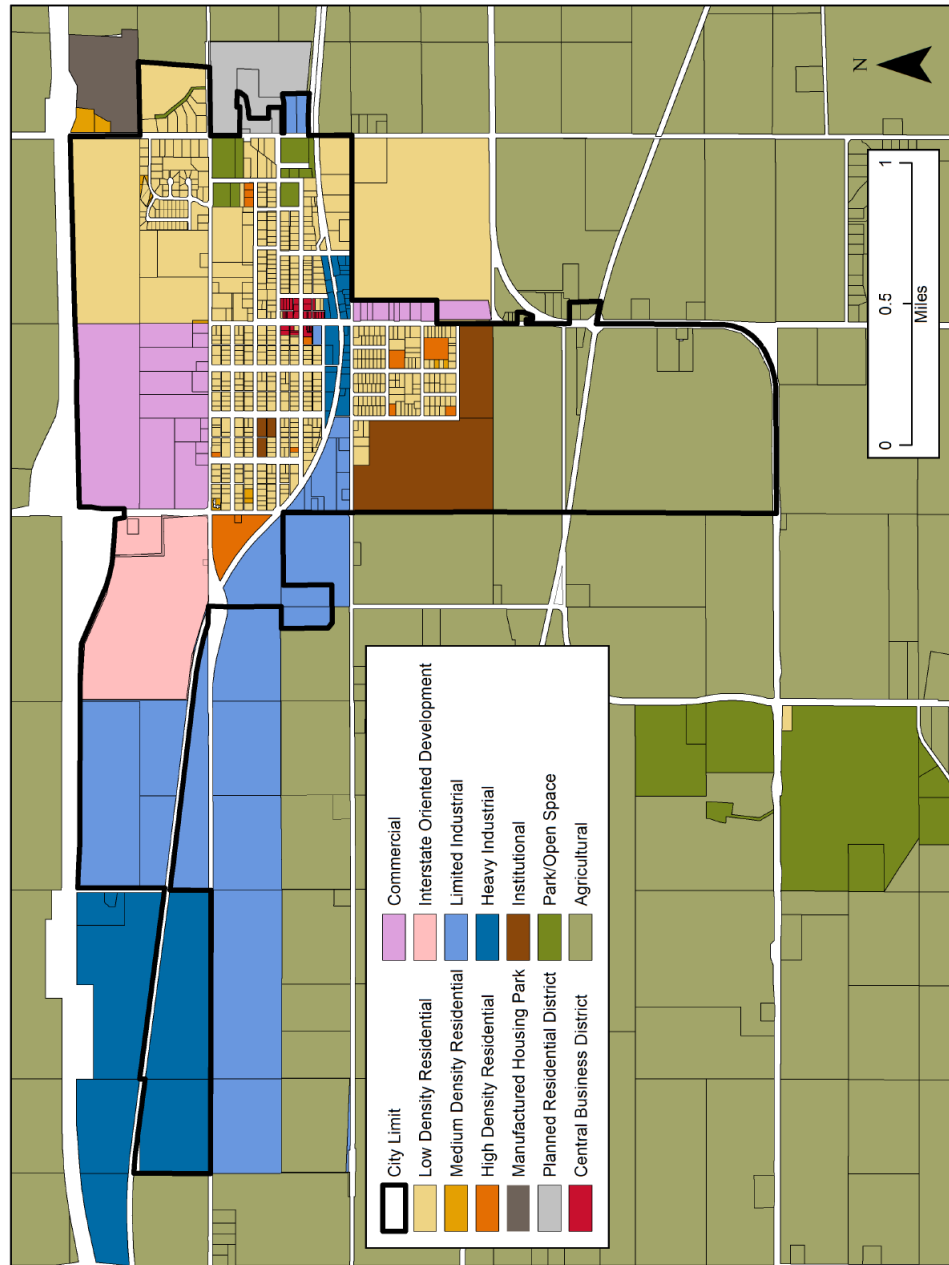
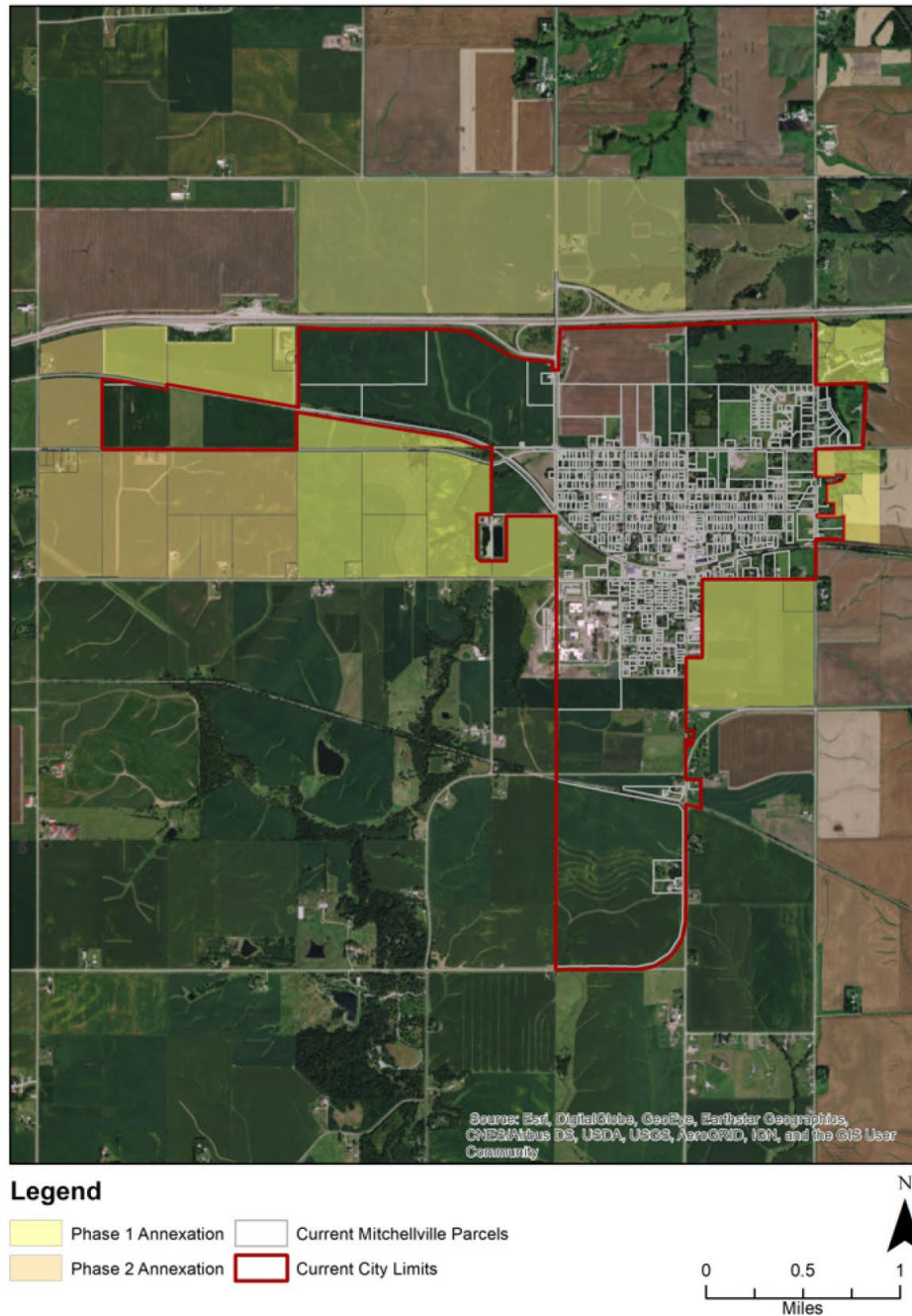


Figure 30 - Mitchellville Future Annexation Map

## 6. Land Use and Infrastructure

Figure 6.8. Mitchellville Future Annexation Map



67

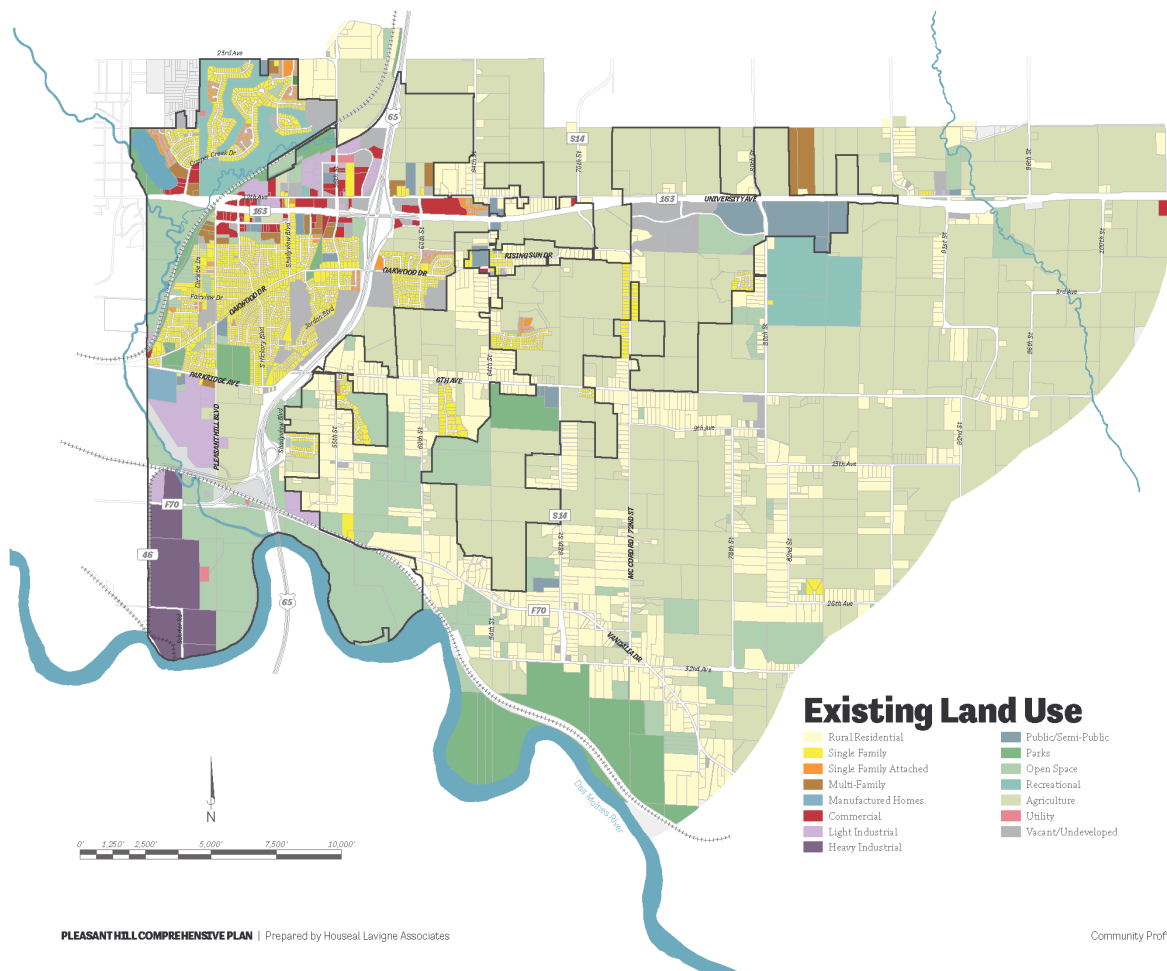


#### 3.2.4.12 PLEASANT HILL

The City continues to see steady growth in residential, commercial, and industrial uses. The majority of land available for development exists east of the Highway 65 bypass towards the Southeast Polk Junior High/High School Complex while also balancing some infill projects, focusing on the development of the University Avenue Corridor throughout the community.

The 2015 Comprehensive Plan outlines the plan and strategies for future development of the City of Pleasant Hill.

**Figure 31 - Pleasant Hill Existing Land Use Map**



Source: 2015 Pleasant Hill Comprehensive Plan

Figure 32 - Pleasant Hill Current Zoning Map

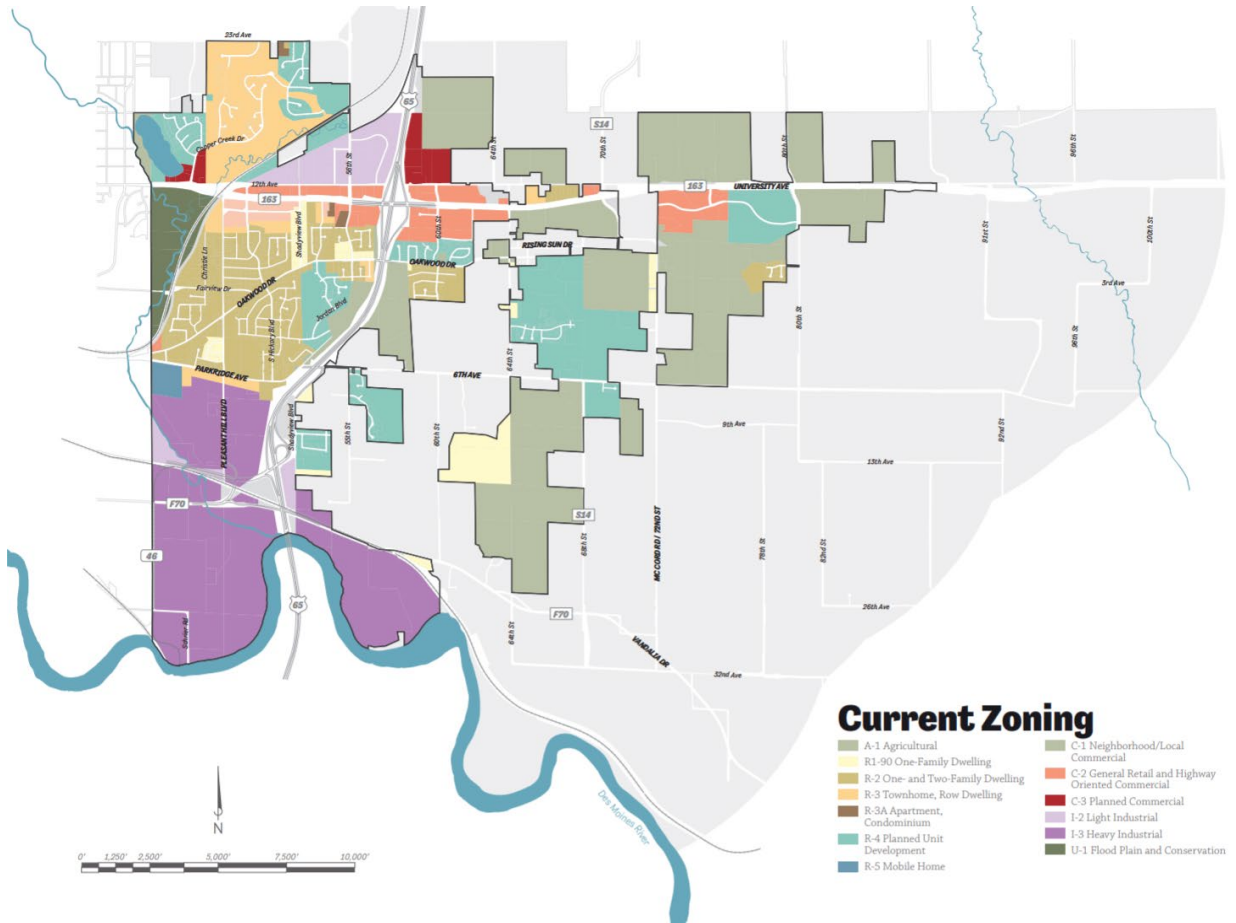
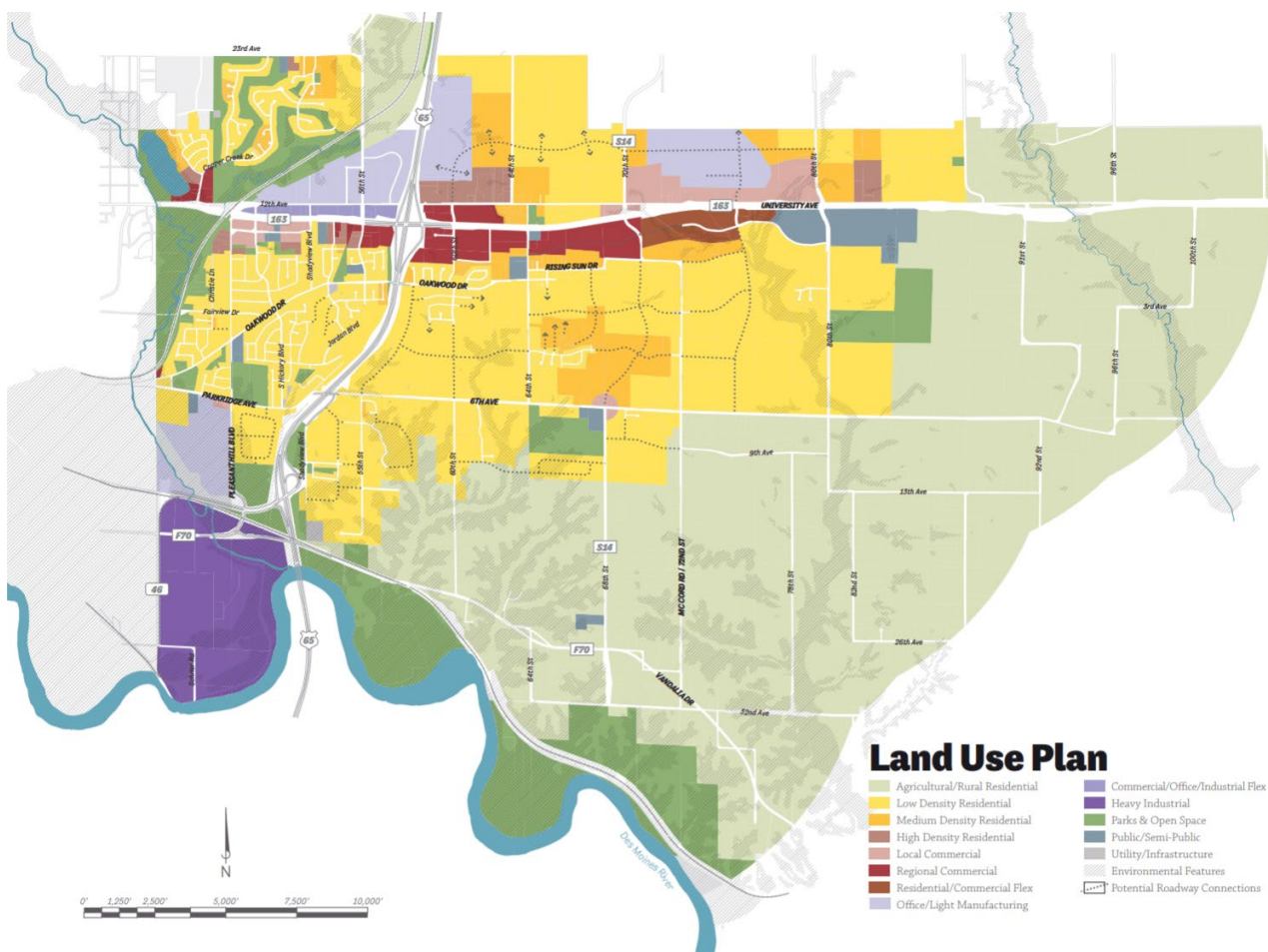
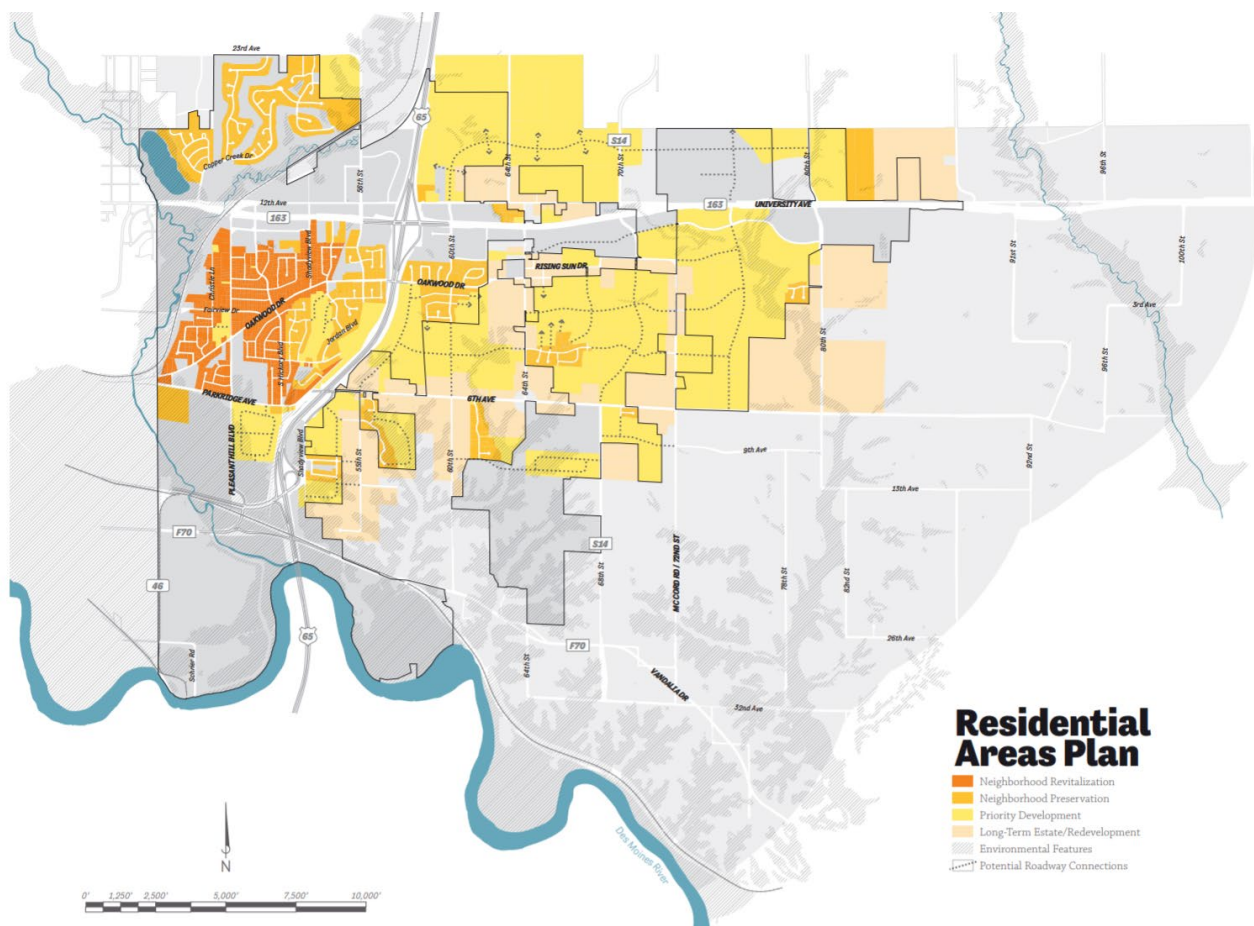


Figure 33 - Pleasant Hill Land Use Plan



Source: 2015 Pleasant Hill Comprehensive Plan

### Figure 34 - Pleasant Hill Residential Plan



Source: 2015 Pleasant Hill Comprehensive Plan

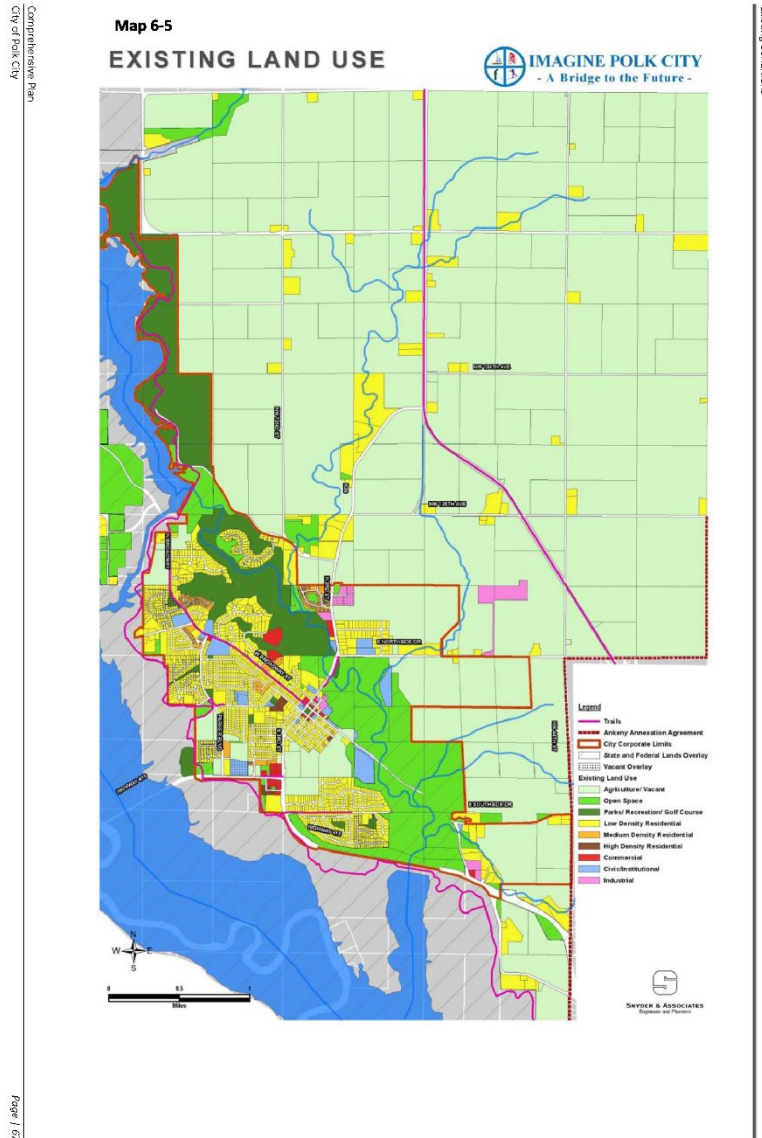
The following statement discouraging development in flood hazard areas is excerpted from the Pleasant Hill 2015 Comprehensive Plan.

This land use area accommodates the existing flood hazard areas along the Des Moines River which runs east along Pleasant Hill. This area protects land surrounding these areas while preserving the natural environment. Urban Development in this area is highly discouraged, although it is possible through standards set by the Federal Emergency Management Agency. Uses, if located in the best areas that would lessen the impact upon the area include; existing and future city parks and trails.



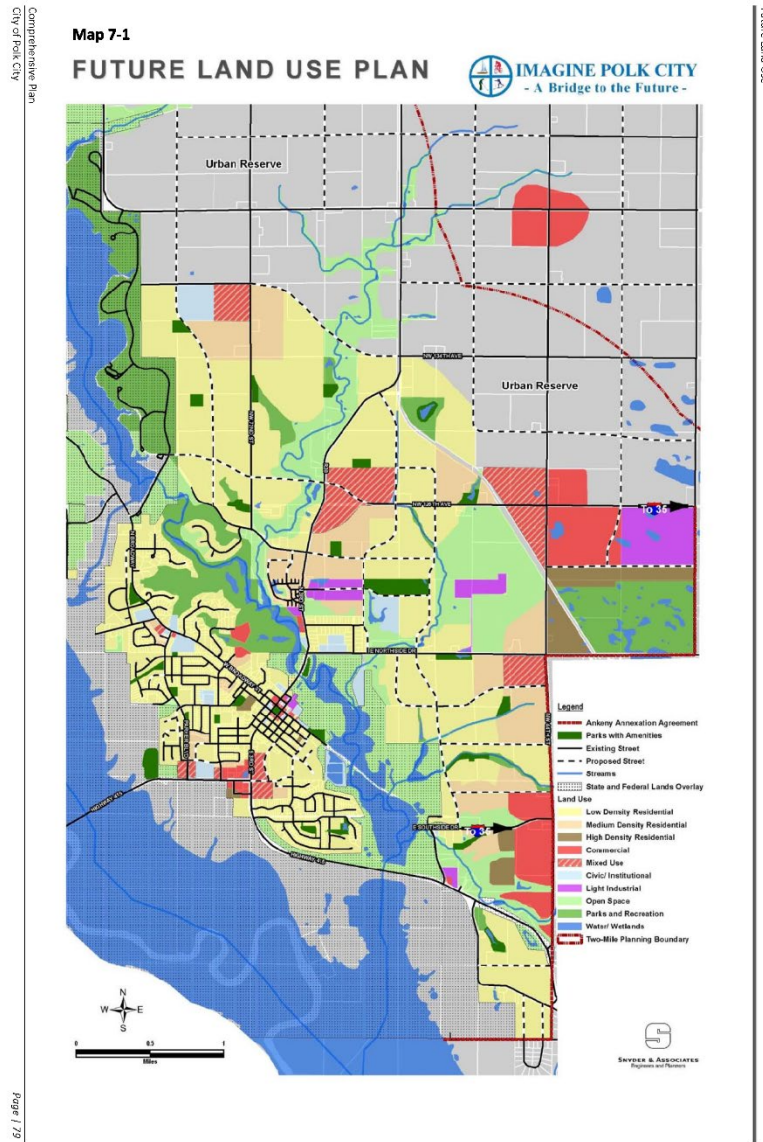
## 3.2.4.13 POLK CITY

Figure 35 - Polk City Existing Land Use Map



Source: Polk City Comprehensive Plan

Figure 36 - Polk City Future Land Use Map



Source: Polk City Comprehensive Plan

#### 3.2.4.14 RUNNELLS

There are no reported growth/development areas pertaining to Runnells.

#### 3.2.4.15 SAYLOR TOWNSHIP

There is no anticipated future development in Delaware Township to report at this time.

#### 3.2.4.16 URBANDALE

Figure 37 shows expected residential growth areas for Urbandale through 2025, which includes development on both sides of 170th Street, due in part to the on-going construction of the new Radiant Elementary school in the Waukee School District, as well as development north and south of Waterford Road, prompted by the 2016 Home Show Expo held at the nearby Coyote Ridge development. Beyond 2025, residential growth will continue west of 170th Street toward the current corporate boundary at 184th Street, and north of Waterford Road.

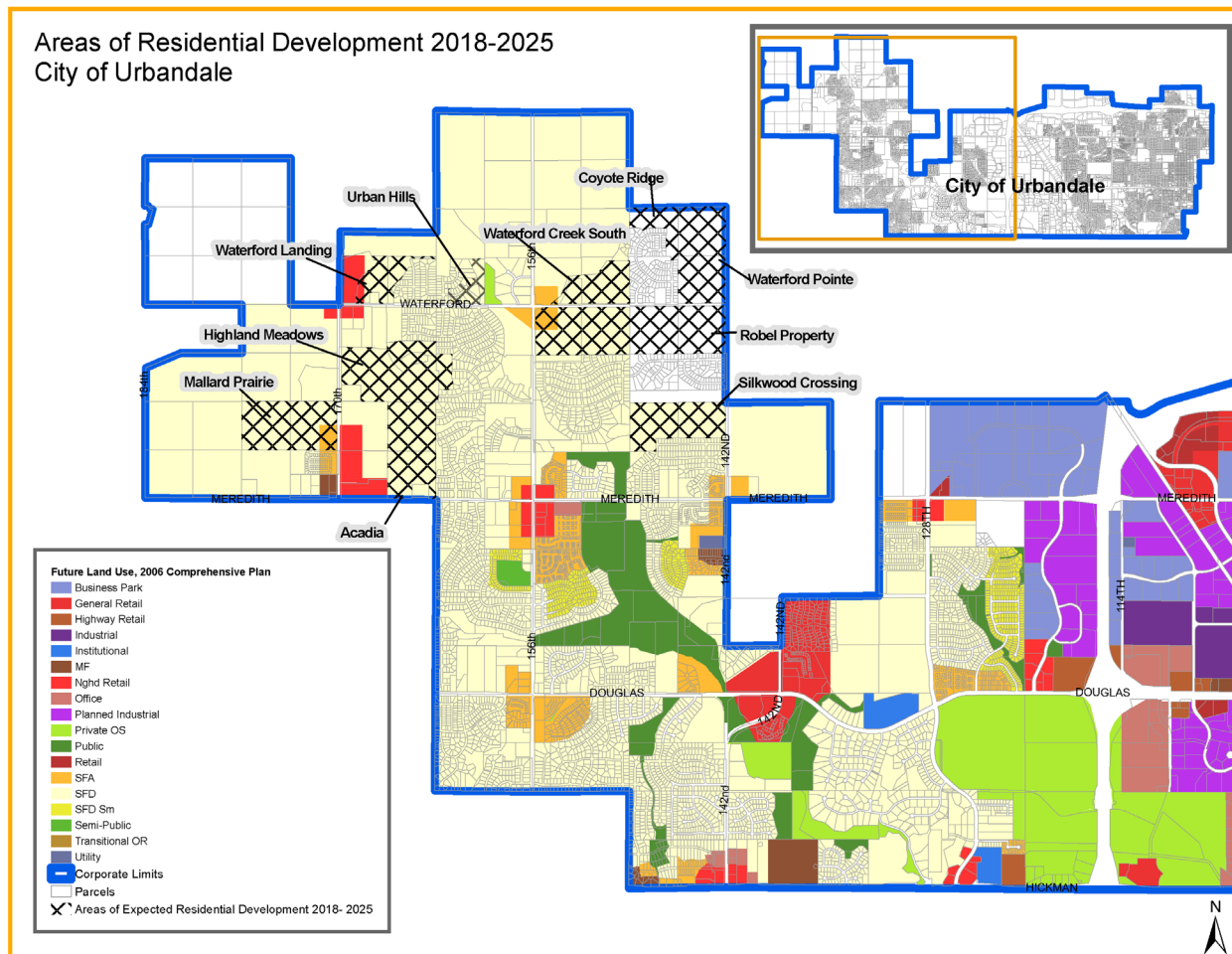
The only hazard area identified in these areas is the Walnut Creek floodplain. It's generally protected by City ownership everywhere to the south of Waterford Road, except for a couple of isolated properties that the City has been unable to acquire. Those are protected by floodplain management regulations.

There is still vacant ground for residential development in the Polk County portion of Urbandale, but a development timetable remains uncertain. No hazard areas exist within this area.

Nonresidential development should continue in the Plum Drive and Northpark Drive corridors, and the Paragon Office Park, due in large part to the opening of the Interstate 35/80 interchange at 100th Street later this year. No hazard areas are located in any of those areas except a small part of the North Walnut Creek floodplain, which is protected by floodplain management regulations and by easements that prevent development within the regulated hazard area.



Figure 37 - Urbandale Planned Areas of Residential Development 2018-2025



Source: Provided by Urbandale HMPC Representative

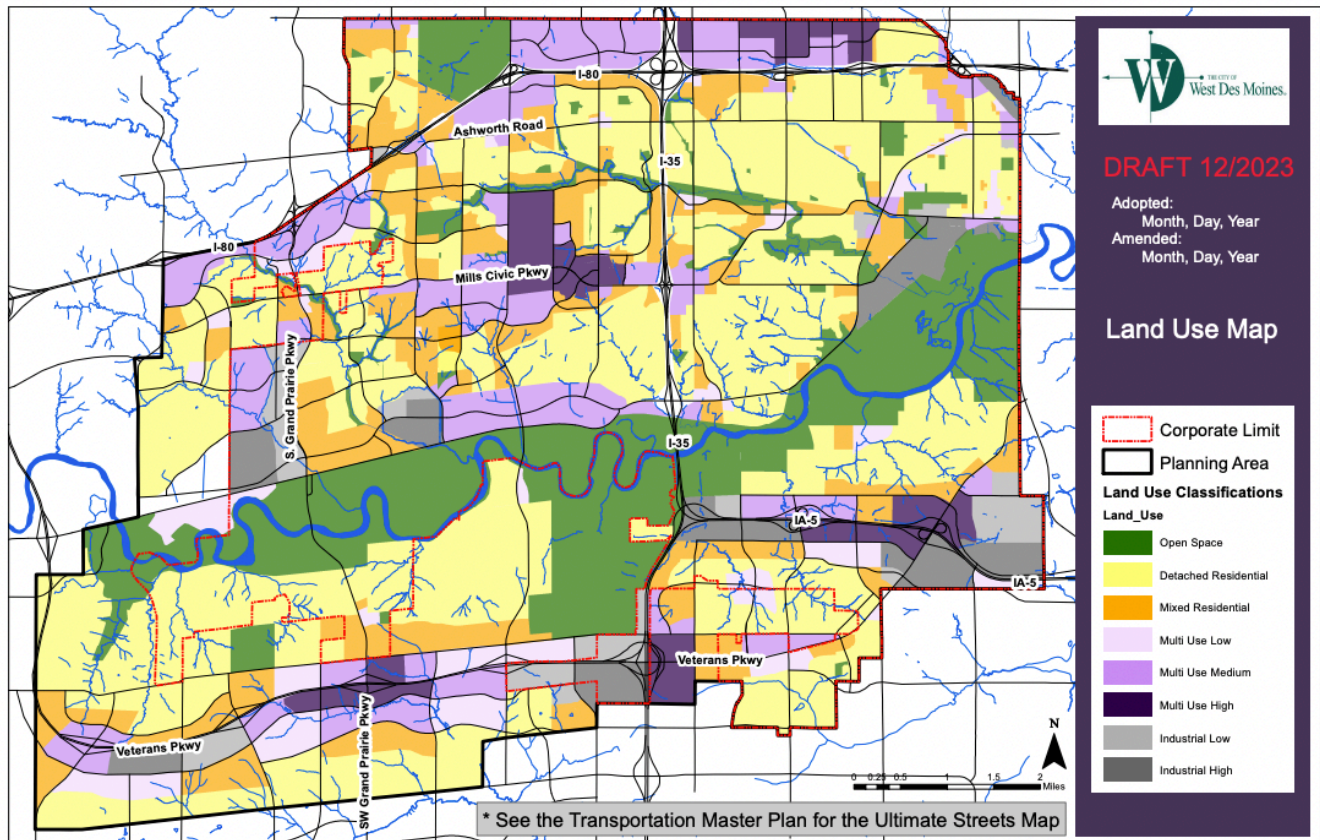
#### 3.2.4.17 WEST DES MOINES

While the majority of West Des Moines that is within Polk County has already been developed, the age of the building stock and infrastructure will require a redevelopment mindset for future growth and development within the county footprint. The SE area of the City within Polk County is relatively rural in context but has started seeing development, partially in response to infrastructure brought in to serve several data centers under construction in the area. In contrast to the 2010 Comp plan that identified the SE area of the City for primarily Office and Business Park uses, due to numerous creeks and topography challenges, the new Comprehensive Plan anticipates primarily residential uses (both single and multi-family with a wide range of densities) with the inclusion of commercial nodes to support the residential areas and promote walkability. With the increase in rain events and rainfall amounts, the flood potential of the numerous creeks in these growth areas is noted in the Comprehensive Plan (Sustainability and Resiliency Topic). Action items include utilizing a comprehensive approach to storm water management, studying stormwater management at a watershed scale, and as a proactive measure, the City has pursued modifying stream beds to allow dispersion of flood waters.

The West Des Moines Comprehensive Plan (Connect 2 Create) was adopted November 2022. With West Des Moines as one of the fastest growing cities in the state, it would be impossible to exactly predict what the city will need in 10-20 years. But what the Plan does is set goals for what our community aims to be and create a path to achieve these goals. This Comprehensive Plan covers a wide array of topics that while separate from one another, when combined are central to the growth and development of a city that meets the needs of all its residents, businesses, and visitors. With this Plan being strategic in nature, projecting growth and development has moved away from planned staging areas used in the previous Comprehensive Plan to employing a companion Action Plan that contains Goals, Strategies and Actions to guide growth and development.

With a focus on flexibility and the ability to be nimble in reacting to changing development demands, new land uses were established within the Plan that generalize land use classification and allow for a broader mix of uses where appropriate for the community. These multi-use classifications allow for the inclusion of residential uses into commercial and office areas to not only support the commercial and employment bases, but to also allow for a more compact and walkable community. The Plan also utilizes a “Place Type” concept that recognizes and promotes the city’s desire to provide a unique character and design for areas of the community while allowing flexibility to accommodate the market and provide the development professionals the opportunity to be creative in achieving the intent of the land use.

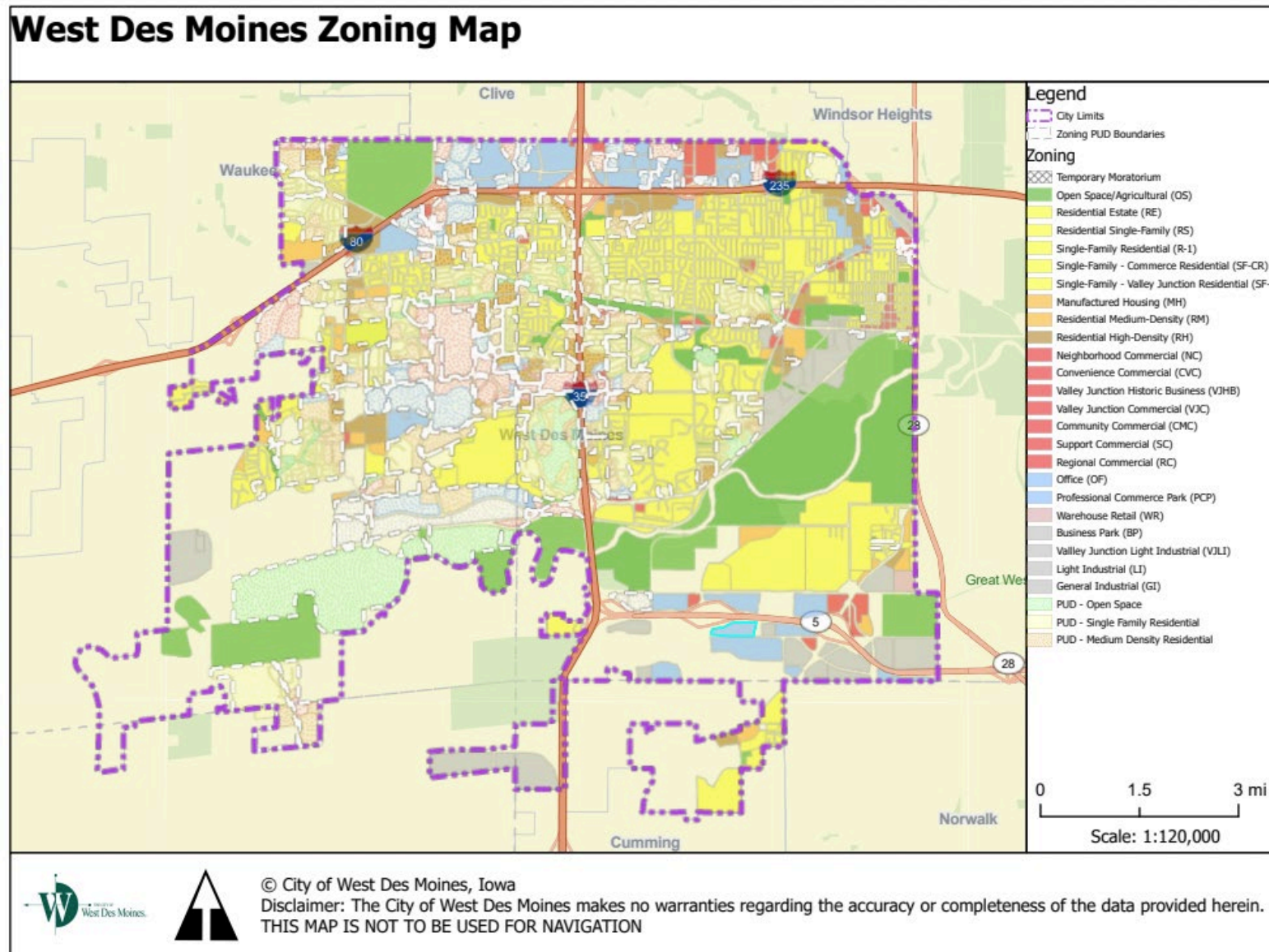
Figure 38 - West Des Moines Land Use Map





### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

Figure 39 - West Des Moines Zoning Map



#### 3.2.4.18 WINDSOR HEIGHTS

Windsor Heights is a landlocked community with limited availability for new residential development. The population is expected to remain relatively stable over the next decade, with perhaps a small increase of around 200 people, for a total of around 5,000. The only potential concerns/issues related to hazards would be an increased density of existing sites through redevelopment or an increase in household size.

The City of Windsor Heights Comprehensive Plan (adopted February 20, 2017) lays out a strategy for the continued vitality of the City through 2030. The redevelopment of 63<sup>rd</sup> Street and Hickman Road will begin in the next couple of years. Figure 40 provides the City of Windsor Heights Future Land Use map.

**FIGURE 2.9:  
FUTURE LAND USE MAP, 2016**

**Legend:**

- Low-Density Residential
- Transitional Residential
- High-Density Residential
- Mixed Use
- Town Center
- Commercial
- Civic
- Park

**Map Features:**

- Community Entrance
- Trail Head
- Trail
- Walnut Creek

**Map Labels:**

- Hickman Rd
- Shasta Pl
- Garrison Rd
- Monterey Dr
- Wilshire Blvd
- Sunrise Blvd
- El Rancho Ave
- Franklin Ave
- Jefferson Ave
- Washington Ave
- Bellaire Ave
- Del Matro Ave
- Reite Ave
- Sunset Ter
- Colby Ave
- Forest Ct
- 72nd St
- 71st St
- 70th St
- 68th St
- Elmcrest Dr
- Carpenter Ave
- Town Center
- Mott Ave
- School St
- Colby Park
- Hunter Cir
- Crocker St
- I-235
- Clive Elementary
- Cowles Elementary
- Lincoln Ave
- Allison Ave
- Timmons Drive
- Northwest Drive
- College Ave
- College Dr
- Luin Lane
- Marilyn Drive
- 80th St
- 79th St
- 78th St
- 77th St
- 76th St
- 75th St
- 74th St
- 73rd St
- 69th St
- 68th St
- 67th St
- 65th St
- 64th St
- 63rd St
- 62nd St
- 61st St
- 60th St
- 59th St
- 58th St
- 57th St
- 56th St
- 55th St
- 54th St
- 53rd St
- 52nd St
- 51st St
- 50th St
- 49th St
- 48th St
- 47th St
- 46th St
- 45th St
- 44th St
- 43rd St
- 42nd St
- 41st St
- 40th St
- 39th St
- 38th St
- 37th St
- 36th St
- 35th St
- 34th St
- 33rd St
- 32nd St
- 31st St
- 30th St
- 29th St
- 28th St
- 27th St
- 26th St
- 25th St
- 24th St
- 23rd St
- 22nd St
- 21st St
- 20th St
- 19th St
- 18th St
- 17th St
- 16th St
- 15th St
- 14th St
- 13th St
- 12th St
- 11th St
- 10th St
- 9th St
- 8th St
- 7th St
- 6th St
- 5th St
- 4th St
- 3rd St
- 2nd St
- 1st St
- 0th St

#### 3.2.4.19 SCHOOL DISTRICTS' FUTURE DEVELOPMENT

This section summarizes future development for the participating school Districts.

**Ankeny School District:** Elementary #12 is scheduled to open in August 2024. A two-story building for classroom/conference space along with team locker rooms and offices for officials at the competition field is scheduled to open in fall 2024. A ticket booth/concession stand/restrooms/storage building is scheduled to open in the summer of 2024 at the south middle school. The Innovative Hub Career & Technical Education building is scheduled to begin construction in fall 2024 with anticipated completion in August 2026.

**Bondurant-Farrar School District:** The Bondurant-Farrar Community School District recently completed a new 7th/8th grade Junior High Building that opened in the Fall of 2022. In the Fall of 2023, district voters passed a \$48 million bond referendum. Included in that bond will be the following projects:

- An addition to Bondurant-Farrar High School which will include commons expansion, additional related arts classrooms, renovated and additional space for boys and girls wrestling, and a larger fitness/weight room space. Construction will start in the Summer of 2024 with completion aimed at August of 2025.
- A new elementary school. This building will initially serve PK-K students with expansion possible up to 2nd grade. Construction is set to start in 2025 with completion by August of 2027.
- Activity spaces to include varsity baseball and softball at the high school complex and tennis and pickleball courts in a partnership with the City of Bondurant. This project will also include additional parking space at the high school and junior high campus. These added projects have been necessitated by a growing community and student population. It is possible that the district will ask voters to pass another bond as early as 2028 to add additional space at the high school and to address infrastructure needs in all of the district's older buildings.

**Des Moines Independent School District:** Beginning in 2012, more than \$67 million in additional renovation and construction projects were scheduled at Des Moines schools. One new building and one new addition were completed since the previous plan:

- Casady Education Center (pre-K and administration) located at 16<sup>th</sup> and Allison; and
- Merrill Middle School Addition

**Johnston School District:** The Johnston Community School District does not anticipate any significant development or expansion in the next five years.

**North Polk School District:** The school district recently completed construction of a new high school and new outdoor facility;



**Southeast Polk School District:** Southeast Polk Community School District has completed numerous projects to enhance safety and security, including recent building double-entry projects in all schools and an overall plan to use grant funds to 1) update and enhance camera systems in all schools, 2) update and enhance swipe card entry systems in all schools, 3) install exterior door readers in all schools, and 4) purchase and implement base/portable radios in all schools with direct connection to first responders (all to be completed by the fall of 2024). The former stadium has been completely replaced with a new structure and location that includes numerous amenities, and a plan is under development to renovate the former stadium for use by the Junior High School.

**Urbandale School District:** Future facilities planning includes a decision on the usage of two vacant buildings. Additionally, future planning includes establishing a permanent, district-owned Administrative Office building.

**West Des Moines School District:** West Des Moines Community Schools has a 10 year facilities improvement plan that will be updated and revised where needed before the end of 2024. The seven major projects at Clive Learning Academy, Crestview Elementary, Fairmeadows Elementary, Stillwell Jr. High, Valley Southwoods Freshman High School are complete or very near complete. Crossroads Elementary and Hillside Elementary are still to be designed and constructed and completion date for these buildings is to be determined. As part of our 10 year plan, we may also schedule a review of Clive Learning Academy, Crestview Elementary, Fairmeadows Elementary, Stillwell Jr. High, Valley Southwoods Freshman High School, Westridge Elementary, and Indian Hills Jr. High.

#### 3.3 HAZARD PROFILES AND VULNERABILITY

---

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

---

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

- **Hazard Description** - This section consists of a general description of the hazard and the types of impacts it may have on a community. It also includes the ratings assigned to the hazard relative to typical warning times and duration of hazard events as described in Table 13.
- **Geographic Location** - This section describes the geographic location of the hazard in the planning area. Where available, maps are utilized to indicate the specific locations of the planning area that are vulnerable to the subject hazard.
- **Extent** - This section provides information as to the extent of the hazard (i.e. the size or degree of impacts). Extent is addressed in more detailed/quantified terms (where available) in the Vulnerability Section for each hazard.
- **Previous Occurrences** - This section includes information on historic incidents and their impacts.
- **Probability of Future Occurrence** - The frequency of past events is used to gauge the likelihood of future occurrences. Where possible, the probability or chance of occurrence was calculated based on historical data. Probability was determined by dividing the number of events observed by the number of years and multiplying by 100. This gives the percent chance of the event happening in any given year. An example would be three droughts occurring over a 30-year period, which suggests a 10 percent chance of a drought occurring in any given year. For each hazard, the probability is assigned a rating as defined in Table 13.

#### 3.3.1 VULNERABILITY ASSESSMENT OVERVIEW

---

**Requirement §201.6(c)(2)(ii) :**[The risk assessment shall include a] description of the jurisdiction’s vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.

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

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

**Requirement §201.6(c)(2)(ii)(C):** [The plan should describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

**Requirement §201.6(c)(2)(ii): (As of October 1, 2008) [The risk assessment] must also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged in floods.**

---

Following the hazard profile for each hazard is the vulnerability assessment. The vulnerability assessment further defines and quantifies populations, structures, systems, natural, historic, and cultural assets, and community activities vulnerable to natural hazards. Additionally, vulnerability descriptions for each hazard include information categorized as:

Existing Development - This section provides the potential losses to existing development. Where data is available, this section provides estimated financial losses as well as the methodology used. For hazards with an overall “Low” rating, potential losses may not be discussed.

Future Development - This section provides information on how vulnerability to this hazard will be impacted by planned future development as well as information for jurisdictions to consider in planning future development.

Climate Change – This section discusses the potential impacts of climate change on frequency and severity of hazards.

The vulnerability assessments were conducted based on the best available data and the significance of the hazard. Data to support the vulnerability assessments was collected from the following sources:

- Statewide GIS data sets compiled by state and federal agencies;
- Written descriptions of assets and risks provided by participating jurisdictions;
- Existing plans and reports;
- Personal interviews with planning committee members and other stakeholders; and
- Other sources as cited.

#### 3.3.2 ANIMAL/PLANT/CROP DISEASE

##### 3.3.2.1 DESCRIPTION

Agricultural infestation is the naturally occurring infection of vegetation, crops or livestock with insects, vermin, or diseases that render the crops or livestock unfit for consumption or use. Because of the overall substantial agricultural industry and related facilities and locations within Polk County, the potential for infestation of crops or livestock poses a significant risk to the county, as well as the State of Iowa. Virtually all Iowa cropland is vulnerable to disease and other agricultural pests.

Producers are required by state law to report any of the reportable animal diseases to the Iowa Department of Agriculture and Land Stewardship's (IDALS) Bureau of Animal Industry. The IDALS's Bureau of The Center for Agriculture Security is the lead coordinating bureau for any emergency response for an agriculture incident.

It is worth noting that, according to FEMA Hazard Mitigation Assistance (HMA) guidance, mitigation projects for mitigating animal/plant/crop disease are not eligible for FEMA HMA grant funding. We are concerned about mitigation efforts for this hazard, but more in-depth analyses of this hazard (in relation to mitigation) is handled by other agencies: for instance, the Iowa Department of Health and Human Services (IHHS), the Iowa Department of Agriculture and Land Stewardship (IDALS) or the Iowa Department of Natural Resources (DNR).

Disease outbreaks can also occur in wild animal populations. The IDALS's Bureau of Animal Industry also monitors wild animal species and game throughout the State as well as diseases that may impact them.

##### 3.3.2.2 LOCATION

According to U.S. Department of Agriculture (USDA) estimates, there are 768 farms in Polk County covering approximately 179,322 acres of land, which accounts for roughly half of all land in the County.<sup>2</sup> The northern and eastern portions of Polk County contain the majority of the County's agricultural land while the southern and western portions of the county are more urbanized. However, even the more urban parts of Polk County may also be subject to possible consequences of animal/plant/crop disease like food shortages and a decline in economic activity tied to agriculture (food production, distribution, etc.). A disease mutating and gaining the ability to infect humans, while unlikely, is a possibility which poses a risk to all individuals in Polk County. While the specific consequences may vary between communities, all jurisdictions in Polk County are considered equally vulnerable to this hazard.

---

<sup>2</sup> U.S. Department of Agriculture. "2022 Census of Agriculture." [nass.usda.gov](https://www.nass.usda.gov/Publications/AgCensus/2022/Full_Report/Volume_1,_Chapter_2_County_Level/Iowa/st19_2_02_002.pdf), 2023.  
[https://www.nass.usda.gov/Publications/AgCensus/2022/Full\\_Report/Volume\\_1, Chapter 2 County Level/Iowa/st19\\_2\\_02\\_002.pdf](https://www.nass.usda.gov/Publications/AgCensus/2022/Full_Report/Volume_1,_Chapter_2_County_Level/Iowa/st19_2_02_002.pdf).

#### 3.3.2.3 EXTENT

The impacts of animal/plant/crop disease can range from loss of production in a single field, herd, or flock to loss of production across an entire region. A recent example of widespread impacts from animal/plant/crop disease is the outbreak of avian influenza in 2022 which resulted in the deaths of more than 50 million animals across 46 states.

#### 3.3.2.4 PAST OCCURRENCES

The Iowa Department of Agriculture and Land Stewardship (IDALS) monitors and reports on the following animal reportable diseases in Iowa:

- Avian Influenza
- Bovine Spongiform Encephalopathy (BSE) Disease
- Chronic Wasting Disease
- Exotic Newcastle Disease
- Foot and Mouth Disease
- Johne's Disease
- Pseudo rabies
- Scrapie
- West Nile Virus

Not all of these diseases have impacted Polk County, but it is important to remain vigilant. Diseases of particular concern are described below, including documented instances of these diseases:

Avian influenza is a significant concern in Iowa as the State is among the top producers of poultry products. Health professionals continue to monitor the possibility of an avian (bird) flu pandemic associated with a highly pathogenic avian H5N1 virus. Since 2003, avian influenza has been spreading through Asia. A growing number of human H5N1 cases contracted directly from handling infected poultry have been reported in Asia, Europe, and Africa, and more than half the infected people have died. There has been no sustained human-to-human transmission of the disease, but the concern is that H5N1 could evolve into a virus capable of human-to-human transmission.

Bovine Spongiform Encephalopathy (BSE) "mad cow" disease is a chronic, degenerative disease affecting the central nervous system of cattle. Cases have been found world-wide since 1986, but in Canada and the U.S. only a single cow was reported with BSE in 2003.

Chronic Wasting Disease (CWD) is a fatal, neurological disease of farmed and wild deer and elk. The disease has been identified in wild and captive mule deer, white-tailed deer and North American elk, and in captive black-tailed deer. Recently from 1996 to June 2002, it was diagnosed in farmed elk herds in Colorado, Kansas, Montana, Iowa, Oklahoma, South Dakota, and the Canadian

Provinces of Alberta and Saskatchewan. Then from 2000 to June 2002, CWD has also been found in wild deer in northwestern Nebraska, southern New Mexico, southwestern South Dakota, south central Wisconsin, northwestern Colorado, and the Canadian Province of Saskatchewan.

Exotic Newcastle disease (END) is a contagious and fatal viral disease affecting all species of birds. There was an epidemic of END in California in 2003 that is resulting in the death of millions of chickens and other birds, and costing millions of dollars. END is probably one of the most infectious diseases of poultry in the world. END is so virulent that many birds die without showing any clinical signs.

Foot and Mouth Disease (FMD) is a severe, highly communicable viral disease caused by a fast-spreading virus, and all cloven-hoofed animals are susceptible to the disease. Nearly 100 percent of the animals may die of the disease. In Iowa, susceptible animals to this disease include; domestic swine, cattle, captive and wild deer, sheep goats, bison, elk, llamas, cloven- hoofed zoo animals.

Johne's (yo-knees) disease is a contagious, chronic and eventually fatal infection that affects the small intestine of ruminants, including cattle, sheep and goats. Johne's, also called Para tuberculosis, is a slow progressive wasting disease with an incubation period of usually 2 or more years. Johne's is a reportable disease, but not a quarantinable disease.

Pseudo rabies is a viral disease most prevalent in swine, often causing newborn piglets to die. Older pigs can survive infection, becoming carriers of the pseudo rabies virus for life. Other animals infected from swine die from pseudo rabies, which is also known as Aujeszky's disease and "mad itch." Infected cattle and sheep can first show signs of pseudo rabies by scratching and biting themselves. In dogs and cats, pseudo rabies can cause sudden death. The virus does not cause illness in humans. Due to an extensive eradication program, Iowa & the rest of United States are free of pseudo rabies. According to the Iowa Department of Public Health, Center for Acute Disease Epidemiology, there was 11 reported rabies cases in Iowa in 2022 and 9 reported in 2021. Specifically in Polk County, there were 2 reported case in 2022 from bats.

Scrapie is a fatal, degenerative disease affecting the central nervous system of sheep and goats that is very similar to mad cow disease, although it does not cause disease in humans, and has been present in the U.S. for over 50 years. Infected flocks that contain a high percentage of susceptible animals can experience significant production losses. In these flocks, over a period of several years, the number of infected animals increases and the age at onset of clinical signs decreases making these flocks economically unviable. Animals sold from infected flocks spread scrapie to other flocks. The presence of scrapie in the U.S. also prevents the export of breeding stock, semen, and embryos to many other countries. Currently there is a national program underway to eradicate scrapie in the U.S.

According to the CDC, West Nile Virus is the leading cause of Mosquito-borne disease in the U.S.<sup>3</sup> Approximately 1 in 5 infected individuals experiences fever and other symptoms, and

---

<sup>3</sup> Centers for Disease Control and Prevention. "West Nile Virus." cdc.gov, August 23, 2023. <https://www.cdc.gov/westnile/index.html>.



approximately 1 in 150 infected individuals development a more severe illness which can be fatal. In 2023, there were 17 confirmed cases of West Nile Virus in horses across the State including 1 confirmed case in Polk County. Between 1999 and 2022 there were 637 reported cases of West Nile Virus across Iowa, including 41 in Polk County.

3.3.2.5 PROBABILITY OF FUTURE OCCURRENCES

Some level of agricultural infestation is normal in Iowa. The concern is when the level of an infestation escalates suddenly, or a new infestation appears, overwhelming normal control efforts. Many factors influence disease development in plants, including hybrid/variety genetics, plant growth stage at the time of infection, weather (e.g., temperature, rain, wind, hail, etc.), single versus mixed infections, and genetics of the pathogen populations. As a result of impact management capabilities, including crop insurance and employment of various techniques to limit infestations, it was determined that the likelihood of a naturally occurring agricultural infestation event causing extensive damage is “Unlikely”.

3.3.2.6 VULNERABILITY ASSESSMENT

While the specific impacts of animal/plant/crop disease can vary, all jurisdictions in Polk County are considered vulnerable to these impacts. The table below describes the potential impacts of animal/plant/crop disease on community lifelines.

Table 24. Potential Impacts of Animal/Plant/Crop Disease on Community Lifelines

| Lifelines                  | Impact Type                                                                         | Description                                                                                                        |
|----------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| Water & Wastewater Systems |  | Water and wastewater systems may need to be shut down or isolated if animal/plant/crop diseases become waterborne. |
| Food, Shelter, & Housing   |  | A significant outbreak of disease among crops or livestock could lead to food insecurity in the planning area.     |

| Lifelines        | Impact Type                                                                       | Description                                                                                                                                                                                              |
|------------------|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Health & Medical |  | Although unlikely, it is possible for animal disease to affect humans. A zoonosis is an infectious disease which jumps from a non-human to a human. Examples include Ebola, salmonellosis, and bird flu. |

#### A) People

A plant disease outbreak or a pest infestation could negatively impact crop production and agriculturally dependent businesses. An extreme outbreak or infestation could potentially result in billions of dollars in production losses. The cascading net negative economic effects could result in wide-spread business failures, reduction of revenues, and soaring food prices. These effects will disproportionately impact individuals living below the poverty line. Individuals with dietary needs may also be disproportionately impacted.

#### B) Structures

Buildings are largely invulnerable to this hazard – its impacts are primarily economic and environmental, rather than structural affects. However, it may be necessary to clean and disinfect buildings which have housed diseased animals or crops.

#### C) Systems

Animal/plant/crop diseases are unlikely to be consequential for most community systems with the exception of water and wastewater. If diseases become waterborne, it may be necessary to temporarily suspend normal water and wastewater services. Sanitizing water and wastewater infrastructure may be costly and time consuming.

#### D) Natural, Historic, and Cultural Resources

The primary concern related to animal/plant/crop disease in Polk County is the impact on agriculture. However, “wild” plants such as vegetation in public spaces can be damaged, and it may be necessary to remove infected vegetation to prevent further spread of a disease. Disease outbreaks can also occur in wild animal populations. The IDALS’s Bureau of Animal Industry also monitors wild animal species and game throughout the State as well as diseases that may impact them.

#### E) Community Activities

Community activities which are intertwined with agriculture can be significantly impacted by animal/plant/crop disease. Farmers markets are an example of this type of community activity. An



ourbreak of animal/plant/crop disease may require the temporary cessation of these community activities due to concerns about the spread of disease.

Existing Development

The rise of backyard chickens and other livestock as household pets can potentially have health impacts within the urban centers even in the absence of livestock farms. Rough estimates of potential direct losses from a maximum threat event fall in a range of 1-50 percent of annual crop receipts. Based on a worst case scenario where 50% of crop production is lost in a given year due to agricultural infestations, the total direct costs could approach \$80,561,500.

Future Development

Future development is not expected to significantly impact the planning area’s vulnerability to this hazard. However, if crop production and numbers of animals/livestock increases, the amount vulnerable to infestation also increases. Additionally, increased density of crops and animals/livestock may enable diseases to spread more quickly.

Climate Change

With observed and predicted increases in average atmospheric temperature, and the resulting increase in the moisture-holding capacity of the air, the Fourth National Climate Assessment anticipates increased pressure on agriculture from diseases and pests. Increases in extreme weather patterns (namely drought intermingled with excessive heat and extreme precipitation events) can also be expected to increase the likelihood of plant and animal diseases and pests. As an example, hotter conditions with increased moisture may lead to growth in mosquito populations. Mosquitos often carry diseases which can infect both animals/livestock and humans.

Hazard Risk Score

Table 25. Animal/Plant/Crop Disease Probability and Health Impact Ratings

| Health Severity | Community Impact | Public Health System Impact | Healthcare System Impact | Total Health Hazard Score | Probability |
|-----------------|------------------|-----------------------------|--------------------------|---------------------------|-------------|
| 2               | 0                | 2                           | 0                        | 4                         | Unlikely    |

#### 3.3.3 CLIMATE CHANGE

##### 3.3.3.1 DESCRIPTION

According to the Iowa Department of Natural Resources, climate change “refers to any significant change in the measures of climate lasting for an extended period of time. This includes major changes in temperature, precipitation, wind patterns, or other effects that occur several decades or longer.”<sup>4</sup> Unlike other hazards profiled in this plan, climate change will not directly impact the people or critical facilities of Polk County. Instead, climate change can affect the frequency and severity of other hazards.

##### 3.3.3.2 EXTENT

FEMA’s latest Local Mitigation Planning Policy Guide notes that the impacts of climate change “create new risks to state and local governments and challenge pre-existing mitigation plans.” Climate change also “pose[s] a unique threat to the nation’s most at-risk populations by exacerbating the impacts of disasters on underserved and socially vulnerable populations who already experience the greatest losses from natural hazards.”<sup>5</sup>

In 2009, the Iowa Climate Change Impacts Committee was established by Iowa Code section 473.7, and the committee was tasked with reviewing climate change impacts in Iowa and exploring possible policy recommendations. The committee released a report on January 1, 2011 detailing its findings. Several key findings from the report, as well as further information provided on the Iowa DNR website, are described below.

##### Precipitation

Iowa has experienced significant changes in precipitation, including a long-term upward trend in precipitation. The report by the Iowa Climate Change Impacts Committee determined that the annual average precipitation across the state had increased by 8% between 1873 and 2008. Additionally, the report concluded that the state was receiving larger amounts of moisture through heavy precipitation during the summer months. Heavy precipitation creates a greater risk of flooding as rainfall in excess of 1.25 inches per day initiates runoff and increases streamflow.<sup>6</sup> Increased runoff can lead to soil erosion which may create new agricultural challenges and exacerbate existing ones. The report states that the

---

<sup>4</sup> Iowa Department of Natural Resources. “Climate Change.” iowadnr.gov. Accessed February 22, 2024. <https://www.iowadnr.gov/Conservation/Climate-Change>.

<sup>5</sup> Federal Emergency Management Agency. “Local Mitigation Planning Policy Guide,” no. FP 206-21-0002 (April 19, 2022). [https://www.fema.gov/sites/default/files/documents/fema\\_local-mitigation-planning-policy-guide\\_042022.pdf](https://www.fema.gov/sites/default/files/documents/fema_local-mitigation-planning-policy-guide_042022.pdf).

<sup>6</sup> Iowa Climate Change Impacts Committee. “Climate Change Impacts on Iowa 2010.” publications.iowa.gov, January 1, 2011. <https://publications.iowa.gov/14167/1/ClimateChangeExecSum121610.pdf>.

precipitation trends are generally expected to continue well into the future, although there may be year-to-year variations.

Temperatures

Between 1873 and 2008 Iowa experienced a long-term upward trend in temperature. However, the extent of temperature increases in Iowa during this time varies by season and time of day. For instance, the Iowa Climate Change Impacts Committee’s report concluded that daily average temperatures during winter months increased six times more than daily average temperatures during summer months. Furthermore, nighttime temperatures increased more than daytime temperatures. Interestingly, the Iowa Climate Change Impacts Committee notes in their report that the state as a whole has been experiencing fewer extreme high summer temperatures, which seems counter to global and continental trends. The committee suggests that this is likely due to increased summer precipitation and moist soils which suppress surface heating and daytime summer maximum temperatures.<sup>7</sup>

Humidity

In addition to precipitation and temperature, climate change appears to be contributing to changing humidity patterns across Iowa. The report by the Iowa Climate Change Impacts Committee notes that humidity – particularly in the summer months – has risen substantially. At the time the report was produced, the average amount of atmospheric moisture present during summer days had increased by 13% over the previous 35 years. Moisture plays an important role in the formation of storm systems, and an increase in moisture may subsequently increase the frequency and severity of storms in Iowa.

In addition to the report produced by the Iowa Climate Change Impacts Committee, the effects of climate change were assessed in the 2023 Iowa Hazard Mitigation Plan. The plan generally agrees with the findings of the 2010 report that trend lines for observed precipitation, temperature, and humidity in Iowa suggest long-term increases in all three. The 2023 Iowa Hazard Mitigation Plan also considered the impacts of climate change on a variety of individual hazards – Table 26 shows the expected changes.

**Table 26. Hazard-by-Hazard Expected Climate-Related Changes**

| Hazard            | Expected Changes                                                                                                                                                                                                                                                                                                                                                   |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dam/levee failure | Increasing. Flooding is expected to increase, increasing strain on levees and likelihood of failure or overtopping. Drought is also expected to increase, which may cause levees, especially those containing clay, to crack. Heavy precipitation events following these dry spells (a cycle expected to increase with climate change) can worsen the cracks. Dams |

<sup>7</sup> Iowa Climate Change Impacts Committee. “Climate Change Impacts on Iowa 2010.” publications.iowa.gov, January 1, 2011. <https://publications.iowa.gov/14167/1/ClimateChangeExecSum121610.pdf>.

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                               | most likely to experience increase risk of overtopping, rather than catastrophic failure, but flooding strains the structure as well.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Drought                       | Varies regionally. May be more common in northwestern and southern counties. Northeastern counties, while potentially experiencing a greater increase in precipitation than the rest of the state, may be affected by drought more often than they are now. Precipitation could be expected to vary more both temporally and spatially, with one area experiencing record heat and drought while nearby areas experience heavy precipitation. Drought may take on a seasonal aspect, with excessive moisture in spring and insufficient moisture in summer. Iowa already sees wetter spring and fall and dryer summers than in its previous climate decade. Higher temperatures will increase evaporation rates, intensifying naturally-occurring droughts. |
| Earthquake                    | No change expected.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Expansive soils               | Uncertain. The expected increase in the back and forth between heavy precipitation and drought could conceivably lead to more damage, but no research in the US was readily available to support this.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Excessive heat                | Increasing. Days with maximum temperatures above 90 are projected to occur 2 to 5 times more often by 2050 in the best case scenario. Days above 100, currently occurring once every few years in most of Iowa, are projected to happen several times per year by 2050. Days over 105 may not be rare either. 'Cooling degree days' will nearly double in about 50 years, straining energy systems and increasing chances of blackouts and brownouts (barring adaptation measures).                                                                                                                                                                                                                                                                         |
| Flooding (flash and riverine) | Increasing. Precipitation is expected to increase in intensity, though not necessarily frequency. With average annual precipitation increasing only 1" to 4" in any county by 2050, however, heavy precipitation events are likely to become more common. Eastern Iowa seeing higher increase in precipitation than western Iowa indicates greater likelihood of flooding in eastern Iowa.                                                                                                                                                                                                                                                                                                                                                                  |
| Grass or wildland fire        | Increasing. If droughts become more common or more intense, even seasonally, dry vegetation will be more prone to ignition. High temperatures will also pull moisture from vegetation. Wind is not expected to increase.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Landslides                    | Uncertain. Landslide damage is not centrally recorded in Iowa and has not been an impactful hazard, historically. With increasing heavy precipitation events, landslides may become more common, but resulting damage is uncertain.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Sinkholes                     | Uncertain. Sinkholes in central Iowa are general related to abandoned coal mines. Sinkholes in northeastern Iowa are generally related to the karst landscapes prevalent there. Increased precipitation could conceivably speed the dissolution of soluble rocks, and drought could conceivably lead                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                 | to subsidence from loss (or over-pumping) of groundwater, but no definite projections are available. The freeze-thaw cycle can break up the ground and lead to sinkholes. Dry soil freezes faster and deeper than moist soil, so water acts as a barrier to freezing. With warming winters and wetter springs projected, the coinciding timing of each may or may not intensify the effects from the freeze-thaw cycle. |
| Thunderstorm lightning and hail | Increasing. Warming summers and higher quantities of water in the atmosphere will likely fuel increased thunderstorm development.                                                                                                                                                                                                                                                                                       |
| Tornado/windstorm               | Uncertain. Frequency and intensity do not appear to be changing. Some evidence suggests that 'Tornado Alley' – an area most favorable to tornado formation – is moving east, but the biggest effect of this is in the South. The likelihood of a tornado in any given part of Iowa has not significantly shifted. As temperatures rise, however, the length of tornado season may increase.                             |
| Winter Storm                    | Decreasing. As winters warm faster than summers, winter weather is expected to cause less damage in coming decades. Overnight lows are increasing quickly relative to daytime temperatures, meaning there may be less than historical rates of re-freezing of snow and ice at some points in winter, and more at other points. Winters are becoming shorter as well.                                                    |

#### 3.3.3.3 VULNERABILITY

Climate change is a phenomena which has the potential to impact virtually all aspects of life in Polk County, and all jurisdictions within the county are considered vulnerable to the impacts of climate change. The possible effects of climate change on public health, infrastructure, and the economy are described in this section.

##### Public Health

Changes in precipitation, temperature, and humidity can quickly create conditions which are detrimental to human health. One of the most straightforward risks associated with climate change is more frequent and extreme heat. The elderly and young children are particularly susceptible to death and illness caused by extreme heat. Additionally, people living below the poverty line or lacking access to a vehicle may be more vulnerable to extreme heat due to having fewer available options for relief from dangerous conditions.

The Iowa Climate Change Impacts Committee stated in their report that “Allergic diseases are expected to become more widespread and more severe due to a northward expansion of the range of certain allergenic plants and climate-associated increases in pollen loads.” Climate change may increase the length and severity of the pollen season for allergy sufferers. For example, the ragweed season in the northern Great Plains and Upper Midwest is now 10 to 21 days longer than it was in 1995, because the first frost in fall is later. Warmer, wetter conditions may also result in larger

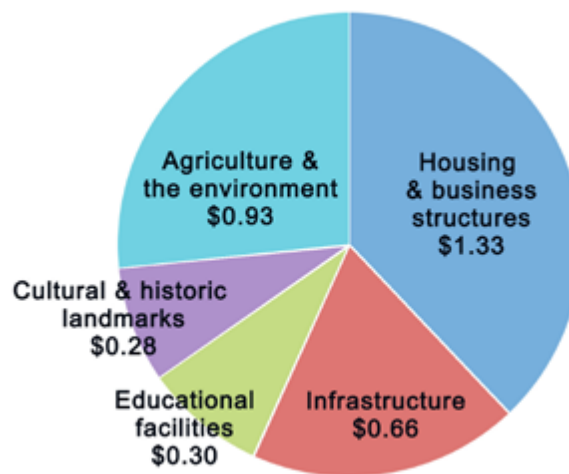


populations of disease vectors such as mosquitos. The elderly, young children, individuals with pre-existing health conditions, and socially vulnerable populations are likely to be disproportionately impacted by these changes.

#### Infrastructure

The consequences of weather-related events are costly to home owners, businesses, and public services and essential infrastructure. The U.S. Environmental Protection Agency notes that most of the U.S. built environment was not designed with climate change in mind, and the potential impacts of climate change are particularly concerning given the current state of infrastructure across the country. Many of the bridges, dams, pipelines, roads, and other infrastructure elements in the U.S. are already in need of repair.<sup>8</sup> If climate change continues to increase both the frequency and severity of storms then it is reasonable to expect the associated consequences to also increase in frequency and severity. Furthermore, it is conceivable that the cost of mitigating against many hazards will also increase as more substantial actions become necessary to adequately protect homes, businesses, and critical infrastructure. As past climate is no longer a good predictor of future climate, new infrastructure will need to be designed and constructed in consideration of potential future conditions to maximize its potential useful life.

**Figure 41. Distribution of Weather-Related Losses in Iowa**



Source: Climate Change Impacts on Iowa 2010, accessed 2/22/2024  
<https://publications.iowa.gov/14167/1/ClimateChangeExecSum121610.pdf>

#### Economy

The Iowa Climate Change Impacts Committee acknowledges in its report that the long-term consequences of climate change on the overall economy are uncertain, but certain industries appear to already be adapting. One example of how climate change may be altering business practices is the

<sup>8</sup> US EPA, OAR. "Climate Change Impacts on the Built Environment." Overviews and Factsheets, October 19, 2022.  
<https://www.epa.gov/climateimpacts/climate-change-impacts-built-environment>.

way in which Iowa’s prominent insurance industry is currently respondign to changes in the climate. The insurance industry appears to be developing novel ways to assess the risks of climate change in addition to identifying areas where climate change-related risks have not yet been considered. Other fields like civil engineering appear to be placing a greater emphasis on incorporating potential impacts of climate change, and increasing demands on the energy grid may lead to shifts in labor productivity and manufacturing.<sup>9</sup>

The impacts of climate change on agriculture are particularly important in Polk County. Improved management and genetics, higher fertility, and reduced drought stress have all been partially credited for the steady increase of corn and soybean yields since the 1940’s, but crop production remains highly dependent on climate. The report from the Iowa Climate Change Impacts Committee notes the following ways in which increases in precipitation, temperature, and humidity are impacting agriculture:

- Increased soil erosion and water runoff
- Delayed planting season and increased replanting of damaged croplands
- Delayed nitrogen application and increased nitrogen losses
- Enhanced development and spread of crop pathogens
- Potential reduction in productivity and lifespan of domestic livestock
- Shorter corn grain-filling period and an associated decrease in grain yields
- Potential for increased crop damage from more frequent and severe storms

Hazard Risk Score

Table 27. Climate Change Probability and Health Impact Ratings

| Health Severity | Community Impact | Public Health System Impact | Healthcare System Impact | Total Health Hazard Score | Probability   |
|-----------------|------------------|-----------------------------|--------------------------|---------------------------|---------------|
| 1               | 1                | 1                           | 1                        | 4                         | Highly Likely |

3.3.4 CYBERATTACK

3.3.4.1 DESCRIPTION

A cyberattack can be defined as any intentional effort to steal, expose, alter, disable, or destroy data, applications, or other assets through unauthorized access to a network, computer system or digital device. Phones and communications systems, home appliances and security systems, transportation systems, medical systems, utility services, and many more aspects of society rely on networked technologies to communicate and operate. While increased interconnectedness provides

<sup>9</sup> Iowa Climate Change Impacts Committee. “Climate Change Impacts on Iowa 2010.” publications.iowa.gov, January 1, 2011. <https://publications.iowa.gov/14167/1/ClimateChangeExecSum121610.pdf>.

better and more efficient services in many ways, the increasing reliance on technology and cyber connections may lead to cyber incidents with far-reaching and devastating impacts. While cyberattacks frequently target private citizens and businesses, the primary focus of this plan is on cyberattacks which target community services and critical infrastructure.

#### 3.3.4.2 LOCATION

Cyberattacks are not limited by geography, and many are conducted by actors outside of the target jurisdiction. Common targets include financial institutions, utility providers, government facilities (civilian and military), healthcare providers, and manufacturing.

#### 3.3.4.3 EXTENT

In 2023, FEMA coordinated with the Cybersecurity and Infrastructure Security Agency (CISA) to produce guidance titled *Planning Considerations for Cyber Incidents*. The document is intended to help emergency management personnel prepare for and respond to cyber incidents in their jurisdictions. The guidance from FEMA and CISA identifies three common cyber incident types, and these are detailed below. Although each is described independently, any of these incident types is likely to cause overlapping and cascading effects.

##### **Hardware Destruction or Loss**

A jurisdiction's critical services often depend upon the hardware (e.g., computers, industrial control systems, storage devices, network infrastructure) that perform critical functions. This hardware may enable day-to-day community functions, such as controlling drinking water systems and water filtration, managing court processes, providing payment systems for municipal services, and controlling traffic safety systems. It also may support critical emergency services, such as 911 services and radio transmitters used to communicate among emergency personnel. The infrastructure that provides these services may be overlapping. Hardware damage may result in the loss of computer and network communication services as well as the loss of data and can disrupt critical services. Hardware destruction or loss can be caused by malicious acts as well as natural hazards including floods, fires, winter storms, thunderstorms, and tornadoes.

Engineers may initially attribute the loss to equipment failure, but further examination may uncover that it was due to a malicious attack on the controller, where a threat actor has introduced malicious code or malware and caused a catastrophic failure of the controller. This can have potentially devastating consequences for the system, leading to extended downtime and disruption of operations. It is therefore essential to investigate any unusual losses of controllers and identify the cause to ensure the security of the system.

##### **Network Unavailability, Compromise, Degradation, or Destruction**

Networks enable computers to communicate and share information, and most critical services rely on networks. Incidents affecting networks may occur because of both malicious attacks and natural

disasters. Since many systems depend upon external organizations and are often provided by third parties, an incident affecting the jurisdiction may be the result of a third party's incident. The impact may vary from unreliable communication among computers to a complete loss of communication. Identifying how the jurisdiction uses networks helps the planning team to understand how the jurisdiction depends upon these systems and to evaluate the potential consequence of their loss.

#### **Software Malfunction, Compromise, or Exploitation**

Incidents affecting software may cause the loss or compromise of critical functions. Malicious actors may steal confidential information, modify and violate the integrity of information, or deny access to information by encrypting it and demanding money (ransom) to decrypt it. Malicious actors may also exploit software to compromise the integrity of physical systems such as security cameras, water and wastewater treatment, dams, traffic signs and signals, streetlights, pipelines, and facility management, which are often controlled (or monitored) by computerized industrial control systems.

#### **3.3.4.4 PAST OCCURRENCES**

The Internet Crime Complaint Center, or IC3, is the nation's central hub for reporting cyber crime, and the organization provides annual reports which detail reported cyberattacks in all 50 states, 6 territories, and the District of Columbia. According to IC3's latest report, there were 2,959 victims of cyberattacks in Iowa in 2022, which ranks 32<sup>nd</sup>. For reference, California was ranked 1<sup>st</sup>, with 80,776 cyberattack victims in 2022. In terms of losses, Iowa ranked 36<sup>th</sup> overall with reported losses totaling more than \$42 million.<sup>10</sup>

In recent years, ransomware incidents have become increasingly prevalent among US state, local, tribal, and territorial governments and critical infrastructure entities, disrupting services. K-12 school districts have been a near constant ransomware target due to school systems' IT budget constraints and lack of dedicated resources, as well as ransomware actors' success at extracting payment from some schools that are required to function within certain dates and hours.

In early 2023, Des Moines Public Schools was the victim of a ransomware attack. The attack resulted in approximately 6,700 individuals having their sensitive data compromised, and the school district cancelled classes for several days following the attack. Troublingly, there are indications that attackers targeting school districts may be seeking sensitive data pertaining to students due to the value of this information on the black market.<sup>11</sup>

In 2022, health care services in Des Moines were disrupted by a cyberattack targeting CommonSpirit health, which operates more than 140 hospitals 21 states. The attack disrupted activity

---

<sup>10</sup> Internet Crime Complaint Center, and Federal Bureau of Investigation. "Internet Crime Report 2022." ic3.gov, March 14, 2023. [https://www.ic3.gov/Media/PDF/AnnualReport/2022\\_IC3Report.pdf](https://www.ic3.gov/Media/PDF/AnnualReport/2022_IC3Report.pdf).

<sup>11</sup> Ta, Linh. "What Happened in Des Moines Schools' Ransomware Attack? Technology Director Tells All." Axios, December 13, 2023. <https://www.axios.com/local/des-moines/2023/12/13/what-happened-in-des-moines-schools-ransomware-attack-technology-director-tells-all>.

at MercyOne hospital in Des Moines. Electronic health records and patient portals were taken offline, and multiple ambulances typically routed to MercyOne were forced to divert to other area hospitals. The hospital was able to resume normal operations after a few weeks.<sup>12</sup>

It is important to note that this list of previous occurrences is not exhaustive. There is no centralized reporting of significant cyberattacks, and hundreds or thousands of individuals are the victims of smaller-scale cyberattacks on a daily basis. This list provides representative examples of the type of cyberattacks that have occurred in the past, and are likely to occur again in the future.

#### 3.3.4.5 PROBABILITY OF FUTURE OCCURRENCES

State and non-state cyber actors continue to seek opportunistic access to critical infrastructure sector targets for disruptive and destructive attacks. Common tactics include denial-of-service, website defacement, and ransomware. Some of these actors also seek to develop or improve existing capabilities that can disrupt industrial control systems that support US energy, transportation, healthcare, and election sectors.

The increased use of advanced technologies – including artificial intelligence, cloud computing, and remote sensors to inform city operations – creates new attack opportunities for adversarial state and non-state cyber actors to gain access to or carry out disruptive attacks against local government and critical infrastructure networks. Because significant cyberattacks occurred in Polk County in both 2022 and 2023 (as defined in “Past Occurrences” above), and in consideration of the ubiquity of small-scale cyberattacks impacting individuals and businesses, the probability of future cyberattacks in the planning area is considered “likely.”

#### 3.3.4.6 VULNERABILITY

The consequences of cyberattacks can be difficult to predict ahead of time, but they are capable of crippling many of the services that communities rely upon. The impact of cyberattacks on community lifelines are detailed in the table below. All jurisdictions are considered equally vulnerable to cyberattacks. Larger cities like Des Moines may have high-profile targets which are appealing for cyber criminals, and smaller jurisdictions may be attacked due to a perceived lack of security.

---

<sup>12</sup> Baxter, Amy. “MercyOne Recovers from Cyberattack of Parent Company.” [healthexec.com](https://healthexec.com/topics/health-it/cybersecurity/mercyone-recovers-cyberattack-parent-company), October 21, 2022. <https://healthexec.com/topics/health-it/cybersecurity/mercyone-recovers-cyberattack-parent-company>.

Table 28. Potential Impacts of Cyberattacks on Community Lifelines

| Lifelines                  | Impact Type                                                                         | Description                                                                                                                                                                                                                                                                                         |
|----------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Water & Wastewater Systems |    | Cyberattacks can disrupt water supplies and potentially damage water infrastructure, leading to shortages. Wastewater treatment facilities may also be disabled by a cyberattack or taken offline by operators to prevent further intrusion, and this can increase the risk of waterborne diseases. |
| Health & Medical           |    | Healthcare facilities are common targets of cyberattacks. A successful attack can severely disrupt facilities' ability to deliver medical care, and sensitive data can also be compromised.                                                                                                         |
| Communications             |   | Cyberattacks can disrupt communication networks, which can hinder the coordination of rescue and relief efforts as well as the dissemination of important information to the public.                                                                                                                |
| Energy                     |  | Power outages can occur if cyberattacks hijack control of energy facilities, damage electrical infrastructure, or force operators to take the facility offline to avoid further damage. Fuel supply may also be disrupted, affecting not just transportation but also heating and power generation. |

A) People

While cyberattacks do not cause physical harm to individuals, the victims of such attacks may lose access to their devices, have personal information disseminated online, and have funds frozen or stolen. Many cyberattacks directed at individuals target people who may lack the knowledge and tools to quickly recognize and/or stop a cyberattack. In broad terms, populations which are common targets of cyberattacks include the elderly and those with limited computer skills.

B) Structures

Structures are largely unaffected by cyberattacks.

#### C) Systems

In general, cyberattacks pose the largest threat to community systems. Utilities like electricity, gas, internet, and water and wastewater services are frequently targeted by cyberattacks, and disruption of these services can have widespread impacts on a community. The impact of utility outages are addressed in greater detail in section 3.3.14. Today, a wide range of government functions including education, judicial systems, permitting, and others rely on digital infrastructure to operate effectively. While increased interconnectedness provides better and more efficient services in many ways, the increasing reliance on technology and cyber connections may lead to cyber incidents with far-reaching and devastating impacts.

#### D) Natural, Historic, and Cultural Resources

Natural, historic, and cultural resources are relatively safe from cyberattacks as these resources often lack avenues through which cyberattacks can be conducted.

#### E) Community Activities

Cyberattacks can disrupt community activities through both direct and indirect means. Direct attacks will cause disruptions by specifically targeting the activity, such as efforts to interfere with elections. Community activities can also be indirectly impacted by cyberattacks which disrupt services such as electricity and internet connectivity. Due to the various motivations of attackers, it is difficult to predict which community activities may be targeted.

#### Existing Development

Healthcare facilities, financial institutions, utility providers, and even school districts have been targeted by recent cyberattacks. These attacks can result in personal data breaches, extortion, and even disruption of critical functions. Due to indications from the FBI and CISA that these cyberattacks are unlikely to cease in the foreseeable future, it is crucial for existing institutions to review their risk and, if necessary, adopt new strategies to mitigate against such attacks.

#### Future Development

There does not appear to be any indication that the trend of increased connectivity will plateau or reverse anytime soon. Additionally, cyber criminals can be expected to continue developing novel and sophisticated attacks. Therefore, it should be anticipated that cyberattacks will increase in frequency and scope, and it is critical for new development to consider the consequences of such attacks and proactively work to mitigate against them.

#### Climate Change

Climate change is not expected to have any direct impact on cyberattacks.



Hazard Risk Score

Table 29. Cyberattack Probability and Health Impact Ratings

| Health Severity | Community Impact | Public Health System Impact | Healthcare System Impact | Total Health Hazard Score | Probability |
|-----------------|------------------|-----------------------------|--------------------------|---------------------------|-------------|
| 2               | 3                | 2                           | 3                        | 10                        | Likely      |

#### 3.3.5 DAM FAILURE

##### 3.3.5.1 DESCRIPTION

Many of Iowa's community settlements were founded along rivers and streams due to their reliance on water resources. Often, these streams or rivers later needed a dam for flood control or a reservoir for a constant water source. A dam is defined as a barrier constructed across a watercourse for the purpose of storage, control, or diversion of water. Dams are typically constructed of earth, rock, concrete, or mine tailings. Dam failure is the uncontrolled release of impounded water resulting in downstream flooding, affecting both life and property. Dam failure can be caused by any of the following: flooding; earthquakes; flow blockages; landslides; lack of maintenance; improper operation; poor construction; vandalism; or terrorism.

The thresholds for when a dam falls under State regulation are outlined in Iowa Administrative Code 567-71.3 and are listed below. The thresholds are primarily based on both dam height and water storage volumes. State regulated dams are those dams that meet the following:

In rural areas:

- a) Any dam designed to provide a sum of permanent and temporary storage exceeding 50 acre-feet at the top of dam elevation, or 25 acre-feet if the dam does not have an emergency spillway, and which has a height of 5 feet or more.
- b) Any dam designed to provide permanent storage in excess of 18 acre-feet and which has a height of 5 feet or more.
- c) Any dam across a stream draining more than 10 square miles.
- d) Any dam located within 1 mile of an incorporated municipality, if the dam has a height of 10 feet or more, stores 10 acre-feet or more at the top of dam elevation, and is situated such that the discharge from the dam will flow through the incorporated area.

In urban areas:

Any dam which exceeds the thresholds in 71.3 (1) "a", "b", or "d".

Low head dams:

Any low head dam on a stream draining 2 or more square miles in an urban area, or 10 or more square miles in a rural area.

Dams are classified by the State of Iowa into three categories based on the potential risk to people and property in the event of failure. The classification can change over time due to changes in development downstream from the dam. Additionally, older dams may not have been built to the standards of their updated classification when this occurs. The Iowa Department of Natural Resources performs annual inspections on all high hazard dams in the State. However, planning team members

note that the IDNR dam safety program is substantially under-resourced, and that as dams age (particularly those that are privately owned), there may be a gap between the assessed risk and actual risk associated with these facilities, and lags in updating the data used in the development of this plan.

#### 3.3.5.2 LOCATION

There are 78 regulated dams inside the county boundaries of Polk County. Of these, 12 are high hazard dams, 22 are significant hazard dams, and 44 are low hazard dams. Of the 12 high hazard dams, five are owned and operated by the United States Army Corps of Engineers (USACE). These include the Saylorville dam, two Big Creek dam structures, and two Red Rock dam structures. Table 30 provides the names, locations, and other pertinent information for all high and significant hazard dams in the planning area. Failure of these dams would significantly impact jurisdictions in the planning area. The Vulnerability Assessment section provides additional information about these dams.

##### Participating Jurisdictions Vulnerable to Dam Failure

The following jurisdictions are at least partially within the mapped inundation areas of a high hazard dams in Polk County and are thus defined as having vulnerability to this hazard:

- Clive
- Des Moines
- Grimes
- Johnston
- Polk City
- Runnells
- Urbandale
- West Des Moines
- Windsor Heights

While the communities listed above are those considered directly vulnerable to dam failures, communities in Polk County which are not within an inundation zone may still be impacted by a significant dam breach. In the event of a dam failure – particularly among the federally administered dams – communities which remain dry may be asked to support the directly impacted communities. Support may include housing displaced individuals, hosting emergency operations centers, and providing vital resources like fuel, electricity, and potable water.

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

**Table 30 - High and Significant Hazard Dams in the Polk County Planning Area**

| <b>Dam Name</b>                                 | <b>Hazard Class</b> | <b>EAP</b> | <b>Dam Height (Ft)</b> | <b>Maximum Storage (Acre-Ft)</b> | <b>Normal Storage (Acre-Ft)</b> | <b>Last Inspection Date</b> | <b>Dam Owner</b>                |
|-------------------------------------------------|---------------------|------------|------------------------|----------------------------------|---------------------------------|-----------------------------|---------------------------------|
| Big Creek Barrier Dam                           | H                   | Y          | 84                     | 4,200                            | 100                             | 12/6/2022                   | U.S. Army Corps Of Engineers    |
| Big Creek Diversion Dam                         | H                   | Y          | 80                     | 27,500                           | 7,600                           | 12/6/2022                   | U.S. Army Corps Of Engineers    |
| Saylorville Reservoir Dam                       | H                   | Y          | 125                    | 641,000                          | 74,000                          | 12/6/2022                   | U.S. Army Corps Of Engineers    |
| Clive Lake Dam                                  | H                   | Y          | 37                     | 1,253                            | 274                             | 03/12/2021                  | Country Club Owners Association |
| Easter Lake Stormwater Retention Basin – Site 9 | H                   | Y          | 24                     | 168                              | 23                              | 05/29/2020                  | City Of Des Moines              |
| Fort Des Moines Park Dam                        | H                   | Y          | 49                     | 240                              | 120                             | 3/12/2021                   | Polk Co Conservation Board      |
| Glen Oaks Country Club Dam                      | H                   | Y          | 36                     | 54                               | 20                              | 4/9/2019                    | Concert Glen Oaks LLC           |
| Parkview Lake Dam                               | H                   | Y          | 21                     | 95                               | 15                              | 06/28/2019                  | City Of Urbandale               |
| Red Rock – Avon Station Remedial Works          | H                   | Y          | 15                     | N/A                              | N/A                             | 12/2/2021                   | U.S. Army Corps Of Engineers    |
| Red Rock – Carlisle Remedial Dam                | H                   | Y          | 13                     | N/A                              | N/A                             | 12/2/2021                   | U.S. Army Corps Of Engineers    |
| Twenty-Sixth Street Stormwater Detention Basin  | H                   | Y          | 43                     | 242                              | 97                              | 5/29/2020                   | City Of Des Moines              |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

| Dam Name                              | Hazard Class | EAP | Dam Height (Ft) | Maximum Storage (Acre-Ft) | Normal Storage (Acre-Ft) | Last Inspection Date | Dam Owner                                             |
|---------------------------------------|--------------|-----|-----------------|---------------------------|--------------------------|----------------------|-------------------------------------------------------|
| West Lakes Office Park Dam            | H            | Y   | 41              | 267                       | 85                       | 7/16/2019            | Iowa Farm Bureau Federation Property Management Inc.  |
| Copper Creek Estates Dam              | S            | NR  | 21              | 24                        | 15                       | 4/8/2015             | Copper Creek Estates Property Owners Association Inc. |
| Copper Creek Lake Dam                 | S            | NR  | 31              | 103                       | 46                       | 4/8/2015             | Copper Creek Golf Course, L.C.                        |
| Crescent Lake Dam                     | S            | NR  | 22              | 27                        | 15                       | N/A                  | Ladco Development                                     |
| DMACC Dam                             | S            | NR  | 37              | 306                       | 88                       | 05/29/2020           | Iowa Dept. Of Transportation                          |
| Easter Lake Dam                       | S            | NR  | 43              | 6,200                     | 3,200                    | 05/12/2017           | Polk County Conservation Board                        |
| Easter Lake Retention Basin #1        | S            | NR  | 18              | 20                        | 6                        | 6/17/2010            | City Of Des Moines                                    |
| Easter Lake Retention Basin #10       | S            | NR  | 22              | 23                        | 10                       | 6/17/2010            | City Of Des Moines                                    |
| Fountain View Lake Dam                | S            | NR  | 8               | 115                       | 78                       | N/A                  | Fountain View Estates Homeowners Assn.                |
| Jester Park Estates Dam               | S            | NR  | 11              | 58                        | 21                       | N/A                  | Jester Lake Estates Homeowners Association            |
| Lake Halice Dam                       | S            | NR  | 27              | 120                       | 75                       | 05/28/2020           | Lake Halice Lot Owners Assn.                          |
| Prairie Trail – CP5                   | S            | NR  | 24              | 61                        | 19                       | N/A                  | City of Ankeny                                        |
| Prairie Trail Development – North Dam | S            | NR  | 22              | 105                       | 44                       | N/A                  | City Of Ankeny & DRA Properties                       |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

| Dam Name                              | Hazard Class | EAP | Dam Height (Ft) | Maximum Storage (Acre-Ft) | Normal Storage (Acre-Ft) | Last Inspection Date | Dam Owner                              |
|---------------------------------------|--------------|-----|-----------------|---------------------------|--------------------------|----------------------|----------------------------------------|
| Prairie Trail Development – South Dam | S            | NR  | 31              | 114                       | 46                       | N/A                  | City Of Ankeny & DRA Properties        |
| SE Des Moines Stormwater Det. Dam #3  | S            | NR  | 34              | 185                       | 30                       | 6/17/2010            | City Of Des Moines                     |
| SE Des Moines Stormwater Det. Dam #4  | S            | NR  | 26              | 95                        | 20                       | 6/17/2010            | City Of Des Moines                     |
| Shryock Dam                           | S            | NR  | 30              | 34                        | 20                       | 4/12/2018            | Jeffrey Rains                          |
| Thirty-Fifth Street Dam               | S            | NR  | 23              | 95                        | 25                       | 11/29/2005           | City Of West Des Moines                |
| Thomas Mitchell Park Dam              | S            | NR  | 27              | 75                        | 25                       | 7/3/2018             | Polk County Conservation Board         |
| Thunder Bay Lake Dam                  | S            | NR  | 19              | 119                       | 60                       | N/A                  | Prairie Crossing Investments, Inc.     |
| Ward Business Park Dam                | S            | NR  | 17              | 25                        | 9                        | N/A                  | WBD Inc                                |
| Woodland Lake Dam                     | S            | NR  | 43              | 723                       | 421                      | 05/26/2016           | Woodland Lake Estates Homeowners Assn. |
| Woodlands Parkway Dam                 | S            | NR  | 28              | 48                        | 23                       | 9/1/2009             | Woodlands Parkway, LLC                 |

Source: National Inventory of Dams accessed March 26, 2024; H = High, S = Significant; NR= Not Required; N/A = Not Available; EAP = Emergency Action Plan

The following maps provide important geographic context for this hazard. Figure 42 illustrates the locations of high hazard dams across the planning area, and Figure 43 broadly shows the inundation areas of the high hazard dams in Polk County.

Figure 42. Location of High Hazard Dams and Critical Facilities in Polk County

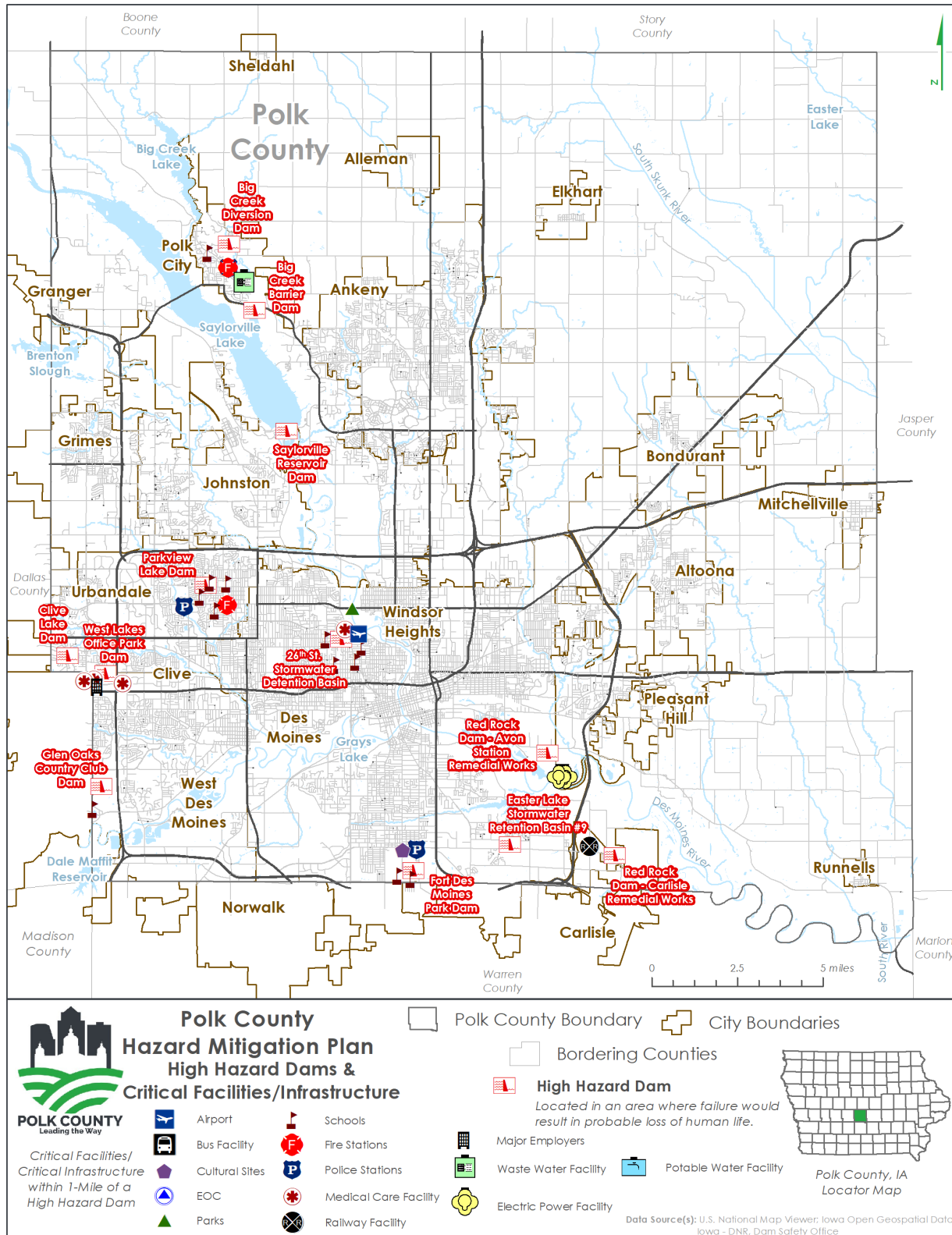
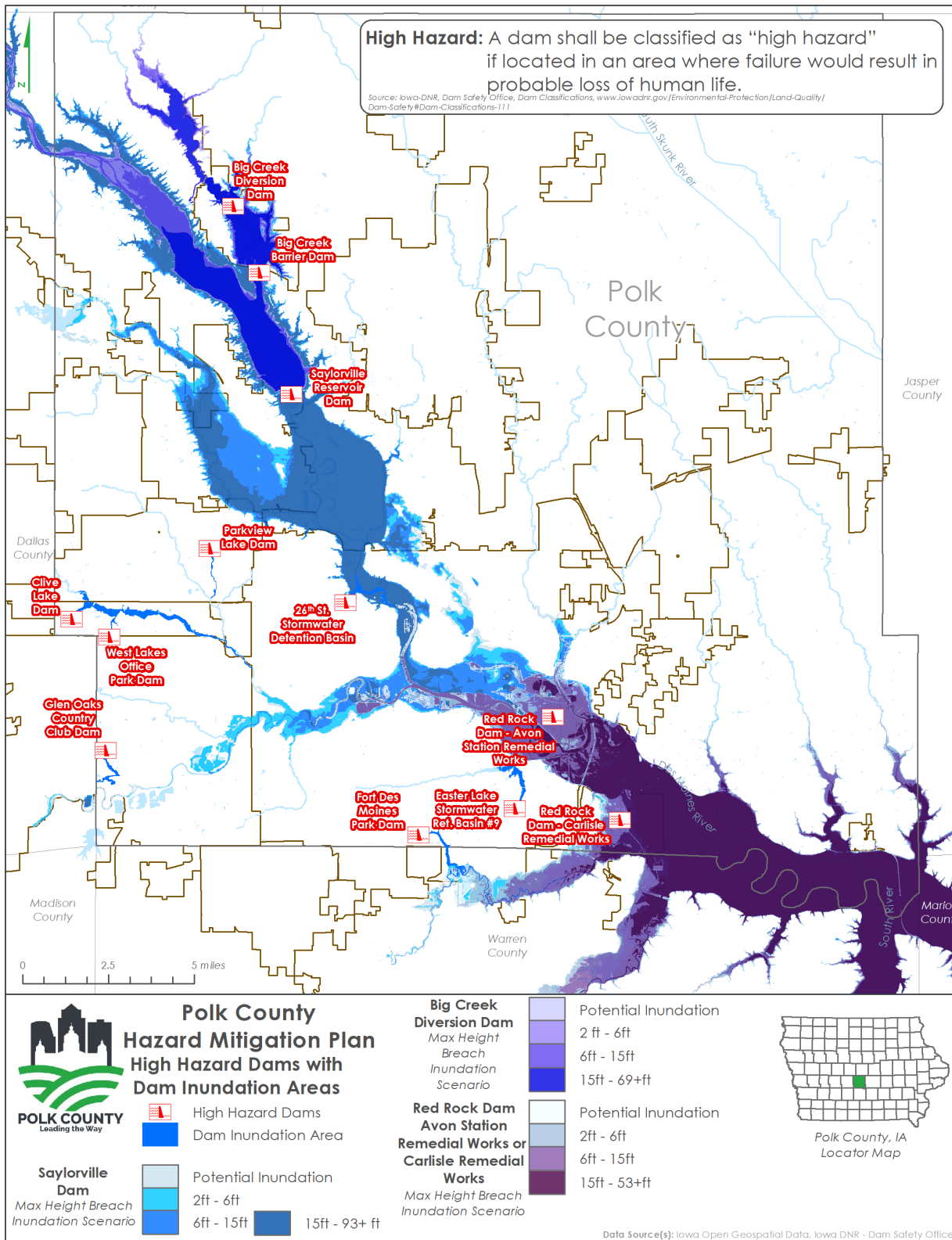




Figure 43. Polk County High Hazard Dams Inundation Areas



#### Upstream Dams Outside the Planning Area

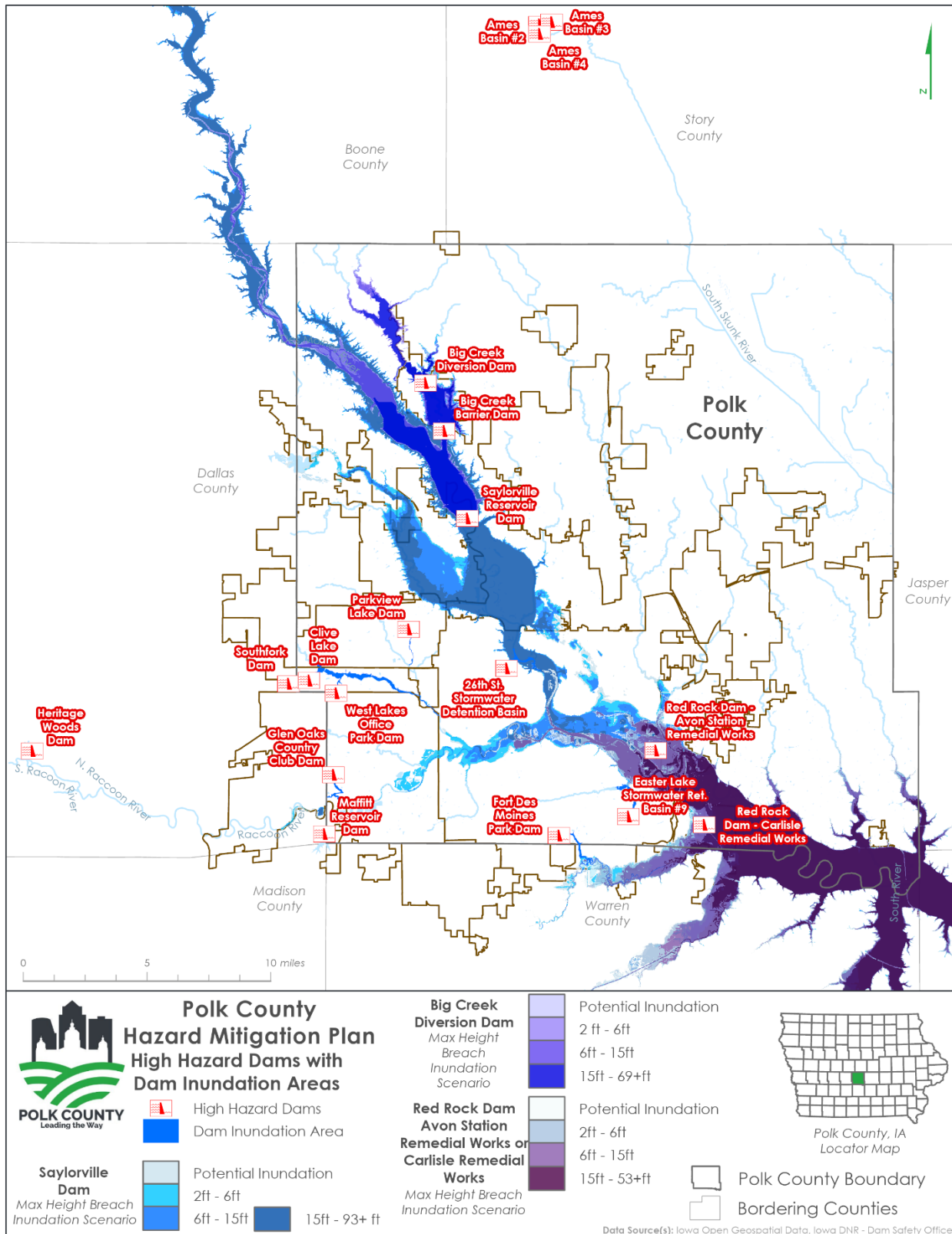
While this plan primarily focuses on assets within Polk County, it is important to remember that nature has no obligation to stay within political boundaries. To this point, an upstream dam breach may release water which will flow into Polk County. Rivers which flows into Polk County largely run through three adjacent counties: Boone, Dallas, and Story. According to the National Inventory of Dams, as of March 2024 there are no high hazard dams in Boone County, three in Dallas County, and three in Story County. The height, storage, condition, and additional information of these high hazard dams is show below in Table 31, and their location is shown in the map below. Inundation mapping for these dams was not available from the State of Iowa to support further analysis, but Figure 44 shows the locations of these dams relative to Polk County.

**Table 31. High Hazard Dams in Adjacent Counties Upstream of Polk County**

| County | Dam Name              | Dam Height (ft) | Normal Storage (acre ft) | Maximum Storage (acre ft) | Condition Assessment | Date of Last Inspection | Dam Owner                      |
|--------|-----------------------|-----------------|--------------------------|---------------------------|----------------------|-------------------------|--------------------------------|
| Dallas | Heritage Woods Dam    | 35              | 61                       | 120                       | Satisfactory         | 05/21/2020              | Heritage Woods LLC             |
| Dallas | Maffitt Reservoir Dam | 79              | 5,200                    | 6,700                     | Satisfactory         | 06/12/2019              | Des Moines Water Works         |
| Dallas | Southfork Dam         | 38              | 67                       | 204                       | Satisfactory         | 03/16/2021              | Southfork Lake Lot Owners Assn |
| Story  | Ames Basin #2         | 13              | N/A                      | 155                       | Satisfactory         | 06/09/2020              | City of Ames Public Works      |
| Story  | Ames Basin #3         | 10              | N/A                      | 66                        | Satisfactory         | 06/09/2020              | City of Ames Public Works      |
| Story  | Ames Basin #4         | 12              | N/A                      | 129                       | Satisfactory         | 06/09/2020              | City of Ames Public Works      |

Source: National Inventory of Dams: <https://nid.sec.usace.army.mil/#/> accessed 4/1/2024.

Figure 44: Location of High Hazard Dams in Adjacent Counties Upstream of Polk County



#### 3.3.5.3 EXTENT

The repercussions of dam failures are largely determined by the volume of water released and the extent of people and property in the inundation zone. Dams are classified as High, Significant, or Low hazard to convey the potential impact a dam failure would have on upstream and/or downstream areas or at locations remote from the dam. This hazard potential classification system was produced by FEMA, and it categorizes dams based on the probable loss of human life and the impacts on economic, environmental, and lifeline interests. Improbable loss of life exists where persons are only temporarily in the potential inundation area. For instance, this hazard potential classification system does not contemplate the improbable loss of life of the occasional recreational user of the river and downstream lands, passer-by, or non-overnight outdoor user of downstream lands. Table 32 provides additional information about dam classifications.

**Table 32. Dam Hazard Classifications**

| <b>Hazard Class</b> | <b>Anticipated Loss of Human Life</b> | <b>Economic, Environmental, and Lifeline Losses</b> | <b>Description of Classification</b>                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------|---------------------------------------|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>High</b>         | Probable. One or more expected.       | Yes (but not necessary for this classification)     | Dams assigned the high hazard potential classification are those where failure or mis-operation will probably cause loss of human life.                                                                                                                                                                                                                                                                                                                                 |
| <b>Significant</b>  | None                                  | Yes                                                 | Dams assigned the significant hazard potential classification are those dams where failure or mis-operation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure. |
| <b>Low</b>          | None                                  | Low and generally limited to owner                  | Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.                                                                                                                                                                                                                           |

According to federal dam safety guidelines, the above hazard potential classification system should be utilized with the understanding that the failure of any dam or water-retaining structure, no matter how small, could represent a danger to downstream life and property. Whenever there is an uncontrolled release of stored water, there is the possibility of someone, regardless of how unexpected, being in its path.<sup>13</sup>

<sup>13</sup> Federal Emergency Management Agency. "Federal Guidelines for Dam Safety, Hazard Potential Classification System for Dams," April 2004. <https://www.ferc.gov/sites/default/files/2020-04/fema-333.pdf>.

#### 3.3.5.4 PAST OCCURRENCES

To determine previous occurrences of dam failure within Polk County, the 2018 Polk County Hazard Mitigation Plan, the 2023 Iowa State Hazard Mitigation Plan, and the Stanford University's National Performance of Dams Program (<http://npdp.stanford.edu/>) were reviewed for historical dam failures. No record of dam failure within Polk County boundaries was found.

Although no record of dam failure within Polk County was found, there was concern during the very wet period of 1993 that water might overtop Saylorville Reservoir. With the outfall flowing at full capacity and water flowing out of the spillway, the reservoir did not overtop the dam.

#### 3.3.5.5 PROBABILITY OF FUTURE OCCURRENCE

Other hazards could affect the likelihood of a dam failure which might affect upstream and downstream flooding potential. Flooding is one of the most likely causes of dam failure and may become more severe due to impacts of climate change and future development. Drought could impact water levels significantly which could (if sustained) affect the structural stability of dams. Finally, earthquakes, although unlikely, could directly damage dam structures.

Despite these potential cascading impacts, there is an overall low probability of dam failures in Polk County. All state-regulated dams are required to be regularly inspected and maintained. USACE is responsible for the inspection and maintenance of their four dams in the planning area. According to information provided by the Iowa DNR, all state-regulated high hazard dams in the County have been inspected since 2022. For these reasons the probability of dam failure in Polk County is considered to be "unlikely."

#### 3.3.5.6 VULNERABILITY

Dam failure is typically an additional or secondary impact of another disaster such as flooding or earthquake. The impacts to the planning area and its municipalities from a dam failure would be similar in some cases to those associated with flood events (see the flood hazard vulnerability analysis and discussion). Based on the hazard class definitions, failure of any of the high hazard dams could result in a serious threat of loss of human life, serious damage to residential, industrial or commercial areas, important public utilities, public buildings, or major transportation facilities.

**Table 33. Potential Impacts of Dam Failure on Community Lifelines**

| Lifelines                         | Impact Type                                                                         | Description                                                                                                                                                                                                                                                                 |
|-----------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Safety & Security                 |    | The sudden release of water can pose immediate threats to life and property, necessitating urgent evacuation and rescue operations. Law enforcement and emergency services are vital for managing the situation, ensuring public safety, and coordinating response efforts. |
| Health & Medical                  |    | Injuries and potential loss of life due to flooding require emergency medical services. Healthcare facilities need to be prepared for an influx of patients and possible challenges in maintaining operations, especially if they are in the flood zone.                    |
| Housing & Building Infrastructure |   | Flooding from dam failures can cause extensive damage to homes, businesses, and infrastructure, resulting in displacement of residents, and necessitating significant reconstruction efforts.                                                                               |
| Utilities                         |  | Dam failures can disrupt essential services such as electricity, water supply, and communication networks, both directly through physical damage and indirectly due to access issues.                                                                                       |
| Transportation                    |  | Roads, bridges, and rail lines may be damaged or rendered impassable, disrupting the movement of people and goods and complicating rescue and recovery efforts.                                                                                                             |
| Economic Stability                |  | The economic impacts include the immediate costs of emergency response and infrastructure repairs, as well as longer-term effects on local economies due to business interruptions and loss of property.                                                                    |



| Lifelines                  | Impact Type                                                                       | Description                                                                                                                                                                                           |
|----------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Environmental & Ecological |  | A dam failure can lead to environmental disasters, impacting water quality, wildlife habitats, and local ecosystems. Remediation and ecological restoration efforts may be required in the aftermath. |

A) People

Individuals living in an inundation zone of a dam are inherently at a greater risk than those who reside outside of an inundation zone. Within the inundation zones in the planning area, virtually all people and property are vulnerable. Analysis of previous dam breaches across the country suggests that water can move at speeds approaching 120 miles per hour near the breach. The movement of water will gradually decrease in speed as it moves further away from the initial breach, but individuals living in inundation zones in the planning area may only have a few minutes before the impact of the water. Such a short window of time would make it difficult for anyone immediately downstream of a dam (regardless of socioeconomic status, ability, or access to transportation) to evacuate.

Part of this plan’s analysis of high hazard dams included a comparison of high hazard dam inundation zones with 2020 Census tracts. This analysis allowed the planning team to estimate the populations vulnerable to high hazard dam failures in the planning area. These estimates are shown below in Table 34, which assumes that all residents of a census tract that contains part of the inundation zone would be in some way impacted by a dam failure, whether directly or indirectly, and are thus considered to be vulnerable. Analysis of Big Creek Barrier Dam was not possible due to data limitations. The potential failure at Saylorville Dam, which helps contain water in Saylorville Reservoir, poses the greatest risk to people in Polk County – more than 40% of the County’s 2020 population is considered vulnerable to this threat.

Table 34. Populations Vulnerable to High Hazard Dam Failure in Polk County

| High Hazard Dam                                 | Population at Risk<br>(2020 Census Tracts) |
|-------------------------------------------------|--------------------------------------------|
| Big Creek Barrier Dam                           | N/A                                        |
| Big Creek Diversion Dam                         | 28,167                                     |
| Clive Lake Dam                                  | 30,472                                     |
| Easter Lake Stormwater Retention Basin – Site 9 | 7,754                                      |
| Fort Des Moines Park Dam                        | 7,107                                      |
| Glen Oaks Country Club Dam                      | 5,755                                      |
| Parkview Lake Dam                               | 11,710                                     |



|                                                |         |
|------------------------------------------------|---------|
| Red Rock – Avon Station Remedial Works         | 68,718  |
| Red Rock – Carlisle Remedial Works             | 68,718  |
| Saylorville Dam                                | 197,431 |
| Twenty-Sixth Street Stormwater Detention Basin | 18,027  |
| West Lake Office Park Dam                      | 6,625   |

#### B) Structures

A catastrophic dam failure can release a large wave of water which contains significant destructive potential. In some ways, water flowing through a dam breach is similar to a tsunami – both phenomena can destroy well-built structures and flatten large swaths of development. Only the most reinforced structures would be expected to remain standing, although the interior of these structures would likely still be ruined. The wave of water released by a dam failure will gradually lose speed as it travels further downstream. Eventually, the wave slows to a point where the primary threat to structures is no longer the initial impact of the water. At this point, the threat picture begins to mirror that of regular flooding events. See the flooding hazard for further information on how structures are impacted by flooding.

#### C) Systems

The impacts of dam failure on infrastructure systems like utility and transportation networks are similar to those on structures. In the immediate vicinity of a breach, infrastructure systems would largely be washed out/destroyed by the initial impact of the water. Eventually, the wave slows to a point where the initial impact is no longer the primary concern, and the threat picture begins to mirror that of regular flooding. See the flooding hazard for further information on how systems are impacted by flooding. Infrastructure systems which are not located in inundation zones are not expected to be directly affected by dam failures, but indirect impacts could occur. An example of an indirect impact would be increased traffic along undamaged roads due to other roadways being rendered unusable by dam failure. There are no hydroelectric dams in the planning area.

#### D) Natural, Historic, and Cultural Resources

Natural, historic, and cultural resources both above and below dams can be impacted by their failure. First, resources which are immediately below a dam failure are likely to be significantly damaged by the wave of water which rushes downstream. Natural resources in particular are likely to be affected as it is common for parks, open spaces, and recreational areas to be located around dams. Second, natural, historic, and cultural resources above a dam – especially those which are functionally intertwined with the reservoir/lake – can be impacted by dam failure. Marinas, beaches, nature trails, and many other resources which rely on the existing qualities of a reservoir/lake may be rendered unusable following a dam failure.

#### E) Community Activities

Community activities may need to be relocated, postponed, or cancelled following a dam failure. Community activities which rely on structures or space immediately downstream of a dam would need to be relocated or postponed for an extended period of time, while those nearer to the edges of inundation zones may only be disrupted for a few days. Activities which are dependent on existing conditions – both above and below a dam – may be permanently disrupted by a dam failure. Community activities which rely on existing conditions primarily involve recreational uses of the reservoir/lake such as boating, fishing, and swimming.

#### Existing Development

This section describes the risks and vulnerabilities to and from each HHPD in Polk County. This will include location and size of populations at risk from HHPDs, as well as potential impacts to institutions and critical infrastructure/facilities/lifelines.

The Iowa Department of Natural Resources coordinates the initial dam Emergency Action Plan (EAPs) review with the dam owner, local First Responders (police, fire), and local Emergency Management Agency. This is done to review the dam specific information and validate the emergency contacts and procedures. Polk County coordinated with Iowa DNR to obtain copies of the EAPs for each state-regulated HHPD in Polk County which were reviewed when developing this section of the plan.

The inundation maps shown in this plan utilize geographic data from the U.S. Army Corps of Engineers and Iowa DNR. 2020 Census tracts and parcel data were then used to approximate the number of people and structures which are located within the inundation areas of 11 of the 12 high hazard dams in Polk County. Parcel data was also used to approximate the value of vulnerable structures. Additionally, the number and type of critical facilities in the inundation areas were identified. An inundation map for the Big Creek Barrier Dam, which is managed by the U.S. Army Corps of Engineers, was not made available to the planning team. Therefore, the specific structures and people at risk to failure of the Big Creek Barrier Dam could not be determined. All other high hazard dams in Polk County are individually profiled below.

When available, the profiles below reference a condition assessment based on information available in the National Inventory of Dams. These assessments are based on the following criteria:

- **Satisfactory:** No existing or potential dam safety deficiencies are recognized. Acceptable performance is expected under all loading conditions (static, hydrologic, seismic) in accordance with the minimum applicable state or federal regulatory criteria or tolerable risk guidelines.
- **Fair:** No existing dam safety deficiencies are recognized for normal operating conditions. Rare or extreme hydrologic and/or seismic events may result in a dam safety deficiency. Risk may be in the range to take further action. Note: Rare or extreme event is defined by the regulatory agency based on their minimum
- **Poor:** A dam safety deficiency is recognized for normal operating conditions which may realistically occur. Remedial action is necessary. POOR may also be used when

uncertainties exist as to critical analysis parameters which identify a potential dam safety deficiency. Investigations and studies are necessary.

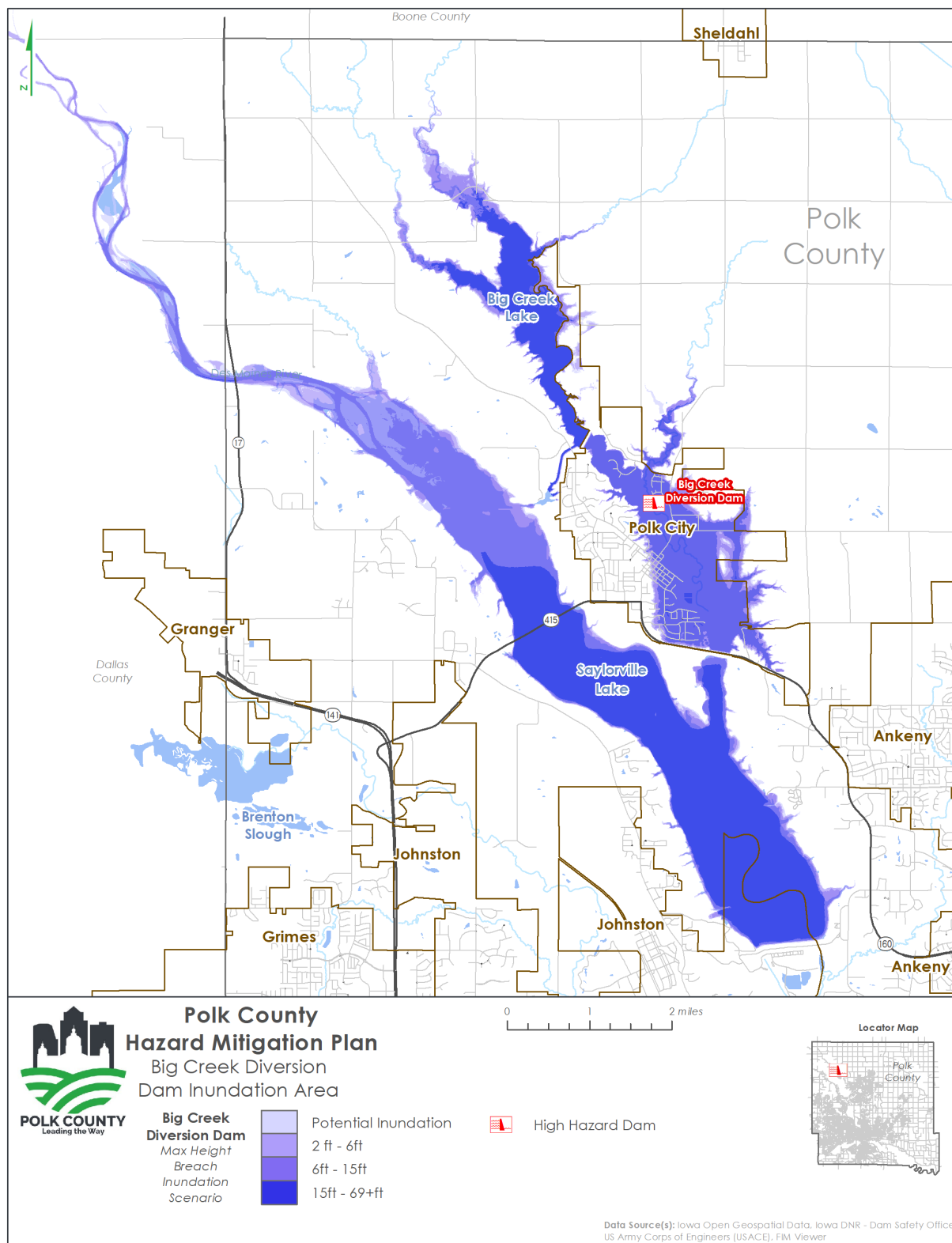
- **Unsatisfactory:** A dam safety deficiency is recognized that requires immediate or emergency remedial action for problem resolution.

#### Big Creek Diversion Dam

Figure 45 shows the expected inundation zone if the Big Creek Diversion Dam were to fail. The following communities would be impacted by this failure:

- Polk City

Figure 45. Big Creek Diversion Dam Inundation Area



Based on the map above, approximately 28,167 people are estimated to be within the inundation zone of Big Creek Diversion Dam. Critical facilities which may be impacted by the failure of Big Creek Diversion Dam include:

Bridges – 5

Fire Stations – 1

Police Stations – 1

Waste Water Treatment Facilities – 1

Tier II Facilities – 0

Dam failures also pose a threat to residential, commercial, industrial and other non-critical properties within the planning area. The following table shows the parcel type, count, and assessed total value of property within the inundation zone of Big Creek Diversion Dam.

**Table 35. Property Vulnerable to Failure of Big Creek Diversion Dam**

| Parcel Type  | Parcel Count | Assessed Total Value |
|--------------|--------------|----------------------|
| Government   | 317          | \$0                  |
| Residential  | 937          | \$372,042,405        |
| Agricultural | 56           | \$1,240,688          |
| Commercial   | 40           | \$15,770,310         |
| School       | 1            | \$0                  |

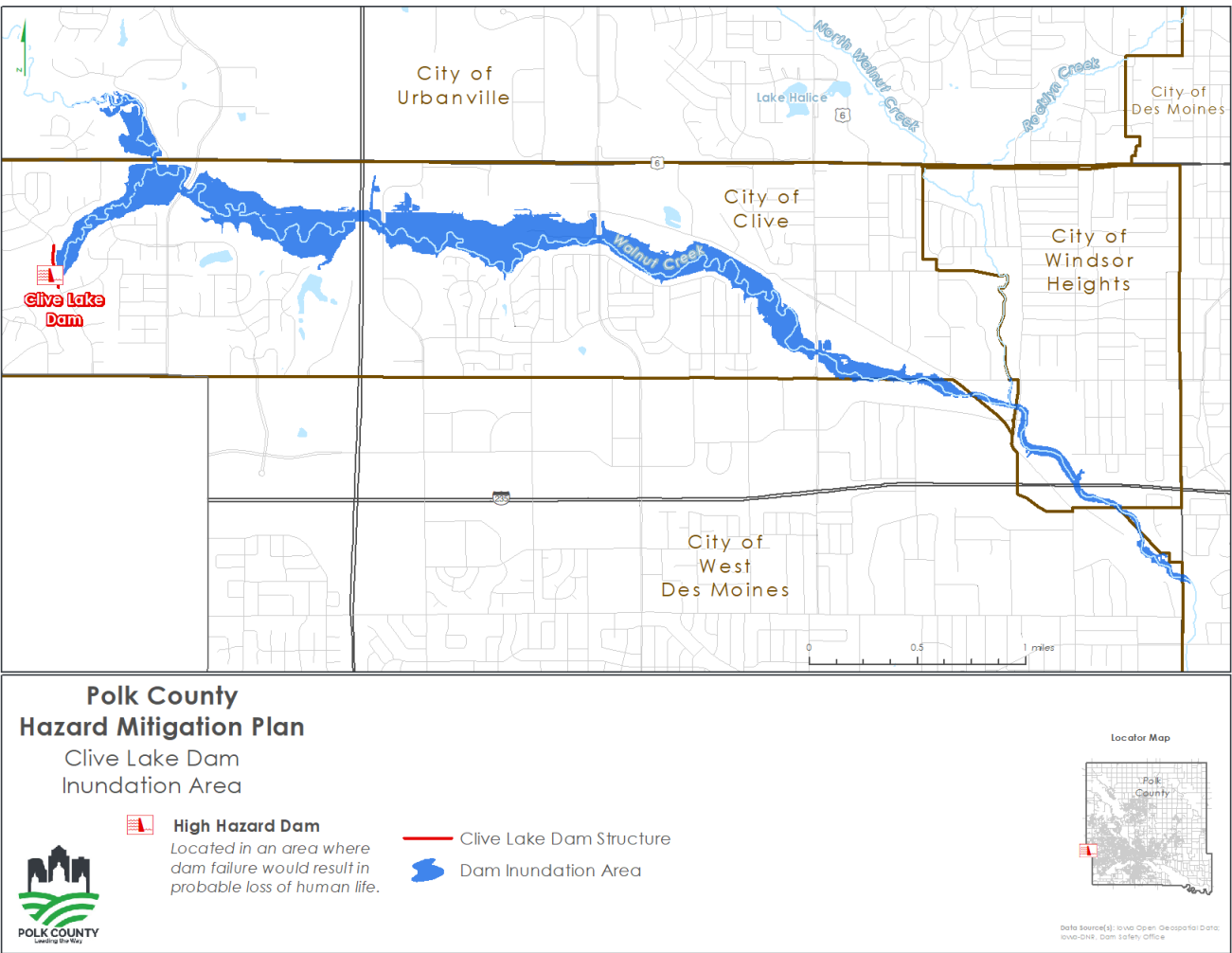
#### Clive Lake Dam

Figure 46 shows the expected inundation zone if the Clive Lake Dam were to fail. The following communities would be impacted by this failure:

- City of Clive
- City of Urbandale
- City of West Des Moines

- City of Windsor Heights

Figure 46. Clive Lake Dam Inundation Area



Based on the map above, approximately 30,472 people are estimated to be within the inundation zone of Clive Lake Dam. Critical facilities which may be impacted by the failure of Clive Lake Dam include:

Bridges - 6

Dam failures also pose a threat to residential, commercial, industrial and other properties within the planning area. The following table shows the parcel type, count, and assessed total value of property within the inundation zone of Clive Lake Dam.

Table 36. Property Vulnerable to Failure of Clive Lake Dam

| Parcel Type | Parcel Count | Assessed Total Value |
|-------------|--------------|----------------------|
|-------------|--------------|----------------------|

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

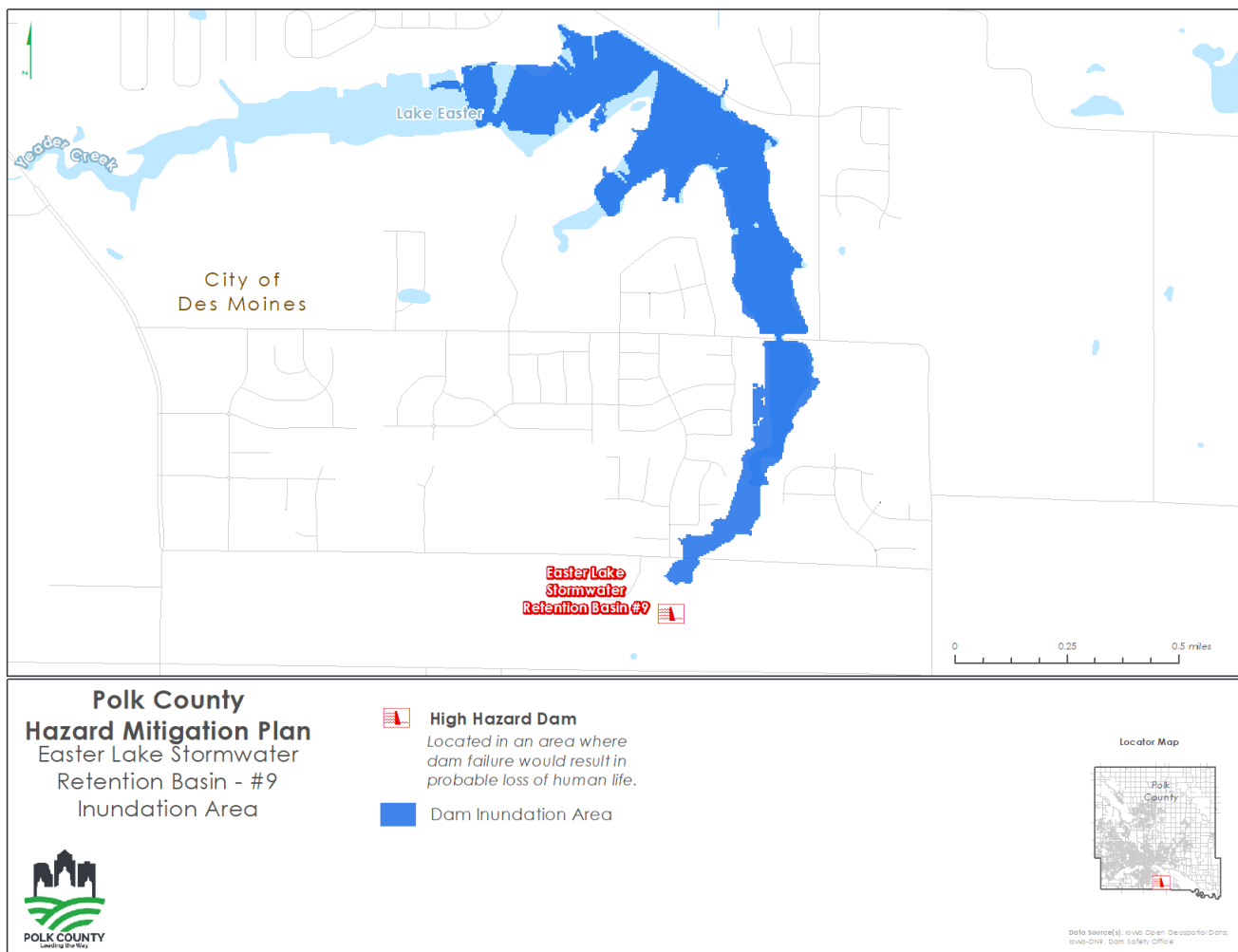
|             |    |             |
|-------------|----|-------------|
| Commercial  | 12 | \$7,890,200 |
| Government  | 61 | \$0         |
| Residential | 13 | \$6,630,210 |

#### Easter Lake Stormwater Retention Basin – Site 9

Figure 47 shows the expected inundation zone if Easter Lake Stormwater Retention Basin – Site 9 were to fail. The following communities would be impacted by this failure:

- City of Des Moines

**Figure 47. Easter Lake Stormwater Retention Basin - Site 9 Inundation Area**





Based on the map above, approximately 7,754 people are estimated to be within the inundation zone of Easter Lake Stormwater Retention Basin – Site 9. There are no critical facilities which would appear to be threatened by the failure of Easter Lake Stormwater Retention Basin – Site 9.

Dam failures also pose a threat to residential, commercial, industrial and other properties within the planning area. The following table shows the parcel type, count, and assessed total value of property within the inundation zone of Easter Lake Stormwater Retention Basin – Site 9.

Table 37. Property Vulnerable to Failure of Easter Lake Stormwater Retention Basin – Site 9

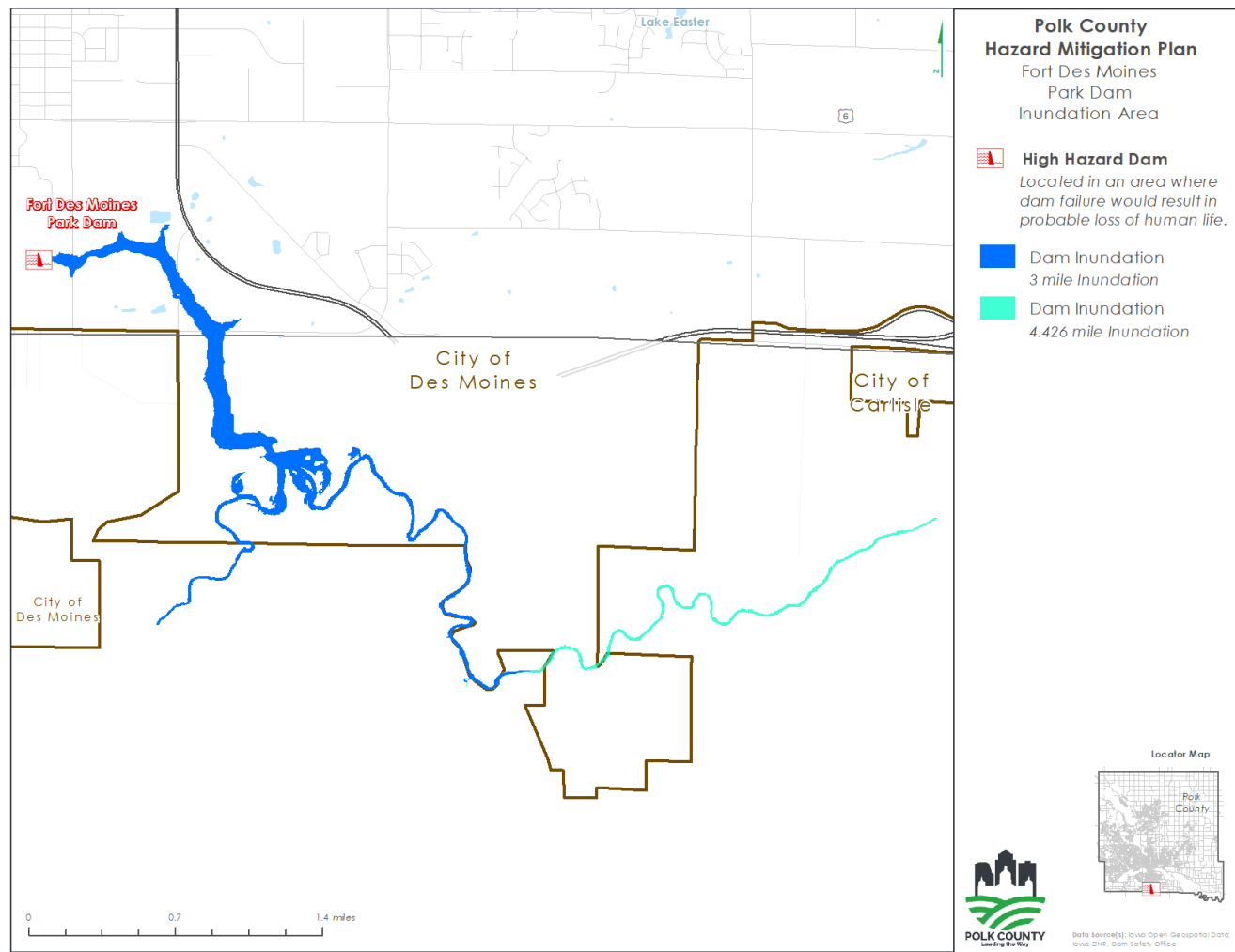
| Parcel Type | Parcel Count | Assessed Total Value |
|-------------|--------------|----------------------|
| Government  | 10           | \$0                  |
| Residential | 1            | \$300                |

Fort Des Moines Park Dam

Figure 48 shows the expected inundation zone if the Fort Des Moines Dam were to fail. The following communities would be impacted by this failure:

- City of Des Moines

Figure 48. Fort Des Moines Park Dam Inundation Area



Based on the map above, approximately 7,107 people are estimated to be within the inundation zone of Fort Des Moines Park Dam. Critical facilities which may be impacted by the failure of Fort Des Moines Park Dam include:

Bridges – 2

Dam failures also pose a threat to residential, commercial, industrial and other properties within the planning area. The following table shows the parcel type, count, and assessed total value of property within the inundation zone of Fort Des Moines Park Dam.

Table 38. Property Vulnerable to Failure of Fort Des Moines Park Dam

| Parcel Type | Parcel Count | Assessed Total Value |
|-------------|--------------|----------------------|
| Agriculture | 1            | \$2,200              |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

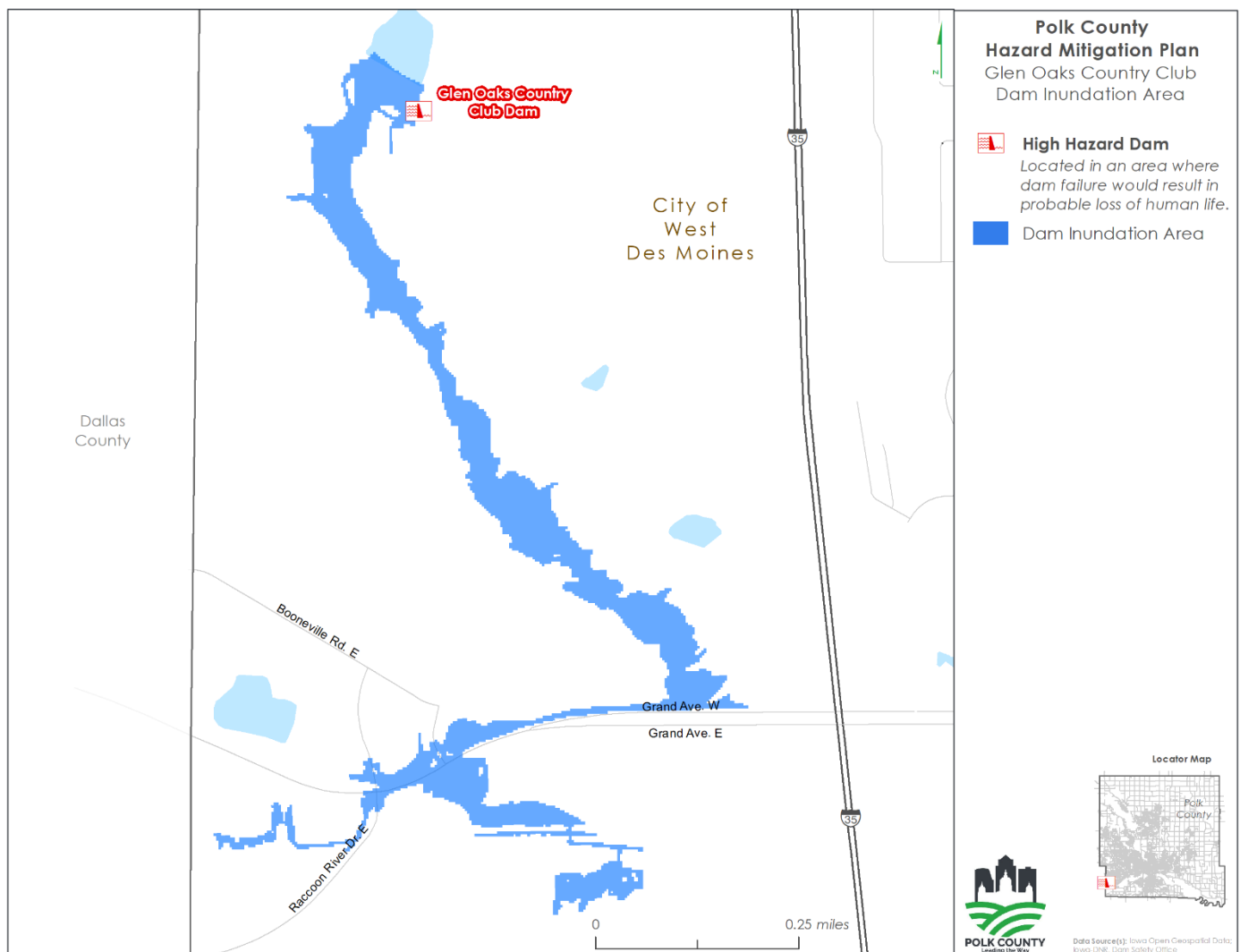
|             |   |             |
|-------------|---|-------------|
| Commercial  | 1 | \$0         |
| Government  | 3 | \$0         |
| Residential | 5 | \$1,132,500 |

#### Glen Oaks Country Club Dam

Figure 49 shows the expected inundation zone if the Glen Oaks Country Club Dam were to fail. The following communities would be impacted by this failure:

- City of West Des Moines

**Figure 49. Glen Oaks Country Club Dam Inundation Area**



Based on the map above, approximately 5,755 people are estimated to be within the inundation zone of Glen Oaks Country Club Dam. There are no critical facilities which have been identified within the inundation area of Glen Oaks Country Club Dam.

Dam failures pose a threat to residential, commercial, industrial and other properties within the planning area. The following table shows the parcel type, count, and assessed total value of property within the inundation zone of Glen Oaks Country Club Dam.

Table 39. Property Vulnerable to Failure of Glen Oaks Country Club Dam

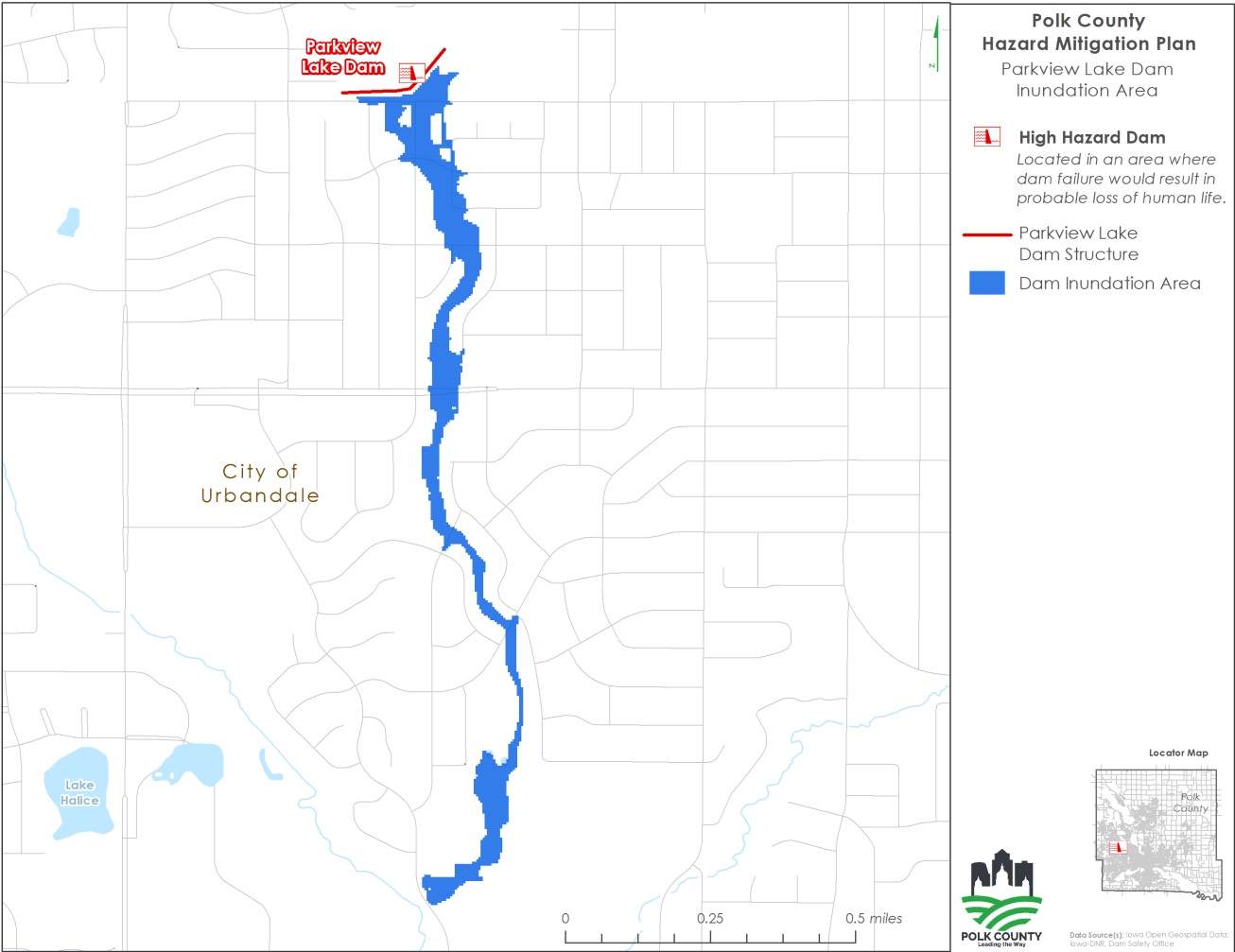
| Parcel Type | Parcel Count | Assessed Total Value |
|-------------|--------------|----------------------|
| Commercial  | 1            | \$704,000            |
| Government  | 6            | \$0                  |
| Residential | 3            | \$638,425            |

Parkview Lake Dam

Figure 50 shows the expected inundation zone if the Parkview Lake Dam were to fail. The following communities would be impacted by this failure:

- City of Urbandale

Figure 50. Parkview Lake Dam Inundation Area



Based on the map above, approximately 11,710 people are estimated to be within the inundation zone of Parkview Lake Dam. There are no critical facilities identified within the inundation area of Parkview Lake Dam.

Dam failures pose a threat to residential, commercial, industrial and other properties within the planning area. The following table shows the parcel type, count, and assessed total value of property within the inundation zone of Parkview Lake Dam.

Table 40. Property Vulnerable to Failure of Parkview Lake Dam

| Parcel Type | Parcel Count | Assessed Total Value |
|-------------|--------------|----------------------|
| Commercial  | 1            | \$64,600             |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

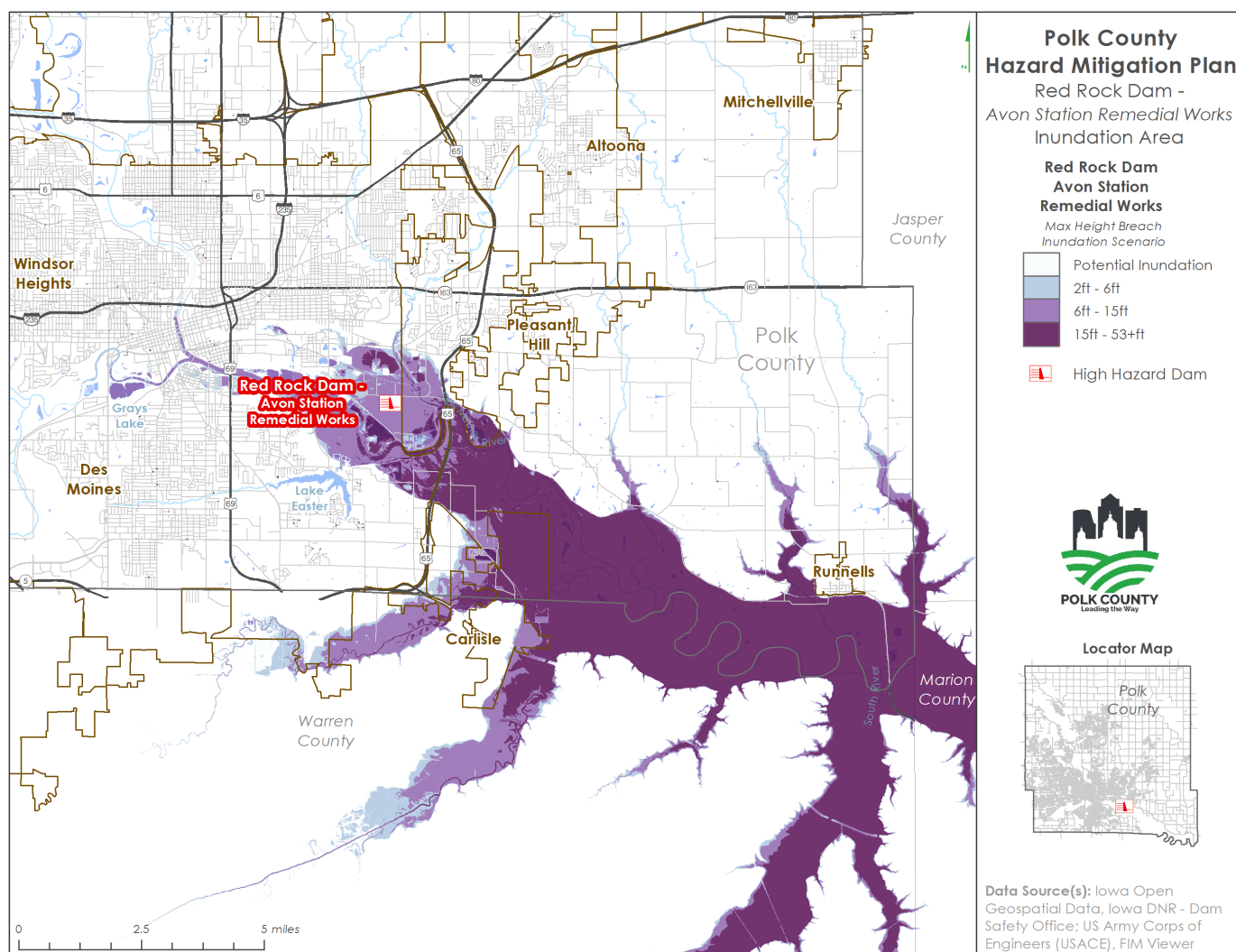
|             |    |             |
|-------------|----|-------------|
| Government  | 6  | \$0         |
| Residential | 38 | \$8,861,000 |

#### Red Rock Dam – Avon Station Remedial Works

Figure 51 shows the expected inundation zone if the Red Rock – Avon Station Remedial Dam were to fail. The following communities would be impacted by this failure:

- City of Des Moines
- City of Runnells

**Figure 51. Red Rock Dam - Avon Station Remedial Works**



Based on the map above, approximately 68,718 people are estimated to be within the inundation zone of Red Rock – Avon Station Remedial Dam. Critical facilities which may be impacted by the failure of Red Rock – Avon Station Remedial Dam include:

Bridges – 22

Electric Power Facility - 2

Railway Facility - 1

Waste Water Facility - 1

Tier II Facilities - 20

Dam failures also pose a threat to residential, commercial, industrial and other properties within the planning area. The following table shows the parcel type, count, and assessed total value of property within the inundation zone of Red Rock – Avon Station Remedial Dam.

**Table 41. Property Vulnerable to Failure of Red Rock -- Avon Station Remedial Dam**

| Parcel Type | Parcel Count | Assessed Total Value |
|-------------|--------------|----------------------|
| Agriculture | 221          | \$10,541,720         |
| Commercial  | 126          | \$54,572,089         |
| Government  | 673          | \$0                  |
| Industrial  | 53           | \$85,976,670         |
| Residential | 720          | \$99,569,340         |
| Utility     | 76           | \$0                  |

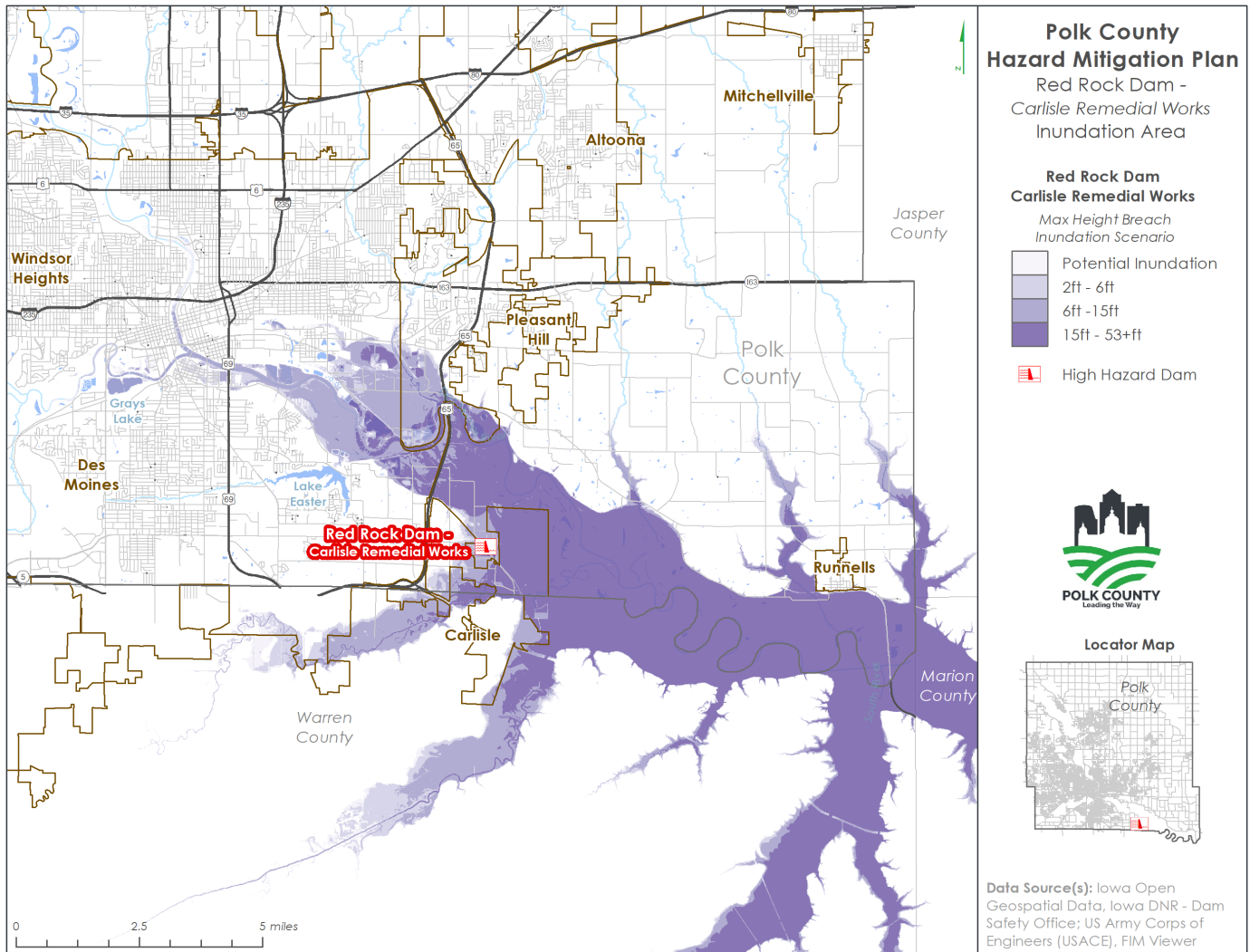
#### Red Rock – Carlisle Remedial Dam

Figure 52 shows the expected inundation zone if the Red Rock – Carlisle Remedial Dam were to fail. The following communities would be impacted by this failure:

- City of Des Moines
- City of Runnells



Figure 52. Red Rock Dam - Carlisle Remedial Works



Based on the map above, approximately 68,718 people are estimated to be within the inundation zone of Red Rock – Carlisle Remedial Dam. Critical facilities which may be impacted by the failure of Red Rock – Carlisle Remedial Dam include:

- Bridges – 22
- Electric Power Facility - 2
- Railway Facility - 1
- Waste Water Facility - 1
- Tier II Facilities – 20

Dam failures also pose a threat to residential, commercial, industrial and other properties within the planning area. The following table shows the parcel type, count, and assessed total value of property within the inundation zone of Red Rock – Carlisle Remedial Dam.

**Table 42. Property Vulnerable to Failure of Red Rock – Carlisle Remedial Dam**

| Parcel Type | Parcel Count | Assessed Total Value |
|-------------|--------------|----------------------|
| Agriculture | 221          | \$10,541,720         |
| Commercial  | 126          | \$54,572,089         |
| Government  | 673          | \$0                  |
| Industrial  | 53           | \$85,976,670         |
| Residential | 720          | \$99,569,340         |
| Utility     | 76           | \$0                  |

#### Saylorville Dam

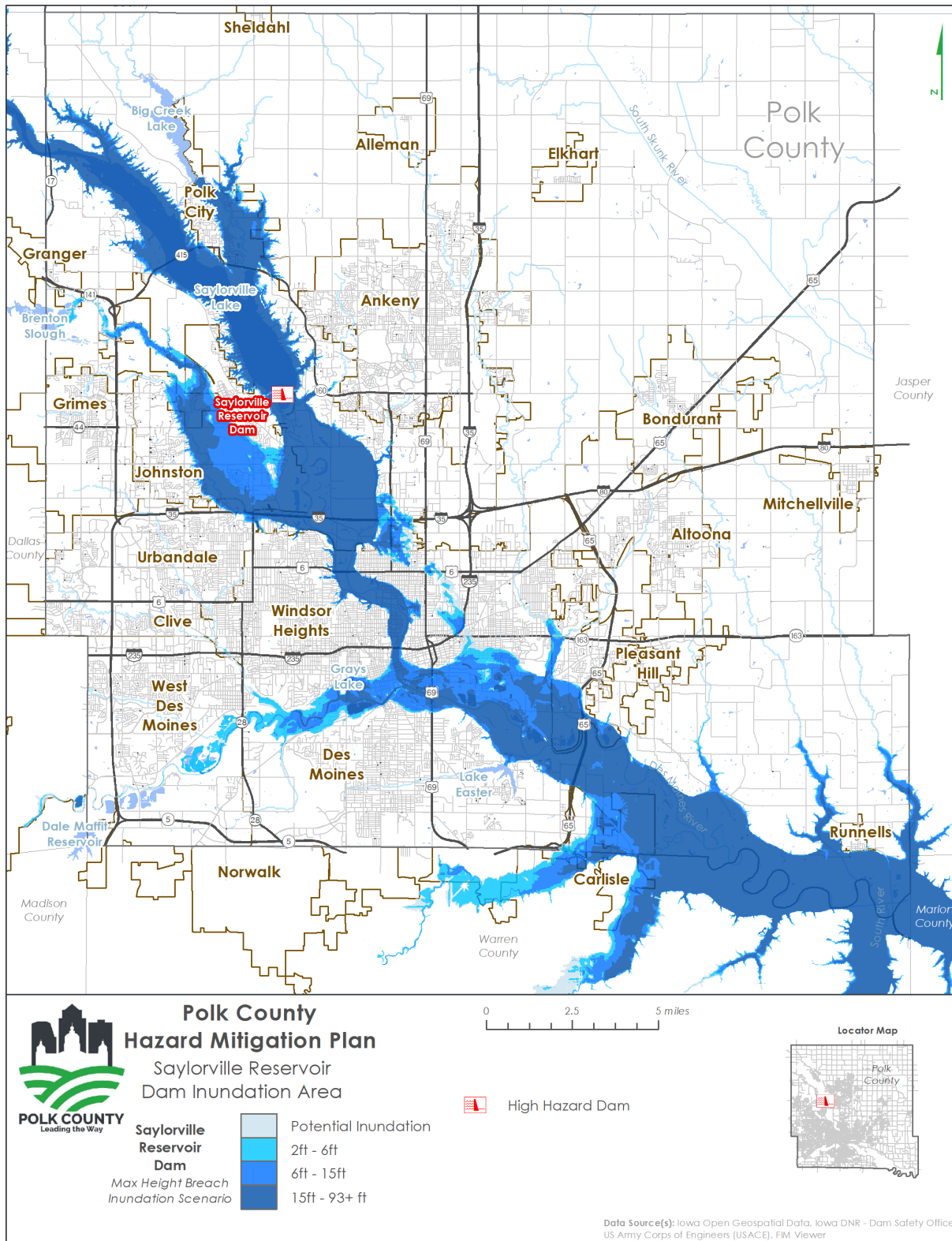
Figure 53 shows the expected inundation zone if Saylorville Dam were to fail. The following communities would be directly impacted by this failure:

- Des Moines
- Grimes
- Johnston
- Polk City
- Runnells
- Urbandale
- West Des Moines

In addition to the cities which are directly in the inundation zone, a significant breach of Saylorville dam is anticipated to have repercussions for all jurisdictions in Polk County, as well as surrounding and downstream communities. Jurisdictions in Polk County which remain dry would likely

be asked to help support recovery efforts by housing displaced individuals and hosting emergency operations centers.

Figure 53. Saylorville Dam Inundation Area



Based on the map above, approximately 197,431 people – approximately 40% of the County’s 2020 population – are estimated to be within the inundation zone of Saylorville Dam. Critical facilities which may be impacted by the failure of Saylorville Dam include:

- Bridges – 116
- Bus Facility - 1
- Communications - 4
- Electric Power Facility - 4
- EOC - 1
- Fire Stations - 4
- Government Facility - 1
- Medical Care Facility - 1
- Parks - 3
- Police Stations - 5
- Potable Water Facility - 1
- Railway Facility - 5
- Schools - 7
- Waste Water Facility – 3
- Tier II Facilities – 64

Dam failures also pose a threat to residential, commercial, industrial and other properties within the planning area. The following table shows the parcel type, count, and assessed total value of property within the inundation zone of Saylorville Dam.

Table 43. Property Vulnerable to Failure of Saylorville Dam

| Parcel Type | Parcel Count | Assessed Total Value |
|-------------|--------------|----------------------|
| Agriculture | 420          | \$24,873,416         |
| Commercial  | 1719         | \$1,364,739,860      |
| Government  | 4,126        | \$0                  |
| Industrial  | 301          | \$268,552,240        |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

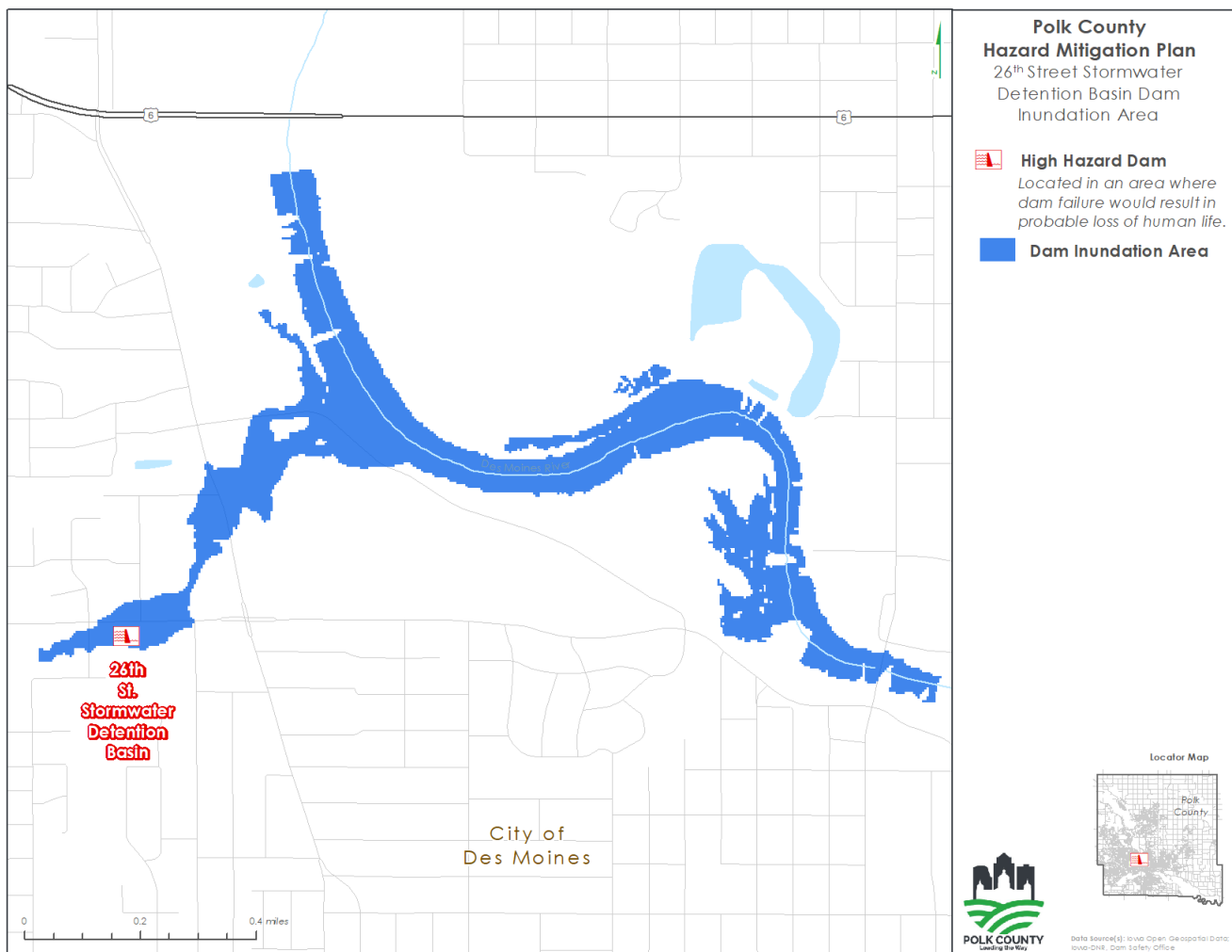
|             |        |                 |
|-------------|--------|-----------------|
| Residential | 10,012 | \$1,973,150,940 |
| School      | 18     | \$0             |
| Utility     | 285    | \$0             |

#### Twenty-Sixth Street Stormwater Detention Basin

Figure 54 shows the expected inundation zone if the Twenty-Sixth Street Stormwater Detention Basin were to fail. The following communities would be impacted by this failure:

- City of Des Moines

**Figure 54. Twenty-Sixth Street Stormwater Detention Basin Dam Inundation Area**



Based on the map above, approximately 18,027 people are estimated to be within the inundation zone of Twenty-Sixth Street Stormwater Detention Basin. There are no critical facilities identified within the inundation area of Twenty-Sixth Street Stormwater Detention Basin.

Dam failures can pose a threat to residential, commercial, industrial and other properties within the planning area. The following table shows the parcel type, count, and assessed total value of property within the inundation zone of Twenty-Sixth Street Stormwater Detention Basin.

Table 44. Property Vulnerable to Failure of Twenty-Sixth Street Stormwater Detention Basin

| Parcel Type | Parcel Count | Assessed Total Value |
|-------------|--------------|----------------------|
| Commercial  | 10           | \$1,901,100          |
| Government  | 19           | \$0                  |
| Residential | 2            | \$367,500            |
| School      | 1            | \$0                  |

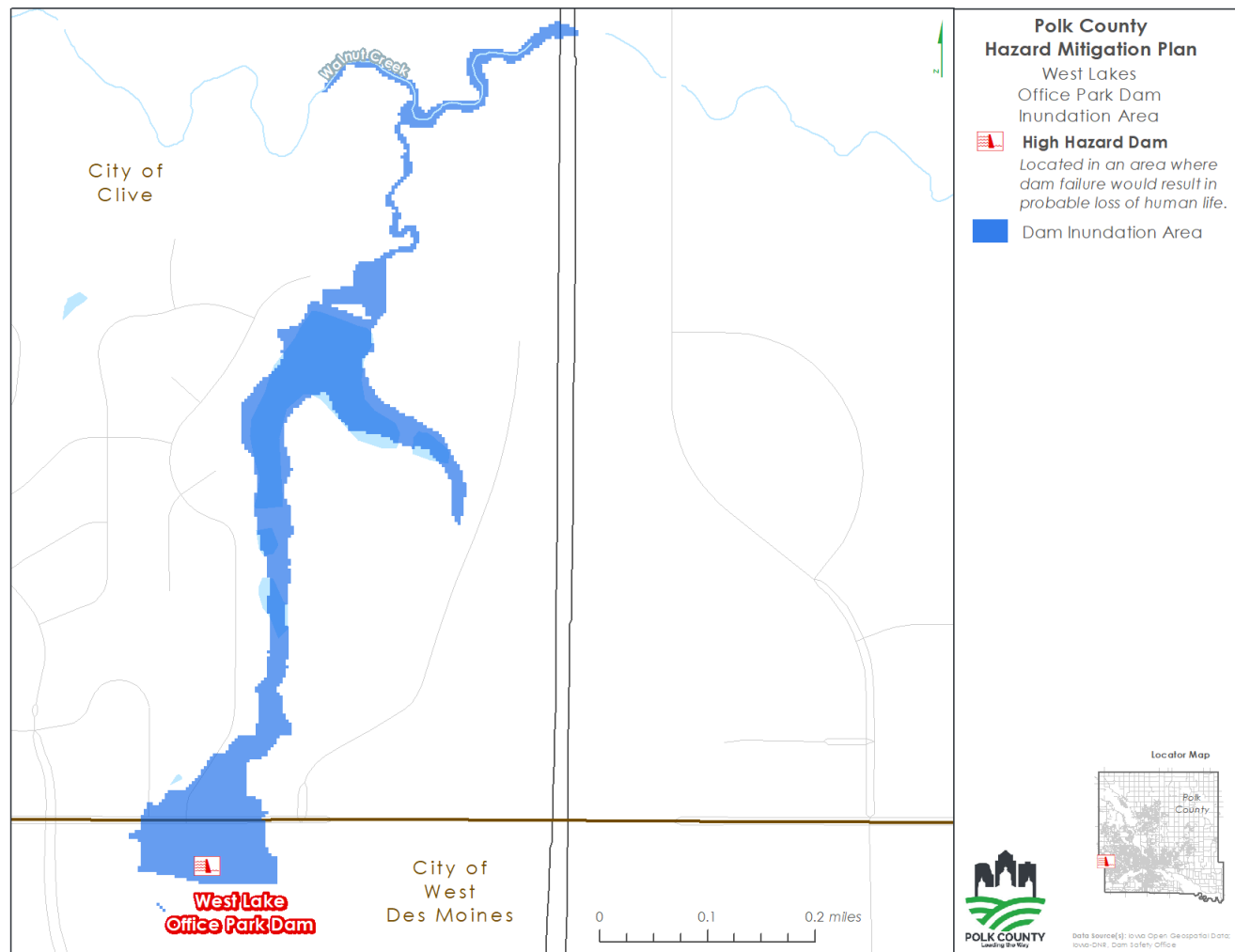
West Lake Office Park Dam

Figure 55 shows the expected inundation zone if the West Lake Office Park Dam were to fail. The following communities would be impacted by this failure:

- City of Clive
- City of West Des Moines



Figure 55. West Lake Office Park Dam Inundation Area



Based on the map above, approximately 6,625 people are estimated to be within the inundation zone of West Lake Office Park Dam. There are no critical facilities which have been identified as being located within the inundation area of West Lake Office Park Dam.

Dam failures also pose a threat to residential, commercial, industrial and other properties within the planning area. The following table shows the parcel type, count, and assessed total value of property within the inundation zone of West Lake Office Park Dam.

Table 45. Property Vulnerable to Failure of West Lake Office Park Dam

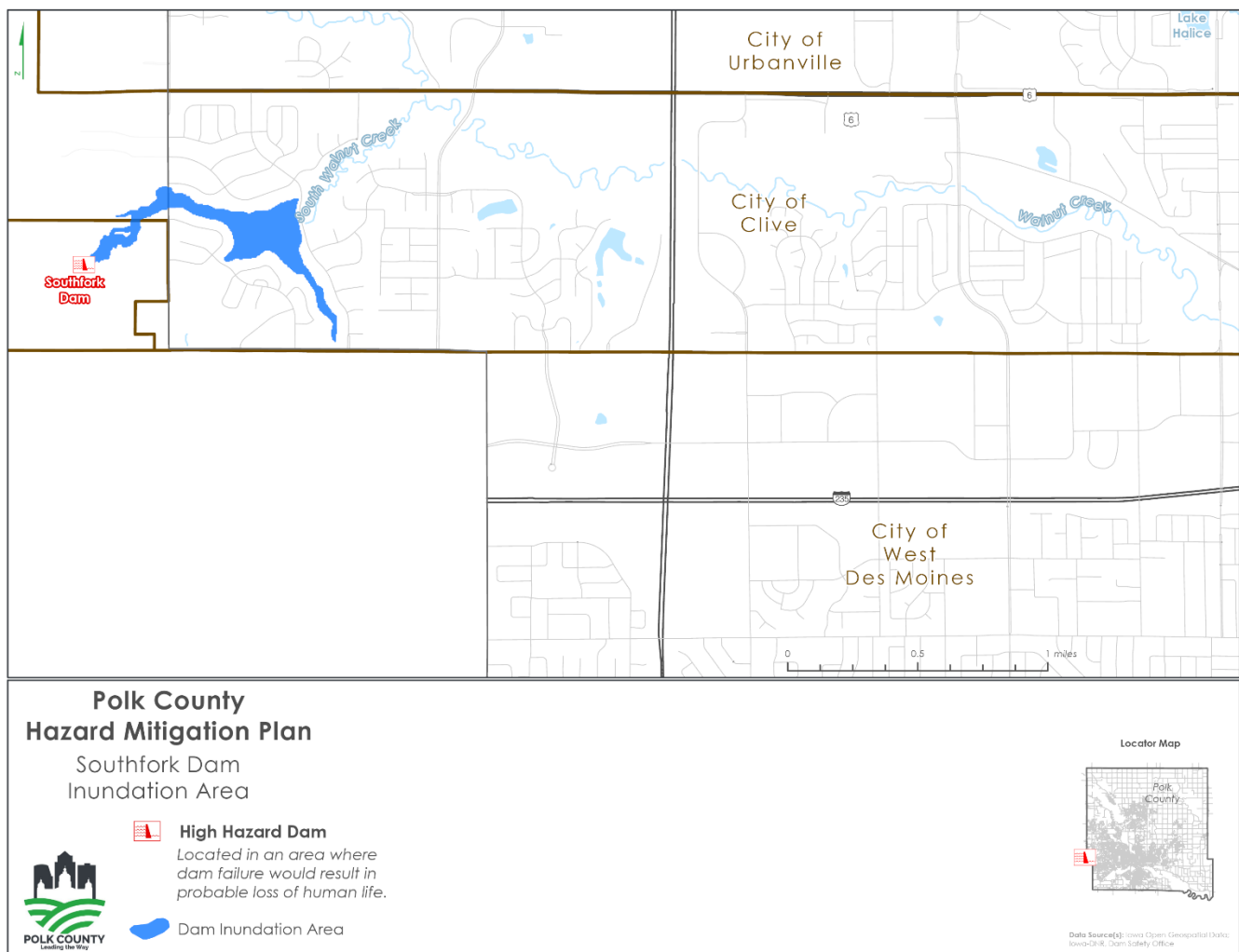
| Parcel Type | Parcel Count | Assessed Total Value |
|-------------|--------------|----------------------|
| Government  | 3            | \$0                  |

|             |   |          |
|-------------|---|----------|
| Residential | 4 | \$11,780 |
|-------------|---|----------|

#### Southfork Dam

The Southfork Dam is one of the upstream high hazard dams not located within Polk County, but it is profiled here to convey the vulnerability of the City of Clive (a CRS participant) to failure of this dam. As such, this dam (and information about the population and facilities vulnerable to its failure) are not included in county-level summary data or mapping located elsewhere in the plan. Figure 56 shows the Southfork Dam's mapped inundation zone.

**Figure 56. Southfork Dam Inundation Area**



Approximately 3,628 people are estimated to be within the inundation zone of Southfork Dam. There are no critical facilities which have been identified as being located within the inundation area of Southfork Dam.

Dam failures also pose a threat to residential, commercial, industrial and other properties within the planning area. The following table shows the parcel type, count, and assessed total value of property within the inundation zone of Southfork Dam. These figures are limited to the geographic boundaries Polk County (for which parcel data was available during the update of this plan), and do not include potential damages outside of the county if this dam were to fail.

**Table 46. Property Vulnerable to Failure of Southfork Dam**

| Parcel Type | Parcel Count | Assessed Total Value |
|-------------|--------------|----------------------|
| Government  | 1            | \$0                  |
| Residential | 17           | \$2,028,700          |

#### HHPD Grant Eligible Dams

Section 5006 of the Water Infrastructure Improvements for the Nation Act provides technical, planning, design, and construction assistance in the form of grants for rehabilitation of eligible high hazard potential dams. The Rehabilitation of High Hazard Potential Dams (HHPD) Grant awards provide technical, planning, design and construction assistance in the form of grants for rehabilitation of eligible high hazard potential dams. According to FEMA, to be eligible for HHPD funding, a dam must:

- Be non-federal
- Be located in a state/territory with a dam safety program
- Be classified as “high hazard potential” by the state/territory dam safety agency in the state/territory in which the dam is located
- Have an Emergency Action Plan (EAP) approved state/territory dam safety program or is in conformance with state/territory law and pending approval by the relevant state/territory dam safety agency
- Fail to meet minimum state/territory dam safety standards and pose an unacceptable risk to the public

Dams are not eligible for HHPD funding if they are:

- Federally owned dams
- A licensed hydroelectric dam under a dam a hydropower project with an authorized installed capacity of greater than 1.5 megawatts
- Dams built under the authority of the U.S. Secretary of Agriculture

As of the writing of this 2024 plan update, the National Inventory of Dams considers one high hazard dam in Polk County – the Glen Oaks Country Club Dam – to be in “poor” condition, which may make it eligible for HHPD funding. However, the Iowa DNR Dam Inventory database identifies the

condition of Glen Oaks Country Club Dam as “satisfactory” with the latest inspection occurring in October 2023. Neither the Iowa DNR nor the National Inventory of Dams consider any high hazard dams in Polk County to be in “unsatisfactory” condition. However, as dams are routinely inspected and future development continues to occur, other dams may be reclassified as high hazard, and existing high hazard dams may deteriorate in condition.

Future Development

Future development located downstream from dams in floodplains or inundation zones would increase vulnerability to this hazard. As described in the flood hazard section, increased development upstream reduces permeable surfaces to absorb water runoff, increasing the volume of water entering river systems, and potentially increasing the likelihood of flooding which can cause dam failure.

Climate Change

Increased frequency of precipitation and precipitation extremes leading to flooding could cause additional stress on dam structures.

Hazard Risk Score

Table 47. Dam Failure Probability and Health Impact Ratings

| Health Severity | Community Impact | Public Health System Impact | Healthcare System Impact | Total Health Hazard Score | Probability |
|-----------------|------------------|-----------------------------|--------------------------|---------------------------|-------------|
| 3               | 1                | 1                           | 2                        | 7                         | Unlikely    |

3.3.6 DROUGHT

3.3.6.1 DESCRIPTION

Drought is generally defined as a condition of moisture levels significantly below normal for an extended period of time over a large area that adversely affects plants, animal life, and humans. There are five types of drought conditions identified by the National Oceanic and Atmospheric Administration:

Meteorological drought is defined on the basis of the degree of dryness (in comparison to some “normal” or average amount) and the duration of the dry period. A meteorological drought must be considered as region-specific since the atmospheric conditions that result in deficiencies of precipitation are highly variable from region to region.

Hydrological drought is associated with the effects of periods of precipitation (including snowfall) shortfalls on surface or subsurface water supply (e.g., streamflow, reservoir and lake levels, ground water). The frequency and severity of hydrological drought is often defined on a watershed or river basin scale. Although all droughts originate with a deficiency of precipitation, hydrologists are more concerned with how this deficiency plays out through the hydrologic system. Hydrological droughts are usually out of phase with or lag the occurrence of meteorological and agricultural droughts. It takes longer for precipitation deficiencies to show up in components of the hydrological system such as soil

moisture, streamflow, and ground water and reservoir levels. As a result, these impacts are out of phase with impacts in other economic sectors.

Agricultural drought focus is on soil moisture deficiencies, differences between actual and potential evaporation, reduced ground water or reservoir levels, and so forth. Plant water demand depends on prevailing weather conditions, biological characteristics of the specific plant, its stage of growth, and the physical and biological properties of the soil.

Socioeconomic drought refers to when physical water shortage begins to affect people.

Ecological Drought occurs when driven beyond their capacity to adapt, ecosystems may cross critical thresholds, resulting in temporary or permanent alteration in their composition, structure, and/or functioning at local or landscape scales. The vulnerability of natural systems to withstand or adapt to drought disturbances depends on the sensitivity of the system, its exposure to the hazard, and its capacity to adapt and recover from drought.

All five of these terms play a significant role as it relates to impacts during a drought in Polk County, Iowa. A meteorological drought is the easiest to determine based on rainfall data and is an easier drought to monitor from rain gauges and reports. A hydrological drought means that stream and river levels are low, which also has an impact for surface water and ground water irrigators. In addition, in-stream discharges that fall below a pre-required level also place the State in regulatory difficulty with U.S. Fish and Wildlife and with neighboring states over cross-border flowage rights. An agricultural drought represents difficulty for Iowa's agricultural-based economy and is also relatively easy to monitor based on crop viabilities for different regions.

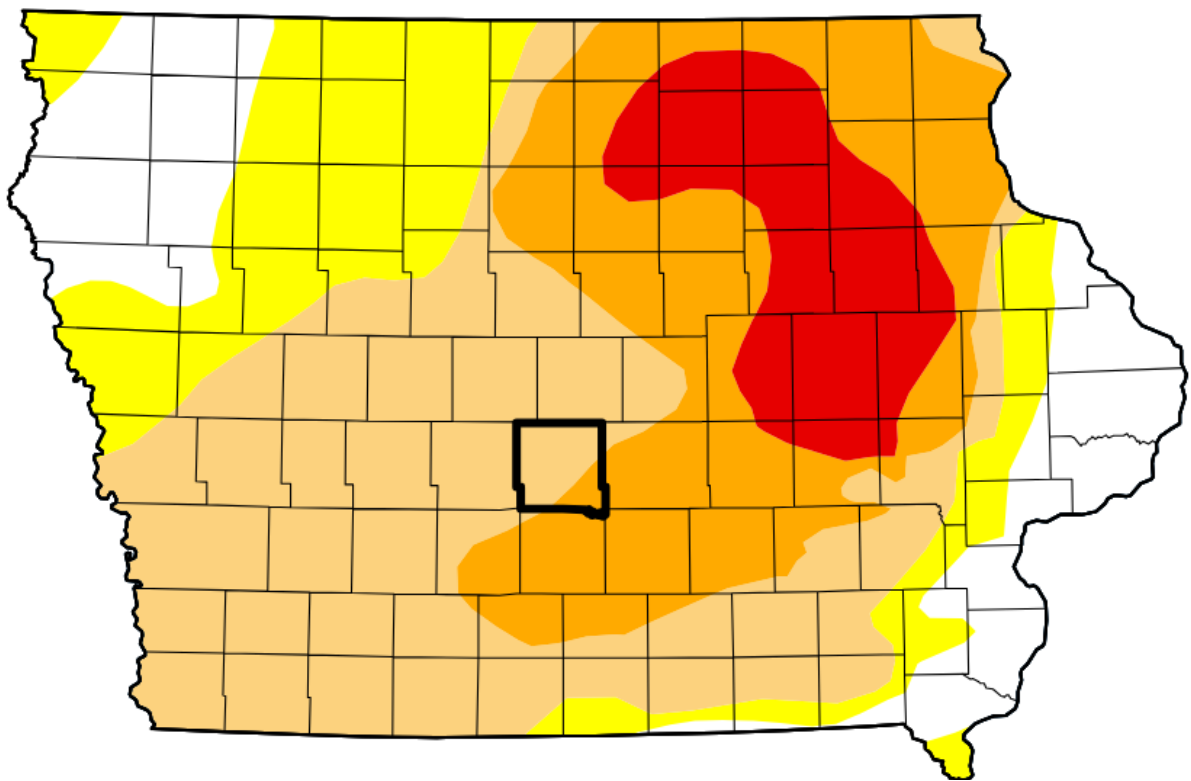
The National Drought Mitigation Center (NDMC) located at the University of Nebraska in Lincoln provides a clearinghouse for information on the effects of drought, based on reports from media, observers and other sources. The NDMC categorizes impacts of drought as economic, environmental, or social. Many economic impacts occur in agriculture and related sectors, including forestry and fisheries, because of the reliance of these sectors on surface and subsurface water supplies. In addition to obvious losses in yields in both crop and livestock production, drought is associated with increases in insect infestations, plant disease and wind erosion. Droughts also bring increased problems with insects and disease to forests and reduce growth. The incidence of forest and range fires increases substantially during extended droughts, which in turn places both human and wildlife populations at higher levels of risk. Income loss is another indicator used in assessing the impacts of drought because so many sectors are affected.

Although drought is not predictable, long-range outlooks may indicate an increased chance of drought, which can serve as a warning. A drought period can last for months, years, or even decades. It is rarely a direct cause of death, though the associated heat, dust and stress can all contribute to increased mortality.

3.3.6.2 LOCATION

The area affected by drought is virtually always larger than Polk County. Therefore, the entirety of the planning area and the multiple jurisdictions within Polk County are considered equally vulnerable to drought. Like other counties in Iowa, agriculture is an important component of the overall prosperity of Polk County, and agriculture is particularly susceptible to the impacts of drought. However, drought should not be perceived as a hazard which only threatens rural areas -- drought can strain water availability and create hardships for those in urban centers like the Des Moines metropolitan area. As shown in Figure 57, the entirety of Polk County is experiencing drought as of April 2024.

Figure 57. U.S. Drought Monitor Map of Iowa on April 11, 2024



Note: The perimeter of Polk County is bolded for ease of identification

3.3.6.3 EXTENT

The U.S. Drought Monitor identifies areas in drought and categorizes them by intensity. There are six different categories utilized by the U.S. Drought Monitor to convey different drought intensities, and these categories are shown in the table below.

Table 48. U.S. Drought Monitor Event Categories

| Category | Description              | Example Percentile Range for Most Indicators | Values for Standard Precipitation Index and Standardized Precipitation-Evapotranspiration Index |
|----------|--------------------------|----------------------------------------------|-------------------------------------------------------------------------------------------------|
| None     | Normal or wet conditions | 30.01 or above                               | -0.49 or above                                                                                  |
| D0       | Abnormally dry           | 20.01 to 30.00                               | -0.5 to -0.79                                                                                   |
| D1       | Moderate drought         | 10.01 to 20.00                               | -0.8 to -1.29                                                                                   |
| D2       | Severe drought           | 5.01 to 10.00                                | -1.3 to -1.59                                                                                   |
| D3       | Extreme drought          | 2.01 to 5.00                                 | -1.6 to -1.99                                                                                   |
| D4       | Exceptional drought      | 0.00 to 2.00                                 | -2.0 or less                                                                                    |

According to the U.S. Drought Monitor, the possible impacts associated with abnormally dry and drought conditions are:

#### **(D0) Abnormally Dry**

- Short-term dryness slowing planting, growth of crops, or pastures
- Lingering water deficits
- Pastures or crops slow to recover

#### **(D1) Moderate Drought**

- Some damage to crops, pastures
- Streams, reservoirs, or wells low, some water shortages developing or imminent
- Voluntary water-use restrictions may be requested

#### **(D2) Severe Drought**

- Crop or pasture losses likely
- Water shortages are common
- Water restrictions may be imposed





**(D3) Extreme Drought**

- Major crop or pasture losses
- Widespread water shortages or usage restrictions

**(D4) Exceptional Drought**

- Exceptional and widespread crop/pasture losses
- Shortages of water in reservoirs, streams, and wells creating water emergencies

**3.3.6.4 PREVIOUS OCCURRENCES**

Drought occurs periodically in Iowa with the most severe in historical times occurring in the 1930's. Other major droughts, usually characterized by deficient rainfall combined with unusually high summer temperatures, occurred in 1886, 1893-1894, 1901, 1954-1956, 1976–1977, 1988–1989, 1999, 2000, 2003, 2005, 2006, 2011-2012, 2013-2014, 2017, 2020, 2021-2024. Although droughts are not the spectacular weather events that floods, blizzards, and tornadoes can be, historically they have had severe economic consequences for both Polk County and the State of Iowa.

According to the National Drought Mitigation Center's Drought Impact Reporter, during the 14-year period from January 2011 through April 2024, Polk County was included in 42 listed drought impacts. These impacts reflect acute consequences of droughts rather than unique drought events, and multiple impacts can arise from a single drought. The impacts of drought in Polk County are shown in Table 49.

**Table 49. Drought Impacts in Polk County 2011-2024**

| <b>Impact Category</b>           | <b>Instances in Polk County</b> |
|----------------------------------|---------------------------------|
| Agriculture                      | 8                               |
| Business and Industry            | 1                               |
| Energy                           | 0                               |
| Fire                             | 1                               |
| Plants & Wildlife                | 4                               |
| Relief, Response, & Restrictions | 8                               |
| Society & Public Health          | 4                               |
| Tourism & Recreation             | 2                               |
| Water Supply & Quality           | 14                              |

|       |    |
|-------|----|
| Total | 42 |
|-------|----|

In addition to the drought impacts documented by the National Drought Mitigation Center, the National Centers for Environmental Information (NCEI) has its own record of drought in Polk County. The NCEI data, which goes back to 1999, identifies 27 drought events impacting Polk County over the past 25 years. Information regarding the financial impacts of these events is not available for events which have occurred since 2020, but droughts impacting Polk County between 1999 and 2019 resulted in more than \$110,300,000 in damages, primarily to crops. Descriptions of previous drought events that affected Polk County are provided below. These descriptions come from the NCEI and the National Drought Mitigation Center.

**January 3, 2024**—Corn and soybean farmers in Polk County have been reported switching to alternative drought resistant crops and tolerant corn and soybean breeds to survive the mild droughts that they’ve faced the past few years. However; such hybrid seeds or drought tolerant breeds have become scarce in the County and have been difficult to find which has greatly impacted the corn and soybean production in Polk County.

**November 30, 2023**-- Iowa officials were preparing for conditions to worsen by aiming to make portable water treatment plants available, streamlining permitting so towns can drill additional wells and deciding how best to get water tankers to dry cities and towns, should the measures be needed. The Iowa DNR, Homeland Security, the Department of Agriculture and other agencies were holding meetings on the state’s response to continued drought.

**August 1-30, 2013**—Serious drought conditions gripped the state through the summer months. Initial sub-soil moisture was good at the beginning of the growing season. The recharged soil was sufficient to maintain the crops through a good part of the summer. Rainfall remained low through August as well and crops deteriorated rapidly under the warmer than normal and very dry conditions. Rainfall for the summer was between 1/3 and 2/3 of normal across much of the Des Moines CWA. A large part of the CWA received under 5% of normal rainfall in August, with most areas under 20%. Crop loss through the month was around 10%. This translated to over \$600 million in crop loss for the corn crop, and about \$350 million for soybeans.

**May 23, 2013**—The Des Moines Water Works, serving approximately 500,000 people, asked metro area customers, both residential and commercial, to use Wise Water Best Practices. The drought conditions from 2012 caused a large nitrate concentration to be found in the Raccoon and Des Moines Rivers and thus Des Moines Water Works could not pull water from either river.

**November 11, 2012**— Drought drove corn prices to record highs this year. As a result, Ethanol producers in the U.S. lost \$0.36 per gallon produced compared to sales the year before.

**October 31, 2012**—The drought trimmed hay production by a third to a half in most parts of the State. Many cattlemen began feeding hay much earlier than usual because pastures did not grow back well.

**October 12, 2012**—Iowa State University agriculture experts advised farmers to test forages for quality this fall because variable nutrient levels and high nitrate levels can occur in forages grown during drought.

**September 25, 2012**— Polk County was in Severe and Extreme Drought conditions.

**July 26, 2012**—The Governor issued a disaster emergency proclamation that allowed for the suspension of state laws and regulations affecting the transportation of hay and straw. In the statement, it says, “the drought has destroyed or depleted sources of these products that are necessary for livestock production and feed.”

**July 17, 2012**—Iowa foresters said that trees across the State were dropping their leaves early, due to the drought, while smaller trees may not be able to survive. Also the Iowa Department of Natural Resources documented massive fish kills as streams dwindled and heat decreased the water’s oxygen content.

**July 1-30, 2012**—Very warm and dry weather that began in the spring continued into the summer. Rainfall was in short supply across the State. Much of the State recorded less than 50 percent of normal rainfall for July. Rapid deterioration of the corn and soybean crop took place with several periods of temperatures in excess of 100 degrees. By the end of July, officials estimated that 32 percent of the corn yield had been lost to the drought. At the current price, the loss total was in excess of \$4.5 billion state-wide.

**2012**—Governor Branstad created a website dedicated to the 2012 Iowa drought as a resource for all Iowans. This year’s drought damages surpassed that of 1988.

**January 1, 2011 to March 31, 2012**—Drought in 2011 led ranchers to sell cattle leading to the lowest cattle inventory in the U.S. since 1952, according to the U.S. Department of Agriculture. Beef and dairy farmers owned 90.77 million head of cattle on January 1, 2012, which were 2.1 percent fewer cattle than in January 2011. Drought forced many ranchers in the South to sell their livestock because it was more economical to sell than to feed them.

**August 2, 2011 to December 13, 2011**—The U.S. Drought Monitor reported the drought conditions as Abnormally Dry in August, Moderate Drought in November and Abnormally Dry in December for Polk County.

**September 15, 2006 to October 20, 2006**—Agriculture Secretary Mike Johanns lengthened the time allowed for emergency livestock grazing on land in the Conservation Reserve Program (CRP) in 30 states including Iowa for farmers and livestock owners who were affected by drought.

**July 31, 2006**—The statewide average precipitation for the May through July period was only 8.28 inches or 4.83 inches less than normal. This ranks 2006 as 8th driest among 134 years of record for this time period with only 1988 being drier in the most recent 70 years.

**October 5, 2005**—In southeastern Iowa, some elevators turned farmers away with loads of corn. Some corn has also been rejected by processors, because of aflatoxin. Aflatoxin is a naturally occurring toxin and it is caused by a mold that grows in corn damaged by insects or heat stress.

**June, July & August 2003**—This was the driest summer since 1991 with only a total of 9.87 inches of rain or 3.20 inches less than normal. The dry conditions caused deterioration on corn and soybean production.

**August & September 2000**—According to NCEI, crops were stressed with the warm temperatures and lack of rainfall. Livestock deaths occurred because of the daytime heat and warm overnight temperatures.

**July 20-30, 1999**—According to NCEI the hot and dry conditions hindered the pollination process. Crop losses over the south third of the State were near 20%.

3.3.6.5 PROBABILITY OF FUTURE OCCURRENCE

Both the NCEI and the National Drought Mitigation Center reported an average of more than one drought event or impact per year over the periods for which data is available from these sources (1999-2024 for the NCEI data and 2011-2024 for the National Drought Mitigation Center data). Therefore, this plan considers the hazard to be “highly likely” as defined in the Probability Scoring Methodology section.

3.3.6.6 VULNERABILITY

The specific impacts of drought can vary, but all jurisdictions in Polk County are considered to be equally vulnerable to this hazard. The potential impacts of drought on community lifelines are described in the table below.

Table 50. Potential Impacts of Drought on Community Lifelines

| Lifelines                  | Impact Type                                                                         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Water & Wastewater Systems |  | Drought can significantly impact water and wastewater systems, posing challenges to both the availability of freshwater resources and the proper functioning of wastewater treatment processes. Some keyways in which drought affects these systems can include: reduced water supply, increased water demand, concentration of contamination, water quality can fluctuate, groundwater depletion, and increased operational costs for businesses. |

|                          |                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Food, Shelter, & Housing |  | Drought can have far-reaching impacts on food, shelter, and housing issues in counties, affecting both rural and urban communities. The impacts of drought could include food scarcity from crop failure and livestock depletion, shelter and housing crisis due to wildfire or water supply issues for construction, and lastly, it can create economic impact and job losses due to lack of resources for agricultural businesses making the housing markets unaffordable by degrading average household incomes. |
| Health & Medical         |  | Drought impacts can be as wide reaching as affecting health and medical elements of the County's communities. Malnutrition can be one of these impacts with reduced food availability and increased prices of goods. Prolonged drought can also lead to social strain within communities as residents struggle with economic hardships, limited resources, housing challenges, and other stress inducing impacts due to drought.                                                                                    |

A) People

Droughts exert far-reaching impacts on individuals and communities, encompassing diverse facets of life. The direct consequence of water scarcity is pronounced, affecting both rural and urban populations as diminished precipitation lowers water levels in rivers, lakes, and reservoirs. Agriculture bears the brunt of droughts, leading to crop failures, livestock losses, and economic hardship for farmers, contributing to food insecurity and heightened food prices. Economic repercussions extend beyond agriculture, influencing industries such as tourism and energy production, resulting in job losses and increased poverty rates. Water scarcity and food insecurity elevate health risks, fostering waterborne diseases and malnutrition, particularly among vulnerable populations. Livelihoods dependent on water availability, such as fisheries, face disruption.

B) Structures

Droughts in Polk County, Iowa, can have significant impacts on structures and infrastructure. Prolonged dry spells can lead to foundation issues, causing structural damage such as cracks in walls and floors due to soil shrinkage. Reduced water availability during droughts strains water supplies, affecting residential, commercial, and agricultural structures alike.

C) Systems

Droughts exert far-reaching impacts on critical systems essential for community stability and well-being. Water supply systems face reduced availability, stressing municipal sources, reservoirs, and treatment facilities. Agricultural systems experience diminished soil moisture and irrigation water,

leading to lower crop yields, livestock struggles, and economic losses for farmers. Energy production systems, especially reliant on hydropower, are hampered by lower water levels, resulting in energy shortages and increased dependence on alternative sources. Infrastructure systems, including roads and buildings, are affected by soil moisture reduction, impacting transportation and overall resilience. Economic systems witness cascading effects as agriculture faces losses, industries dependent on water experience disruptions, and local economies are strained.

#### D) Natural, Historic, and Cultural Resources

The indirect effects of drought, particularly sustained durations of exposure, are a larger threat to the natural environment than the direct effects, although localized impacts to the natural environment are possible. Maintenance of natural, historical and cultural resources and sites require substantial volumes of water every year which can be particularly challenging during sustained periods of drought.

#### E) Community Activities

Droughts significantly impact community activities across various domains. Water-dependent activities, including swimming and boating, are directly affected as water levels in lakes and rivers decline, leading to restrictions and closures of recreational areas. Outdoor events and festivals may be scaled down or canceled due to concerns about fire hazards and reduced water availability. Recreational sports and physical activities face disruptions as playing fields and parks become less suitable for outdoor pursuits. Tourism in communities reliant on outdoor attractions may experience a decline in visitor numbers, affecting local businesses. Community gardens and green spaces suffer as water conservation measures limit maintenance.

Polk County has 768 farms in the County that cover 179,322 acres of land. This translates to 49% of the surface land in the County being used for agriculture. Therefore, the planning area has significant agricultural exposure to this hazard. Aside from agricultural impacts, other losses related to drought include increased costs of fire suppression, disruption to local ecosystems, and damage to roads and structural foundations due to the shrink dynamic of expansive soils during excessively dry conditions. Drought also presents hazards to public health in extreme cases, where drinking water production cannot keep up with demand. Water wells become less productive during drought and a failure of remaining productive wells (due to power outage, etc.) can cause public drinking water supplies to become compromised.

#### Existing Development

Areas associated with agricultural use are vulnerable to drought conditions which could result in a decrease in crop production or a decrease in available grazing area for livestock. Drought has no real effect on houses and buildings. The impacts would be minimal in terms of landscaping. Rationing water supplies would most likely be the worst case scenario impact.

According to the ten year period from USDA's Risk Management Agency, the amount of claims paid for crop damage as a result of drought in Polk County was \$14,080,555.41. According to the 2017

Iowa Crop Insurance Profile from USDA’s Risk Management Agency, 88% of the insurable crops in Iowa are insured with USDA Crop Insurance. To factor in estimated losses to insurable crops that are not insured, the 88% crop insurance coverage was factored in to provide an adjusted estimate of losses. According to this calculation, estimated annualized losses were \$1,600,063.

Considering the value of crops from the Census of Agriculture as baseline crop exposure, the estimated annual losses from drought was determined minimal compared to the value of the insurable crops.

Future Development

Increases in acreage planted with crops would increase the exposure to drought-related agricultural losses. In addition, increases in population add additional strain on water supply systems to meet the growing demand for treated water.

Climate Change

Climate change is exerting significant impacts on drought conditions in Polk County. Rising temperatures associated with climate change contribute to increased evaporation rates, leading to drier conditions and exacerbating the intensity and frequency of drought events. Altered precipitation patterns, characterized by changes in the timing, intensity, and distribution of rainfall, further contribute to water scarcity in the region. Extended growing seasons, resulting from changes in temperature and weather patterns, increase water demand for crops and add stress to water resources, exacerbating drought conditions. Reduced soil moisture, a consequence of warmer temperatures and shifting precipitation, plays a role in the onset and persistence of drought, affecting agriculture, water supply, and overall ecosystem health.

The increased frequency and intensity of extreme weather events associated with climate change contribute to more rapid transitions between wet and dry conditions, adding to the variability of drought. These changes impact water supply sources, posing risks to both agricultural and municipal water needs in Polk County. Drought conditions, in turn, pose significant risks to agriculture, affecting crop yields and livestock, and may necessitate shifts in local agricultural practices and economies. The ecological consequences of prolonged drought include adverse effects on natural habitats, biodiversity, and the overall health of ecosystems in Polk County, impacting local wildlife and ecosystem services.

Hazard Risk Score

Table 51. Drought Probability and Health Impact Ratings

| Health Severity | Community Impact | Public Health System Impact | Healthcare System Impact | Total Health Hazard Score | Probability   |
|-----------------|------------------|-----------------------------|--------------------------|---------------------------|---------------|
| 1               | 0                | 1                           | 1                        | 3                         | Highly Likely |



#### 3.3.7 EARTHQUAKES

##### 3.3.7.1 DESCRIPTION

An earthquake is a natural phenomenon characterized as a sudden motion or trembling that is caused by a release of energy accumulated within or along the edge of Earth's tectonic plates. Earthquakes occur primarily along fault zones, tears in the Earth's crust, along which stresses build until one side of the fault slips, generating compressive and shear energy that produces the shaking and damage to the built environment. The composition of geologic materials between these points is a major factor in transmitting the energy to buildings and other structures on the Earth's surface. The point on the Earth's surface directly above the origin of the earthquake is known as the epicenter, while the actual location of the earthquake within the crust is called the hypocenter or focus. Heaviest damage generally occurs nearest the epicenter.

The magnitude of an earthquake, which reflects the amount of energy released, is typically measured on the Richter scale or, more commonly now, the moment magnitude scale. Earthquakes can have significant impacts, ranging from ground shaking, surface rupture, and soil liquefaction, to triggering landslides and tsunamis. They are major natural hazards that can lead to loss of life, injury, and extensive property damage.

##### 3.3.7.2 LOCATION

While geologists often refer to the Midwest as the "stable midcontinent," because of its lack of major crustal movements, there are two regions of seismic activity: the Nemaha Ridge and the New Madrid Fault Zone. The Nemaha Ridge in Kansas and Nebraska, associated with the Humboldt Fault, is characterized by numerous small earthquakes that release stresses before they build to dangerous levels. The fault is not considered a threat to Iowa. The New Madrid Fault Zone, on the other hand, has greater destructive potential. It is located along the valley of the Mississippi River, from its confluence with the Ohio River southward, and includes portions of Illinois, Kentucky, Tennessee, Missouri, Arkansas, and Mississippi. The Earth's crust in the midcontinent is older, and therefore thicker, cooler, and more brittle than that in California for example. Consequently, earthquake shock waves travel faster and farther in the Midwest, making quakes in the planning potentially more damaging than similar sized events in other geologic settings. Activity in the New Madrid Fault Zone is likely to be the largest seismic threat to Iowa and the planning area, although the overall risk of earthquakes remains low.

##### 3.3.7.3 EXTENT

The extent or severity of earthquakes is typically measured in two ways: 1) Magnitude Measurement utilizing the Richter Magnitude Scale and 2) Severity Measurement utilizing the Modified Mercalli Intensity Scale.

###### **Richter Magnitude Scale**

The Richter Magnitude Scale was developed in 1935 by Charles F. Richter of the California Institute of Technology as a mathematical device to compare the size of earthquakes. The magnitude of an earthquake is determined from the logarithm of the amplitude of waves recorded by seismographs. Adjustments are included for the variation in the distance between the various seismographs and the epicenter of the earthquakes. On the Richter Scale, magnitude is expressed in whole numbers and decimal fractions. For example, a magnitude 5.3 might be computed for a moderate earthquake, and a strong earthquake might be rated as magnitude 6.3. Because of the logarithmic basis of the scale, each whole number increase in magnitude represents a tenfold increase in measured amplitude; as an estimate of energy, each whole number step in the magnitude scale corresponds to the release of about 31 times more energy than the amount associated with the preceding whole number value. Table 52 provides an overview of the Richter Scale magnitudes and corresponding damage.

Table 52. Richter Scale Magnitudes and Effects

| Richter Magnitude | Earthquake Effects                                           |
|-------------------|--------------------------------------------------------------|
| 2.5 or less       | Usually not felt, but can be recorded by seismograph         |
| 2.5 to 5.4        | Often felt, but causes only minor damage                     |
| 5.5 to 6.0        | Slight damage to buildings and other structures              |
| 6.1 to 6.9        | May cause a lot of damage in very populated areas            |
| 7.0 to 7.9        | Major earthquake; serious damage                             |
| 8.0 or greater    | Great earthquake; can destroy communities near the epicenter |

Modified Mercalli Intensity Scale

The effect of an earthquake on the Earth's surface is called the intensity. The intensity scale consists of a series of certain key responses such as people awakening, movement of furniture, damage to chimneys, and finally - total destruction. Although numerous *intensity scales* have been developed over the last several hundred years to evaluate the effects of earthquakes, the one currently used in the United States is the Modified Mercalli (MM) Intensity Scale. It was developed in 1931 by the

American seismologists Harry Wood and Frank Neumann. This scale, composed of 12 increasing levels of intensity that range from imperceptible shaking to catastrophic destruction, is designated by Roman numerals. It does not have a mathematical basis; instead it is an arbitrary ranking based on observed effects.

The Modified Mercalli Intensity value assigned to a specific site after an earthquake has a more meaningful measure of severity to the nonscientist than the magnitude because intensity refers to the effects actually experienced. The lower numbers of the intensity scale generally deal with the manner in which the earthquake is felt by people. The higher numbers of the scale are based on observed structural damage. Structural engineers usually contribute information for assigning intensity values of VIII or above. Table 53 provides additional information about the Modified Mercalli Intensity scale ratings.

**Table 53. Modified Mercalli Intensity Scale with Associated Impacts**

| Scale | Intensity       | Description of Effects                                                                                                                                                                                            | Corresponding Richter Scale magnitude |
|-------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| I     | Instrumental    | Usually detected only on seismographs.                                                                                                                                                                            | <4.2                                  |
| II    | Feeble          | Felt only by a few persons at rest, especially on upper floors of buildings.                                                                                                                                      |                                       |
| III   | Slight          | Felt quite noticeably indoors, especially on upper floors. Most people don't recognize it as an earthquake (i.e. a truck rumbling).                                                                               |                                       |
| IV    | Moderate        | Can be felt by people walking; dishes, windows, and doors are disturbed.                                                                                                                                          |                                       |
| V     | Slightly Strong | Sleepers are awoken; unstable objects are overturned.                                                                                                                                                             | <4.8                                  |
| VI    | Strong          | Trees sway; suspended objects swing; objects fall off shelves; damage is slight.                                                                                                                                  | <5.4                                  |
| VII   | Very Strong     | Damage is negligible in buildings of good design and construction, slight to moderate in well-built ordinary structures, and considerable in poorly built or badly designed structures; some chimneys are broken. | <6.1                                  |
| VIII  | Destructive     | Damage is slight in specially designed structures; considerable in ordinary, substantial buildings. Moving cars become uncontrollable; masonry fractures, poorly constructed buildings damaged.                   | <6.9                                  |

| Scale | Intensity       | Description of Effects                                                                                                                                                                    | Corresponding Richter Scale magnitude |
|-------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| IX    | Ruinous         | Some houses collapse, ground cracks, pipes break open; damage is considerable in specially designed structures; buildings are shifted off foundations.                                    |                                       |
| X     | Disastrous      | Some well-built wooden structures are destroyed; most masonry and frame structures are destroyed along with foundations. Ground cracks profusely; liquefaction and landslides widespread. | <7.3                                  |
| XI    | Very Disastrous | Most buildings and bridges collapse, roads, railways, pipes, and cables destroyed.                                                                                                        | <8.1                                  |
| XII   | Catastrophic    | Total destruction; trees fall; lines of sight and level are distorted; ground rises and falls in waves; objects are thrown upward into the air.                                           | >8.1                                  |

According to the Iowa Geological Survey, the southeastern part of the state of Iowa is more at risk to earthquake effects from the New Madrid Fault Zone. Iowans in four southeast counties could experience trembling buildings, some broken dishes and cracked windows, movement and falling of small unstable objects, abrupt openings or closing doors, and liquids spilling from open containers. About 29 other counties, from Page to Polk to Muscatine, could experience vibrations similar to the passing of a heavy truck, rattling of dishes and windows, creaking of walls, and swinging of suspended objects.<sup>14</sup> These effects will vary considerably with differences in local geology and construction techniques. The risk of damaging earthquakes remains low across Iowa, including the entirety of the planning area.

#### 3.3.7.4 PAST OCCURRENCES

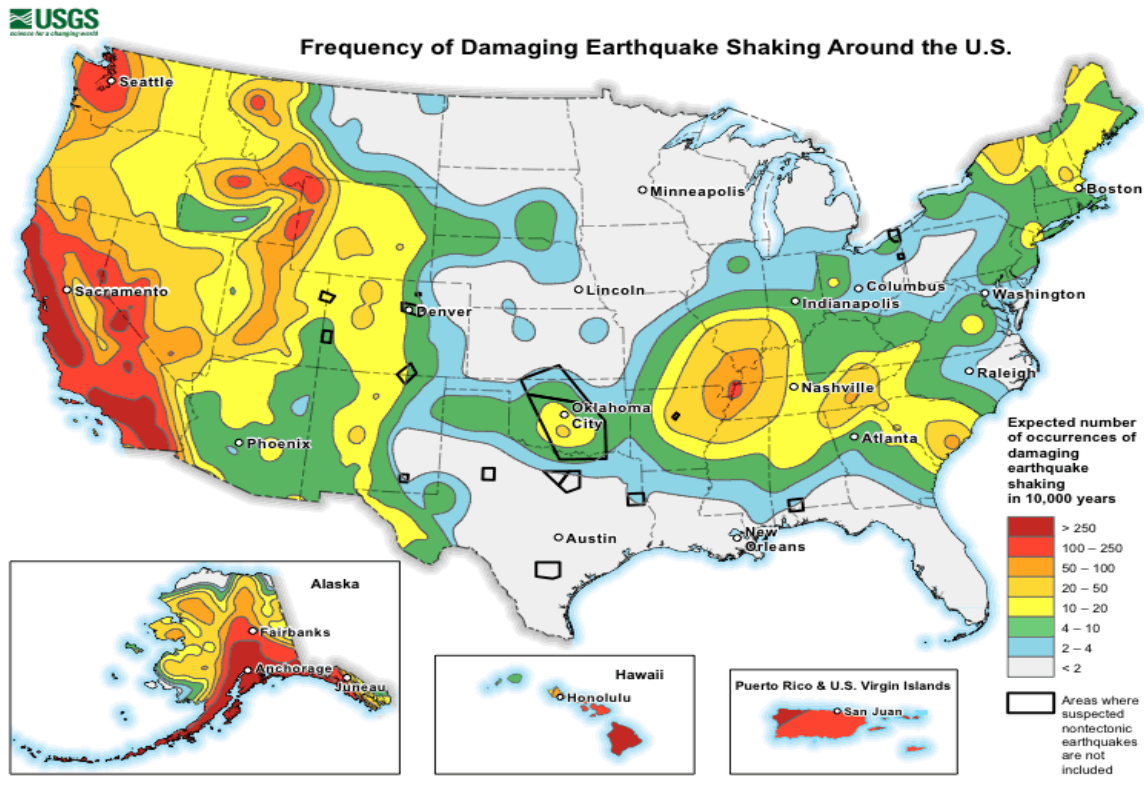
Iowa has experienced little effects from only a few earthquakes in the past 175 years. According to the Iowa Department of Natural Resources, as of 2011, the epicenters of 13 earthquakes have been located in the State of Iowa, and most of these occurred along the Mississippi River. The U.S. Geological Survey identifies one additional earthquake in Iowa in 2021 – a magnitude 2.7 with an epicenter near Rembrandt, Iowa. The strongest earthquake in Iowa occurred in Davenport in 1934 and resulted in only slight damage. There have been no epicenters in Polk County and no documented earthquake damages in the County.

<sup>14</sup> Iowa Geological Survey. "An Iowa Perspective on Earthquakes." [iowageologicalsurvey.uiowa.edu](https://iowageologicalsurvey.uiowa.edu/iowa-geology/popular-interest/iowa-perspective-earthquakes). Accessed February 6, 2024. <https://iowageologicalsurvey.uiowa.edu/iowa-geology/popular-interest/iowa-perspective-earthquakes>.

3.3.7.5 PROBABILITY OF FUTURE OCCURRENCE

The risk of damaging earthquakes remains low across Iowa, including the entirety of the planning area. As can be seen in Figure 58, virtually all of Iowa is expected to experience fewer than two damaging earthquakes in a 10,000-year period. The probability of a damaging earthquake in any given year is “unlikely.”

Figure 58. Frequency of Damaging Earthquake Shaking Around the U.S.



3.3.7.6 VULNERABILITY

Earthquakes – although unlikely in Polk County – can have significant impacts on community lifelines, and these impacts are described in the table below. All jurisdictions in Polk County are equally vulnerable to earthquakes.

**Table 54. Potential Impacts of Earthquakes on Community on Community Lifelines**

| Lifelines                  | Impact Type                                                                         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Water & Wastewater Systems |    | Earthquakes often damage water lines and sewage systems, leading to water shortages and sanitation issues. Restoring these services is crucial for public health and hygiene.                                                                                                                                                                                                                                                                   |
| Food, Shelter, & Housing   |    | The destruction of homes and businesses can displace people, creating an immediate need for shelter. Additionally, disruptions in supply chains can impact the availability and distribution of food. Incoming evacuees from areas more heavily damaged by an event may result in a demand surge for shelter, food, and water.                                                                                                                  |
| Health & Medical           |  | Healthcare facilities might suffer structural damage, and there could be an influx of injured individuals needing medical attention. Disruptions in utility services could also affect the operation of hospitals and clinics. Incoming evacuees from areas more heavily damaged by an event may have significant medical needs. The increased demand for health and medical services may be greater than what the local resources can support. |
| Energy                     |  | Power outages are common following earthquakes due to damage to power stations and distribution lines. This can affect not only homes and businesses but also critical facilities like hospitals and emergency response centers. Incoming evacuees from areas more heavily damaged by an event may increase demand for energy in the planning area.                                                                                             |

| Lifelines         | Impact Type                                                                       | Description                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Safety & Security |  | Earthquakes can cause significant damage to infrastructure, leading to hazardous situations like building collapses, gas leaks, and fires. Emergency services such as police, fire, and rescue teams would be heavily involved in immediate response efforts.                                                                                                                        |
| Transportation    |  | Earthquakes can damage roads, bridges, and public transportation systems, impeding mobility and rescue efforts. Restoring transportation is vital for response operations and for the community to begin returning to normalcy. Incoming evacuees from areas more heavily damaged by an event may create congested roadways and put additional stress on the transportation network. |

#### A) People

Certain demographics, notably the elderly, young children, and those living below the poverty line, are particularly vulnerable due to factors like their physical capacity, financial resources, and housing conditions. A significant oversight in disaster planning is the lack of consideration for individuals with disabilities. A 2014 UNDRR report emphasized that only a mere 15% of disabled persons were consulted during community resilience planning. In the event of a major earthquake, the repercussions could disproportionately impact those with limited mobility, including young children, the elderly, and individuals with a disability.

#### B) Structures

Many of the most striking images of earthquakes are those of buildings which have been damaged or destroyed as a result of earthquakes. While the high-magnitude events which happen elsewhere in the country are exceedingly unlikely in Iowa, even smaller events have the potential to damage structures. Since most buildings in the Polk County are not designed to withstand damaging earthquakes, many structures would likely be damaged if a significant earthquake does occur. Polk County has a plethora of large structures in and around the Des Moines metropolitan area, including the tallest building in Iowa. The structural integrity of these structures could be comprised if sufficient motion occurs. In the event of a severe incident, residents might find themselves unable to return to their homes or communities for an extended duration. Even moderate earthquakes might cause minor structural damages, mandating safety inspections of buildings and residences. Until safety is assured, residents would need to vacate their premises.

#### C) Systems



Virtually all systems which communities rely upon could be damaged by an earthquake. Gas pipelines are of particular concern as a rupture could create a significant fire risk. Water and sewer pipelines could also rupture, and communication and power lines be severed. On the transportation front, roads and rail tracks might bear the brunt of ground failures, potentially disrupting regional transport and material distribution. Damaged and obstructed roads could also slow the pace of emergency services and first responders.

#### D) Natural, Historic, and Cultural Resources

Generally, the impact of earthquakes on the natural environment is relatively short lived. Flora and Fauna may be temporarily affected, but typically they return to form on their own. Longer-term impacts could occur if an earthquake fundamentally alters the character of an area such as rerouting a river. Additionally, earthquakes could damage or kill crops, and this could be detrimental to the local economy and potentially result in food shortages.

#### E) Community Activities

A significant earthquake could significantly disrupt the rhythm of daily life and community activities. Public gatherings, school sessions, local events, and religious ceremonies might face abrupt cancellations or postponements due to safety concerns or infrastructure damages. Local businesses, including farmers' markets, shops, and eateries, which form the backbone of community interactions, could experience temporary closures, impacting local economy and livelihoods. Parks and recreational areas, often hubs for community bonding, might be deemed unsafe due to potential aftershocks or structural damages, depriving residents of essential communal spaces.

As discussed under the probability section, the entire planning area is expected to experience fewer than two damaging earthquakes in a 10,000-year time period. Although a damaging event is unlikely, the potential impacts could be costly as most structures in Polk County are not built to withstand earthquake shaking. The main impacts to Polk County from a New Madrid Earthquake would likely be related to incoming evacuees from areas more heavily damaged by the event. This could result in a shortage of short-term lodging, such as hotel rooms and extended stay establishments. Depending on the magnitude of the earthquake, shelters may be designated in Polk County as evacuee shelter locations. If this occurred, assistance would be coordinated through the Emergency Management Assistance Compact (EMAC) between the State of Iowa and State governments of impacted areas.

#### Existing Development

FEMA's loss estimation software HAZUS was utilized to assess the potential impact of an earthquake in the planning area. The probabilistic hazard option allows the user to generate estimates of damage and loss based on probabilistic seismic hazard for eight return periods assigned to each census tract in the planning area. Probabilistic hazard data are provided by the USGS and are derived from the latest national seismic hazard maps.

HAZUS can use the probabilistic data to estimate annualized losses. Annualized loss is defined as the expected value of loss in any one year and is developed by aggregating losses calculated for the eight specified probabilistic return periods (100, 250, 500, 750, 1000, 1500, 2000 and 2500 year) and their exceedance probabilities. The annualized loss estimates of a 5.0 magnitude earthquake in Polk County are shown in Table 55.

**Table 55. Annualized Estimated Economic Losses 5.0 Magnitude Event (In Dollars)**

| Category             | Area            | Single Family      | Other Residential  | Commercial          | Industrial         | Others             | Totals              |
|----------------------|-----------------|--------------------|--------------------|---------------------|--------------------|--------------------|---------------------|
| Income Losses        | Wage            | \$0.00             | \$1,300.00         | \$23,700.00         | \$600.00           | \$5,100.00         | \$30,700.00         |
|                      | Capital-related | \$0.00             | \$500.00           | \$19,500.00         | \$300.00           | \$600.00           | \$20,900.00         |
|                      | Rental          | \$1,300.00         | \$2,800.00         | \$11,300.00         | \$500.00           | \$2,300.00         | \$18,200.00         |
|                      | Relocation      | \$4,600.00         | \$1,400.00         | \$17,000.00         | \$2,800.00         | \$11,300.00        | \$37,100.00         |
| Capital Stock Losses | Structural      | \$11,600.00        | \$3,300.00         | \$25,100.00         | \$6,400.00         | \$10,000.00        | \$56,400.00         |
|                      | Non-structural  | \$29,800.00        | \$8,900.00         | \$30,500.00         | \$6,600.00         | \$18,800.00        | \$94,600.00         |
|                      | Content         | \$4,700.00         | \$1,100.00         | \$9,400.00          | \$3,500.00         | \$5,300.00         | \$24,000.00         |
|                      | Inventory       | \$0.00             | \$0.00             | \$1,600.00          | \$500.00           | \$0.00             | \$2,100.00          |
| <b>Totals</b>        |                 | <b>\$52,000.00</b> | <b>\$19,300.00</b> | <b>\$138,100.00</b> | <b>\$21,200.00</b> | <b>\$53,400.00</b> | <b>\$284,000.00</b> |

Source: HAZUS-MH 6.0 February 2024

Table 56 provides the anticipated numbers of buildings by type and damage category that would result according to the HAZUS analysis. The estimated building types and counts are from the HAZUS damage outputs utilizing census block data.

**Table 56 – Annualized Expected Buildings Damaged by Building Type—5.0 Magnitude Earthquake**

| Property Type            | None           | Slight       | Moderate   | Extensive | Complete | Total          |
|--------------------------|----------------|--------------|------------|-----------|----------|----------------|
| Agriculture              | 34             | 0            | 0          | 0         | 0        | 34             |
| Commercial               | 7,022          | 73           | 16         | 0         | 0        | 7,111          |
| Education                | 32             | 0            | 0          | 0         | 0        | 32             |
| Government               | 8,774          | 196          | 47         | 0         | 0        | 9,017          |
| Industrial               | 1,225          | 11           | 1          | 0         | 0        | 1,237          |
| Other Residential        | 10,217         | 186          | 36         | 0         | 0        | 10,439         |
| Religion                 | 527            | 2            | 0          | 0         | 0        | 529            |
| Single Family            | 143,557        | 3,618        | 541        | 13        | 0        | 147,729        |
| <b>Polk County Total</b> | <b>171,388</b> | <b>4,086</b> | <b>641</b> | <b>13</b> | <b>0</b> | <b>176,128</b> |

Source: HAZUS-MH 6.0, February 2024.

#### Future Development

Overall the planning area has a low vulnerability to earthquake risk. Future development is not expected to increase the risk other than contributing to the overall exposure of what could become damaged as a result of an unlikely event.



Climate Change

The correlation between climate change and earthquakes is an area of ongoing research. Current research on the matter is inconclusive, and Polk County is encouraged to monitor this topic for any new developments.

Hazard Risk Score

Table 57. Earthquake Probability and Health Impact Ratings

| Health Severity | Community Impact | Public Health System Impact | Healthcare System Impact | Total Health Hazard Score | Probability |
|-----------------|------------------|-----------------------------|--------------------------|---------------------------|-------------|
| 1               | 1                | 1                           | 3                        | 6                         | Unlikely    |

### 3.3.8 EXPANSIVE SOILS

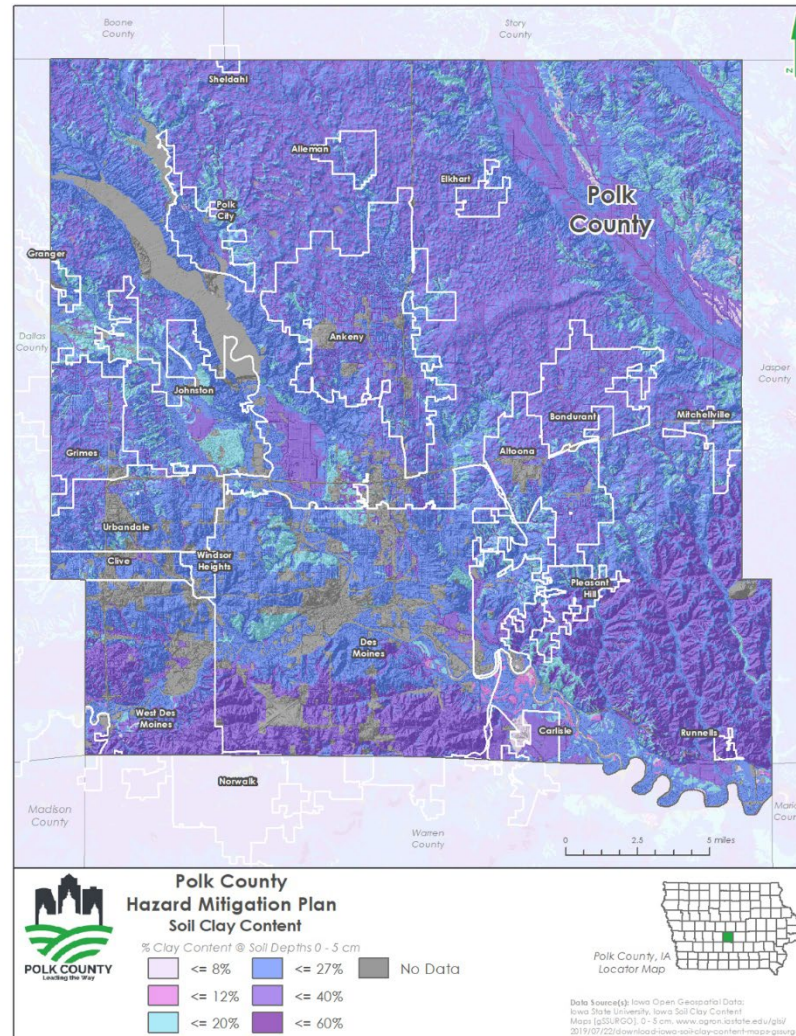
#### 3.3.8.1 DESCRIPTION

Expansive soils are soils that expand and shrink in relation to their water content. Expansive soils, also known as shrink-swell soils, can cause physical damage to building foundations, roadways, and other components of the infrastructure when clay soils swell and shrink due to changes in moisture content. For Iowa, the vulnerability to this hazard most frequently is associated with soils shrinking during periods of drought.

#### 3.3.8.2 LOCATION

The figure below shows a map of the swelling potential of soils in Iowa. Soils with higher swelling potential are reflected with darker shading. However, the entire planning area and all participating jurisdictions are, to some degree, vulnerable to this hazard.

Figure 59. Polk County Soil Clay Contents



#### 3.3.8.3 EXTENT

Expansive soils typically contain clay minerals that undergo significant volume changes with variations in moisture content. Some of the common impacts of expansive soils are:

- Instability of structures on slopes
- Lateral movement of foundations and retaining walls
- Damage to pipelines and other buried infrastructure
- Lifting and settling of buildings
- Damage to roads, sidewalks, and driveways

Swelling clays derived from residual soils can exert uplift pressures of as much as 5,500 PSF, which can do considerable damage to lightly-loaded wood-frame structures. Insurance companies pay out millions of dollars yearly to repair homes distressed by expansive soils.

3.3.8.4 PREVIOUS OCCURRENCES

Streets and parking lots throughout the County, as well as underground water lines, are damaged every year by the effects of expansive soils. The frequency of damage from expansive soils can be associated with the cycles of drought and heavy rainfall, which leads to changes in moisture content. Damages occur with isolated incidents and affected property owners, local governments, and businesses generally make any necessary repairs.

The Urbandale School District reported significant damages to Jensen Elementary as a result of exterior wall movement that occurred due to expansive soils. The most recent incident and most notable damage became noticeable in 2010 and gradually became worse. Soil movement at this site caused cracking of mortar joints in CMU walls, some damaged CMU block, floor shifting, as well as major window and door problems. This problem resulted in the District closing a classroom for approximately two weeks. The students had to be moved to another area while helical pilings and structural repairs were made. The cost of repairs was over \$140,000.

3.3.8.5 PROBABILITY OF FUTURE OCCURRENCE

Although there will continue to be future damage to paved areas and foundations in Polk County due to swelling soils, it is unlikely that these damages will become greater in the future unless new development occurs in areas where the hazard is more severe. Certain buildings and construction practices may be put in place to lessen these impacts. Based on the structure-specific nature of damage from expansive soils, the probability of *significant* impacts from expansive soils occurring is considered “unlikely.”

3.3.8.6 VULNERABILITY

The entire planning area is vulnerable to some structural damage as a result of shrinking and expanding soils. In most cases, individual property owners, local governments, and businesses pay for repairs to damages caused by this hazard. Utility lines such as water and sewer pipes may be at risk to damages associated with expansive soils.

Table 58. Potential Impacts of Expansive Soils on Community Lifelines

| Lifelines | Impact Type | Description |
|-----------|-------------|-------------|
|-----------|-------------|-------------|

|                            |                                                                                     |                                                                                                                                                                                                                                                                                                                                          |
|----------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Water & Wastewater Systems |    | Expansive soils water supplies and damage water infrastructure, leading to shortages and health hazards. Wastewater treatment facilities may also be overwhelmed or damaged, increasing the risk of waterborne diseases from contamination or increase of debris and sediment.                                                           |
| Food, Shelter, & Housing   |    | Depending on the location and construction of housing and shelter, residents may be displaced due to their homes being damaged or otherwise compromised. Large scale expansive soil incidents may also damage agriculture and crop yields in cases where harvest plots are exposed these soils which are highly vulnerable to expansion. |
| Communications             |  | Communication networks may be disrupted or damaged by expansive soils, which can hinder the coordination of rescue and relief efforts as well as the dissemination of important information to the public.                                                                                                                               |
| Energy                     |  | Expansive soils can cause power outages by damaging electrical infrastructure. Fuel supply may also be disrupted, affecting not just transportation but also heating and power generation.                                                                                                                                               |
| Transportation             |  | Expansive soils can damage roads, bridges, and rail lines, severely limiting mobility and access. This disruption impacts not just daily commutes but also the delivery of essential goods and services.                                                                                                                                 |

#### A) People

Soil expansion and contraction can pose some mild danger to people depending on the scope of expansion. Most common dangers from expanding soils occur when expansion affect homes, roadways, and critical infrastructure.



#### B) Structures

Soil expansion and contraction can lead to foundation movement, causing uneven settlement and compromising the structural integrity of buildings. This, in turn, results in cracks in foundations, walls, and floors, with potential distortions such as tilting or leaning walls. Structures with basement or slab-on-grade foundations are particularly vulnerable, as expansive soils can lead to costly damage, including misaligned doors and windows, plumbing and utility issues, and water intrusion.

#### C) Systems

Expansive soils can cause power, water, and gas outages; disrupt transportation routes and the movement of commercial goods; pollute drinking water systems; and damage or destroy communications infrastructure. These impacts can disrupt other community services like trash/recycling collection, law enforcement, and medical care. Nearly all transportation modes (e.g., roads, transit, aviation, etc.) are vulnerable to the impacts of expansive soils.

#### D) Natural, Historic, and Cultural Resources

Expansive soils can exert diverse impacts on natural, historical, and cultural resources. In natural ecosystems, these soils may disrupt vegetation and alter water availability, affecting the health of plant life and influencing local water bodies. Historical resources, including buildings and archaeological sites, face the risk of structural damage, foundation movement, and artifact disturbance due to expansive soils. Preservation efforts for historical and cultural landmarks must carefully consider the potential consequences of soil-related issues.

#### E) Community Activities

Expansive soils cause minimal impacts to community activities, but can cause cancellations, postponements, and relocations of community events and activities due to direct or indirect damage to hosting locations. Repairs and restoration may cause delay to resuming those community activities.

#### Existing Development

Existing development will continue to be vulnerable to expansive soils, especially the existing development that is in expansive soil prone areas and unable to be relocated.

#### Future Development

Additional future developments in the planning area will also be vulnerable to this hazard, depending on location and what types of soils and environment the development is occurring. Geotechnical considerations and mitigation actions at the time of construction can reduce this risk.

#### Climate Change

Climate change is expected to increase the severity and frequency of drought, which can impact expansive soils. Rising temperatures contribute to increased evaporation, leading to soil drying,

contraction, and potential cracking in expansive soils. Changes in precipitation patterns associated with climate change can result in variations in moisture levels, causing swelling during wet periods and contraction during dry spells, which may lead to soil instability. The increased frequency and intensity of other extreme weather events, such as heavy rainfall or droughts, further contribute to rapid fluctuations in soil moisture.

Hazard Risk Score

Table 59. Expansive Soils Probability and Health Impact Ratings

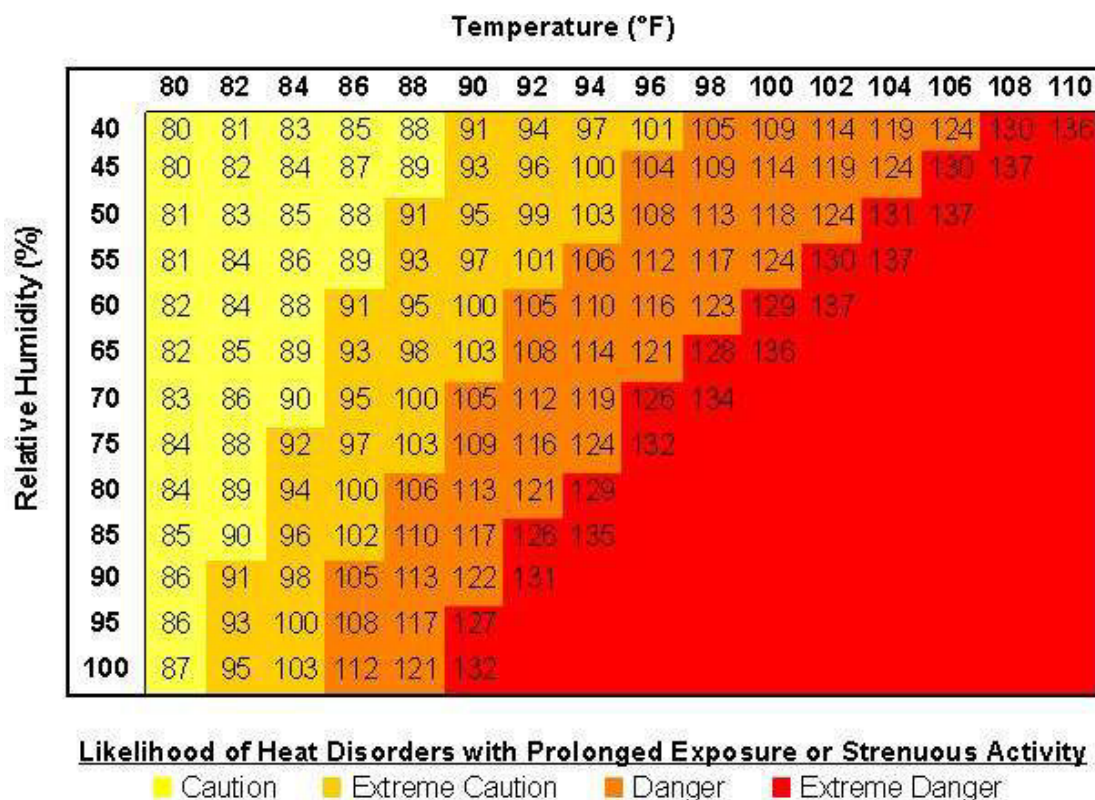
| Health Severity | Community Impact | Public Health System Impact | Healthcare System Impact | Total Health Hazard Score | Probability |
|-----------------|------------------|-----------------------------|--------------------------|---------------------------|-------------|
| 1               | 0                | 0                           | 2                        | 3                         | Unlikely    |

3.3.9 EXTREME TEMPERATURE

3.3.9.1 DESCRIPTION

Extreme temperature events, both hot and cold, can have severe impacts on human health and mortality, natural ecosystems, agriculture and other economic sectors. According to extreme heat data provided by FEMA, extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks. Extreme cold is defined as a period of reaching or exceeding locally/regionally defined warning criteria (typical value around -35° F or colder). Ambient air temperature is one component of extreme temperature conditions, with relative humidity being the other. The relationship of these factors creates what is known as the apparent temperature. The Heat Index chart shown in Figure 60 uses both of these factors to produce a guide for the apparent temperature or relative intensity of heat conditions.

Figure 60 - National Weather Service Heat Index (HI) Chart



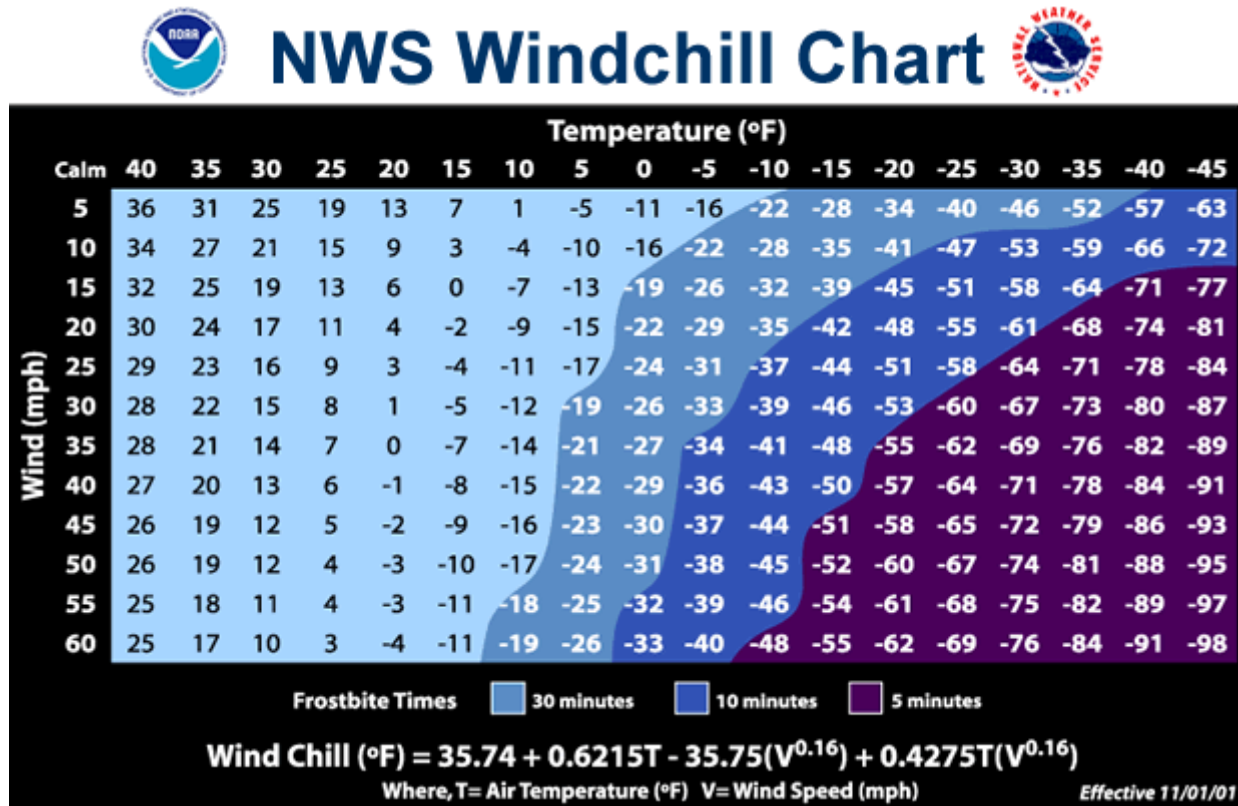
Source: National Weather Service (NWS)

Note: Exposure to direct sun can increase Heat Index values by as much as 15°F. The shaded zone above 105°F corresponds to a HI that may cause increasingly severe heat disorders with continued exposure and/or physical activity.

The National Weather Service has a system in place to initiate alert procedures (advisories or warnings) when the temperature is expected to have a significant impact on public safety. The expected severity of the event determines whether advisories or warnings are issued. A common guideline for issuing excessive heat alerts is when the maximum daytime Heat Index is expected to equal or exceed 105 degrees Fahrenheit (°F) and the night time minimum Heat Index is 80 °F or above for two or more consecutive days. A heat advisory is issued when temperatures reach 105 °F and a warning is issued at 115 degrees.

Similarly, the NWS also issues a wind chill warning when dangerously cold wind chill values are expected or occurring. The table below from the national weather service shows the apparent air temperature based on wind speed and temperature, and the relative risk of frostbite under these conditions.

Table 60 – Wind Chill



3.3.9.2 LOCATION

The entire planning area is subject to extreme temperatures and all participating jurisdictions are affected.

3.3.9.3 EXTENT

Extreme temperature events in Polk County, Iowa, can have multifaceted impacts on the community. Extreme temperatures pose significant health risks, particularly for vulnerable populations, leading to exposure-related illnesses. Agriculture may suffer as crops and livestock experience heat or cold stress, potentially affecting yields and the local agricultural economy. Water resources may be strained due to increased evaporation during periods of excessive heat, exacerbating drought conditions. Infrastructure, including roads and bridges, may undergo stress, and the demand for electricity for cooling systems can strain power grids, impacting energy consumption. Outdoor activities may be limited, affecting tourism and recreational events. Emergency services need to be prepared for increased demand, particularly related to temperature-related illnesses.

3.3.9.4 PREVIOUS OCCURRENCES

Table 61 below shows information obtained from the National Centers for Environmental Information (NCEI) and the National Weather Service in Des Moines, Iowa there have been 3 heat-

related watches 12 heat-related warnings and 26 heat-related advisories between 2005 and August 2023.

Table 61 - Heat Warnings, Watches, and Advisories Issued, May 2005-May 2023

| Phenomena | Significance | Number Issued |
|-----------|--------------|---------------|
| Heat      | Warning      | 8             |
| Heat      | Watch        | 3             |
| Heat      | Advisory     | 48            |

Source: Iowa State University, Iowa Environmental Mesonet, VTEC Archives

According to the National Centers for Environmental Information, Iowa has experienced 22 days of excessive heat from 1996 and 2023. During these 22 days of excessive heat there have been 99 counties (multiple counties affected multiple times), 3 deaths or injuries, and 2 property damages. Those at greatest risk for heat-related illness include infants and children up to five years of age, people 65 years of age and older, people who are overweight, and people who are ill or on certain medications. However, even young and healthy individuals are susceptible if they participate in strenuous physical activities during hot weather. In agricultural areas, the exposure of farm workers, as well as livestock, to extreme temperatures is a major concern.

According to the National Weather Service COOP station in Des Moines, Iowa, years when temperatures exceeded 100 during an event were 1977, 1983, 1984 1987, 1988, 2003, 2012, 2013, and 2017, 2020, 2021. The highest recorded temperature in Des Moines, Iowa during this time period (Polk County) was 108 °F which was reached in August 1983.

Research revealed that the average monthly temperatures at the Des Moines, Iowa Station for the months of June, July, and August, are 82, 86, and 84 °F, respectively. Based on these average monthly temperatures, the heat events that were 10 degrees or more above the average monthly temperature for June, July, and August, were considered. To further review historical occurrences of extreme heat events, the data for temperatures 10 degrees or more above normal were further analyzed to determine how many events last three days or more.

According to the USDA’s Risk Management Agency, insured payments in Polk County for damages to crops as a result of heat and hot wind from 2008-2017 totaled \$295,099.76 up from \$6,547 from 2003-2012. Table 62 shows the insurable crop insurance claims paid in Polk County as a result of heat and hot wind. According to the USDA database, crop insurance and crop loss information extends only to the year 2017.

Table 62 - Claims Paid in Polk County for Crop Loss as a Result of Heat, 2008-2017

| Crop Year | Crop Name | Cause of Loss Description | Insurance Paid |
|-----------|-----------|---------------------------|----------------|
|-----------|-----------|---------------------------|----------------|

|        |                  |          |              |
|--------|------------------|----------|--------------|
| 2013   | Corn             | Heat     | \$215,092.80 |
| 2013   | Soybeans         | Heat     | \$17,512.00  |
| 2012   | Oats             | Heat     | \$462.00     |
| 2012   | Corn             | Heat     | \$20,216.86  |
| 2012   | Soybeans         | Heat     | \$241.00     |
| 2011   | Oats             | Heat     | \$895.05     |
| 2011   | Corn             | Heat     | \$319.00     |
| 2011   | Hybrid Corn Seed | Heat     | \$22,205.50  |
| 2011   | Soybeans         | Heat     | \$6,365.00   |
| 2011   | Corn             | Hot Wind | \$7,228.50   |
| 2009   | Oats             | Hot Wind | \$742.05     |
| 2008   | Corn             | Hot Wind | \$3,820.00   |
| Total: |                  |          | \$295,099.76 |

Source: USDA Risk Management Agency Crop Cause of Loss Historical Data Files, <https://www.rma.usda.gov/data/cause.html>

**Table 63 - Estimated Insurable Annual Crops Lost as a Result of Heat, 2008-2017**

| <b>10-Year Drought Insurance Paid</b> | <b>Adjusted 10-Year Drought Losses (considering 88% insured)</b> | <b>Estimated Annualized Losses</b> |
|---------------------------------------|------------------------------------------------------------------|------------------------------------|
| \$295,099.76                          | \$335,340.64                                                     | \$33,534.06                        |

Crop Insurance Paid is from the USDA's Risk Management Agency for 2008-2017. Note: This includes crops that are insured

According to the NCEI, there were two occurrences of extreme cold between 2010 and 2023. In February 2015, temperatures below 20 degrees combined with 30+ mph winds, leading to significant wind chill that caused one fatality. In February 2021, temperatures dropped as low as -17 degrees, with wind chills exceeding -40 degrees.

#### 3.3.9.5 PROBABILITY OF FUTURE OCCURRENCE

Based on historical data from the NOAA Storm Events Database, there were 41 days of extreme cold or cold/wind chill and 2 days of extreme heat in the decade from 2014-2023, averaging 4.3 extreme temperature days per year. For this reason, extreme temperatures are considered "likely" as defined in the methodology section.



3.3.9.6 VULNERABILITY

Table 64. Potential Impacts of Extreme Temperatures on Community Lifelines

| Lifelines                | Impact Type                                                                         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Food, Shelter, & Housing |    | Excessive temperature in Polk County, Iowa, presents a range of challenges impacting food, shelter, and housing. The local agriculture sector faces potential crop failures and reduced yields due to temperature stress, affecting food supply and the economy. Livestock well-being becomes a concern with risks of climate-induced productivity losses. High and low temperatures increase energy demand for cooling systems, potentially straining housing affordability as utility bills rise. The safety and comfort of housing are affected, especially in homes lacking proper insulation or ventilation. Vulnerable populations, including the elderly and those with health conditions, face heightened risks, necessitating access to cooling or heating centers and suitable housing. |
| Health & Medical         |  | Excessive temperatures pose significant risk to anyone exposed for sustained periods of time. Heat exhaustion and hypothermia are common in regions that often face long periods of extreme temperature.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Energy                   |  | Extreme temperatures in Polk County, Iowa, significantly impact the energy sector by intensifying the demand for cooling and heating systems. The surge in energy consumption places strain on local power grids, leading to potential power outages and increased energy costs for residents and businesses. Prolonged exposure to extreme temperatures stresses energy infrastructure, necessitating maintenance and upgrades to enhance resilience.                                                                                                                                                                                                                                                                                                                                            |
| Safety & Security        |  | Extreme temperatures in Polk County, Iowa, pose significant challenges to safety and security across various domains. Health risks escalate, particularly among vulnerable populations, leading to an increased demand for emergency response services to address exposure-related illnesses. The strain on utility                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |



|  |  |                                                                                                                                                                       |
|--|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  |  | infrastructure during extreme heat can result in failures, including power outages, impacting residents' ability to cool or heat their homes and posing safety risks. |
|--|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|

A) People

Prolonged exposure to high temperatures increases the risk of heat-related illnesses, ranging from mild conditions like heat cramps to severe cases of heatstroke. Dehydration becomes a concern as the body loses fluids through sweating, leading to symptoms such as weakness and dizziness. Individuals with respiratory issues may experience exacerbated symptoms, and cardiovascular stress can occur as the heart works harder to cool the body. Vulnerable populations, including the elderly and young children, are at a higher risk of heat-related complications. Prolonged exposure to low temperatures can also cause illnesses, including risk of hypothermia. Just as with heat, vulnerable populations are less able to handle the impacts of extreme cold, and are at higher risk of complications.

B) Systems

Extreme temperatures pose a substantial threat to critical systems vital for community well-being. Energy systems, including power grids, face increased demand from heating and cooling, potentially leading to infrastructure strain, power outages, and challenges in maintaining a stable energy supply. Water and wastewater systems are affected by heightened demand, contributing to water scarcity and impacting both supply and management. Transportation infrastructure, such as roads and bridges, may experience stress, posing safety hazards and requiring maintenance. Public health systems are strained with a rise in heat- or cold-related illnesses, leading to increased demand for emergency services and potential challenges for healthcare facilities. Agriculture and food systems face risks, impacting local production and potentially leading to food supply challenges.

C) Structures

The primary impact of extreme temperature on structure is to bridges and other road infrastructure; prolonged exposure to extreme temperature and rapid temperature changes can strain these facilities, reducing their useful life.

D) Natural, Historic, and Cultural Resources

Extreme temperatures can be dangerous for plants and animals, and can cause significant damage to crops. Freezing temperatures can potentially delay the start of the growing season. A cold snap can also be deadly for crops which have already been planted in the ground. According to the U.S. Department of Agriculture, temperatures at or below 24 °F can cause heavy damage to most plants. At these temperatures, the ground freezes solid, with the depth of the frozen ground dependent on the duration and severity of the freeze, soil moisture, and soil type.

E) Community Activities

Extreme temperatures significantly disrupt community activities, introducing challenges across various domains. Outdoor events, festivals, and recreational activities face limitations or cancellations, impacting community engagement and social interaction. Sports practices, games, and physical activities are affected as health risks associated with extreme temperatures necessitate modifications and rescheduling. Outdoor venues, including parks and markets, experience reduced attendance due to discomfort and health concerns, affecting local businesses. Tourism can also be impacted, leading to decreased participation in cultural and arts events. Traditional community celebrations and fairs may need adaptation to ensure the well-being of participants

Existing Development

Extreme temperatures can strain electrical systems through increased demand for heating or cooling, which can lead to power outages. Those power outages can lead to the failure of climate control systems, which can impact existing structures and their contents. Extreme heat can buckle or warp asphalt-paved roads, parking lots, and driveways.

Future Development

The Des Moines metropolitan area is one of the fastest growing Midwest metros, with about 33 new residents moving in each day. Population growth can result in increases in the age-groups that are most vulnerable to extreme heat. Population growth also increases the strain on electricity infrastructure, which will worsen as development continues.

Climate Change

Extreme temperatures, intensified by climate change, pose multifaceted challenges for Polk County. Climate change is expected to lead to increased frequency and severity of extreme temperature events, increasing associated risks.

Hazard Risk Score

Table 65. Extreme Temperature Probability and Health Impact Ratings

| Health Severity | Community Impact | Public Health System Impact | Healthcare System Impact | Total Health Hazard Score | Probability |
|-----------------|------------------|-----------------------------|--------------------------|---------------------------|-------------|
| 2               | 2                | 2                           | 2                        | 8                         | Occasional  |

3.3.10 FLASH FLOODING

3.3.10.1 DESCRIPTION

Flash flooding is an extremely dangerous form of flooding – as the name implies, flash flooding can rapidly reach full peak in only a few minutes and allows little or no time for protective measures to be taken by those in its path. Flash flood waters move at very fast speeds and can move boulders, tear out trees, scour channels, destroy buildings, and obliterate bridges. Flash flooding often results in higher loss of life, both human and animal, than slower developing river and stream flooding.

A flash flood is an event that occurs when water levels rise at an extremely fast rate as a result of intense rainfall over a brief period, sometimes combined with rapid snowmelt, ice jam release, frozen ground, saturated soil or impermeable surfaces. Most flash flooding is caused by slow-moving thunderstorms or thunderstorms repeatedly moving over the same area. Ice jam flooding is a form of flash flooding that occurs when ice breaks up in moving waterways, and then stacks on itself where channels narrow. This creates a natural dam, often causing flooding within minutes of the dam formation.

In certain areas, aging storm sewer systems are not designed to carry the capacity currently needed to handle the increased storm runoff. Typically, the result is water backing into basements, which damages mechanical systems and can create serious public health and safety concerns. This combined with rainfall trends and rainfall extremes all demonstrate the high probability, yet generally unpredictable nature of flash flooding in the planning area.

3.3.10.2 LOCATION

Flash flooding occurs in those locations of the in the planning area that are low-lying and/or do not have adequate drainage to carry away the amount of water that falls during intense rainfall events. According to NCEI, many jurisdictions in Polk County have experienced at least one instance of flash flooding between January 1, 1996 and December 31, 2022. Table 66 provides the number of flash flood events by location for 117 flash flood events documented by the NCEI for the 26-year period; 34 of these events occurred since 2018 when the last update of this plan was created. The specific location of each flash flooding event was determined by the National Weather Service at the time of the event; please note that many of these locations are small, unincorporated communities that have since been incorporated into other municipalities.

Table 66. NCEI Flash Flood Events by Location 1996-2022

| Location             | Number of Flash Flood Events |
|----------------------|------------------------------|
| Altoona              | 1                            |
| Ankeny               | 14                           |
| Avon                 | 2                            |
| Capitol Heights      | 4                            |
| Clover Hills         | 2                            |
| Des Moines           | 25                           |
| Des Moines Ekman ARP | 1                            |
| Des Moines INTL      | 4                            |
| Dodge FLD ARPT       | 1                            |
| Elkhart              | 6                            |
| Enterprise           | 1                            |
| FT Des Moines        | 4                            |
| Grimes               | 5                            |
| Hastie               | 2                            |

|                             |   |
|-----------------------------|---|
| Herrold                     | 1 |
| Lovington                   | 7 |
| Mitchellville               | 1 |
| Norwoodville                | 1 |
| Oralabor                    | 3 |
| Polk City                   | 3 |
| Polk County (Countywide)    | 1 |
| Polk County (North Portion) | 2 |
| Polk County (South Portion) | 1 |
| Rider                       | 3 |
| Santiago                    | 2 |
| Saydell                     | 1 |
| Saylorville                 | 1 |
| Swanwood                    | 2 |
| Urbandale                   | 8 |
| West Des Moines             | 5 |
| Windsor Heights             | 1 |
| Youngstown                  | 2 |

Source: NCEI Storm Events Database: <https://www.ncdc.noaa.gov/stormevents/> Note: The locations in the table are directly identified by the National Oceanic and Atmospheric Administration and listed as being within Polk County, Iowa.

Additionally, specific areas reported to be prone to flash flooding and/or included in descriptions of previous impacts are provided by jurisdiction below:

Unincorporated County: Vandalia Rd. and SE 42<sup>nd</sup> Street; Lovington Area—Intersection of Beaver Drive and Valdez Drive and Merle Hay Road;

Altoona: NE 9<sup>th</sup> Street; NE 38<sup>th</sup> at 24<sup>th</sup> Street near the 6<sup>th</sup> Ave SE intersection

Ankeny: North Ankeny Blvd between 5th & 9th; SE Cortina Drive near SE Shurfine Drive; 400 Block of NE Delaware; SE National Drive & SE Delaware; flash flooding of Rock Creek and Four Mile Creek can cause damages/disruptions within the City of Ankeny; Swanwood Area—Delaware Ave. north of Oralabor Rd.

Clive: Stonegate Plat One (between Beechwood Avenue and Buena Vista Drive) resulting in storm sewer backup and stormwater detention basin overtopping causing inundation in several walk-out homes; Verona Hills Plat 1 (between Winston Circle and Aurora Court) resulting in stormwater detention basins overtopping and creating erosive uncontrolled release; Verona Hills Plat 3 (drainageway running along Alices Road) resulting in storm sewer backup and stormwater detention basins overtopping causing inundation in several walk-out homes; Tanglewood Drive (between NW 167th Street and NW 1668th Court) resulting in an overwhelmed emergency pond overflow and approximately 12 inches of ponding at the street intersection restricting neighborhood access; Swanson Boulevard (between NW 92nd Street and NW 94th Street) resulting in backwater from Walnut Creek inundating the roadway with approximately 12 inches of water preventing access to area businesses.

Des Moines: Aurora and 30<sup>th</sup> Street; 22<sup>nd</sup> and Logan; 55<sup>th</sup> and Beaver Drive; Martin Luther King and Delaware; Keo Way; US Highway 6; intersection at 63<sup>rd</sup> and Hickman Road; Douglas near Merle Hay Road; 47<sup>th</sup> and 48<sup>th</sup> Streets between Hickman and Beaver Crest; Hickman and Merle Hay Road; Martin Luther King near Douglas and Euclid Avenue; Virginia Ave near SW 12<sup>th</sup> St; Valley Gardens / Bell Ave

Grimes: South 19<sup>th</sup> Street between Little Beaver and Highway 141; James Road, 7<sup>th</sup> Street Place.

Mitchellville: I-80 east of the east mix master

Pleasant Hill/Youngstown area: 4300 block of Fairview near Dean Avenue/ 65 ramp at Vandalia Road south of Pleasant Hill

Polk City: Highway 17 and 122<sup>nd</sup> Avenue near the Des Moines River Bridge

Runnells: Low lying gravel roads between Runnells and Highway 163

West Des Moines: Intersection of Grand and 61<sup>st</sup> Street; George Flagg Parkway and southwest 30<sup>th</sup> Street near the Raccoon River; Garden Road near Waterworks Park; Valley West Drive and Westown Parkway

Windsor Heights: NW 75<sup>th</sup> Street, 76<sup>th</sup> Street, Marilyn Drive, 6900 block of School Street, Colby Park, and Hunter Circle

Des Moines International Airport: Highway 5 and Highway 28; Fleur Drive south of Army Post Road

#### 3.3.10.3 EXTENT

As the hazard name implies, flash flooding can develop much more quickly than standard riverine flooding; the speed at which flash flooding can occur has often caught people unprepared and in vulnerable positions. The National Weather Service has various flash flooding products that are issued to the public to provide information regarding upcoming and current flash flood threats.

**Table 67. National Weather Service Flooding Alerts**

| Product                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Description                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Hydrologic Outlook</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Issued when a flood potential exists in a time beyond 48 hours from the start of the event.                                                                                                                 |
| <b>Flash Flood Watch</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | A Flash Flood Watch is issued when conditions are favorable for rapidly rising water to pose an immediate hazard to life and property. It does not mean that flash flooding will occur, but it is possible. |
| <b>Flash Flood Warning</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | A Flash Flood Warning is issued when rapidly rising water poses an immediate hazard to life and property.                                                                                                   |
| A <i>Flash Flood Emergency</i> may be declared when a severe threat to human life and catastrophic damage from a flash flood is imminent or ongoing. The declaration of a <i>Flash Flood Emergency</i> would typically be found in either a Flash Flood Warning or Flash Flood Statement. People are strongly encouraged to avoid the geographic area of concern in a <i>Flash Flood Emergency</i> . The <i>Flash Flood Emergency</i> wording is used very rarely and is reserved for exceptionally rare and hazardous events. |                                                                                                                                                                                                             |

Source: National Weather Service, website accessed 2/14/2024

[https://www.weather.gov/otx/Watch\\_Warning\\_Advisory\\_Definitions#Hydrologic%20Outlook](https://www.weather.gov/otx/Watch_Warning_Advisory_Definitions#Hydrologic%20Outlook)

Although flash floods are somewhat unpredictable, there are factors that can point to the likelihood of flash floods occurring. Weather surveillance radar is being used to improve monitoring capabilities of intense rainfall. This, along with knowledge of the watershed characteristics, modeling techniques, monitoring, and advanced warning systems increases the warning time for flash floods.

#### 3.3.10.4 PREVIOUS OCCURRENCES

Information from the National Centers for Environmental Information (NCEI) was obtained from 1996 to December 2022 to determine previous occurrences of flash flooding in the planning area. Table 68 provides a summary of the NCEI data, including the number of events and resulting deaths, injuries, property damage, and crop damage.

**Table 68. NCEI Polk County Flash Flood Events Summary 1996-2022**

| Year         | # of Events | # of Deaths | # of Injuries | Property Damages    | Crop Damages       |
|--------------|-------------|-------------|---------------|---------------------|--------------------|
| 2022         | 5           | 0           | 0             | \$20,000            | \$0                |
| 2020         | 1           | 0           | 0             | \$0                 | \$0                |
| 2019         | 8           | 0           | 0             | \$200,000           | \$0                |
| 2018         | 20          | 1           | 0             | \$3,960,000         | \$650,000          |
| 2016         | 4           | 0           | 0             | \$30,000            | \$0                |
| 2015         | 6           | 0           | 0             | \$80,000            | \$0                |
| 2014         | 4           | 0           | 0             | \$107,000           | \$0                |
| 2013         | 4           | 0           | 0             | \$35,000            | \$0                |
| 2012         | 2           | 0           | 0             | \$50,000            | \$0                |
| 2011         | 1           | 0           | 0             | \$250,000           | \$0                |
| 2010         | 26          | 1           | 4             | \$2,806,000         | \$75,000           |
| 2008         | 20          | 0           | 0             | \$7,327,000         | \$0                |
| 2007         | 2           | 0           | 0             | \$300,000           | \$300,000          |
| 2004         | 6           | 0           | 0             | \$400,000           | \$60,000           |
| 2003         | 2           | 0           | 0             | \$200,000           | \$0                |
| 2002         | 1           | 0           | 0             | \$150,000           | \$15,000           |
| 2001         | 1           | 0           | 0             | \$150,000           | \$10,000           |
| 1998         | 2           | 0           | 0             | \$1,150,000         | \$40,000           |
| 1997         | 3           | 1           | 0             | \$330,000           | \$20,000           |
| 1996         | 7           | 0           | 0             | \$300,000           | \$50,000           |
| <b>Total</b> | <b>117</b>  | <b>3</b>    | <b>4</b>      | <b>\$17,845,000</b> | <b>\$1,220,000</b> |

Source: NCEI Storm Events Database, data accessed 2/13/2024

Of the 117 events described in the NCEI data, three were ice jam events; one in 2010, one in 2008, and one in 1997. These events resulted in three fatalities and more than \$19 million in damages. Descriptions of notable flash flood events are provided below in reverse chronological order:

**August 19, 2022:** A surface low sinking south into the area allowed for scattered storms to develop across central Iowa in the afternoon. Steep lapse rates and deep layer shear allowed for the development of organized updrafts while low melting levels supported larger hail development. Several storms strengthened and prompted warnings, though few resulted in any severe reports. The strongest quickly developed over the Des Moines metro, where the time between a clear radar image and golf ball sized hail was just over 20 minutes. Hail pummeled the west side of the metro for nearly 30



minutes, resulting in hundreds of vehicles with significant damage. One high school in West Des Moines also reported damage to the building which resulted in water leaking into the library and a rush to protect the books. After the hail ended the storms continued to train across the metro, resulting in flash flooding a a couple of water rescues due to stranded vehicles.

**June 22, 2019:** Strong to severe storms and heavy rainfall moved up into Iowa from northern Missouri during the late afternoon and evening hours of the 22nd of June. Ahead of the storms, a warm front lifted into and through much of the state, bringing with it temperatures into the low to mid 80s and dew points in the low to mid 70s. Support for storms was decent with MUCAPE values of 2000+ J/kg reaching roughly the Interstate 80 corridor, effective bulk shear in the 30 to 40 kt range, and strong low level moisture transport boosting precipitable water values in excess of 1.5 to 1.75 inches.

All in all, a handful of severe storm reports (hail and wind) were seen as storms moved into the state from the south and eventually transitioned more into a rain threat that came to fruition over the eastern half of the Des Moines metro. A number of heavy rainfall amounts in excess of 2 to 4 inches were received, producing multiple flash flooding reports.

**FEMA-4386-DR:** Much of western and central Polk County received five to 10 inches of rain in the span of just a few hours. This event caused widespread flash flooding in Urbandale, Windsor Heights, Des Moines, West Des Moines, Ankeny, Johnston, and other communities. The National Weather Service issued a rare “Flash Flood Emergency” because of severity of the event. After the flood waters had receded more than 6,000 homes were reported to have been affected and more than 25 were destroyed. Additionally, there was one fatality reported. This event triggered a number of other hazards such as: structural fire, sinkholes, transportation incidents, infrastructure failures, and river flooding. A Presidential Disaster Declaration was declared for Polk County in August 2018, and throughout much of central Iowa.



Water inundates the intersection of 56<sup>th</sup> Street and New York Avenue after flash flooding on June 30<sup>th</sup>, 2018.

Source: Des Moines Register, 2018

**June 2012:** The City of Grimes reported 12 inches of rain in 3 days that caused basement flooding, bank erosion and minor storm sewer blow outs.



**April 14, 2012:** Street flooding reported with one to two feet in Ankeny near the HyVee and High School by 1<sup>st</sup> Street as well as 18 inches of water flowing across Delaware Ave., north of Oralabor Rd.

**June 9, 2011:** Four Feet of water covered Vandalia Rd. and SE 42<sup>nd</sup> Street.

**FEMA-DR-1930-IA:** The flash flooding associated with this event transitioned in to widespread riverine flooding. The details described below for Polk County occurred from August 4-11. Three vehicles, containing 11 people were swept into the waters of Mud Creek near Altoona in Polk County. One fatality occurred and four were injured. Evacuations took place from 3324 Hubble Ave. at an apartment complex to 3560 Douglas Avenue near a trailer Park in east Des Moines. Interstate 35 was covered by water at mile post 97 and several cars spun out in the flood waters. In Ankeny 4 to 5 inches of water covered the intersection of Crestmoor Place and Northeast 6<sup>th</sup> Street, water was 2 feet deep on Delaware Avenue in the 400 block, 18 inches of running water went across the intersection of SE 4<sup>th</sup> and Trilein; intersection of West 1<sup>st</sup> Street and SW State Street was impassable; and North Ankeny Boulevard and NE 9<sup>th</sup> Street was closed due to 16-18 inches of water. The basement walls of a house in the Avon Lakes area collapsed due to the heavy rains. In Grimes, water from the flooded creek flowed over James Road and inundated a few houses along the creek on 7<sup>th</sup> Street Place, extending to the 1800 block and 6 to 8 inches of water flowed out of a corn field and across South 19<sup>th</sup> Street between Little Beaver and Highway 141. In Des Moines, four feet of water covered the street at Aurora and 30<sup>th</sup> Street. In the Pleasant Hill/Youngstown area, flooding in the 4300 block of Fairview near Dean Avenue washed away railroad tracks and caused a derailment. In West Des Moines, water was over the road at Grand and 61<sup>st</sup> Street. In Urbandale, water flooded over the intersections of 86<sup>th</sup> and I-80, Northwest Urbandale Drive and Meredith Drive, and Douglas Avenue and Aurora Avenue. In Windsor Heights, four basement apartments and three houses were inundated with water on NW 75<sup>th</sup> Street due to the fast rising waters from North Walnut Creek. In the unincorporated county, Merle Hay had 2 feet of water over the road and the intersection was flooded at Beaver Drive and Valdez Drive.

**May 12, 2010:** Highway 65 ramp at Vandalia Road south of Pleasant Hill was impassable due to high water and NE 38<sup>th</sup> at 24<sup>th</sup> Street near the 6<sup>th</sup> Ave SE intersection was washed out in Ankeny.

**March 10, 2010:** An ice jam upstream of the Fleur Drive gauge caused water to rise rapidly, impacting George Flagg Parkway and southwest 30<sup>th</sup> Street near the Raccoon River.

**December 27, 2008:** An ice jam on the Raccoon River caused water levels in the Des Moines area to rise 7 feet in less than 3 hours caused water to back up over George Flagg Parkway and Garden Road near Waterworks Park. Water backed up through the storm drains and flooded some businesses on Garden Road.

**June 25-26, 2008:** In Des Moines, six to eight inches of water covered the road at 22<sup>nd</sup> and Logan, water was over the road at 55<sup>th</sup> and Beaver Drive, and nine inches of water was over a 300 foot area of Martin Luther King and Delaware, causing a vehicle to stall, 2.5 feet of water covered the intersection at 63<sup>rd</sup> and Hickman Road and water flowed over Douglas near Merle Hay Road; Near Mitchellville, four inches of water covered the interstate east of the east mix master. In West Des Moines, Valley West Drive and Westown Parkway had two and one half feet of water depth that drowned out a police squad car. In Polk City, water covered the road on Highway 17 and 122<sup>nd</sup> Avenue near the Des Moines River Bridge.

**June 12, 2008:** Court Avenue was flooded with manhole covers being described as geysers.

**June 6, 2008:** In Des Moines, flash flooding brought debris onto the road on Keo Way and waist high water covered the road near 47<sup>th</sup> and 48<sup>th</sup> Streets between Hickman and Beaver Crest. At the Des Moines International Airport, five feet of water was reported over Highway 5 and Highway 28 with multiple cars stalled and Fleur Drive south of Army Post Road had cars stalled with 8 to 9 inches of water on the road.

**June 3, 2008:** Flash flooding was reported at Hickman and Merle Hay Road and on Martin Luther King near Douglas and Euclid Avenues.

**June 16, 2004:** Heavy rainfall in Des Moines caused flash flooding with water flowing over 2 feet deep over US Highway 6.

**November 3, 2003:** Heavy rains caused water over several intersections in the Des Moines metro area. In Altoona, the heavy rains resulted in some basements flooding.

**May 4, 2003:** Flash flooding caused water over roads and highways as well as flooded basements in the metro area.

**June 12, 2002:** Flash flooding took place in southern Polk County, especially in Des Moines and areas east and south. Rainfall rates were in the 2 to 3 inch per hour range. The city of Des Moines was hard hit with flooded streets. There were numerous reports of stalled vehicles with water two to three feet deep in the streets. East of Des Moines in the Runnells area, low lying gravel roads between Runnells and highway 163 were barricaded as they went under water. Damage occurred to some of the county gravel roads as well as numerous houses by basement flooding.

**June 18, 1998:** In Des Moines, a state of emergency was declared as water of 6 feet or greater in depth choked many of the city intersections. Hundreds of cars were stalled in the streets and many basements were flooded. Between the high winds and water, electricity was knocked out to 15,000 homes in Des Moines during the height of the storm. Damage estimates were in the hundreds of thousands of dollars in all of the flash flood counties, and over one million dollars in Polk County, where the Governor declared a state disaster. A disaster declaration was also made for Dallas County. Reports indicated that in the Des Moines metropolitan area, up to 10,000 homes had water in the basement. The city of Des Moines reported that infrastructure losses alone around \$1 million.

**July 24, 1997:** Heavy rains mentioned above in the urban and small stream flooding caused flash flooding in Polk County, specifically in Des Moines. Walnut Creek rose quickly above flood stage. Serious flooding occurred in low areas of the city with rush hour traffic snarled by closed roads that were under water.

**February 19 and 20, 1997:** Ice jams occurred along the lower reaches of the Raccoon River. On the 19<sup>th</sup>, a fatality occurred due to an ice jam suddenly breaking. The water released from the jam swept a car off the road on the west side of Des Moines, drowning the occupant. On the 20<sup>th</sup>, a major ice jam, 12 miles in length, began at the 63<sup>rd</sup> street bridge in West Des Moines. The river went slightly above flood stage there before it broke free. The ice flowed down the river where it once again became jammed near the mouth of the river. It caused a rapid rise in the river level to nearly 2 feet above flood

stage. Roads along the river were closed by the high water and ice. Heavy equipment was brought in to move the large chunks of ice off the roads before they could be opened.

3.3.10.5 PROBABILITY OF FUTURE OCCURRENCE

The frequency of past events is used to gauge the likelihood of future occurrences of flash flooding in Polk County. The events of flash flooding as documented by the NCEI were used to assess the number of flash flooding events which occurred in the planning area. There were 116 documented instances of flash flooding somewhere in the planning area during the period from 1996 to 2022 (26 years). This translates to flash flooding somewhere in the planning area approximately 4.5 times in any given year. Therefore, the probability of flash floods occurring Polk County is assessed to be “highly likely” in any given year.

3.3.10.6 VULNERABILITY

Table 69. Potential Impacts of Flash Flooding on Community Lifelines

| Lifelines                  | Impact Type                                                                         | Description                                                                                                                                                                                                                          |
|----------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Water & Wastewater Systems |   | Flooding can contaminate water supplies and damage water infrastructure, leading to shortages and health hazards. Wastewater treatment facilities may also be overwhelmed or damaged, increasing the risk of waterborne diseases.    |
| Food, Shelter, & Housing   |  | Flooding can lead to the displacement of people, necessitating immediate shelter solutions. The disruption in supply chains can affect the availability and distribution of food, especially fresh produce.                          |
| Health & Medical           |  | There is a heightened risk of injuries during floods, as well as increased potential for waterborne and vector-borne diseases. Healthcare facilities might be directly affected by floods, impacting their operational capabilities. |

| Lifelines         | Impact Type                                                                         | Description                                                                                                                                                                                                     |
|-------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Communications    |    | Communication networks may be disrupted, which can hinder the coordination of rescue and relief efforts as well as the dissemination of important information to the public.                                    |
| Energy            |    | Flooding can cause power outages by damaging electrical infrastructure. Fuel supply may also be disrupted, affecting not just transportation but also heating and power generation.                             |
| Safety & Security |   | Emergency services are crucial during flooding for rescue operations and maintaining public order. Flooding can also increase the risk of accidents and infrastructure failures, such as dam or levee breaches. |
| Transportation    |  | Floods can damage roads, bridges, and rail lines, severely limiting mobility and access. This disruption impacts not just daily commutes but also the delivery of essential goods and services.                 |

#### A) People

The rapid pace at which flash flooding can occur means that the hazard is of particular concern for people who have a limited ability to quickly reach safety. Individuals at an increased risk of this hazard include the elderly, young children, people with a disability, and individuals who lack access to a vehicle. Additionally, people who have not learned to swim are particularly vulnerable if they cannot avoid the flood waters. Location also contributes to vulnerability, and anyone living in a flood prone or low-lying area is at a higher risk of experiencing a flash flooding event. There is potential for loss of life if motorists drive into moving water. However, public education campaigns have helped to educate citizens about not driving through moving water.

#### B) Structures

Building damage is generally limited to water in basements where rain is too intense for drainage systems and natural drainage to carry water away from the structure. In addition, when

combined storm/sanitary sewer systems are overloaded, this can result in sewer back-up. Standing water in structures may cause electrical faults which can potentially result in fires. Although flash floods are generally of short duration, standing water can degrade building materials and lead to mold.

#### C) Systems

Flash flooding can cause power, water, and gas outages; disrupt transportation routes and the movement of commercial goods; pollute drinking water systems; and damage or destroy communications infrastructure. These impacts can disrupt other community services like trash/recycling collection, law enforcement, and medical care. Nearly all transportation modes (e.g., roads, transit, aviation, etc.) are vulnerable to the impacts of flash flooding. Polluted drinking water can force communities to issue boil orders and distribute bottled water. Response efforts may be hampered if communication is unreliable due to damaged cell towers and other communications infrastructure.

#### D) Natural, Historic, and Cultural Resources

Flooding has long been a major challenge for many historic properties. Changing weather patterns and more frequent extreme weather events are some of the factors increasing the risk of flooding events, both in terms of their frequency and magnitude. Some historic properties that have never flooded before may now be exposed to this risk, and those that flooded infrequently in the past may experience more instances of flooding reaching higher levels than ever before. In fact, the Secretary of the Interior adopted Guidelines on Flood Adaptation for Rehabilitating Historic Buildings in response to flooding. Flash flooding can also quickly inundate natural and community assets such as parks and nature preserves, as well as causing severe environmental problems including landslides and mudslides.

#### E) Community Activities

Flash flooding events can cause widespread cancellations, postponements, and relocations of community events and activities due to direct or indirect damage to hosting locations. Concerns about waterborne bacteria and structural damage may result in prolonged disruptions to community activities if suitable alternative sites cannot be found.

#### Existing Development

Existing development faces significant risk from flash flooding. Polk County has experienced heavy rainfall events which quickly damaged residential structures. Just one inch of standing water can cause \$25,000 in damage, and standing water can lead to rot and other phenomena which directly jeopardizes the integrity of structures, and mold and other fungi can develop and create health hazards. Heavy rainfall is more likely to cause flash flooding if a drought occurred recently; dry, sunbaked soil tends to be less capable of quickly absorbing moisture. Planning team members noted during the process of updating this plan that Iowa State Law SF-455 restricts local and community regulation of stormwater and topsoil, which has made it difficult to take action to reduce this risk.

Future Development

Future development may increase the risk of flash flooding in the planning area. When land use changes from fields or woodlands to roads and parking lots, it loses its ability to absorb rainfall. Such urban development, with significant impervious surface, has been known to increase runoff two to six times over what would occur on natural terrain. If measures are not taken to limit or slow runoff in developing areas, flash floods may become more frequent. In certain areas, aging storm sewer systems were not designed with enough capacity to handle increased storm runoff. Then again, other storm sewers built in the past may convey water too quickly and efficiently to streams and rivers resulting in peak flows that result in flood events downstream.

Climate Change

Available data indicates that climate change may be increasing the annual precipitation in the planning area. Research incorporated in the 2023 Iowa State Hazard Mitigation Plan indicates that annual rainfall totals are expected to increase by 1-4 inches by 2050, and heavy precipitation events are likely to become more common.

Hazard Risk Score

Table 70. Flash Flooding Probability and Health Impact Ratings

| Health Severity | Community Impact | Public Health System Impact | Healthcare System Impact | Total Health Hazard Score | Probability   |
|-----------------|------------------|-----------------------------|--------------------------|---------------------------|---------------|
| 2               | 3                | 1                           | 2                        | 8                         | Highly Likely |

3.3.11 GRASS OR WILDLAND FIRE

3.3.11.1 DESCRIPTION

Grass or wildland fires, often referred to simply as wildfires, are uncontrolled fires that occur in natural areas such as forests, grasslands, or shrublands. These fires can be sparked by various sources, including lightning strikes, human activities like campfires or discarded cigarettes, or even volcanic eruptions. Wildfires spread rapidly, fueled by dry vegetation, high winds, and hot temperatures. They can engulf vast areas of land, consuming everything in their path, including trees, plants, wildlife, and sometimes even structures like homes or buildings located in or near the affected areas. Wildfires are a natural part of many ecosystems, playing a crucial role in clearing dead vegetation and promoting new growth, but they can also pose significant risks to human lives, property, and the environment when they occur near populated areas or during periods of drought or extreme weather. Wildfires are frequently associated with lightning and drought conditions, as dry conditions make vegetation more flammable. As new development encroaches into the wildland/urban interface more and more structures and people are at risk. On occasion, ranchers and farmers intentionally set fire to vegetation to restore soil nutrients or alter the existing vegetation growth. Also, individuals in rural areas frequently

burn trash, leaves and other vegetation debris. These fires have the potential to get out of control and turn into wildfires.

The risk of wildfires is a real threat to landowners across the State. The National Weather Service monitors the conditions supportive of wildfires in the State on a daily basis so that wildfires can be predicted, if not prevented.

The risk factors considered are:

- High temperature
- High wind speed
- Fuel moisture (greenness of vegetation)
- Low humidity
- Little or no cloud cover

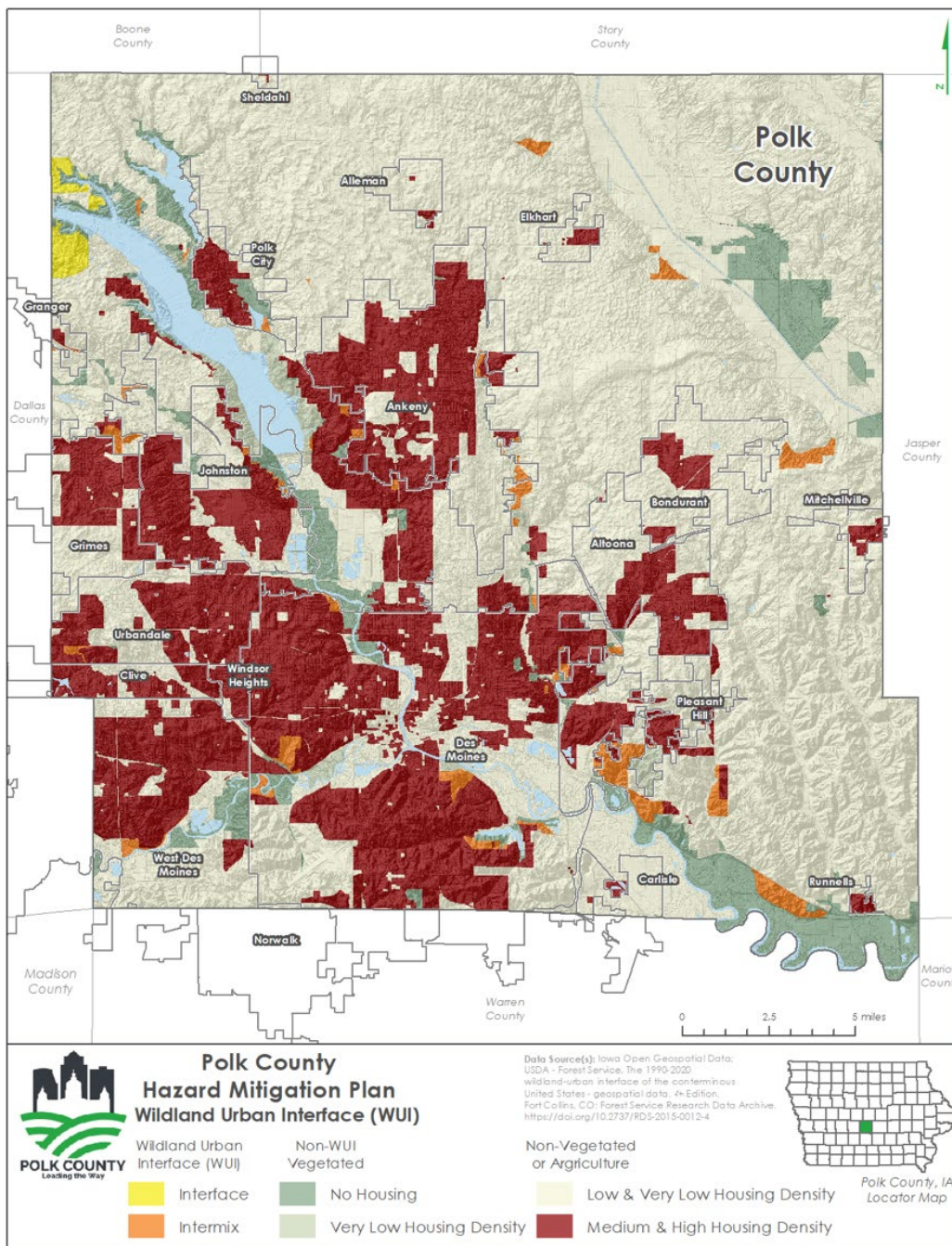
Iowa's urban/rural interface (areas where development occurs within or immediately adjacent to wildland, near fire-prone trees, brush, and/or other vegetation), is growing as metro areas expand into natural forest, prairies and agricultural areas).

#### 3.3.11.2 LOCATION

Wildland/Grass fires are most likely to occur in the Wildland Urban Interface (WUI). This is the area where houses meet or intermingle with undeveloped wildland vegetation. Within the WUI, there are two specific areas identified: 1) Interface and 2) Intermix. The interface areas are those areas that abut wildland vegetation and the Intermix areas are those areas that intermingle with wildland areas. As can be seen in Figure 61, Polk County has very few areas of WUI Interface and WUI Intermix. The WUI Interface areas are limited to the unincorporated areas in the very northwest corner of the County along the northern portion of Saylorville Lake. The WUI Intermix areas are slightly more prevalent, sprinkled throughout the County.



Figure 61 - Polk County Wildland Urban Interface



## 3.3.11.3 EXTENT

Fire severity refers to the effects of a fire on the environment, typically focusing on the loss of vegetation both above ground and below ground but also including soil impacts. There are three categories of fire severity:

- Low: A fire that has limited effect on overstory trees
- 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.

The worst wildfire in Iowa's history was the great fire of 1910, which burned more than three million acres and led to 86 fatalities, and was a "high" severity fire. Wildfires of all three levels of severity are possible in Polk County.

#### 3.3.11.4 PREVIOUS OCCURRENCES

There have been three notable grassland or wildland fires for Polk County since 2017:

- According to WHO Channel 13, on November 25, 2017, a grassland fire occurred near Runnels and the Des Moines River, which required response from multiple agencies. Though the impacts of the fire was low, the fire raged on for several hours and took substantial amounts of resources.
- According to the data center with the Des Moines Register, on March 30<sup>th</sup>, 2019, a wildfire consumed around 3 acres in the southern Polk County which was later found to be accidentally started by a resident.
- Most recently, on March 1<sup>st</sup>, 2024, multiple fire crews responded to a grassland fire near Yellow Banks Park. We Are Iowa Plus new outlet stated that local residents said there had been fires off and on in that area the previous 4 or 5 days. The cause of the fires is unknown. On the same date, Clive experienced a grassland fire in Greenbelt just west of NW 100<sup>th</sup> Street. The Clive Greenbelt is approximately 450 acres of native woodland, prairie, and wetlands immediately adjacent to significant private buildings. This fire was found to be the result of improper use of fireworks.

#### 3.3.11.5 PROBABILITY OF FUTURE OCCURRENCE

The probability of future occurrence is determined to be "occasional" due to the infrequency of these events. However, although these events are infrequent, it is important to note that if a grassland or wildfire does occur, the impacts on Polk County can be substantial.

#### 3.3.11.6 VULNERABILITY

The urban fire departments in the County are equipped to handle smaller-scale brush/grass fires, which are generally extinguished before much damage occurs. Areas that are most vulnerable to

wildfire are the intermix and interface areas. Table 71 identifies the total number of acres in each of these zones in Polk County.

**Table 71 - Wildland Urban Interface/Intermix Acreage by Jurisdiction**

| Jurisdiction               | Intermix (Acreage) | Interface (Acreage) |
|----------------------------|--------------------|---------------------|
| Alleman                    | 0                  | 0                   |
| Altoona                    | 0                  | 0                   |
| Ankeny                     | 127.11             | 0                   |
| Bondurant                  | 0                  | 0                   |
| Clive                      | 0                  | 0                   |
| Delaware Township          | 272.23             | 0                   |
| Des Moines                 | 1,191.54           | 0                   |
| Elkhart                    | 0                  | 0                   |
| Grimes                     | 1.87               | 0                   |
| Johnston                   | 73.19              | 0                   |
| Mitchellville              | 0                  | 0                   |
| Pleasant Hill              | 42.69              | 0                   |
| Polk City                  | 54.69              | 0                   |
| Polk County Unincorporated | 3,749.50           | 1,326.61            |
| Runnells                   | 0                  | 0                   |
| Saylor Township            | 7.43               | 0                   |
| Urbandale                  | 0                  | 0                   |
| West Des Moines            | 173.5              | 0                   |
| Windsor Heights            | 0                  | 0                   |
| <b>Total</b>               | <b>5,693.75</b>    | <b>1,326.61</b>     |

**Table 72. Potential Impacts of Grass or Wildland Fire on Community Lifelines**

| Lifelines         | Impact Type                                                                         | Description                                                                                                                                                                                                                                                                                                                           |
|-------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Safety & Security |  | Grass and wildland fire incidents pose immediate threats to public safety, requiring prompt evacuation and emergency response. Law enforcement and fire response teams play a crucial role in securing the area, managing the situation, and preventing further harm.                                                                 |
| Health & Medical  |  | Exposure to fires of any kind can lead to acute and chronic health issues, and severe burns or death. Medical facilities need to be prepared to treat victims of such exposure, which may require specialized treatment and specialized medical facilities with burn units capable of providing the care necessary for such exposure. |

|                                    |                                                                                    |                                                                                                                                                                                                                                                                                                         |
|------------------------------------|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Housing & Building Infrastructure  |   | Grass fires or wildland fires, depending on the fuels to support the fires in the area, can cause significant damage or destroy houses completely, even if briefly exposed to the fire. Houses that are exposed often must undergo complete reconstruction or substantial renovation to infrastructure. |
| Economic Stability                 |   | The economic impacts include the immediate costs of emergency response, cleanup, and recovery of property damage. These events often cause major disruption to local businesses, especially businesses in agriculture who lose substantial amounts of crops and other revenue generating losses.        |
| Environmental & Ecological Systems |  | Grass and wildland fires have potential to cause significant impacts on the environment and ecological systems, including habitat destruction, impacts to nutrient cycling in soils, air quality for species within, and impacting behaviors and patterns of wildlife within.                           |

#### A) People

The most devastating consequences of wildfire include the loss of lives and injuries, as rapidly spreading fires pose significant threats to those in their path. The destruction of homes, businesses, and infrastructure leads to substantial property damage, resulting in financial losses and the need for extensive recovery efforts. Evacuation orders disrupt daily lives, causing temporary or prolonged displacement with associated challenges in housing and resource access. The degradation of air quality due to wildfire smoke poses health risks, particularly for vulnerable populations. Economic disruption occurs as local businesses are damaged or forced to close, leading to job losses and reduced income. Critical infrastructure damage hinders recovery efforts, while the social fabric of communities may experience strain or resilience. Emergency response costs strain local budgets, and individuals and businesses may face challenges in obtaining insurance coverage or experience significant premium increases. Addressing these multifaceted impacts requires coordinated efforts in emergency response planning, community resilience initiatives, mental health support, and sustainable land management practices to reduce the risk and severity of wildfires.

#### B) Structures

Critical infrastructure, including power lines, bridges, and roads, can suffer damage or complete destruction, disrupting daily life and complicating emergency response efforts. Businesses, factories,

and commercial structures face operational disruptions, income loss, and potential long-term economic consequences for the broader community. Firefighters focus on protecting structures, employing strategies like creating firebreaks, but the risk of structure loss remains significant. Even after flames are extinguished, post-fire hazards in weakened structures, damaged utilities, and potential debris flow require careful assessment and remediation efforts. The destruction of structures has profound and lasting economic implications for communities, necessitating extensive rebuilding and reconstruction efforts.

#### C) Systems

Grass and wildland fires can damage any nearby infrastructure, including utility lines, roads, and communications towers. Often times damage to these utilities cause major delay and disruption as recovery and restoration can take up to weeks or months after significant fire events.

#### D) Natural, Historic, and Cultural Resources

Wildfires have multifaceted impacts on natural, historical, and cultural resources, shaping landscapes and communities in profound ways. The intense heat and rapid spread of wildfires can lead to the destruction of ecosystems, including the loss of diverse plant and animal species. Valuable habitats may be altered or entirely consumed, disrupting the delicate balance of local ecosystems. Wildfires can damage or destroy archaeological sites, historic structures, and artifacts. Moreover, the loss of vegetation and altered landscapes can impact water sources, affecting both the environment and the communities that rely on these resources. Preserving and restoring these resources in the aftermath of wildfires often requires coordinated efforts between environmental, historical preservation, and community-focused initiatives.

#### E) Community Activities

Community activities may be disrupted if grass or wildland fire incidents result in evacuations. Additionally, buildings may be exposed to burns or destroyed, which can require cancellation, postponement, or relocation of community activities.

#### Existing Development

Wildfires can be responsible for extensive damage to crops, the environment and occasionally residential or business facilities. Homes built in rural areas are more vulnerable since they are in closer proximity to land that is burned and homeowners are more likely to burn trash and debris in rural locations. The vulnerability of structures in rural areas is exacerbated due to the lack of hydrants in these areas for firefighting and the distance required for firefighting vehicles and personnel to travel to respond. Potential losses to crops and rangeland are additional concerns.

#### Future Development

Grass and wildland fires can pose significant challenges to future development. The vulnerability of critical infrastructure, including roads and utility systems, must be considered, with a



focus on fire-resistant designs and materials. Properties in fire-prone areas are at risk of damage or destruction, necessitating future development strategies that prioritize defensible space planning, fire-resistant landscaping, and building materials to mitigate property loss. Considering the potential increase in insurance costs for property owners, future development should explore ways to incentivize fire-resistant construction.

Climate Change

Climate change is exerting a substantial impact on grass and wildland fires in Polk County, Iowa. Rising temperatures contribute to drier conditions, increasing the susceptibility of vegetation to ignition and creating favorable circumstances for fires. Altered precipitation patterns, coupled with prolonged dry periods and drought conditions, elevate the risk of grass and wildland fires, as reduced moisture content in vegetation serves as fuel. The lengthening of the fire season due to climate change allows for extended periods with conducive conditions for ignition and fire spread. Changes in vegetation types and density, influenced by climate change, may alter fuel loads, affecting fire behavior and making certain areas more susceptible to ignition. More intense weather events associated with climate change, such as heatwaves and storms, contribute to conditions conducive to fire ignition or lightning strikes, further increasing the risk of fires.

Hazard Risk Score

Table 73. Grass or Wildland Fire Probability and Health Impact Ratings

| Health Severity | Community Impact | Public Health System Impact | Healthcare System Impact | Total Health Impact Score | Probability |
|-----------------|------------------|-----------------------------|--------------------------|---------------------------|-------------|
| 0               | 0                | 0                           | 0                        | 0                         | Occasional  |

3.3.12 HAZARDOUS MATERIALS INCIDENT

3.3.12.1 DESCRIPTION

A hazardous substance is one that may cause damage to persons, property, or the environment when released. Hazardous material releases can contaminate air, water, and soils and have the potential to cause injury or death. Dispersion can take place rapidly when released materials get carried by water and wind. While often accidental, hazardous materials releases can occur as a result of human carelessness, intentional acts, or natural hazards. When caused by natural hazards, these incidents are known as secondary events.

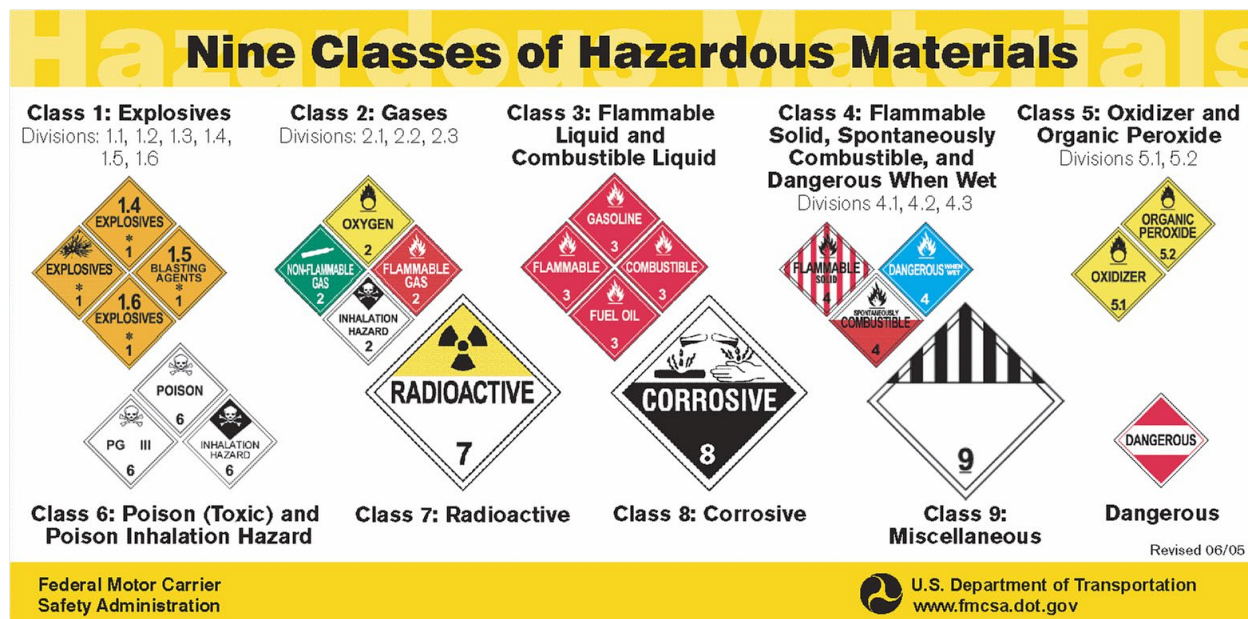
Hazardous materials are substances that are considered severely harmful to human health and the environment, as defined by the United States Environmental Protection Agency (EPA) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The EPA designates nearly 800 substances as hazardous and identifies many more as potentially hazardous due to their characteristics and the circumstances of their release.<sup>15</sup> Therefore, it is critical for

<sup>15</sup> US EPA, OLEM. "CERCLA Hazardous Substances Defined." Overviews and Factsheets, April 10, 2019. <https://www.epa.gov/epcra/cercla-hazardous-substances-defined>.

communities to understand the hazardous materials in their jurisdiction and take all reasonable steps to educate the public, reinforce safe handling, and prepare and practice a robust response to incidents involving hazardous materials.

Hazardous materials can include toxic chemicals, infectious substances, biohazardous waste and any materials that are explosive, corrosive, flammable or radioactive. The U.S. Department of Transportation divides hazardous materials into 9 categories, and these are illustrated in Figure 62.

Figure 62. U.S. DOT Classes of Hazardous Materials



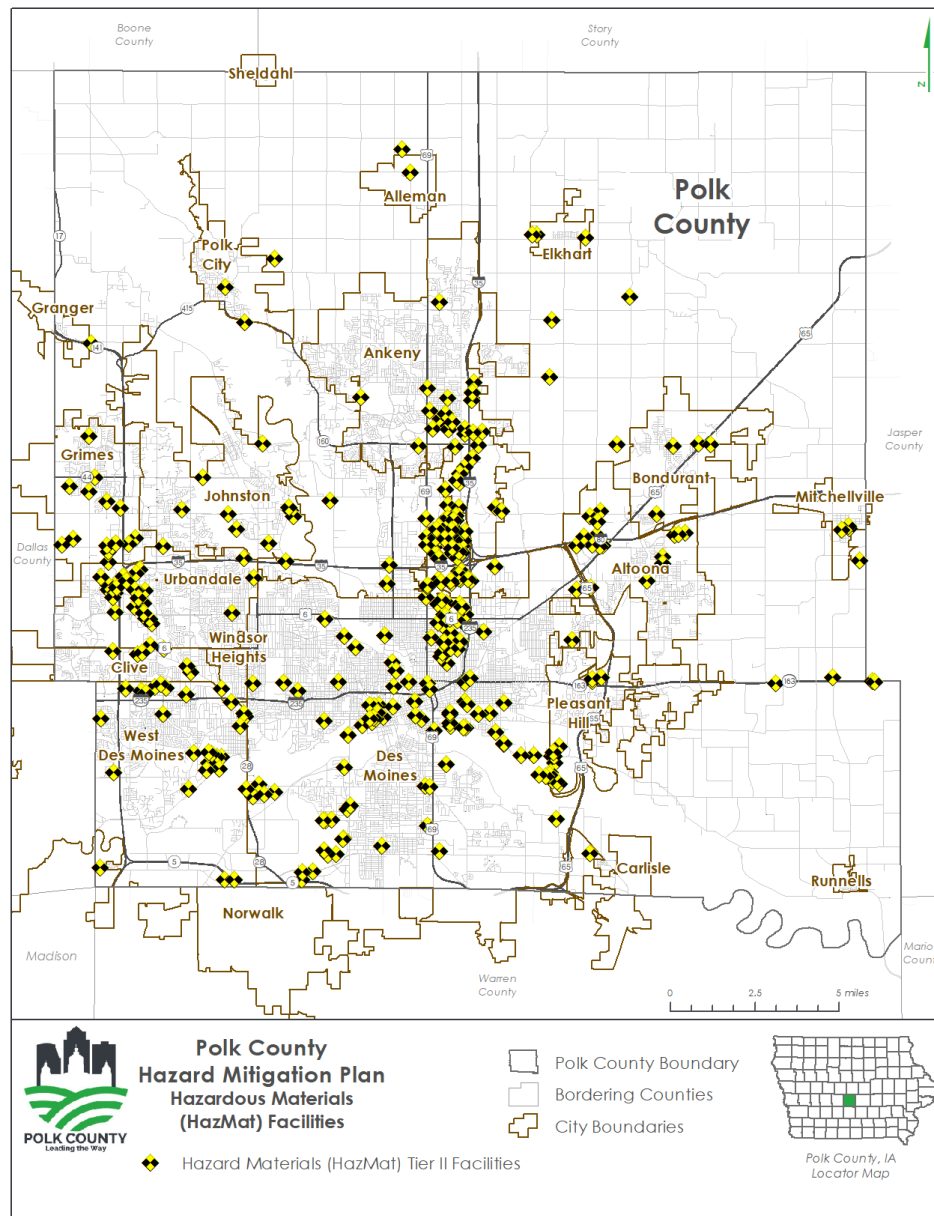
#### 3.3.12.2 LOCATION

An uncontrolled release of hazardous materials can occur virtually anywhere hazardous materials are present, including along transportation routes and at fixed-site facilities where hazardous materials are manufactured, used, or stored. So, all jurisdictions are considered to have at least some vulnerability to this hazard. People, pets, livestock, and vegetation in close proximity to facilities producing, storing, or transporting hazardous substances are at higher risk. Populations downstream, downwind, and downhill of a released substance are also at a higher risk of exposure to hazardous materials releases. Generally, hazardous materials incidents occur at a fixed site (storage, production, etc.), during transportation via a vehicle, or along pipelines.

**Fixed Hazardous Materials Incident** - A fixed hazardous materials incident is the accidental release of chemical substances or mixtures during production or handling at a fixed facility. In Polk County, many Tier II facilities are located in close proximity to major transportation routes including Interstate 80 and Interstate 35. According to the Iowa Department of Natural Resources, as of 2022, there were 337 sites in Polk County designated as Tier II Facilities under the Superfund Amendments and Reauthorization Act. Figure 63 shows the approximate locations of Tier II facilities in Polk County.



**Figure 63. Tier II Facilities in Polk County**



**Transportation Hazardous Materials Incident** - A transportation hazardous materials incident is the accidental release of chemical substances or mixtures during transport. Transportation-related hazardous materials incidents in Polk County can occur during rail transport or highway transport. Accidents involving rail shipments of hazardous materials typically fall into four general categories: track deterioration, equipment failures, human error, and other causes. Highway accidents involving hazardous materials pose a great potential for public exposure. Both nearby populations and motorists can be impacted and become exposed by accidents and releases. Generally speaking, the volume of

hazardous materials transported is greater in rail transport than highway transport due to the higher capacity in rail cars.

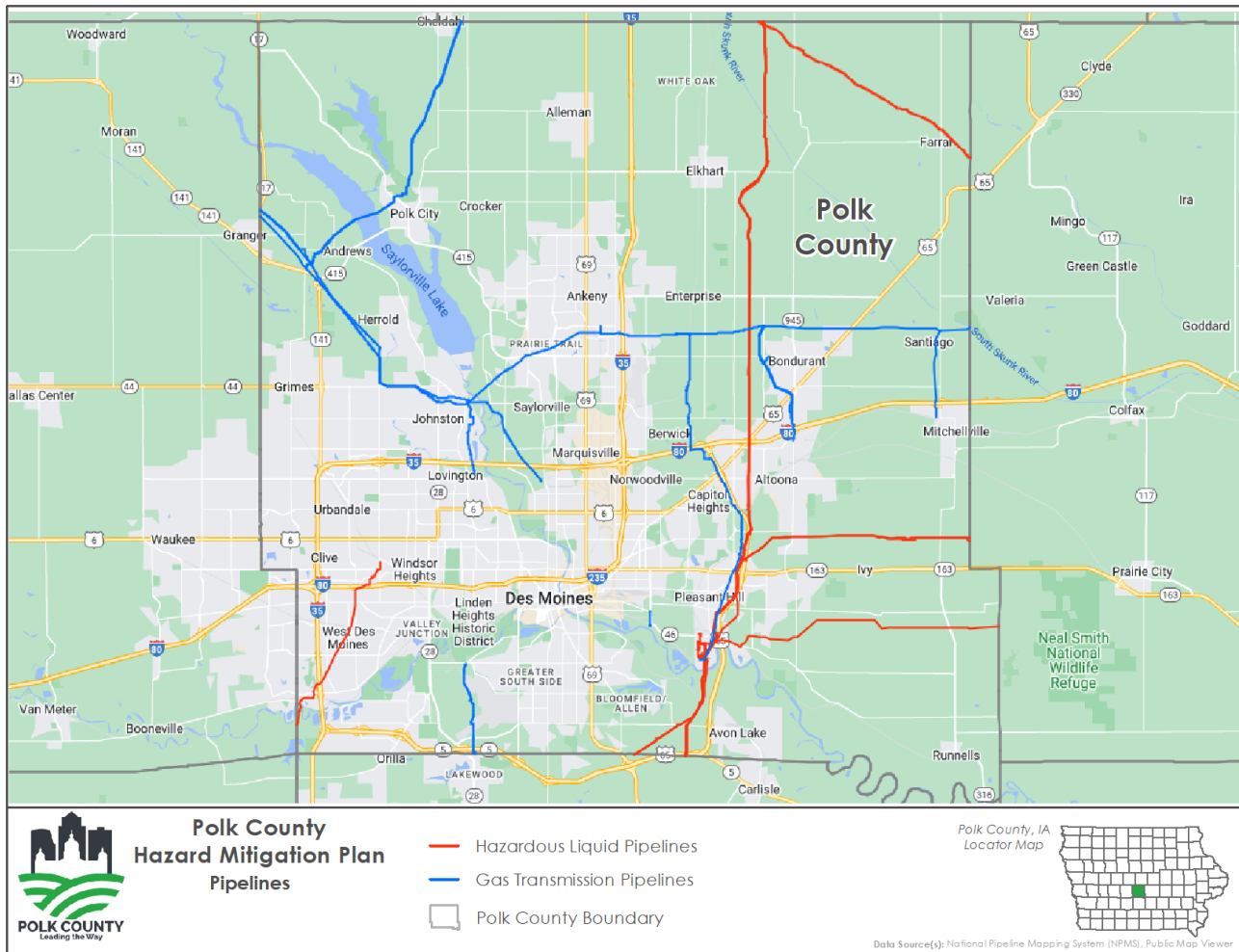
The location of Polk County and its extensive transportation network underscores the importance of transportation not only in the State, but nationwide. The interstate corridors of I-35 and I-80 are critical trade corridors for national freight movements, and segments of I-35 and I-80 within Polk County and the Des Moines metropolitan area have truck traffic counts above 13,000 vehicles per day. Other roadways within this area that experience higher truck volumes include U.S. 6, Iowa 141, and Iowa 160. Many other U.S. and state highways within Polk County and throughout the eight county area that comprise the Central Iowa Regional Transportation Planning Alliance (CIRTPA) also play an important role in freight movement across Iowa and the nation. Additionally, the area contains several rail corridors which are used by multiple major carriers to move hundreds of thousands of tons of freight each year.

The National Hazardous Materials Route Registry (NHMRR) is a listing, as reported by States and Tribal governments, for all designated and restricted roads and preferred routes for highway transportation of radioactive materials. In Iowa, the preferred routes for transportation of radioactive materials are Interstate 880, Interstate 29, Interstate 280, Interstate 80, and Interstate 35. However, it is important to acknowledge that deviations from NHMRR preferred routes are permitted when security concerns arise.

**Pipeline Incident** - 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.

According to the Pipelines and Hazardous Materials Safety Administration, there are approximately 250 miles of gas and hazardous liquid pipelines in Polk County. Figure 64 provides the locations of pipelines in Polk County. The data for this map consists of gas transmission pipelines and hazardous liquid trunklines. It does not contain gathering or distribution pipelines, such as lines which deliver gas to a customer's home. Therefore, not all pipelines in the County will be visible.

Figure 64. Pipelines in Polk County



#### 3.3.12.3 EXTENT

Hazardous materials vary greatly in the types of health risks they pose to humans. Individuals who are exposed to hazardous materials may face one or more of the following health risks:

**Thermal harm:** Thermal harm results from exposure to extreme temperatures. Thermal injuries can be external (from contacting, or being in close proximity to, a fire or other heat source) or internal (from inhaling fumes or heated air). Thermal injuries can also include frostbite from contact with low-temperature hazardous materials.

**Radiological harm:** Radiological harm results from exposure to radioactive materials. Different types of radiation have different energy levels, and not all types are dangerous. The most harmful types of radiation cannot be seen, felt, or smelled. The radiation that poses a threat to humans is ionizing radiation, which is strong enough to strip electrons from atoms and can damage living cells and DNA. Receiving a high dose of ionizing radiation in a short period of time can result in Acute Radiation

Syndrome, while lower doses can increase the likelihood of cancer and other longer-term health conditions.

**Asphyxiation:** Asphyxiation results from exposure to materials that reduce oxygen to levels that may cause suffocation. Asphyxiation typically occurs in confined spaces or with extremely concentrated forms of simple asphyxiants. Asphyxiants displace so much oxygen from the ambient atmosphere that the lungs can't supply enough oxygen to the body and the victim suffocates. Many asphyxiants (e.g., carbon dioxide, methane) are odorless and tasteless (unless odorants are added).

**Chemical harm:** Chemical harm results from exposure to chemicals, including poisons and corrosives. Injuries and illness vary by material. Chemical agents are classified according to the potential severity of their effects. More information on the effects of exposure to different chemicals is available on the Department of Health and Human Services (HHS) Chemical Hazards Emergency Medical Management (CHEMM) website.

**Etiological (biological) harm:** Etiological (or biological) harm results from exposure to biological materials, which include bacteria, viruses, and biological toxins. Symptoms of etiological harm are often delayed because the pathogens often require time to multiply sufficiently to cause illness in the person carrying the pathogen.

**Mechanical harm:** Mechanical harm results from exposure to, or contact with, fragmentation or debris scattered because of a pressure release, explosion, or boiling liquid expanding vapor explosion. Sources of injuries can occur fragmentation and flying debris, blast overpressure, and secondary blast injuries (such as being thrown into other objects). The degree of mechanical harm is closely related to the size of the blast and distance between the epicenter and the victim(s).

With a hazardous material release, there are multiple potentially exacerbating or mitigating circumstances that will affect its severity or impact. Mitigating conditions are precautionary measures taken in advance to reduce the impact of a release. Primary and secondary containment or shielding by sheltering-in-place protects people and property from the harmful effects of a hazardous material release. Exacerbating conditions, characteristics that can enhance or magnify the effects of a hazardous material release include:

- Weather conditions that affect how the hazard occurs and develops
- Micro-meteorological effects of buildings and terrain that alters dispersion of hazardous materials
- Non-compliance with building or fire codes and maintenance failures such as fire protection and containment features
- Type of material(s) released
- Distance from emergency response teams

- Training of emergency response teams/familiarity with hazardous material(s) properties
- Accessibility of area

The areas within closest proximity to the releases are generally at greatest risk, yet depending on the agent, a release can travel great distances or remain present in the environment for centuries in the case of radioactive materials.

Environmental hazard incidents within Polk County can range from minor petroleum spills to large facility-based incidents that lead to the loss of life, property, environment and economy. Environmental hazard and explosion incidents can contaminate soil and surface water, and groundwater supplies can result in many direct impacts on surrounding ecosystems. Local flora and fauna within hazard areas are also at risk. The application of salt to de-ice roads may impact groundwater and contaminate potable drinking water sources near major highway corridors and state highway routes in Polk County. The environmental impacts of hazardous material releases include:

Hydrologic effects, such as surface and groundwater contamination

- Other effects on water quality such as changes in water temperature
- Damage to streams, lakes ponds, estuaries, and wetland ecosystems
- Air quality effects, such as pollutants, smoke, and dust
- Loss of quality in landscape
- Reduced soil quality
- Damage to plant communities, including loss of biodiversity and damage to vegetation
- Damage or death to animals, through the degradation of habitat, pollution of drinking water, loss of biodiversity or disease

#### 3.3.12.4 PREVIOUS OCCURRENCES

In Iowa, hazardous materials spills are reported to the Department of Natural Resources. According to Iowa Administrative Code Chapter 131, *Notification of Hazardous Conditions*, any person manufacturing, storing, handling, transporting, or disposing of a hazardous substance must notify the Department of Natural Resources and the local police department or the office of the sheriff of the affected county of the occurrence of a hazardous condition as soon as possible but not later than six hours after the onset of the hazardous condition or the discovery of the hazardous condition. The Department of Natural Resources maintains a database of reported spills; according to this database, there have been 1,565 hazardous materials spills reported in Polk County since 1997. The cities of Des Moines, Ankeny, and Saylor Township are the three jurisdictions in Polk County with the most reported

hazardous materials spills. Table 74 lists the number of spills reported in different jurisdictions across Polk County, and Figure 65 maps these spills to provide additional geographic context.

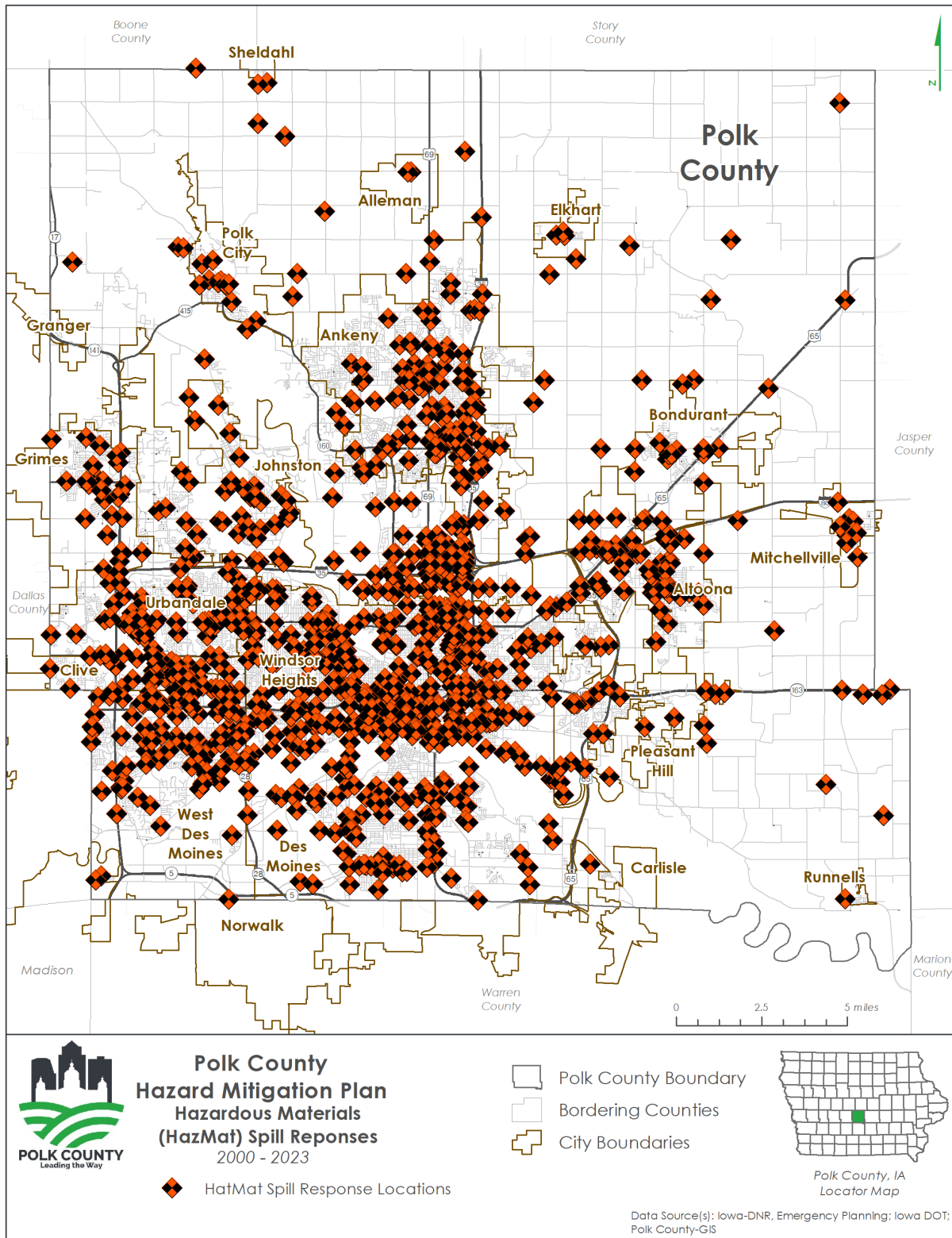
**Table 74. Hazardous Materials Spills in Polk County by Jurisdiction**

| <b>Jurisdiction</b>        | <b>Number of Reported Hazardous Materials Incidents</b> |
|----------------------------|---------------------------------------------------------|
| Alleman                    | 4                                                       |
| Altoona                    | 87                                                      |
| Ankeny                     | 154                                                     |
| Bondurant                  | 21                                                      |
| Carlisle                   | 1                                                       |
| Clive                      | 77                                                      |
| Delaware Township          | 20                                                      |
| Des Moines                 | 608                                                     |
| Elkhart                    | 3                                                       |
| Grimes                     | 29                                                      |
| Johnston                   | 53                                                      |
| Mitchellville              | 16                                                      |
| Pleasant Hill              | 45                                                      |
| Polk City                  | 14                                                      |
| Runnells                   | 1                                                       |
| Saylor Township            | 127                                                     |
| Sheldahl                   | 3                                                       |
| Urbandale                  | 103                                                     |
| West Des Moines            | 116                                                     |
| Windsor Heights            | 16                                                      |
| Unincorporated Polk County | 67                                                      |
| <b>Total Spills</b>        | <b>1,565</b>                                            |

Source: Iowa Department of Natural Resources



Figure 65. Hazardous Materials Spills in Polk County 2000 - 2023





Another source consulted to report previous Hazardous Materials Incidents is the Environmental Protection Agency’s Toxics Release Inventory (TRI). This inventory tracks the management of toxic chemicals that pose a threat to human health and the environment. U.S. facilities in certain industry sectors that manufacture, process, or otherwise use these chemicals in amounts above established levels must report how each chemical is managed through recycling, energy recovery, treatment, and releases to the environment. A “release” of a chemical means that it is emitted to the air or water, or placed in some type of land disposal.

The information submitted by facilities to the EPA and states is compiled annually as the Toxics Release Inventory or TRI, and is stored in a publicly accessible database in Envirofacts. According to the latest available data from TRI, there have been 3,847 uncontrolled releases of hazardous materials in Polk County between 1987 and 2022.

TRI data reflect releases and other waste management activities of chemicals, not whether (or to what degree) the public has been exposed to those chemicals. Release estimates alone are not sufficient to determine exposure or to calculate potential adverse effects on human health and the environment. TRI data, in conjunction with other information, can be used as a starting point in evaluating exposures that may result from releases and other waste management activities which involve toxic chemicals. The determination of potential risk depends upon many factors, including the toxicity of the chemical, the fate of the chemical, and the amount and duration of human or other exposure to the chemical after it is released.

3.3.12.5 PROBABILITY OF FUTURE OCCURRENCE

Based on the annual average of nearly 58 spills per year reported to Iowa DNR since 1997 (1,565 over approximately 27 years), the probability of future occurrence of hazardous materials incidents is assessed to be “Highly Likely.”

3.3.12.6 VULNERABILITY

Hazardous Materials incidents can have serious implications for community lifelines. These incidents can occur due to accidents, natural disasters, or, in rare cases, deliberate acts. The impacts of hazardous materials incidents on various community lifelines are shown below.

Table 75. Potential Impacts of Hazardous Materials Incidents on Community Lifelines

| Lifelines         | Impact Type                                                                         | Description                                                                                                                                                                    |
|-------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Safety & Security |  | HazMat incidents pose immediate threats to public safety, requiring prompt evacuation and emergency response. Law enforcement and HazMat response teams play a crucial role in |

| Lifelines                          | Impact Type                                                                         | Description                                                                                                                                                                                                                                                  |
|------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                    |                                                                                     | securing the area, managing the situation, and preventing further harm.                                                                                                                                                                                      |
| Health & Medical                   |    | Exposure to hazardous materials can lead to acute and chronic health issues. Medical facilities need to be prepared to treat victims of such exposure, which may require specialized treatment and decontamination procedures.                               |
| Housing & Building Infrastructure  |    | Chemical spills or gas leaks can lead to the contamination of buildings, requiring evacuation and extensive cleanup before they are safe for reoccupation. In severe cases, infrastructure may be permanently damaged.                                       |
| Economic Stability                 |   | The economic impacts include the immediate costs of emergency response, cleanup, and potential fines, as well as longer-term effects on local businesses and industries, especially if the incident leads to a loss of public trust or environmental damage. |
| Environmental & Ecological Systems |  | Spills and leaks can have devastating effects on the environment, contaminating soil, water, and air, and harming wildlife. Cleanup and remediation efforts can be extensive and costly.                                                                     |

#### A) People

People, pets, livestock, and vegetation in close proximity to facilities producing, storing, or transporting hazardous substances are at higher risk. Populations downstream, downwind, and downhill of a released substance are particularly vulnerable. Depending on the characteristics of the substance released, more people, in a larger area may be in danger from explosion, absorption, injection, ingestion, or inhalation. The elderly, children, and the physically and mentally handicapped are most vulnerable because of the lack of mobility to escape the hazard. Additionally, people whose primary language is not English may not understand warnings and evacuation orders given in English.

#### B) Structures

Hazardous materials incidents can lead to the contamination of buildings, requiring evacuation and extensive cleanup before they are safe for reoccupation. Depending on the agent spilled/leaked, fires and explosions may occur. Explosions can destroy entire buildings, and chemical fires can cause extensive structural damage.

#### C) Systems

Fires and explosions may occur as a result of hazardous materials incidents, and any nearby infrastructure – utility lines, roads, communications towers, etc. – may be damaged. Additionally, contamination is a concern for water systems. If groundwater is contaminated, wells may pull polluted water into the larger water system. Spills which occur near railways and highways can force authorities to close these routes, and significant events may destroy the routes. Many of the Tier II facilities in Polk County are located along major roadways like Interstate 80 and Interstate 35.

#### D) Natural, Historic, and Cultural Resources

Hazardous materials incidents can quickly contaminate the natural environment. Hazardous materials can pollute soil, surface water, groundwater, and even the atmosphere. The impact of hazardous materials contaminating the natural environment can last decades, and remedial action is often required to restore the affected area. Flora and fauna which rely on the natural environment can also suffer the consequences of hazardous materials spills, and disruptions to the local ecosystem can have cascading effects. Contaminated water may be unusable for irrigation, which could have dire consequences for local agriculture.

#### E) Community Activities

Community activities may be disrupted if hazardous materials incidents result in evacuations. Additionally, buildings may be contaminated or destroyed, and this will require cancellation, postponement, or relocation of community activities.

All jurisdictions in the planning area are considered to have some vulnerability of hazardous materials spills can effect virtually any part of the county. Even locations far from the site of a spill can be impacted if the hazardous materials contaminate the ground or are carried through the air. Most of the hazardous materials incidents are localized and are quickly contained or stabilized. Depending on the characteristic of the hazardous material or the volume of product involved, the affected area can be as small as a room in a building or as large as 5 square miles or more. Many times, additional regions outside the immediately affected area are evacuated for precautionary reasons. More widespread effects occur when the product contaminates the municipal water supply or water system such as river, lake, or aquifer.

Existing Development

The impact of this type of disaster will likely be localized to the immediate area surrounding the incident. The initial concern will be for people, then the environment. If contamination occurs, the spiller is responsible for the cleanup actions and will work closely with responders in the local jurisdiction, the Iowa Department of Natural Resources, and the Environmental Protection Agency to ensure that cleanup is done safely and in accordance with federal and state laws.

As mentioned, it is difficult to determine the potential losses to existing development because of the variable nature of a hazardous materials spill. For example, a spill of a toxic airborne chemical in a populated area could have greater potential for loss of life. By contrast a spill of a very small amount of a chemical in a remote rural area would be much less costly and possibly limited to remediation of soil.

To analyze critical facilities at risk in the planning area, the planning committee compiled an inventory of critical and essential facilities and infrastructure in the planning area. A comparison was made with the locations of Tier II facilities to determine those critical/essential facilities that are within ½ mile and 1 mile of Tier II fixed chemical facilities. There are 157 critical facilities within a ½ mile radius of Tier II facilities and 256 within a 1 mile radius.

Future Development

Continued population growth within many communities in Polk County is likely to increase the overall exposure to this hazard. When feasible, future development should be kept upwind/upstream of fixed facilities which handle large volumes of hazardous materials. Additionally, new industry is encouraged to be mindful of their surroundings and avoid placing hazardous materials unnecessarily close to existing development and natural assets such as lakes and rivers. Industry leaders are also encouraged to work local law enforcement and emergency services to ensure that authorities have a proper understanding of the volume and characteristics of hazardous materials present.

Climate Change

Climate change is unlikely to have a noticeable impact on the frequency and severity of hazardous materials incidents in Polk County. Transportation, manufacturing, and storage of hazardous materials is anticipated to continue independent of changing weather conditions.

Hazard Risk Score

Table 76. Hazardous Materials Incident Probability and Health Impact Ratings

| Health Severity | Community Impact | Public Health System Impact | Healthcare System Impact | Total Health Hazard Score | Probability   |
|-----------------|------------------|-----------------------------|--------------------------|---------------------------|---------------|
| 2               | 1                | 3                           | 2                        | 8                         | Highly Likely |

#### 3.3.13 HUMAN DISEASE

##### 3.3.13.1 DESCRIPTION

A human disease outbreak is a medical, health or sanitation threat to the general public (such as contamination, epidemic, plague and insect infestation). The outbreak may be spread by direct contact with an infected person or animal, ingesting contaminated food or water, vectors such as mosquitoes or ticks, contact with contaminated surroundings such as animal droppings, infected droplets, or by aerosolization.

Iowa's public health and health care communities work to protect Iowans from infectious diseases and preserve the health and safety of Iowans by rapidly identifying and containing a wide range of biological agents. Local public health departments and the Iowa Department of Public Health, Center for Acute Epidemiology investigate disease "outbreaks" of routine illnesses. There are a number of biological diseases/agents that are of concern to the state of Iowa such as vaccine preventable disease, foodborne disease and community associated infections having significant impact on the morbidity of Iowans. The following descriptions are general and it should be noted that individuals may experience more or less severe consequences.

##### ***Vaccine Preventable Disease***

In the U.S., there are common infectious diseases that include polio, measles, diphtheria, pertussis, rubella, mumps, tetanus and *Haemophilus influenzae* type b that are now rare because of widespread use of vaccines. Routine childhood immunizations have helped protect both individuals and communities each year saving nearly \$14 billion in direct medical costs and

\$69 billion in costs to society according to the U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. Vaccine preventable diseases continue to threaten the health of Iowans when children, adolescents and adults are un-immunized or under-immunized.

##### ***Influenza***

Influenza (flu) is a viral infection of the nose, throat, bronchial tubes, and lungs. There are two main types of virus: A and B. Each type includes many different strains, which tend to change each year. In Iowa, influenza occurs most often in the winter months. Illnesses resembling influenza may occur in the summer months, but these are usually the result of other viruses that exhibit symptoms commonly referred to as influenza-like illness or ILI.

Influenza is highly contagious and is easily transmitted through contact with droplets from the nose and throat of an infected person during coughing and sneezing. Typical symptoms include headache, fever, chills, cough, and body aches. Although most people are ill for only a few days some may have secondary infections, such as pneumonia, and may need to be hospitalized.

Anyone can get influenza, but it is typically more serious in the elderly and people with chronic illnesses such as cancer, emphysema, or diabetes or weak immune systems. It is estimated that thousands of people die each year in the United States from flu or related complications.

In 2012, influenza and pneumonia combined was the 8<sup>th</sup> leading causes of death in Iowa with 657 deaths.

#### ***Pandemic Influenza***

A pandemic is a global disease outbreak. A pandemic flu is a human flu that causes a global outbreak, or pandemic, of serious illness. A flu pandemic occurs when a new influenza virus emerges for which people have little or no immunity, and for which there is no vaccine.

This disease spreads easily person-to-person, causing serious illness, and can sweep across the country and around the world in a very short time. The Centers for Disease Control and Prevention (CDC) has been working closely with other countries and the World Health Organization to strengthen systems to detect outbreaks of influenza that might cause a pandemic and to assist with pandemic planning and preparation.

During 2009 and 2010 health professionals around the globe worked to combat the H1N1 influenza virus. This relatively mild and stable influenza virus circulated across the globe and caused one of the most robust worldwide vaccination campaigns since the 1970s. Health professionals continue to monitor the possibility of an avian (bird) flu pandemic associated with a highly pathogenic avian H5N1 virus. Since 2003, avian influenza has been spreading through Asia. A growing number of human H5N1 cases contracted directly from handling infected poultry have been reported in Asia, Europe, and Africa, and more than half the infected people have died. There has been no sustained human-to-human transmission of the disease, but the concern is that H5N1 will evolve into a virus capable of human-to-human transmission.

An especially severe influenza pandemic could lead to high levels of illness, death, social disruption, and economic loss. Impacts could range from school and business closings to the interruption of basic services such as public transportation, health care, and the delivery of food and essential medicines.

#### **COVID-19**

In December 2019 the SARS-CoV-2 virus (COVID-19) was identified in China. The disease rapidly began to spread around the globe, and the first case in the U.S. was confirmed on January 21, 2020. The first case of COVID-19 within the State of Iowa was confirmed on March 8, 2020. The disease would go on to be one of the most significant events in recent history, and day-to-day disruptions would rival those of the terrorist attacks on September 11, 2001. Millions of people were hospitalized, schools and workplaces would shift to remote work (work from home), and economies grappled with loss of revenues as many businesses had to reduce or temporarily cease operations due to regulations intended to reduce the spread of COVID-19. As of 2024, the planning area has largely

returned to normal, although impacts of the pandemic can still be found. According to aggregate data from the CDC and state and local health agencies, COVID-19 has resulted in 145,914 hospitalizations and 1,201 deaths in Polk County through March 13, 2024.

#### 3.3.13.2 LOCATION

Due to the contagious nature and ubiquity of disease, residents in all jurisdictions within the planning area are equally vulnerable.

#### 3.3.13.3 EXTENT

The hazard of human disease comprises a wide variety of illnesses with diverse potential impacts. Human disease can be small outbreaks of minor contagious illnesses such as the common cold, or widespread pandemics leading to mass fatalities.

#### 3.3.13.4 PREVIOUS OCCURRENCES

There have been five acknowledged pandemics in the past century:

- **2020 COVID-19 Pandemic** – The COVID-19 pandemic began in late 2019 and spread around the world in 2020. The virus resulted in roughly 7 million deaths worldwide, with approximately 1.2 million deaths in the U.S.
- **2009 H1N1 Influenza**—The 2009 H1N1 Pandemic Influenza caused 659 hospitalizations with lab confirmed H1N1 since 9/1/09 and resulting in 41 fatalities. Typically, people who became ill were the elderly, the very young and people with chronic medical conditions and high risk behaviors.
- **1968–69 Hong Kong flu (H3N2)** —This strain caused approximately 34,000 deaths in the United States and more than 700,000 deaths worldwide. It was first detected in Hong Kong in early 1968 and spread to the United States later that year. Those over age 65 were most likely to suffer fatal consequences. This virus returned in 1970 and 1972 and still circulates today.
- **1957–58 Asian flu (H2N2)** —This virus was quickly identified because of advances in technology, and a vaccine was produced. Infection rates were highest among school children, young adults, and pregnant women. The elderly had the highest rates of death. A second wave developed in 1958. In total, there were about 70,000 deaths in the United States. Worldwide deaths were estimated between one and two million.
- **1918–19 Spanish flu (H1N1)** —This flu is estimated to have sickened 20-40 percent of the world’s population. Over 20 million people lost their lives. Between September 1918 and April 1919, 500,000 Americans died. The flu spread rapidly; many died within a few days of infection, others from secondary complications. The attack rate and mortality were highest among adults 20-50 years old; the reasons for this are uncertain.



3.3.13.5 PROBABILITY OF FUTURE OCCURRENCE

There are many endemic diseases that have the potential to create pandemics. Because these diseases have not yet been eradicated, future occurrence of human disease is virtually guaranteed. Periods of high spread and occurrence of the flu and common cold are expected on an annual basis. Due to the ubiquity of disease among humans, the possibility of human disease in any given year is “very likely” as defined in the methodology section.

3.3.13.6 VULNERABILITY

Most disease outbreaks that cause critical numbers of deaths are communicable in nature, meaning that they are spread from person to person. The key to reducing the critical nature of the event is to stop the spread of disease. This is generally done in three ways: (1) identification and isolation of the ill, (2) quarantine of those exposed to the illness to prevent further spread, and (3) education of the public about methods to prevent transmission. The public health and health care providers in Polk County routinely utilize all three methods to reduce morbidity and mortality from infectious disease.

The CDC estimates 76 million people suffer foodborne illnesses each year in the United States, accounting for 325,000 hospitalizations and more than 5,000 deaths. Foodborne disease is extremely costly. Health experts estimate that the yearly cost of all foodborne diseases in this country is \$5 to \$6 billion in direct medical expenses and lost productivity. Infections with the bacteria *Salmonella* alone account for \$1 billion yearly in direct and indirect medical costs.

The ease and speed with which human disease can spread means that all communities in Polk County are equally vulnerable to this hazard. The potential impacts of this hazard on different community lifelines are shown below.

Table 77. Potential Impacts of Human Disease on Community Lifelines

| Lifelines        | Impact Type                                                                         | Description                                                                                                                                                                                                                                                                                                          |
|------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Health & Medical |  | The most direct impact of a pandemic is on health services. Hospitals and healthcare facilities can become overwhelmed with patients, leading to a strain on resources, personnel, and infrastructure. The need for medical supplies, ventilators, and personal protective equipment can surge beyond normal levels. |

| Lifelines              | Impact Type                                                                         | Description                                                                                                                                                                                                                                                                           |
|------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Food, Water, & Shelter |    | Supply chains for essential goods, including food and water, can be disrupted due to illness-related workforce shortages or quarantine measures. Ensuring access to these basic necessities becomes a critical challenge, particularly for vulnerable populations.                    |
| Transportation         |    | Pandemics can lead to reduced transportation services due to decreased demand, illness among transportation workers, or quarantine measures. This can affect the movement of goods and people, including the delivery of essential supplies and access to healthcare.                 |
| Communications         |  | Reliable communication is crucial for disseminating public health information, guidelines, and updates during a pandemic. The increased demand for internet and telecommunication services can strain existing communication networks, especially with more people working from home. |
| Energy                 |  | While energy infrastructure may be less directly impacted, workforce shortages due to illness can affect the maintenance and operation of power plants and the energy grid.                                                                                                           |
| Safety & Security      |  | The need for public safety and security services can increase, as pandemics can lead to heightened public anxiety, the enforcement of quarantine measures, and the potential for civil unrest.                                                                                        |

| Lifelines          | Impact Type                                                                       | Description                                                                                                                                                                                          |
|--------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Economic Stability |  | Pandemics can have a profound impact on the economy, affecting businesses, employment rates, and financial stability. Sectors such as tourism, hospitality, and retail can be particularly hard hit. |

A) People

Although infectious diseases do not respect geographic boundaries, several populations in Polk County are at increased risk to infectious diseases. Communicable diseases are most likely to spread quickly in institutional settings such as prisons, dormitories, long-term care facilities, day care facilities, and schools. Many diseases can be controlled through the widespread utilization of vaccines. Pandemics are generally thought to be the result of novel strains of viruses. Because of the process utilized to prepare vaccines, it is impossible to have vaccine pre-prepared to combat pandemics. A portion of the human and financial cost of a pandemic is related to lag time to prepare a vaccine to prevent future spread of the novel virus. In some cases, current vaccines may have limited activity against novel strains. According to data from the Centers for Disease Control and Prevention (CDC), 70% of Polk County residents and 95% of Polk County residents aged 65 or older were vaccinated against COVID-19. This indicates a moderate level of participation in vaccine programs reducing Polk County's disease risk.

B) Structures

Buildings, infrastructure, and critical facilities are not vulnerable to this hazard. It affects only persons susceptible to the illness. The impacts and potential losses are largely economic and are dependent on the type, extent and duration of the illness.

C) Systems

Transportation, electricity, internet, and most other services are unlikely to be disrupted by human diseases. Water systems may need to be monitored for possible waterborne diseases which could be spread to the community.

D) Natural, Historic, and Cultural Resources

Human diseases are unlikely to have any noticeable impact on natural, historic, and cultural resources in the planning area.

E) Community Activities

Human disease can cause considerable disruption to normal community activities. Recent events have necessitated new strategies such as remote work and virtual conferences to enable continuation of critical services. Schools, courtrooms, and many other sites altered the way they function throughout the COVID-19 pandemic.

Existing Development

While human diseases do not cause physical harm to existing development, such events may cause a shift in what is considered desirable. As an example, large, open office spaces may become less appealing for companies that have a significant number of employees which work from home. Furthermore, older structures may have fewer outlets and outdated internet connections, and this may make it harder for these structures to compete with newer development on the market.

Future Development

Future development is unlikely to have a major impact on occurrences of human disease, but new development may incorporate some of the lessons learned through the COVID-19 pandemic. Examples of this include apartment buildings offering amenities to make remote work more feasible, companies needing smaller volumes of office space, and better heating, ventilation, and air conditioning systems which filter out airborne pathogens. Additionally, healthcare systems must adapt or expand in order to continue provide adequate healthcare for an increasing population.

Climate Change

At present there is a scarcity of evidence directly linking climate change to increased occurrences and severity of human diseases. However, the impacts of climate change may have indirect consequences on human diseases; changing conditions may lead to human migration, and this may bring previously distant populations closer to one another. Additionally, animals may also move close to human populations as changing weather patterns – coupled with human activities such as deforestation – erode the viability of existing habitats.

Hazard Risk Score

Table 78. Human Disease Probability and Health Impact Ratings

| Health Severity | Community Impact | Public Health System Impact | Healthcare System Impact | Total Health Hazard Score | Probability   |
|-----------------|------------------|-----------------------------|--------------------------|---------------------------|---------------|
| 3               | 3                | 4                           | 3                        | 13                        | Highly Likely |

#### 3.3.14 INFRASTRUCTURE FAILURE

##### 3.3.14.1 DESCRIPTION

Critical infrastructure involves several different types of facilities and systems including: communications, energy (electricity and natural gas), other utilities such as water and sewer systems, and transportation facilities such as roads and bridges. Failure of these utilities or other components of the infrastructure in the planning area can seriously impact public health, functioning of communities and the economy. Disruption of any of these services could result from the majority of the natural, technological, and manmade hazards described in this plan. In addition to a secondary or cascading impact from another primary hazard, utilities and infrastructure can fail as a result of faulty equipment, lack of maintenance, degradation over time, or accidental damage such as damage to buried lines or pipes during excavation.

It is worth noting that, according to FEMA Hazard Mitigation Assistance (HMA) guidance, mitigation projects for mitigating infrastructure failure as a standalone hazard are not eligible for FEMA HMA grant funding. We are concerned about mitigation efforts for this hazard, but more in-depth analyses of this hazard (in relation to mitigation) is handled by other agencies such as the Iowa Utilities Board and Public Works departments.

##### ***Communications Failure***

Communications failure is the widespread breakdown or disruption of normal communication capabilities. This could include major telephone outages, internet interruption, loss of cellular telephone service, loss of local government radio facilities, long-term interruption of electronic broadcast services, or 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 communications systems to effectively protect citizens. In addition, business and industry rely heavily on various modes of communication. Mechanical failure, traffic accidents, power failure, line severance, and weather can all affect communications systems and disrupt service. Disruptions and failures can range from localized and temporary to widespread and long-term.

The types of hazards and impacts to internet and telecommunications infrastructure are very similar to electric power supply. Land line phone lines often utilize the same poles as electric lines. So, when weather events such as windstorm or winter weather cause lines to break, both electricity and telephone services experience outages. With the increasing utilization of cellular phones, hazard events such as tornado that can damage cellular repeaters can cause outages. In addition, during any hazard event, internet and telecommunications systems can become overwhelmed due to the surge in call/usage volume.

##### ***Energy Failure***

Energy failure includes interruption of service to electric, petroleum, or natural gas. Disruption of electric power supply can be a cascading impact of several other hazards. Electric power is the type of energy failure that is most often a secondary impact of other hazard events. The most common hazards analyzed in this plan that disrupt power supply are: flood, tornado, windstorm, and winter weather as these hazards can cause major damage to power infrastructure. To a lesser extent, extreme temperatures, dam and levee failure, lightning, and terrorism can disrupt power. Extreme heat can disrupt power supply when air conditioning use spikes during heat waves which can cause brownouts. Dam and levee failure, are similar to flood in that infrastructure can be damaged or made inaccessible by water. Lightning strikes can damage substations and transformers, but is usually isolated to small areas of outage. Many forms of terrorism could impact power supply either by direct damage to infrastructure or through cyber-terrorism targeting power supply networks.

Electricity in Polk County is provided by: MidAmerican Energy, Interstate Power and Light Company, Midland Power Rural Electric Cooperative, Consumer's Energy Rural Electric Cooperative, and Carlisle Municipal Energy. Natural gas providers in Polk County include MidAmerican Energy, Consumers Energy, Black Hills Energy, and Alliant/Interstate Power and Light.

Primary hazards that can impact natural gas and oil pipelines are earthquake, expansive soils, land subsidence, landslide, and terrorism. Interstate pipelines connect the local distribution system to the gas suppliers and to natural gas hubs. Polk County has two pipeline connections to the Northern Natural Gas Company transportation system (now owned by MidAmerican Energy). The primary connection is to the City of Boone, where several pipeline branches converge. MidAmerican recently built a second smaller natural gas pipeline connecting the County to pipeline systems in the southern part of the State.

#### ***Other Utility Failure***

Interruption of other utilities such as water and sewer systems can be a devastating, costly impact. The primary hazards that can impact water supply systems are: drought, flood, hazardous materials, and terrorism. (Note: Terrorism is not profiled in this plan). Winter storm can also impact water supply if low temperatures cause failure/breakage of water infrastructure. The primary hazard that impacts wastewater/sewer systems is flood (flash and fluvial).

#### ***Transportation Infrastructure Failure***

Failure of transportation infrastructure is a growing concern across the U.S. In 2022, concerns about deteriorating transportation infrastructure and increasing fatalities led the U.S. Secretary of Transportation to state that the U.S. faces a "crisis on our roadways." While some level of road maintenance is to be expected – repairing potholes is a seasonal activity – there is unease about the state of large structures like bridges, as well as the broader transportation network. Each year, the American Society of Civil Engineers (ASCE) produces infrastructure report cards for U.S. states. The 2023 report card gave Iowa a D+ grade for overall bridge infrastructure. According to the report, one in every five bridges in Iowa is rated poor, giving the state the worst ranking in the nation by number of poor bridges, and seventh worst by poor bridge deck area. Reducing the number of poor bridges is an

Iowa DOT priority, and over the last four years the department achieved a 26% reduction in state-owned poor bridges. However, all but 30 of Iowa's 4,599 poor bridges are owned by cities and counties. Bridges which are no longer in adequate condition are understandably more vulnerable to various hazards including but not limited to, tornadoes, windstorms, and flooding.

#### 3.3.14.2 LOCATION

The entire planning area is at risk to all types of infrastructure failure included in the hazard description section, either from primary failure due to malfunction, degradation, or accidental or intentional damage or as a result of a secondary impact related to another hazard event. Additional information is provided for specific types of infrastructure based on available data.

Polk County is well served for internet access and broadband services. Des Moines is the center of Iowa's statewide fiber optic network, installed by the state of Iowa in the early 1990s, which is now administered by the Iowa Communications Network.

Table 79 provides the names of electric, natural gas, and landline telephone service providers for each jurisdiction in Polk County. The electrical service area map for Polk County is shown in Figure 66.

**Table 79. Electric, Natural Gas, and Landline Telephone Service Providers in Polk County**

| <b>Jurisdiction</b>   | <b>Electric Service Providers</b>                       | <b>Gas Service Providers</b>           | <b>Landline Telephone Service Providers</b> |
|-----------------------|---------------------------------------------------------|----------------------------------------|---------------------------------------------|
| Unincorporated County | MidAmerican Energy<br>Midland Power<br>Consumers Energy | MidAmerican Energy                     | Windstream Communications                   |
| City of Alleman       | MidAmerican Energy<br>Consumers Energy                  | MidAmerican Energy                     | Windstream Communications                   |
| City of Altoona       | MidAmerican Energy                                      | MidAmerican Energy                     | CenturyLink<br>McLeodUSA                    |
| City of Ankeny        | MidAmerican Energy<br>Consumers Energy                  | MidAmerican Energy<br>Consumers Energy | CenturyLink<br>McLeodUSA                    |
| City of Bondurant     | MidAmerican Energy                                      | MidAmerican Energy                     | CenturyLink<br>McLeodUSA                    |
| City of Carlisle      | Carlisle Municipal<br>MidAmerican Energy                | MidAmerican Energy                     | CenturyLink<br>McLeodUSA                    |
| City of Clive         | MidAmerican Energy                                      | MidAmerican Energy                     | CenturyLink<br>McLeodUSA                    |
| City of Des Moines    | MidAmerican Energy                                      | MidAmerican Energy                     | CenturyLink<br>McLeodUSA                    |
| City of Elkhart       | MidAmerican Energy                                      | MidAmerican Energy                     | Windstream Communications                   |
| City of Granger       | MidAmerican Energy                                      | Black Hills Energy                     | CenturyLink<br>McLeodUSA                    |
| City of Grimes        | MidAmerican Energy                                      | Black Hills Energy                     | CenturyLink<br>McLeodUSA                    |
| City of Johnston      | MidAmerican Energy                                      | MidAmerican Energy                     | CenturyLink<br>McLeodUSA                    |
| City of Mitchellville | MidAmerican Energy                                      | MidAmerican Energy                     | CenturyLink                                 |
| City of Norwalk       | MidAmerican Energy                                      | MidAmerican Energy                     | CenturyLink<br>McLeodUSA                    |

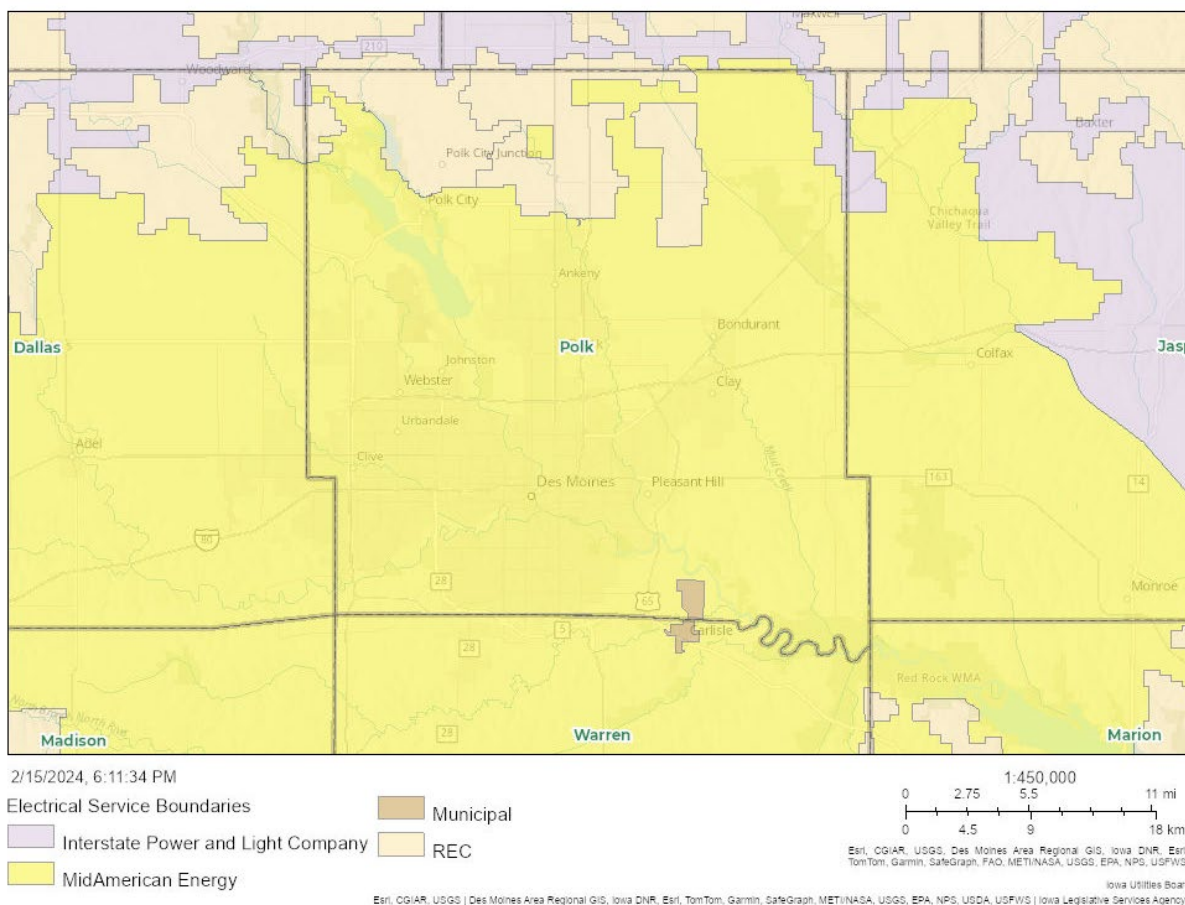


### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                         |                                    |                                    |                           |
|-------------------------|------------------------------------|------------------------------------|---------------------------|
| City of Pleasant Hill   | MidAmerican Energy                 | MidAmerican Energy                 | CenturyLink McLeodUSA     |
| City of Polk City       | MidAmerican Energy                 | MidAmerican Energy                 | CenturyLink McLeodUSA     |
| City of Runnells        | MidAmerican Energy                 | Not Reported                       | CenturyLink McLeodUSA     |
| City of Sheldahl        | Alliant/Interstate Power and Light | Alliant/Interstate Power and Light | Windstream Communications |
| City of Urbandale       | MidAmerican Energy                 | MidAmerican Energy                 | CenturyLink McLeodUSA     |
| City of West Des Moines | MidAmerican Energy                 | MidAmerican Energy                 | CenturyLink McLeodUSA     |
| City of Windsor Heights | MidAmerican Energy                 | MidAmerican Energy                 | CenturyLink McLeodUSA     |

Source: Iowa Utilities Board

**Figure 66. Electrical Service Area Boundaries Polk County**



There are relatively few private wells supplying potable water within Polk County, although the planning team acknowledges that there are a number of unknown abandoned or disused wells that might have an impact on surface water, and may or may not have been properly abandoned. Instead, most water is provided by public water suppliers, both municipal and private. The Des Moines Water Works is the largest public water supplier, serving residential and commercial customers within an approximately 50-mile radius around the City of Des Moines. Water comes directly from the Des

Moines and Raccoon Rivers and from an infiltration gallery or radial collector wells in the sands and gravels along the Raccoon River. Water is treated prior to distribution at the Fleur Drive treatment plant in the City of Des Moines and a new facility at Maffitt Reservoir southwest of the Des Moines metro area. Des Moines Water Works sells water to many smaller public water suppliers and other entities in Central Iowa. Des Moines Water Works sells water to the cities of Ankeny, Bondurant, Clive, Johnston, Pleasant Hill, Polk City and West Des Moines, to the local water systems in Berwick and Saylorville, and to the Southeast Polk and Xenia Rural Water Districts. These purchasers of water generally maintain their own distribution systems, billing, and other services.

While the water supply comes from Des Moines Water Works, rural water systems located in the unincorporated areas operate the distribution networks. Most of the southeast portion of the county is served the Southeast Polk Rural Water District, the northwestern portion by the Xenia Rural Water District, and the northeastern corner by the Central Iowa Water Association. Water treatment and other similar facilities are included in the critical facilities list used in analyses throughout this plan.

According to the Iowa Department of Transportation, there are 543 bridge structures in Polk County. The average daily traffic among all 543 bridges in Polk County is 6,553,541, which is an average of 12,069 per bridge. Of these 543 bridges, 321 are considered to be in “good” condition, 192 in “fair” condition, and 32 are considered “structurally deficient”. Table 80 shows the available data for structurally deficient and fair condition bridges among different Polk County jurisdictions. None of the bridges along the Interstate network in Polk County (I-80, I-35, I-235) are considered structurally deficient.

**Table 80. Fair and Structurally Deficient Bridges in Polk County by Jurisdiction**

| <b>Jurisdiction</b> | <b>Number of “Fair” Condition Bridges</b> | <b>Number of “Structurally Deficient” Bridges</b> |
|---------------------|-------------------------------------------|---------------------------------------------------|
| Alleman             | 1                                         | 0                                                 |
| Altoona             | 0                                         | 0                                                 |
| Ankeny              | 4                                         | 0                                                 |
| Bondurant           | 2                                         | 1                                                 |
| Clive               | 5                                         | 0                                                 |
| Deleware Township   | N/A                                       | N/A                                               |
| Des Moines          | 28                                        | 2                                                 |
| Elkhart             | N/A                                       | N/A                                               |
| Grimes              | 1                                         | 0                                                 |
| Johnston            | 0                                         | 0                                                 |
| Mitchellville       | N/A                                       | N/A                                               |
| Pleasant Hill       | 3                                         | 1                                                 |
| Polk City           | N/A                                       | N/A                                               |
| Saylor Township     | N/A                                       | N/A                                               |

|                                                                                                                                                                                                        |            |           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|
| Urbandale                                                                                                                                                                                              | 12         | 0         |
| West Des Moines                                                                                                                                                                                        | 28         | 2         |
| Windsor Heights                                                                                                                                                                                        | 3          | 0         |
| Remainder of Polk County*                                                                                                                                                                              | 103        | 26        |
| <b>Polk County Total</b>                                                                                                                                                                               | <b>190</b> | <b>32</b> |
| *Includes bridges in unincorporated Polk County as well as communities like Elkhart, Sheldahl, and others in Polk County for which the Iowa DOT database did not provide city-specific bridge numbers. |            |           |

#### 3.3.14.3 EXTENT

Utility interruptions most commonly affect lighting, heating, air conditioning, communications, ventilation/circulation, household appliances, and office equipment. The impacts of utility outages can be exacerbated by the presence of other hazards; unpowered sump pumps will be unable to mitigate basement flooding, and unpowered homes can quickly become too hot or too cold if the planning area is experiencing extreme temperatures. Extreme temperatures – both hot and cold – can impact the health and safety of vulnerable populations like children, the elderly, disabled individuals, people who lack access to transportation, and others. More severe interruptions can impact fire, medical, and security systems, although these systems often have a back-up power source. The impacts of interruptions can also be dire for people who are dependent on electronic medical equipment. Utility interruptions can significantly hamper first responders in their efforts to provide aid during or following a disaster, especially with the loss of telecommunications and wireless capabilities. Additionally, internet outages could significantly disrupt the economy, especially as recent industry changes have led to significant increases in employees working from home.

Failure of transportation infrastructure typically occur when conditions exceed what a structure was designed to withstand. Failures can also occur when defects in the design, engineering, construction, or material strength go unnoticed and result in a bridge which is weaker than expected. In severe cases, transportation infrastructure failures can be major events. First, bridge failures can be mass casualty incidents. Second, the loss of a bridge with a high daily traffic count can significantly disrupt travel within and through Polk County. Third, a bridge collapse can have negative health impacts for the surrounding community – leaking fuel and motor oil, as well as hazardous materials leaking from ruptured containers, may contaminate the surrounding land and waterways. Lastly, the removal of debris and the design and construction of a new bridge can be costly and time consuming endeavours.

#### 3.3.14.4 PREVIOUS OCCURRENCES

As previously mentioned, infrastructure failure often occurs as a secondary impact to other hazard events. For specific descriptions, please see the “previous occurrences” section of the other hazards included in this plan.

3.3.14.5 PROBABILITY OF FUTURE OCCURRENCES

Infrastructure failure does occur on a routine basis, although events that are life threatening, damaging, or otherwise adversely impact the economy are less common. Overall, the probability of infrastructure failure within the planning area is considered “highly likely.”

3.3.14.6 VULNERABILITY

While every community in the planning area is at risk to some type of utility/infrastructure failure, the vulnerability is somewhat elevated in the more urbanized areas of the county due to the higher population density, development, and economic activities in those areas. Agricultural areas of the planning area are also vulnerable to prolonged outage events as modern agricultural practices are reliant on energy; such as electric milking machines, and irrigation pivots.

In addition, the smaller utility suppliers such as small electrical suppliers generally have limited resources for mitigation. This could mean greater vulnerability in the event of a major, widespread disaster, such as a major flood, severe winter storm or ice storm. The majority of the municipal utilities purchase power on the wholesale market for resale to their customers. This may make them more vulnerable to regional shortages of power as well.

The specific impacts of infrastructure failure can vary depending on what component fails – these impacts are described in the following table. Since all communities in Polk County broadly rely upon electric, water, transportation, and other infrastructure, they are considered to be equally vulnerable to this hazard.

Table 81. Potential Impacts of Infrastructure Failure on Community Lifelines

| Lifelines         | Impact Type                                                                         | Description                                                                                                                                                                                                                                            |
|-------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Safety & Security |  | Utility disruptions can compromise safety systems, street lighting, and security alarms, increasing risks for accidents and crime. Emergency services must adapt to these challenges, ensuring public safety in the absence of regular utilities.      |
| Health & Medical  |  | Hospitals and healthcare facilities rely heavily on utilities. Power outages can affect medical equipment, refrigeration of medicines, and comfort of patients. Backup systems are crucial for maintaining healthcare operations during interruptions. |

| Lifelines                         | Impact Type                                                                         | Description                                                                                                                                                                                                  |
|-----------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Housing & Building Infrastructure |    | Residential and commercial buildings depend on utilities for lighting, heating, cooling, and running essential appliances. Extended interruptions can make buildings uninhabitable, leading to displacement. |
| Utilities                         |    | The interruption itself directly impacts this lifeline. Restoring these services swiftly is critical for the functioning of all other community aspects.                                                     |
| Transportation Services           |    | Traffic control systems, public transit, and fuel stations rely on utilities. Disruptions can lead to traffic congestions, accidents, and hinder the mobility of residents and emergency responders.         |
| Economic Stability                |  | Utility interruptions can halt business operations, affect commerce, and lead to significant economic losses. Industries that depend on consistent power and water supply are particularly vulnerable.       |

#### A) People

Utility failures are usually short-lived and not a major concern for most individuals. However, short utility failures can be problematic for individuals who rely upon these services, such as those with medical conditions, and prolonged utility failures can have severe consequences. In particular, power outages which prevent the use of air conditioning in the summer or heating in the winter can leave individuals exposed to dangerous temperatures. Extreme temperatures are especially concerning for the elderly and young children. Individuals with disabilities or without access to a vehicle are also at an elevated risk due to the added challenges they face when seeking relief from the heat/cold.

#### B) Structures

Infrastructure failures can involve important transportation structures like tunnels and bridges. There is a limited inventory of tunnels (not including underpasses) in the planning area, but there are over 540 bridges in Polk County. Utility failures generally do not have a significant impact on structures. However, it is conceivable that the secondary impacts of utility failure – such as fires resulting from a ruptured gas pipeline – can pose a risk to structures in the planning area.

C) Systems

Infrastructure failures will inherently involve the systems which communities typically rely upon, and significant failures can disrupt or even entirely halt the use of these systems. In some instances, failures of one system can impact others; for example, the loss of electricity may also lead to the loss of internet connectivity. The greatest concern is a cascading event which renders multiple systems unreliable or unusable.

D) Natural, Historic, and Cultural Resources

Utility failures generally have a limited impact on natural, historic, and cultural resources in the planning area. The secondary impacts of utility failure, such as fires resulting from ruptured gas pipelines and contamination from wastewater, may pose a greater risk to these resources than the actual utility failure.

E) Community Activities

Community activities may need to be rescheduled, postponed, or cancelled if the locations where these activities take place are impacted by infrastructure failure. However, the extent of the transportation network in Polk County makes it unlikely that the failure of a bridge or road will render an area completely inaccessible. Utility failures like power and internet outages may disrupt community activities so long as they persist, while utility failures involving water, wastewater, and natural gas may have consequences that extend beyond the outage period.

Existing Development

Since infrastructure failure is generally a secondary or cascading impact of other hazards, it is not possible to quantify estimated potential losses specific to this hazard due to the variables associated with affected population, duration of outages, etc.

Although the variables make it difficult to estimate specific future losses, FEMA has developed standard loss of use estimates in conjunction with their Benefit-Cost Analysis methodologies to estimate the cost of lost utilities on a per-person, per-use basis (See Table 82).

Table 82. FEMA Standard Values for Loss of Service for Utilities and Roads/Bridges

|                               |                                                   |
|-------------------------------|---------------------------------------------------|
| Loss of Electric Power        | Cost of Complete Loss of Service                  |
| Total Economic Impact         | \$126 per person per day                          |
| Loss of Potable Water Service | Cost of Complete Loss of Service                  |
| Total Economic Impact         | \$93 per person per day                           |
| Loss of Wastewater Service    | Cost of Complete Loss of Service                  |
| Total Economic Impact         | \$41 per person per day                           |
| Loss of Road/Bridge Service   | Cost of Complete Loss of Service                  |
| Vehicle Delay Detour Time     | \$38.15 per vehicle per hour                      |
| Vehicle Delay Mileage         | \$0.55 per mile (or current federal mileage rate) |

Source: FEMA BCA Reference Guide, June 2009, Appendix C



Future Development

Increases in development and population growth increase the demand for utilities and use of infrastructure as well as the level of impacts when the utilities or infrastructure fail. To better accommodate increased utility demand, improvements to utility infrastructure are likely to become more urgent as population increases.

Climate Change

Climate change has the potential to impact the probability of infrastructure failure in several ways. First, changing weather patterns may increase both the frequency and severity of hazards like extreme temperatures, winter storms, tornadoes, and other natural hazards which can directly damage infrastructure. See the other hazard sections for additional information on this. Climate change may also jeopardize the availability of water, electricity, and natural gas due to increased demand. Climate change may also make it more difficult to produce electricity through renewable resources like solar and wind power by increasing the frequency of cloudy days and making wind patterns less predictable.

Hazard Risk Score

Table 83. Infrastructure Failure Probability and Health Impact Ratings

| Health Severity | Community Impact | Public Health System Impact | Healthcare System Impact | Total Health Hazard Score | Probability   |
|-----------------|------------------|-----------------------------|--------------------------|---------------------------|---------------|
| 4               | 3                | 2                           | 4                        | 13                        | Highly Likely |

3.3.15 LEVEE FAILURE

3.3.15.1 DESCRIPTION

Levees are earth embankments constructed along rivers and coastlines to protect adjacent lands from flooding. Floodwalls are concrete structures, often components of levee systems, designed for urban areas where there is insufficient room for earthen levees. When levees and floodwalls and their appurtenant structures are stressed beyond their capabilities to withstand floods, levee failure can result in loss of life and injuries as well as damages to property, the environment, and the economy.

Levees range from small agricultural levees that protect farmland from high-frequency flooding to large urban areas that protect people and property from larger-less frequent flooding events such as the 100-year and 500-year flood levels. For purposes of this discussion, levee failure will refer to both overtopping and breach of a levee as defined in FEMA’s Publication “So You Live Behind a Levee” (<https://www.spl.usace.army.mil/Portals/17/SoYouLiveBehindLevee.pdf>).

Overtopping occurs when floodwaters exceed the height of a levee and flow over its crown. As the water passes over the top, it may erode the levee, worsening the flooding and potentially causing an opening, or breach, in the levee.



A levee breach occurs when part of a levee gives way, creating an opening through which floodwaters may pass. A breach may occur gradually or suddenly. The most dangerous breaches happen quickly during periods of high water. The resulting torrent can quickly swamp a large area behind the failed levee with little or no warning.

Earthen levees can be damaged in several ways. For instance, strong river currents and waves can erode the surface. Debris and ice carried by floodwaters—and even large objects such as boats or barges—can collide with and gouge the levee. Trees growing on a levee can blow over, leaving a hole where the root wad and soil used to be. Burrowing animals can create holes that enable water to pass through a levee. If severe enough, any of these situations can lead to a zone of weakness that could cause a levee breach. In seismically active areas, earthquakes and ground shaking can cause a loss of soil strength, weakening a levee and possibly resulting in failure. Seismic activity can also cause levees to slide or slump, both of which can lead to failure.

3.3.15.2 LOCATION

There are likely agricultural levees and other non-regulated levees within the planning area that are not inventoried or inspected. These levees that are not designed to provide protection from the 1% annual chance flood would overtop or fail in the 1% annual chance flood scenario. These levees are also not reflected in the U.S. Army Corp of Engineer’s National Levee Database. For the purposes of this levee failure profile and risk assessment, the levees identified in the National Levee Database will be discussed and further analyzed. According to the database there are 11 levees in Polk County. The specific jurisdictions in which these levees are located, in whole or in part, are Carlisle, Des Moines, Pleasant Hill, and West Des Moines, as well as unincorporated sections of Polk County. Table 84 provides additional information about these levees.

Table 84. Levees in Polk County

| System Name                                     | Flooding Source(s) | Levee Length (miles) | People Behind Levee | Buildings Behind Levee | Critical Facilities Behind Levee | Property Value Behind Levee |
|-------------------------------------------------|--------------------|----------------------|---------------------|------------------------|----------------------------------|-----------------------------|
| Avon Station, IA – Lake Red Rock Remedial Works | Des Moines River   | 2.06                 | 309                 | 129                    | 0                                | \$31,111,440                |
| Des Moines Water Works Levee                    | Raccoon River      | 0.75                 | 0                   | 11                     | 1                                | \$47,879,381                |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)



|                                                                             |                                 |      |        |     |    |                 |
|-----------------------------------------------------------------------------|---------------------------------|------|--------|-----|----|-----------------|
| Des Moines, IA – Birdland Park                                              | Des Moines River                | 1.37 | 2,283  | 183 | 1  | \$175,321,737   |
| Des Moines, IA – Central Place                                              | Des Moines River                | 1.10 | 1,168  | 149 | 5  | \$227,487,670   |
| Des Moines, IA – DM-I & SEDM – Pleasant Hill – Lake Red Rock Remedial Works | Des Moines River                | 9.70 | 7,938  | 869 | 16 | \$1,874,429,192 |
| Des Moines, IA – DM-II                                                      | Des Moines River, Raccoon River | 2.38 | 44,753 | 323 | 25 | \$2,678,496,260 |
| Des Moines, IA – DM-III                                                     | Des Moines River, Raccoon River | 2.01 | 1,993  | 860 | 4  | \$183,384,360   |
| Des Moines, IA – RR-I                                                       | Raccoon River                   | 1.26 | 1,686  | 65  | 0  | \$159,644,010   |
| Polk County Drainage District No. 9                                         | Des Moines River                | 3.22 | 8      | 45  | 0  | \$26,762,748    |
| WDM-I                                                                       | North Raccoon River             | 0.79 | 21     | 30  | 0  | \$22,996,736    |

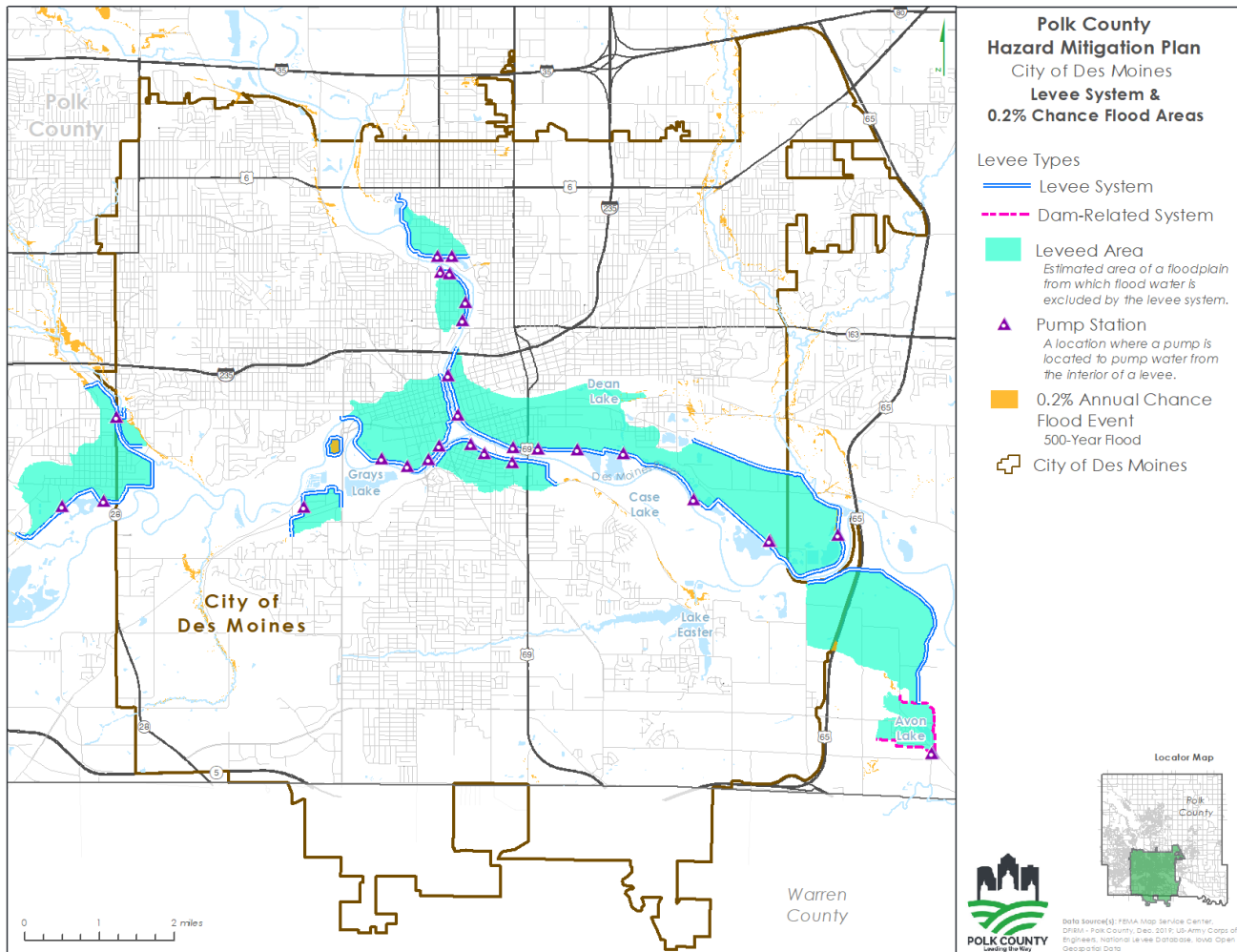
|                                                  |                                      |      |       |       |   |               |
|--------------------------------------------------|--------------------------------------|------|-------|-------|---|---------------|
| West Des Moines, IA<br>and Des Moines, IA<br>LFP | Raccoon<br>River,<br>Walnut<br>River | 3.71 | 3,053 | 1,360 | 4 | \$550,059,200 |
|--------------------------------------------------|--------------------------------------|------|-------|-------|---|---------------|

Note: Data on the number of people, buildings, critical facilities, and property value comes from the U.S. Army Corps of Engineers' National Inventory of Levees.

City of Des Moines

According to the National Inventory of Levees database, there are nine different levee systems which protect the City of Des Moines from flooding events. With more than 90% of the levee systems in Polk County, the City of Des Moines is easily the most exposed jurisdiction in Polk County to the potential impacts of levee failure. The City of Des Moines is identified as the entity responsible for operation and maintenance of all nine levees which protect the City. A map of the levee systems in and around Des Moines is provided below.

Figure 67. City of Des Moines Levee Systems & 0.2% Chance Flood Area



After significant flooding impacted Des Moines in 2008, USACE conducted the Des Moines River Regulated Flow Frequency Study (DMRRFFS). Released in January 2011, the DMRRFFS concluded that flood flow frequencies have increased over previous estimates, and floods similar in magnitude to the 1993 and 2008 events are more likely to occur than previously believed. In response to the findings of the DMRRFFS, the City of Des Moines began the process of improving its levee systems. The City's plan to upgrade the levees would be implemented in phases:

**Phase A:** This phase covers improvements to the upstream reaches of the DM-I and DM-II levees along the Des Moines River. A contract was awarded to Corell Contractor, Inc. in August 2020, and construction was completed in 2022.

**Phase B:** This phase covers improvements to the DM-II and DM-III levee systems along the portions of the Raccoon River. A contract was awarded to Peterson Contractors, Inc. and construction is ongoing.

**Phase C:** This phase covers improvements to the downstream reaches of the DM-I and DM-III levee system along the Des Moines River near the confluence with the Raccoon River. The project was awarded to Peterson Contractors, Inc. and is currently ongoing.

**Phase D:** This phase covers improvements to the downstream reaches of the DM-I and DM-III levee systems along the Des Moines River from approximately 14<sup>th</sup> Street to just upstream of the Des Moines Metropolitan Wastewater Reclamation Facility. In 2021, Des Moines and Barr Engineering Company entered into a Professional Services Agreement for design of Phase D levee improvements.

**Phases E, F, G, and H:** These phases cover improvements to the Southeast Des Moines levee system (SEDM), which is part of the Lake Red Rock Remedial Works and is hydraulically connected to the DM-I levee system. SEDM is an eight (8) mile levee system located along the Des Moines River starting just upstream of the Des Moines Metropolitan Wastewater Reclamation Facility to the confluence of Fourmile Creek, then runs along Fourmile Creek to about a quarter mile east of SE 30th Street. Phases F, G, and H are maintained and operated by USACE. USACE is currently responsible for the maintenance and operation of Phase E along the Des Moines Metropolitan Wastewater Reclamation Facility; however, there is an agreement in place for the City to perform general maintenance along Phase E. Recent federal legislation has provided for Phase E to become part of the DM-I levee, pending real estate transactions between the City, Wastewater Reclamation Authority and USACE. As a result of these findings, the protection levels provided by the levee systems are being re-evaluated.<sup>16</sup>

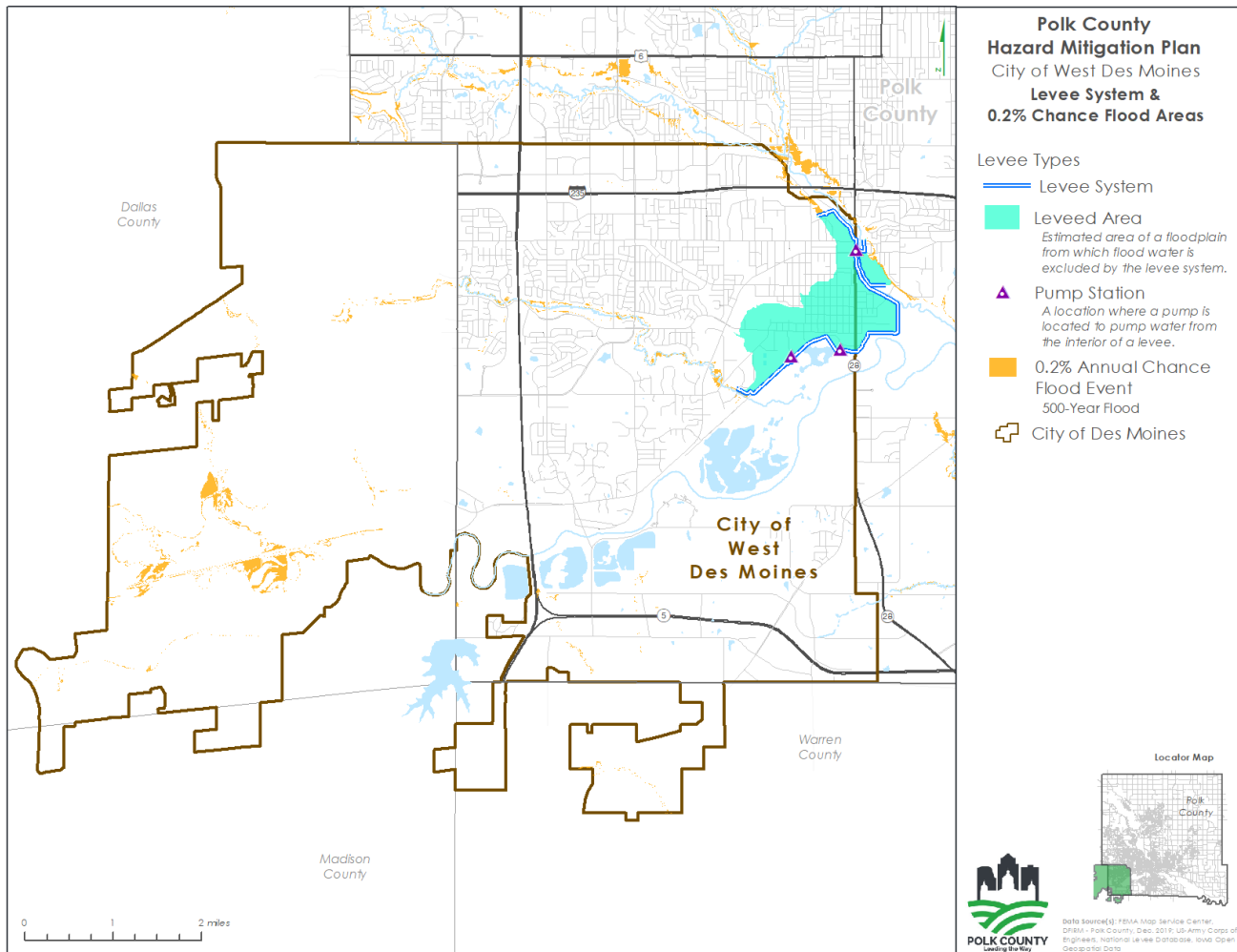
#### City of West Des Moines

The City of West Des Moines has a local flood protection levee that was designed and built by the USACE, Rock Island District that protects the City from the 1% annual chance flood from Raccoon River and Walnut Creek. The levee – simply called West Des Moines, IA and Des Moines, IA levee system – was constructed in 1997 in response to the 1993 flooding. According to the laster performance and condition review from USACE, there is some performance uncertainty related to floodwall stability based on current I-wall criteria; however, the project has been loaded to over 80% in the past and performed well. Additionally, there is a high level of community awareness concerning floods, the evacuation effectiveness is excellent, and the project is expected to perform well during future loadings.<sup>17</sup> A map of the levee system impacting West Des Moines is shown below.

<sup>16</sup> City of Des Moines Office of the City Manager. "Council Communication: 23-307," no. 23-307 (June 26, 2023). <https://councildocs.dsm.city/communications/2023/23-307.pdf>.

<sup>17</sup> U.S. Army Corps of Engineers. "National Levee Database." [levees.sec.usace.army.mil](https://levees.sec.usace.army.mil/levees/5105550006), April 5, 2024. <https://levees.sec.usace.army.mil/levees/5105550006>.

Figure 68. City of West Des Moines Levee System & 0.2% Chance Flood Area



#### Pleasant Hill and Carlisle

According to the USACE National Levee Database, Pleasant Hill and Carlisle are each behind one levee system. Pleasant Hill is behind the Des Moines, IA – DM-I & SEDM – Pleasant Hill – Lake Red Rock Remedial Works levee system. This levee system was constructed in 1970, but as of April 2024, USACE performance and condition information simply states “in progress” in the National Levee Database.<sup>18</sup> Carlisle is behind the Avon Station, IA – Lake Red Rock Remedial Works levee system. This system was constructed in 1969 and has an average height of 6 ft. A review of this levee’s performance and condition concluded that there is a moderate likelihood of overtopping with low associated consequences. Additionally, Embankment seepage poses an unacceptable performance concern, mainly due to agricultural activity on the toe of the levee which is damaging the clay blanket and possibly shortening any seepage paths. The long loading duration and possible deep inundation depths are somewhat offset by the relatively flood risk aware population, well planned flood warning

<sup>18</sup> U.S. Army Corps of Engineers. “National Levee Database.” [levees.sec.usace.army.mil](https://levees.sec.usace.army.mil/levees/5105950071), April 5, 2024.  
<https://levees.sec.usace.army.mil/levees/5105950071>.

methods, short egress routes to high ground/safety where most of the population is located, and ample warning time for evacuation.<sup>19</sup>

#### 3.3.15.3 EXTENT

The levees in Polk County are designed to protect the community against 1% annual chance flooding. Events exceeding that capacity subject the levee to potential failure, the consequences of which would be additional flooding. According to the National Inventory of Levees, there are 56 critical facilities behind levees in Polk County, and inundation of these sites could have severe consequences for the surrounding communities. Perhaps the best example of this is the inundation of the Des Moines Water Works after floodwaters overtopped a nearby levee in 1993. More than 250,000 people were left without water service for nearly three weeks, and water had to be shipped in from other communities. For more information on the extent of flooding in the planning area see the river flood hazard profile.

#### 3.3.15.4 PREVIOUS OCCURRENCES

According to the USACE National Inventory of Levees, there are no documented breaches along any levees in Polk County. However, this contradicts various news articles and reports from respectable entities like the U.S. Geological Survey documenting past flooding incidents. The following occurrences reflect information pulled from these sources.

- **2017 Birdland Park Levee Leak:** In December 2017, a concern with seepage under the Birdland Park Levee was identified. Staff from USACE and the City of Des Moines determined that the levee did not meet USACE design criteria due to a design deficiency. However, a Levee Risk Assessment later determined that the levee was safe and no additional measures were required. This was confirmed by the Levee Safety Oversight Group in August 2021.<sup>20</sup>
- **2010 Birdland Park Levee Leak:** During this event, the Birdland Park Levee was closely monitored and a small “leak” or seepage was discovered. However, the levee did not fail or overtop during this event.<sup>21</sup>
- **2008 Birdland Park Levee Breach:** Very high water along the Des Moines River put stress on the levee system in Des Moines. The crest had passed, but water levels were still within about one foot of the record crest. A weak spot in the levee in the Birdland park area gave way in spite of efforts by citizens and the National Guard to reinforce the levee. A breach of about 100 feet in width occurred causing very rapid

---

<sup>19</sup> U.S. Army Corps of Engineers. “National Levee Database.” [levees.sec.usace.army.mil](https://levees.sec.usace.army.mil/levees/5105950071), April 5, 2024.

<sup>20</sup> U.S. Army Corps of Engineers. “Des Moines & Raccoon Rivers, Iowa.” Rock Island District, October 30, 2023. <https://www.mvr.usace.army.mil/About/Offices/Programs-and-Project-Management/District-Projects/Projects/Article/2124382/des-moines-raccoon-rivers-iowa/>.

<sup>21</sup> Welte, Melanie. “Des Moines Levee Springs Leak.” NBC News, July 3, 2010. <https://www.nbcnews.com/id/wbna38069320>.



water rises of about four feet in the flooded area within an hour and about 6 feet within several hours. A mandatory evacuation order was given by the Des Moines Police. About 271 homes were affected by the flooding as well as several businesses and a high school. One fertilizer and chemical business sustained an estimated \$3 million in damages and the damage to North High School was estimated at \$1.1 million.<sup>22</sup>

- **1993 Des Moines Water Works Breach:** Record flooding in July 1993 resulted in floodwater overtopping the levee system protecting the Des Moines Water Works installation. Despite being built to a height 6 ft above the highest, previously documented flood, water from the Raccoon River overcame the levee around 1am on July 11, 1993. The inundation of the Des Moines Water Works left more than 250,000 people in the Des Moines area without water service for more than two weeks.<sup>23</sup>

3.3.15.5 PROBABILITY OF FUTURE OCCURRENCES

Based on the paucity of previous occurrences in the planning area, the probability of future occurrence of levee failure of the known levees in the planning area is “unlikely.”

3.3.15.6 VULNERABILITY

Levee failure is typically an additional or secondary impact of another disaster such as flooding or earthquake. The main difference between levee failure and the types of losses associated with riverine flood is that failure of any size levee in the midst of a flood event has the potential to result in more destruction to property and infrastructure as well as an increased potential for loss of life due to the speed of onset and greater depth, extent, and velocity of flooding.

Table 85. Potential Impacts of Levee Failure on Community Lifelines

| Lifelines         | Impact Type                                                                         | Description                                                                                                                                                                                                                                                                 |
|-------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Safety & Security |  | The sudden release of water can pose immediate threats to life and property, necessitating urgent evacuation and rescue operations. Law enforcement and emergency services are vital for managing the situation, ensuring public safety, and coordinating response efforts. |

<sup>22</sup> WHO 13 Des Moines. “Decade Anniversary: Community Remembers Birdland Levee Breach.” *Who13.Com* (blog), June 14, 2018. <https://who13.com/news/decade-anniversary-community-remembers-birdland-levee-breach/>.

<sup>23</sup> KCCI Des Moines. “30 Years Later: What Led up to the Devastating Flood of ‘93 in Iowa.” KCCI, July 15, 2023. <https://www.kcci.com/article/flood-of-1993-des-moines-iowa-30th-anniversary/44496812>.

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

| Lifelines                         | Impact Type                                                                         | Description                                                                                                                                                                                                                                              |
|-----------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Health & Medical                  |    | Injuries and potential loss of life due to flooding require emergency medical services. Healthcare facilities need to be prepared for an influx of patients and possible challenges in maintaining operations, especially if they are in the flood zone. |
| Housing & Building Infrastructure |    | Flooding from levee failures can cause extensive damage to homes, businesses, and infrastructure, resulting in displacement of residents, and necessitating significant reconstruction efforts.                                                          |
| Utilities                         |   | Levee failures can disrupt essential services such as electricity, water supply, and communication networks, both directly through physical damage and indirectly due to access issues.                                                                  |
| Transportation                    |  | Roads, bridges, and rail lines may be damaged or rendered impassable, disrupting the movement of people and goods and complicating rescue and recovery efforts.                                                                                          |
| Economic Stability                |  | The economic impacts include the immediate costs of emergency response and infrastructure repairs, as well as longer-term effects on local economies due to business interruptions and loss of property.                                                 |
| Environmental & Ecological        |  | A levee failure can lead to environmental disasters, impacting water quality, wildlife habitats, and local ecosystems. Remediation and ecological restoration efforts may be required in the aftermath.                                                  |

A) People

Levee failure allows water to inundate an area which would otherwise be dry. Because the consequences of levee failure largely mirrors that of flooding, the populations vulnerable to levee failure are largely the same as those which are vulnerable to river and flash flooding. Reference the vulnerability sections of the flash flooding and river flooding hazard profiles for additional information.

#### B) Structures

According to the USACE National Levee Database, there are 4,024 buildings behind levees in Polk County. Water damage resulting from a levee failure is no different than water damage brought on by flash and river flooding. For additional information on the vulnerability of structures to water inundation reference the vulnerability sections of the flash flooding and river flooding hazard profiles.

#### C) Systems

According to the USACE National Levee Database, there are 56 critical facilities behind levees in Polk County. In the event of levee failure, these facilities would be exposed to the consequences of water inundation. For additional information on the impacts of water inundation on critical facilities reference the vulnerability sections of the flash flooding and river flooding hazard profiles.

#### D) Natural, Historic, and Cultural Resources

Natural, historic, and cultural resources in Polk County which are behind levee systems are vulnerable to water inundation in the event of a levee failure. Natural, cultural, and historic resources in Polk County which are behind levees include: Des Moines Water Works Park, Denman's Woods Trail, Pete Crivaro Park, and Gray's Station Wetland. For additional information on the consequences of water inundation on natural, historic, and cultural resources reference the vulnerability sections of the flash flooding and river flooding hazard profiles.

#### E) Community Activities

Community activities which rely on space behind levees in Polk County may need to be postponed or relocated in the event of a levee failure. For additional information on how water inundation can disrupt community activities reference the vulnerability sections of the flash flooding and river flooding hazard profiles.

#### Existing Development

It is difficult to determine specific economic losses to existing development as a result of levee failure. A wide variety of assets and buildings would be substantially damaged, and loss of life as a result of levee failure may be greater than that of riverine flood due to the speed of onset and the velocity and wave action that would occur. According to data from the National Levee Database, the total value of property behind levees in Polk County is \$5,997,572,734. Development in the communities of Carlisle, Des Moines, Pleasant Hill, and West Des Moines is vulnerable to levee failure in Polk County.

Future Development

Additional development in the areas protected by the levees in the communities of Carlisle, Des Moines, Pleasant Hill, and West Des Moines would increase the vulnerability to this hazard. Between 2010 and 2020 all four of these jurisdictions experienced population growth.

Climate Change

Climate change may increase the likelihood of flooding (both riverine and flash), which may increase the likelihood of levee failure within the planning area. Following the 2008 flooding, the USACE conducted a study which found that flood flow frequencies in the Des Moines area have increased over previous estimates, and floods similar in magnitude to the 1993 and 2008 events are more likely to occur than previously assessed. However, the report declined to consider whether climate change played a role in these changes.

Hazard Risk Score

Table 86. Levee Failure Probability and Health Impact Ratings

| Health Severity | Community Impact | Public Health System Impact | Healthcare System Impact | Total Health Hazard Score | Probability |
|-----------------|------------------|-----------------------------|--------------------------|---------------------------|-------------|
| 1               | 2                | 1                           | 1                        | 5                         | Unlikely    |

3.3.16 RIVER FLOODING

3.3.16.1 DESCRIPTION

A flood is partial or complete inundation of normally dry land areas. Flooding has been a major problem for many of the communities in Polk County. Many of the communities were settled and developed largely because of their proximity to water resources. Heavy precipitation can cause flooding either in the region of precipitation or in areas downstream. Heavy accumulations of ice or snow can also cause flooding during the melting stage. These events are complicated by the freeze/thaw cycles characterized by moisture thawing during the day and freezing at night. There are two main types of flooding in the planning area: riverine/flouvia flooding and flash flooding which includes ice jam flooding. Flash flooding is discussed in a separate section. Flooding caused by dam and levee failures are also separate sections.

Riverine flooding is defined as the overflow of rivers, streams, drains, and lakes due to excessive rainfall, rapid snowmelt or ice melt. The areas adjacent to rivers and stream banks that carry excess floodwater during rapid runoff are called floodplains. A floodplain is defined as the lowland and relatively flat area adjoining a river or stream. The terms “base flood” and “100-year flood” refer to the area in the floodplain that is subject to a one percent or greater chance of flooding in any given year. Floodplains are part of a larger entity called a basin, which is defined as all the land drained by a river and its branches.

#### 3.3.16.2 LOCATION

For purposes of this hazard profile and vulnerability analysis, the geographic location/extent for river flooding will be primarily considered as those areas at risk to the 100-year flood (also known as the 1% annual chance flood). The 1% annual chance flood has been adopted by FEMA as the base flood for floodplain management purposes. However, the accompanying maps also show the 500 year floodplains for two major reasons. First, climate models suggest that the planning area should anticipate rain events with increasing intensity in the coming years and decades. Second, Polk County has experienced consistent population growth over past decades, and this trend is expected to continue. Continued population growth may result in new development within or near 500 year floodplains. The figures below illustrate the areas within Polk County and participating jurisdictions which are vulnerable to flooding in 100-year (1%) and 500-year (0.2%) flooding events.

Figure 69. Polk County Flood Hazard Areas

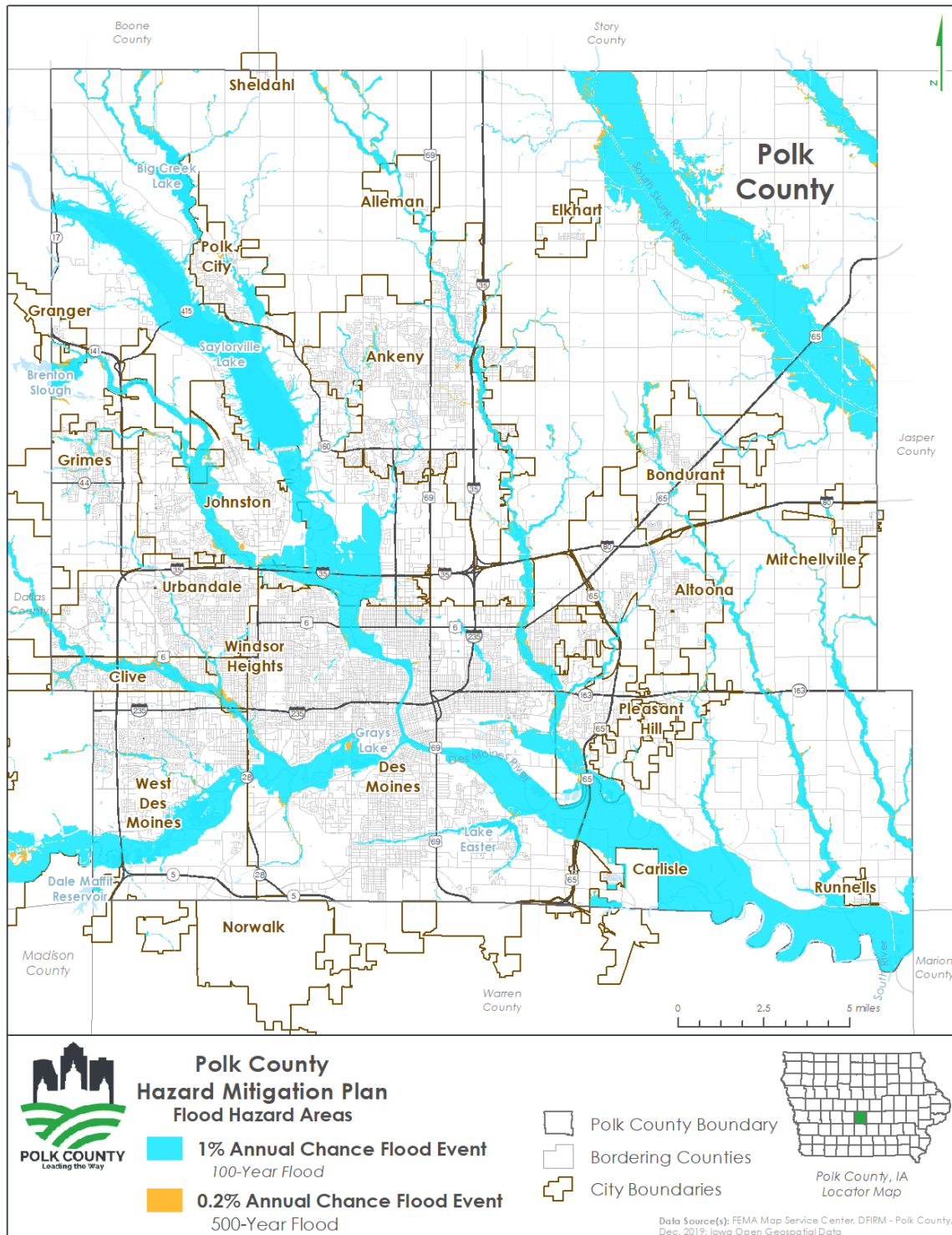


Figure 70. City of Alleman Flood Hazard Areas

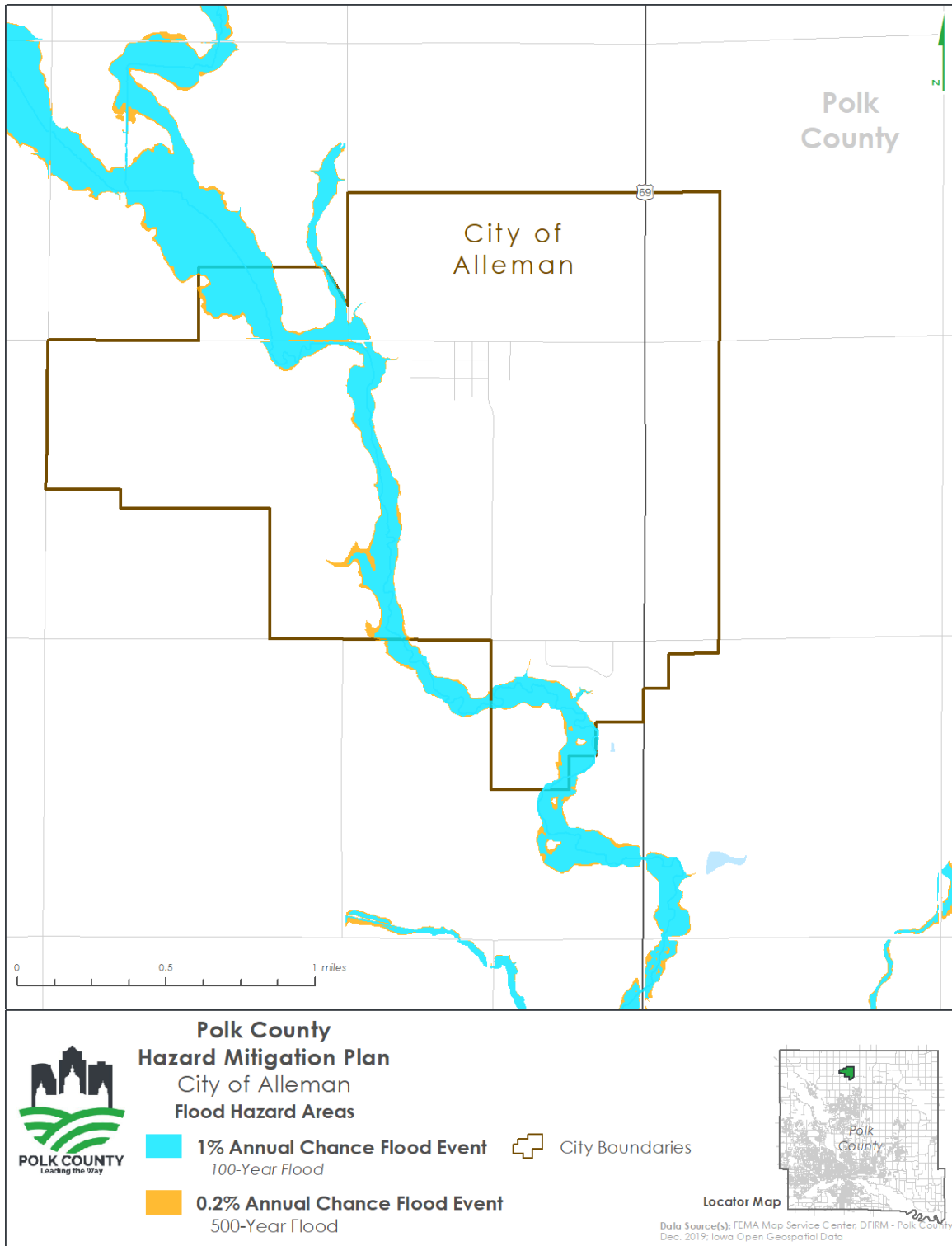




Figure 71 – City of Altoona Flood Hazard Area

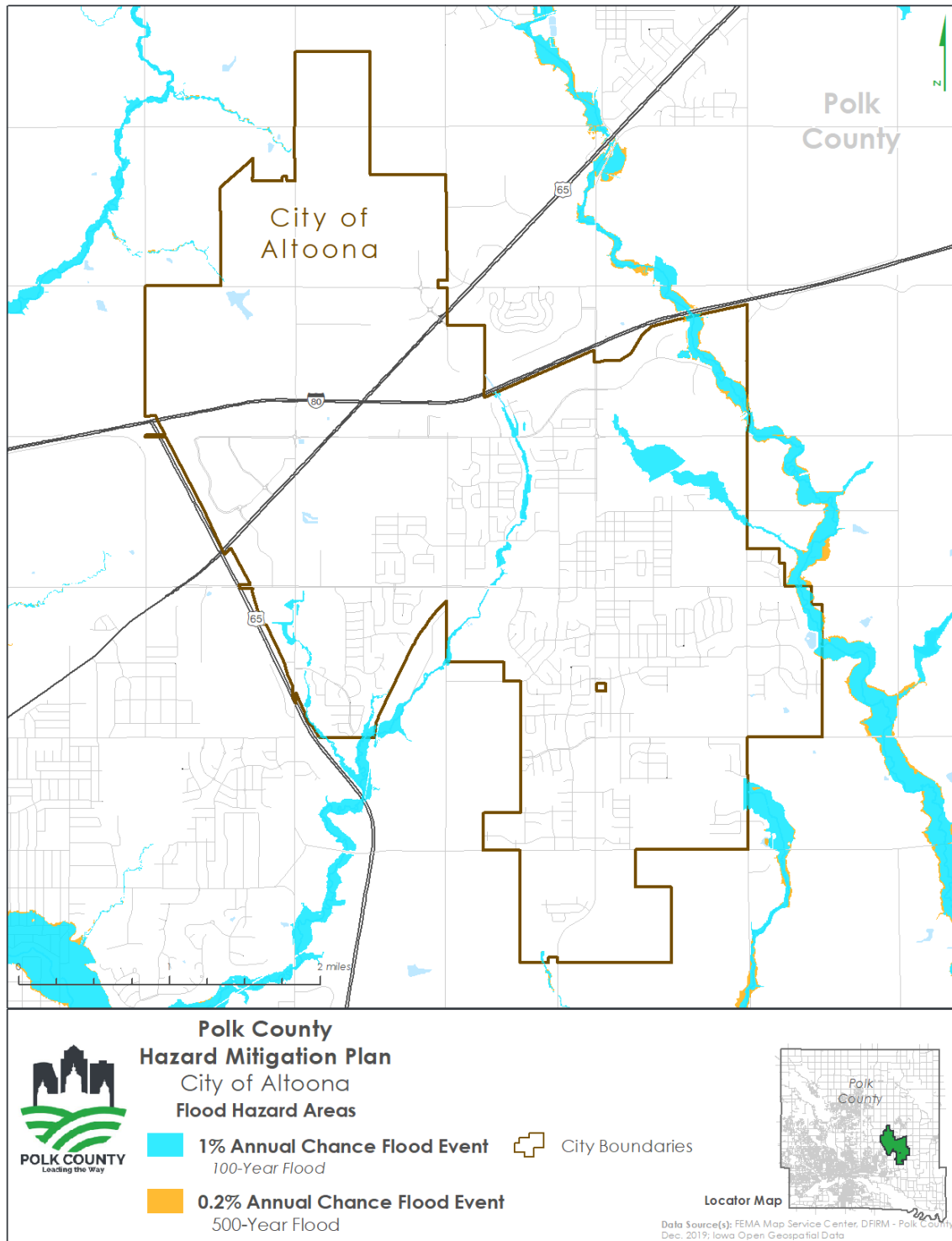


Figure 72 - City of Ankeny Flood Hazard Areas

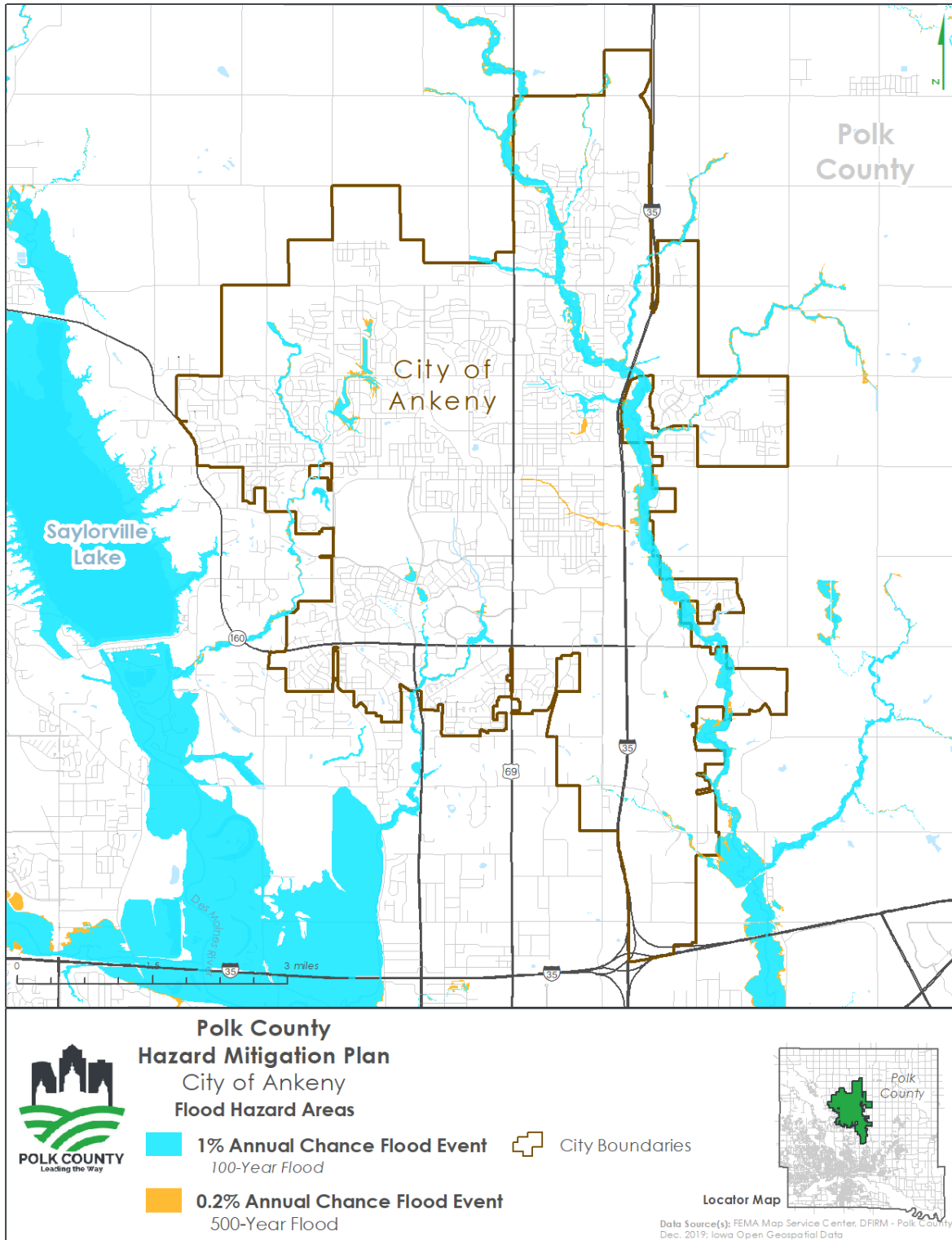


Figure 73 – City of Bondurant Flood Hazard Area

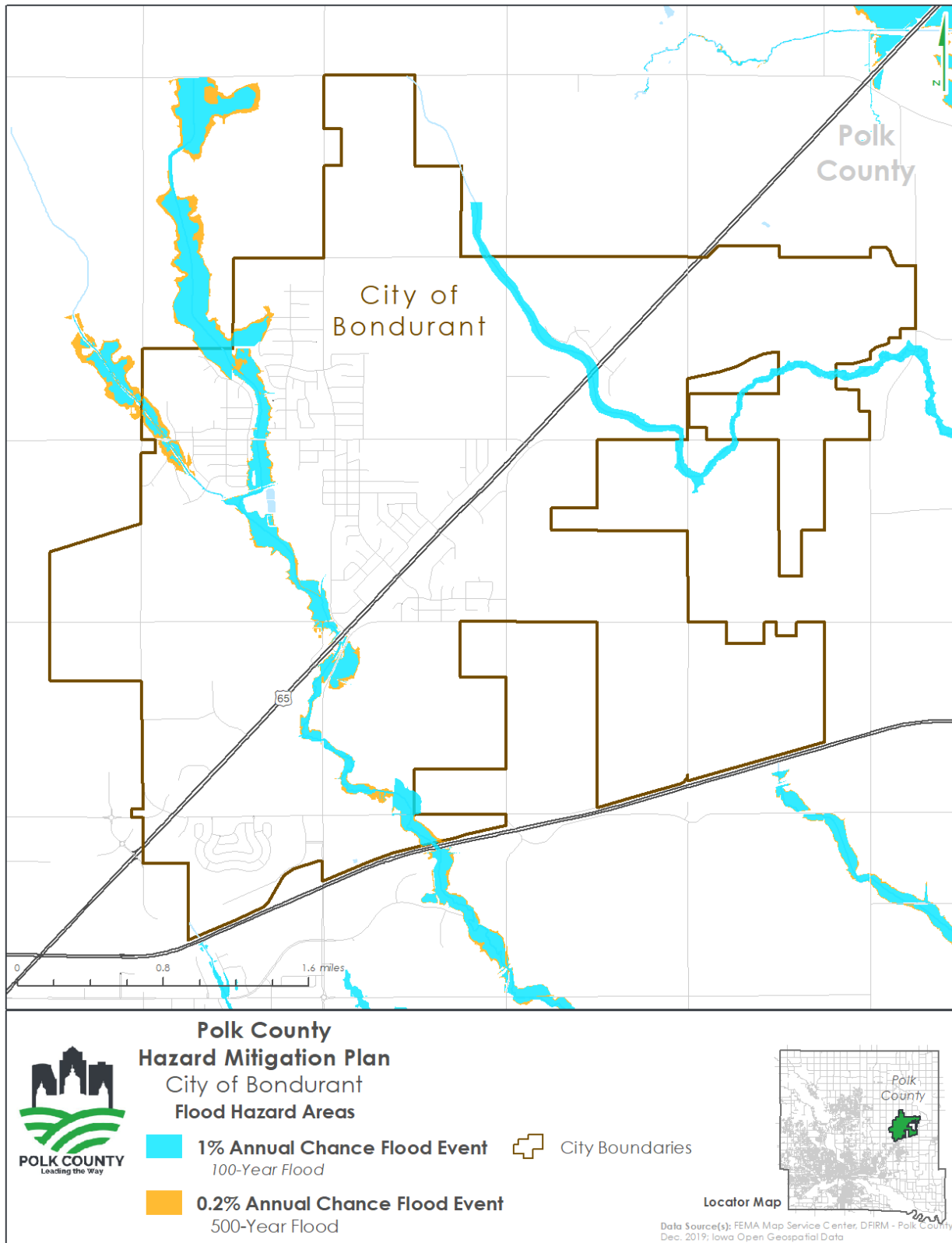


Figure 74 – City of Clive Flood Hazard Area

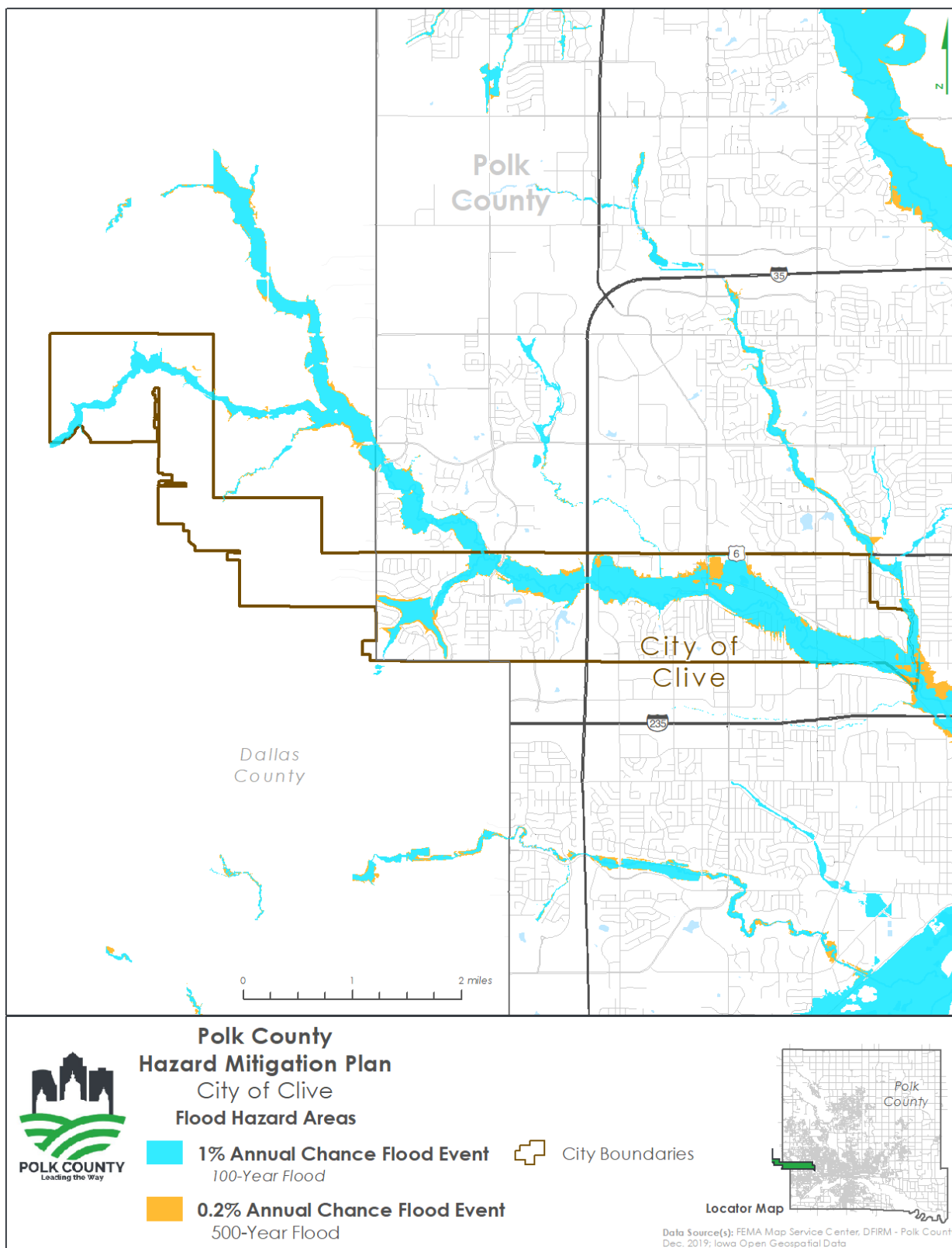


Figure 75: Delaware Township Flood Hazard Map

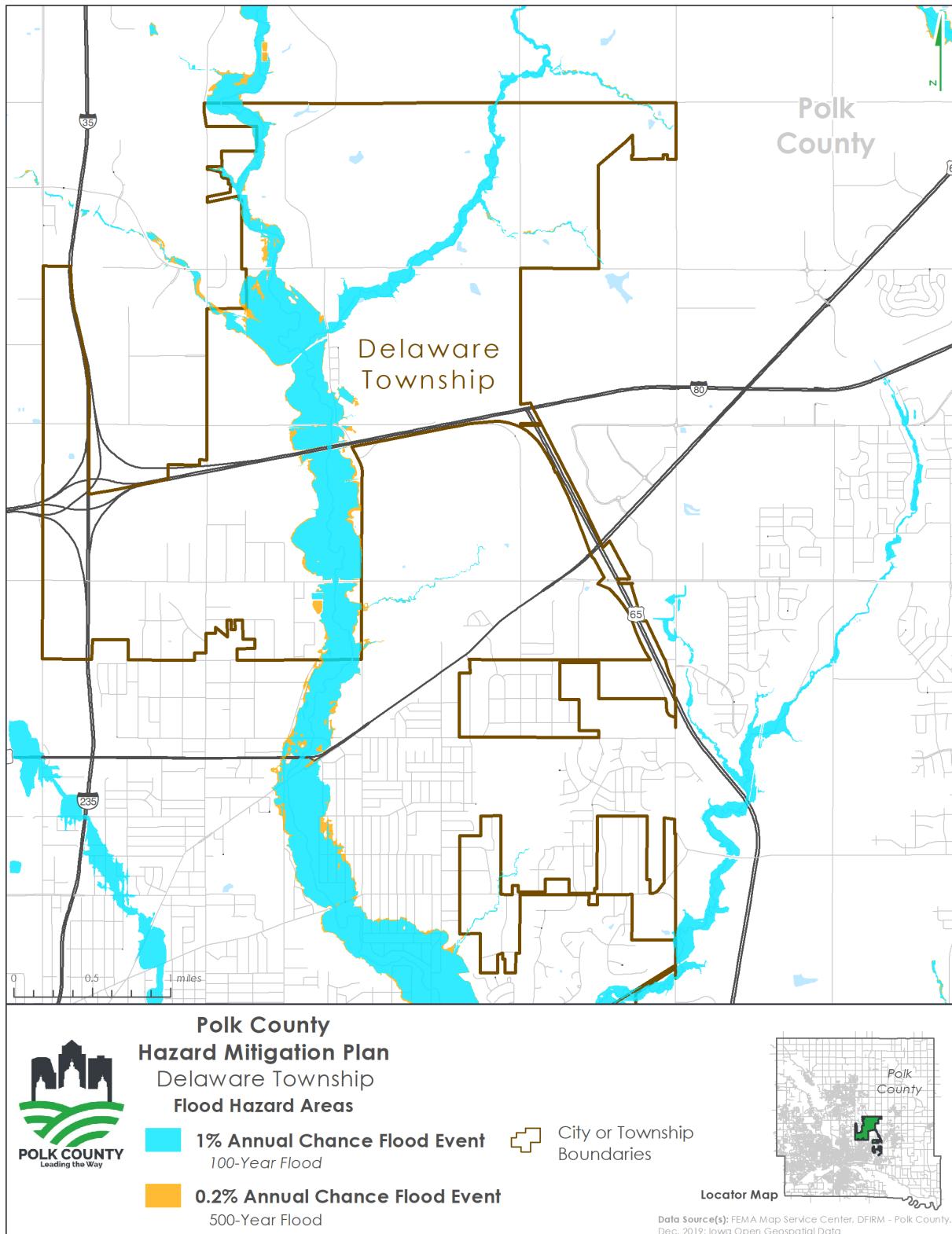


Figure 76 – City of Des Moines Flood Hazard Area

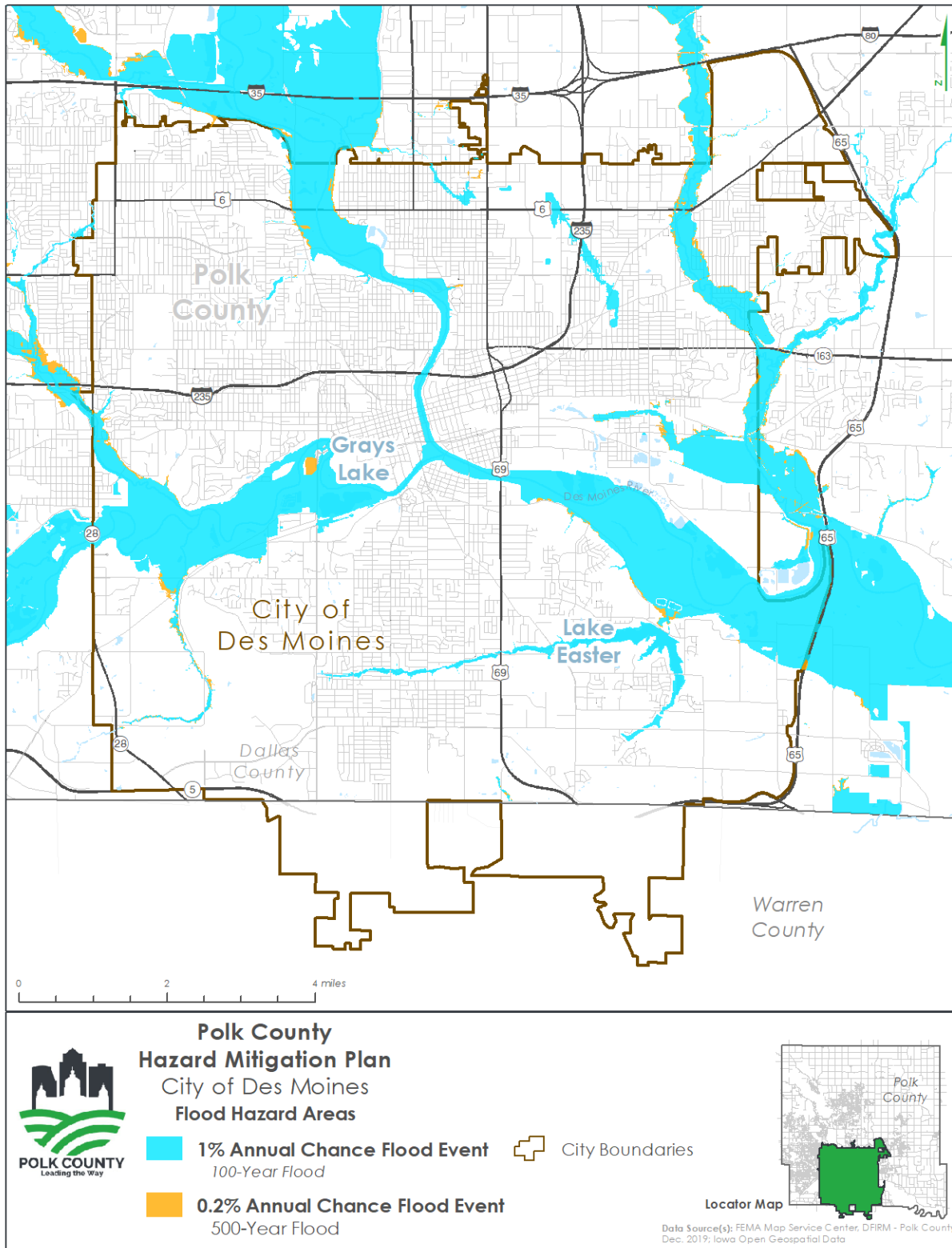


Figure 77 – City of Elkhart Flood Hazard Area

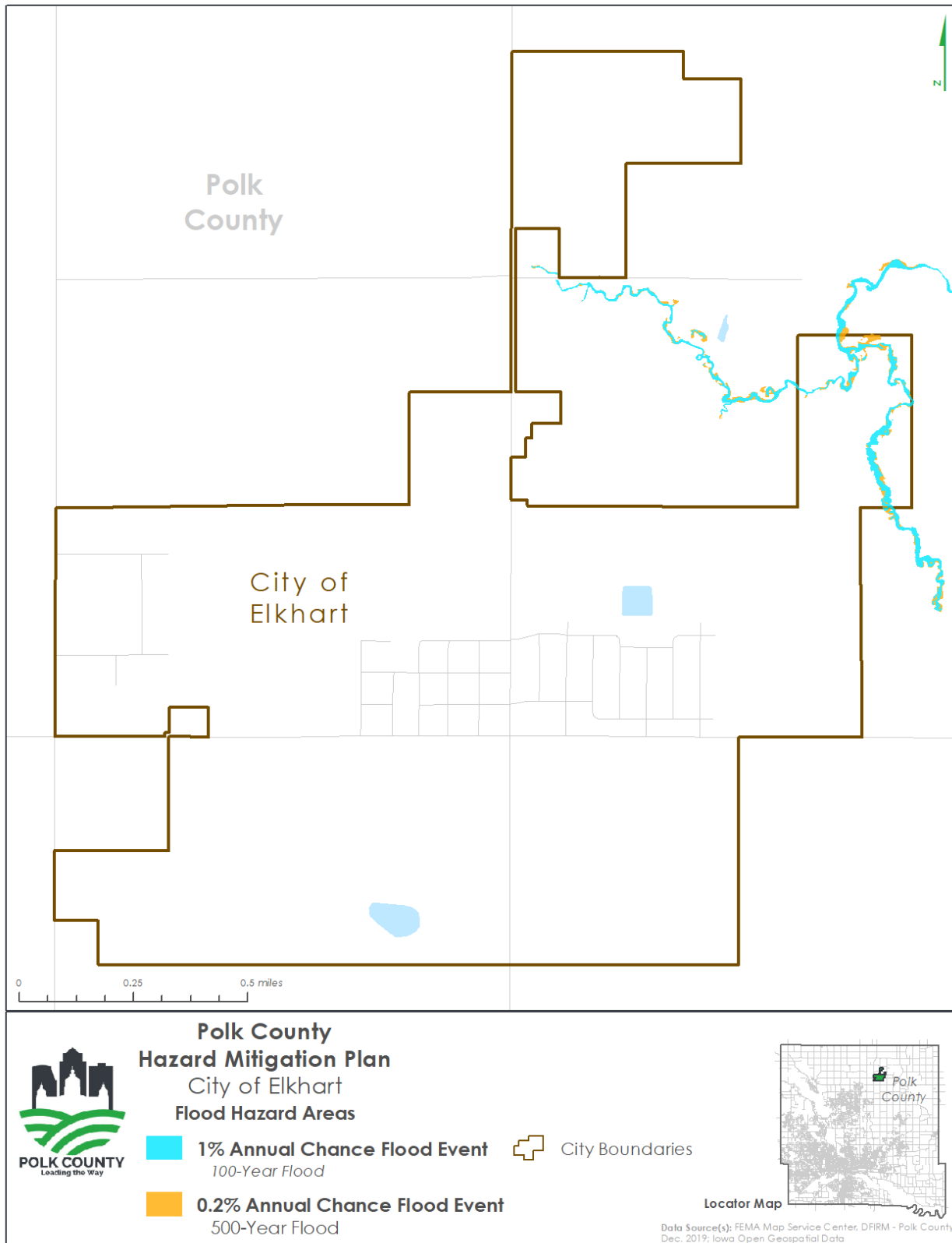




Figure 78 – City of Grimes Flood Hazard Area

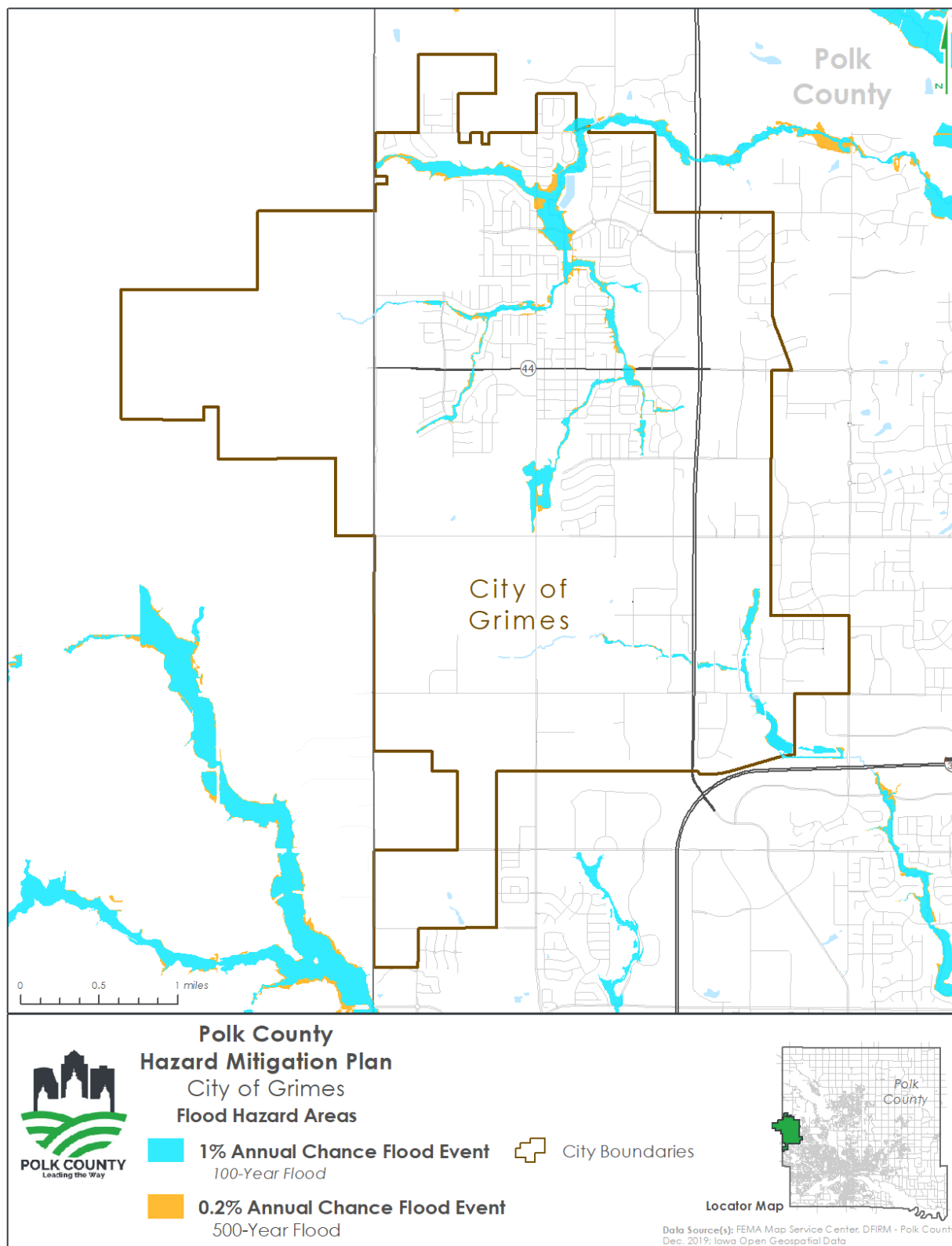


Figure 79 – City of Johnston Flood Hazard Area

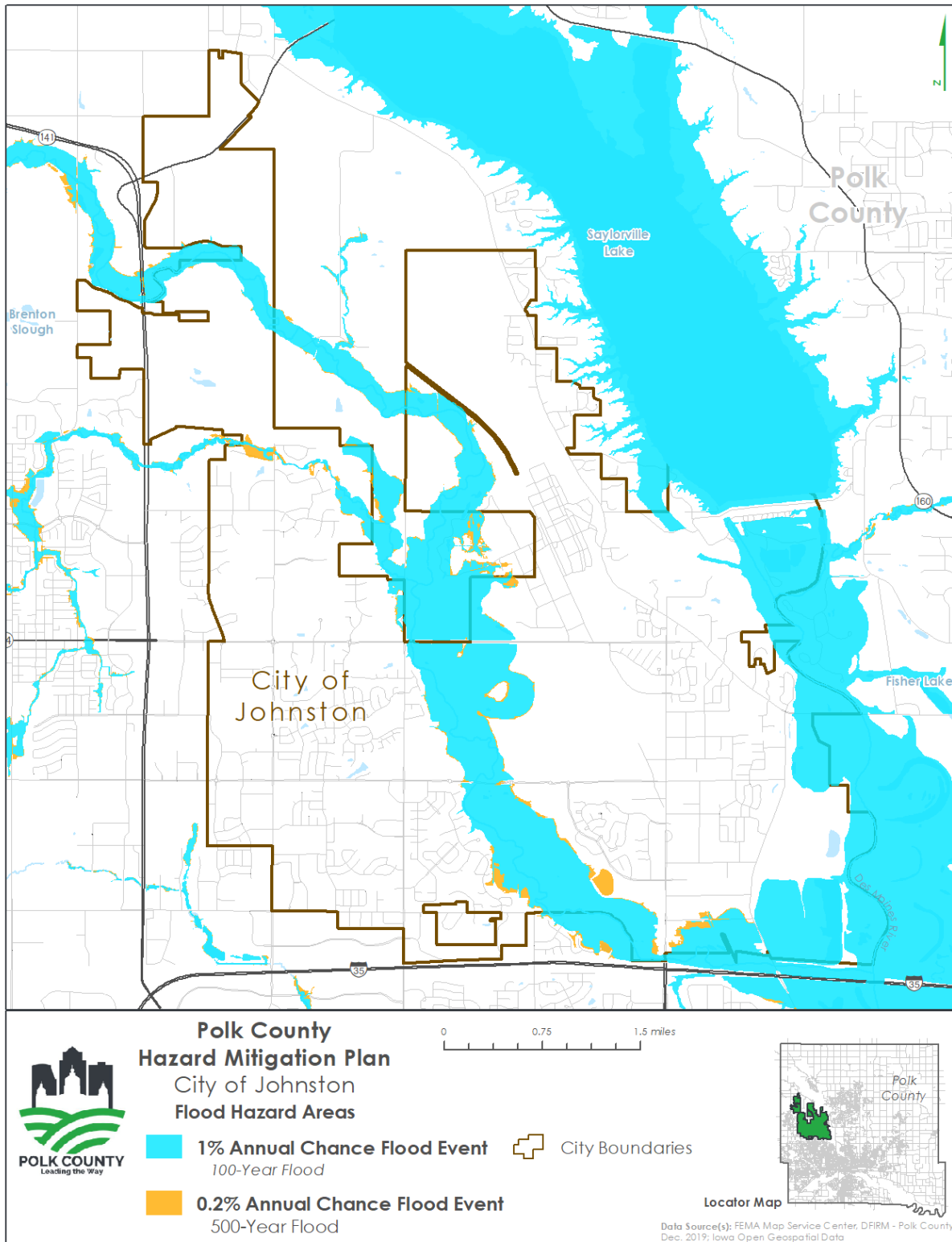


Figure 80 – City of Mitchellville Flood Hazard Area

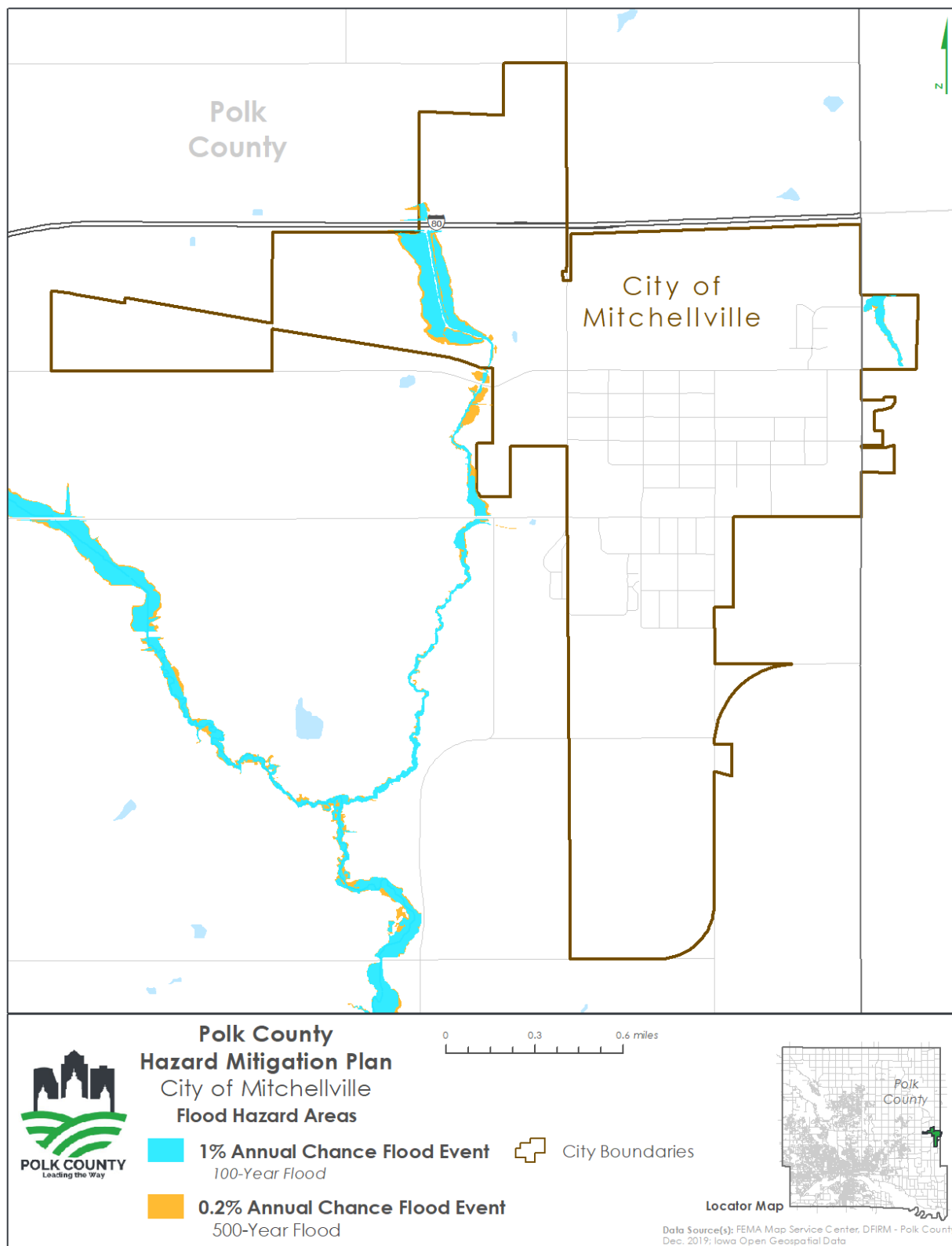


Figure 81 – City of Pleasant Hill Flood Hazard Area

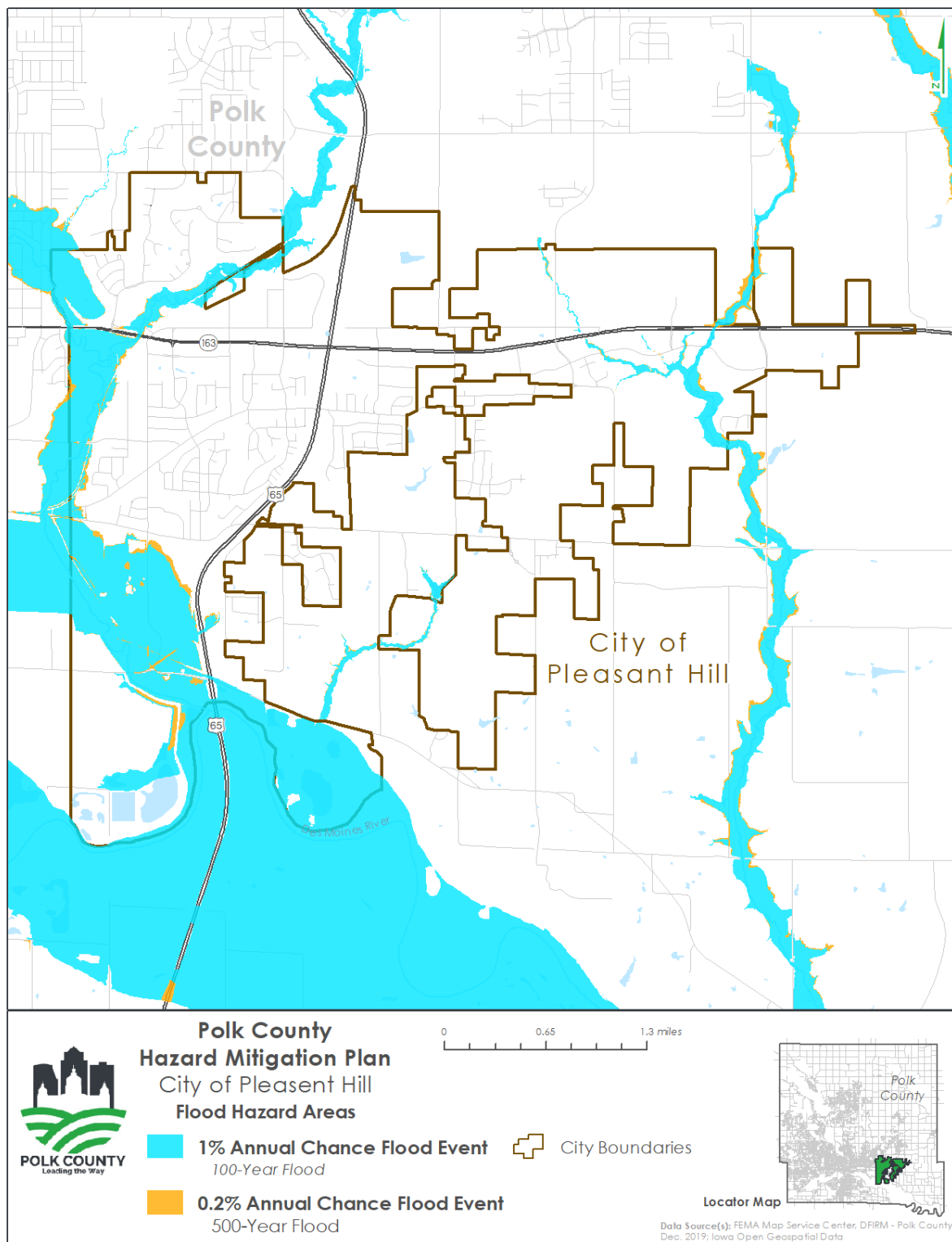


Figure 82 – City of Polk City Flood Hazard Area

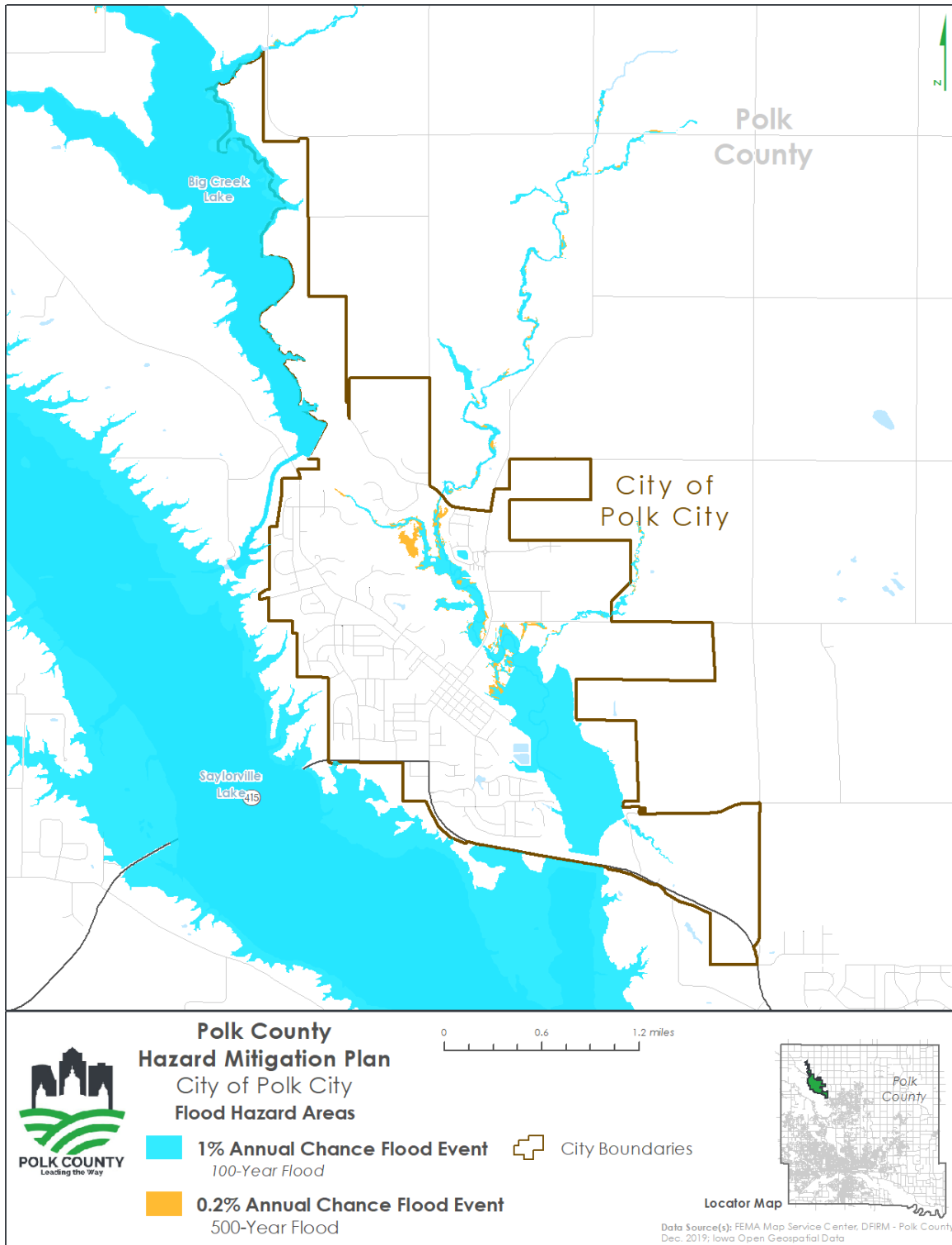


Figure 83 – City of Runnells Flood Hazard Area

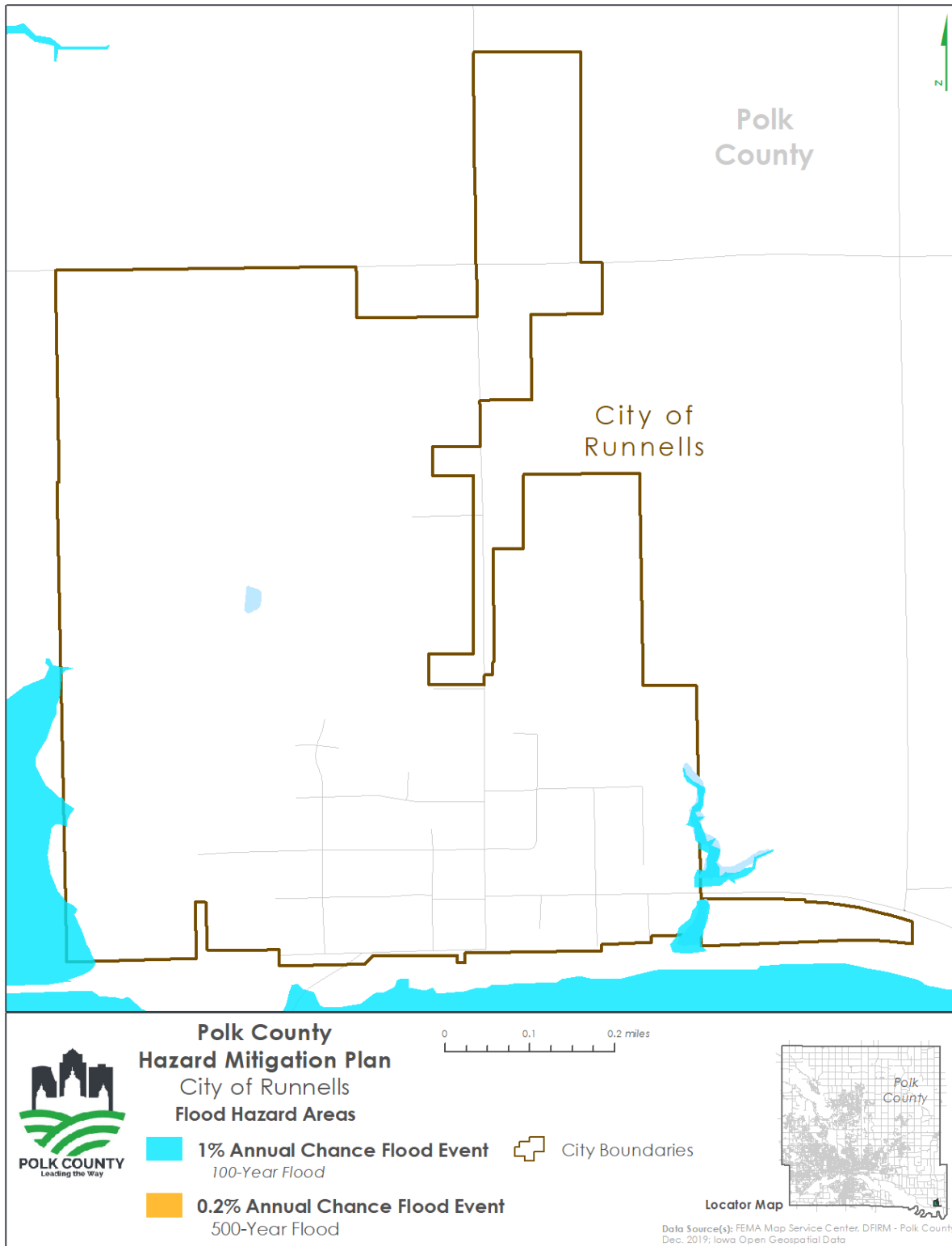


Figure 84 – Saylor Township Flood Hazard Area

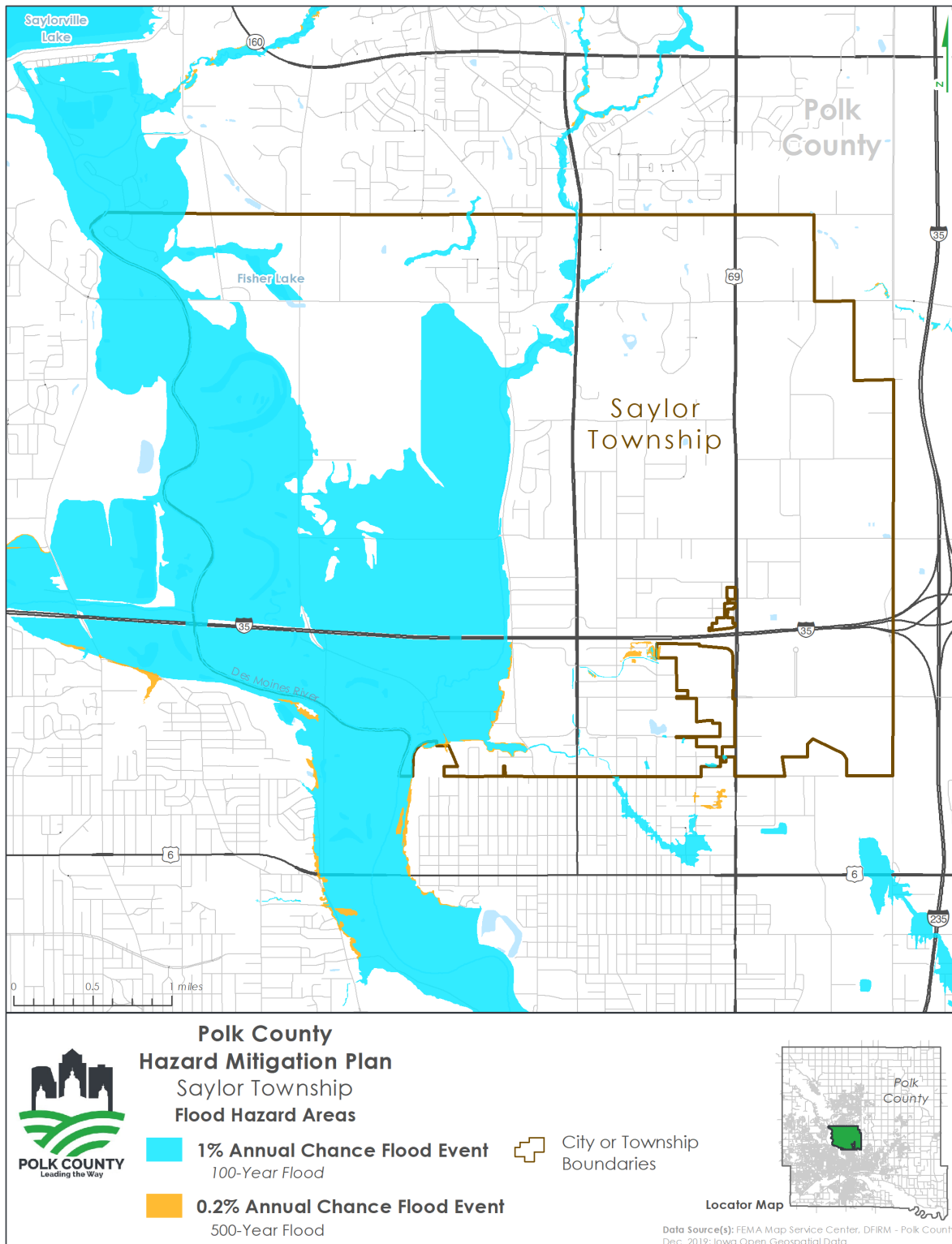




Figure 85 – City of Urbandale Flood Hazard Area

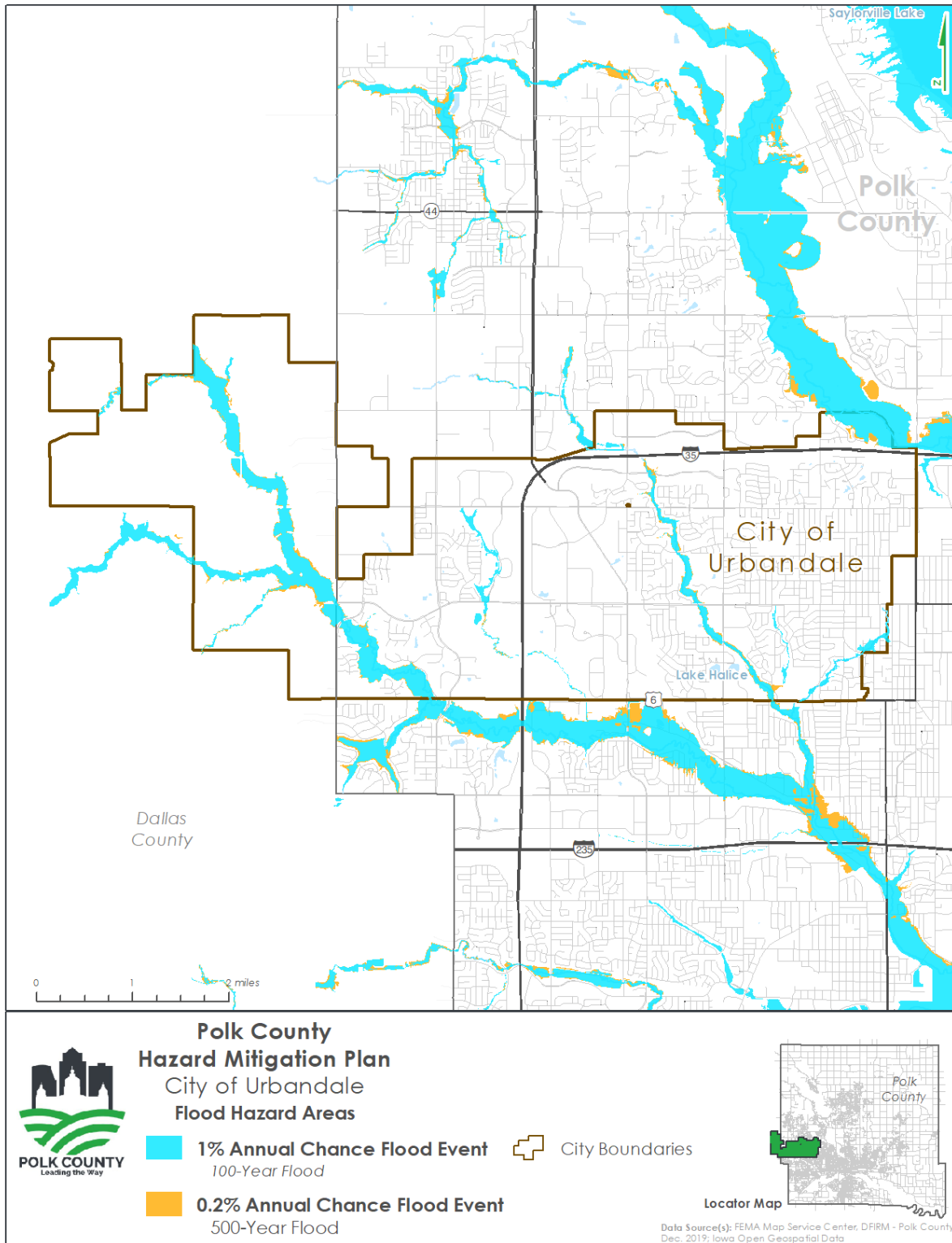


Figure 86 – City of West Des Moines Flood Hazard Area

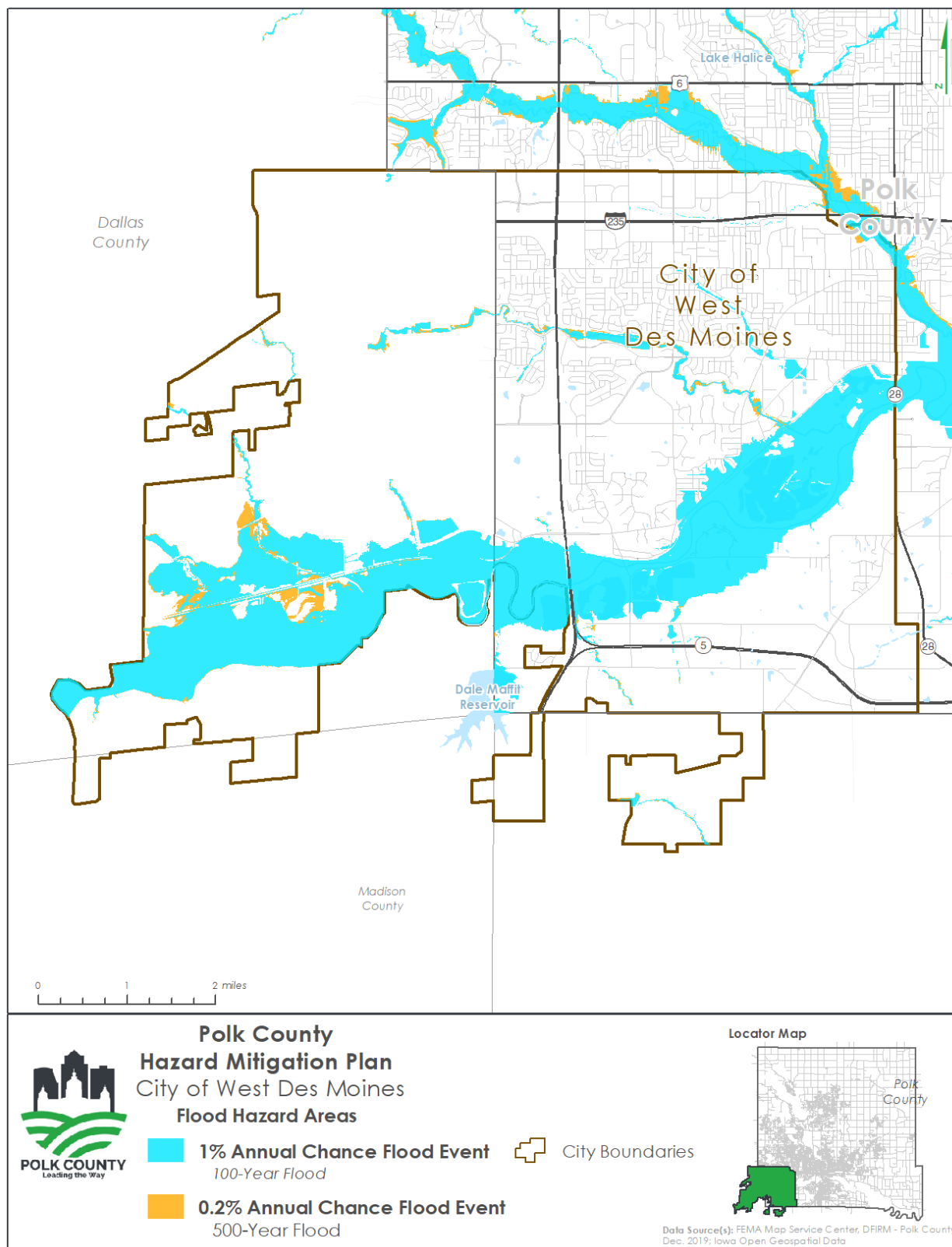
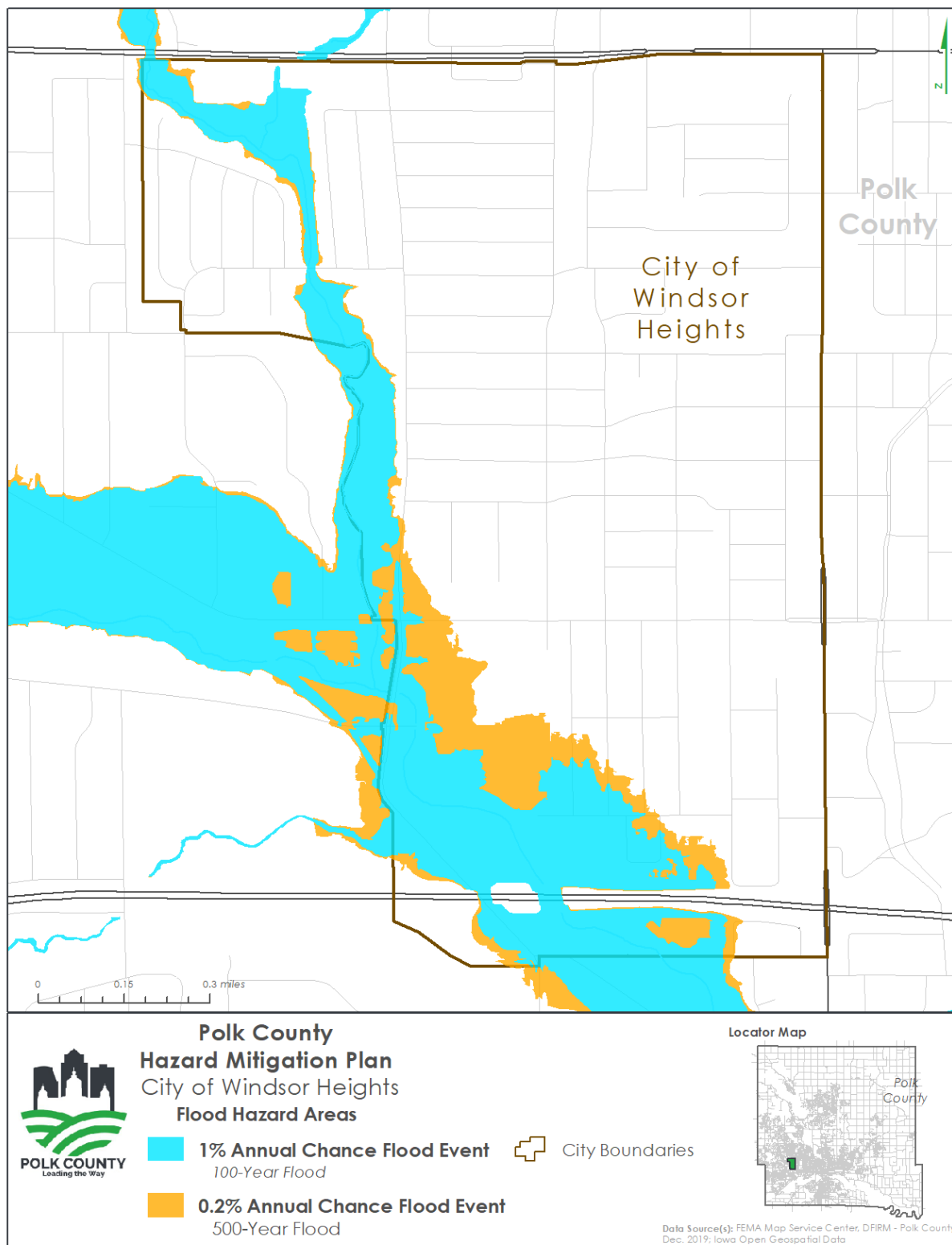


Figure 87 – City of Windsor Heights Flood Hazard Area



#### 3.3.16.3 EXTENT

Riverine flooding is among the most significant hazards in the planning area for a variety of reasons. First, the hazard can extend over a relatively large geographic area, threatening a significant number of people and properties. Second, the dangers associated with flooding manifest with ease – just an inch of water can cause tens of thousands of dollars worth of property damage, and adults can be swept away by as little as six inches of moving water.<sup>24</sup> Furthermore, it only takes a foot of moving water to wash away most cars. The danger of floodwater can be deceptive, and it is common for individuals to attempt to drive through water which they *perceive* as safe. Sadly, such a misjudgement can have dire consequences, and more than half of all flood-related deaths occur as a result of vehicles driving into hazardous floodwater.<sup>25</sup> Third, flooding generally tends to be longer-lasting than many other hazards. It can take days or weeks for floodwaters to recede, and during this time people will be displaced, transportation and utility services will be limited, and community activities will be disrupted.

Across its history Polk County has experienced several major flooding events, with the two most severe events occurring in 1993 and 2008.

##### 1993 Flooding

The 1993 flood – sometimes called the “Great Flood of 1993” – is arguably the worst flooding event in Polk County’s history. Record rainfall throughout spring and early summer in the midwest led to extensive flooding, including in Polk County. On July 10<sup>th</sup>, discharge at the a gaging station along the Raccoon River tripled (going from 23,500 ft<sup>3</sup>/s to 70,100 ft<sup>3</sup>/s), and floodwaters reportedly rose by nearly a foot every hour.<sup>26</sup> On the evening of July 10, 1993, a break occurred in the West Des Moines levee and businesses nearby weer quickly inundated with more than 5 ft of water. Evacuation orders for the area were issued at approximately 8pm. The flooding continued to spread, and by 1am on the morning of July 11 floodwaters overtopped a levee protecting the Water Works for the City of Des Moines. The levee built to protect this installation was more than 6 ft higher than the highest, previously known flood. The flooding at this site cut off water service to the Des Moines area, leaving more than 250,000 people without water service for 19 days.<sup>27</sup> Truckloads of potable water were hauled to Des Moines and distributed at 29 area grocery stores.

---

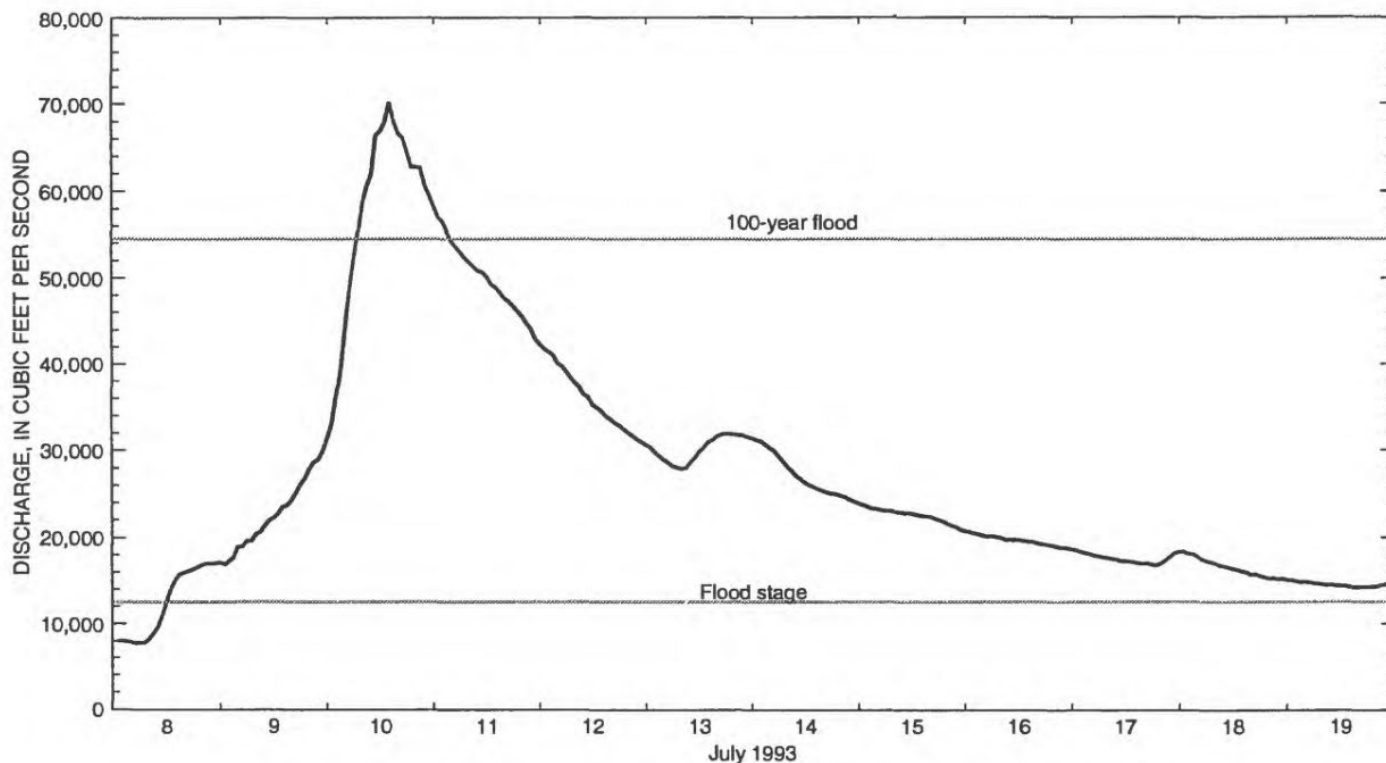
<sup>24</sup> US Department of Commerce, NOAA. “Turn Around Don’t Drown.” weather.gov. NOAA’s National Weather Service. Accessed April 3, 2024. <https://www.weather.gov/safety/flood-turn-around-dont-drown>.

<sup>25</sup> US Department of Commerce, NOAA. “Turn Around Don’t Drown.” weather.gov. NOAA’s National Weather Service. Accessed April 3, 2024. <https://www.weather.gov/safety/flood-turn-around-dont-drown>.

<sup>26</sup> Eash, David, and Barbara Koppensteiner. “Flood of July 9-11, 1993, In the Raccoon River Basin, West-Central Iowa.” Open-File Report. Open-File Report. U.S. Geological Survey, 1997. <https://pubs.usgs.gov/of/1997/0557/report.pdf>.

<sup>27</sup> Eash, David, and Barbara Koppensteiner. “Flood of July 9-11, 1993, In the Raccoon River Basin, West-Central Iowa.” Open-File Report. Open-File Report. U.S. Geological Survey, 1997. <https://pubs.usgs.gov/of/1997/0557/report.pdf>.

Figure 88. Discharge at the Raccoon River at Station Number 05484500 July 8-19, 1993



The extent of flooding in the Des Moines area continued to grow, and multiple electrical substations were inundated, resulting in power outages in many parts of Des Moines, including all of the downtown area. Many major roadways were also submerged, further complicating response operations. Thousands of residents were evacuated, and both Des Moines and West Des Moines declared states of emergency. Over the next two weeks, local, state, and federal resources worked around the clock to preserve, as much as possible, people and property, as well as restoring critical services. Potable water service was finally restored on July 29, but much work remained. The Mayor of Des Moines at the time was quoted as saying “It will take six months to get homes cleaned up, small businesses reopened, streets repaired, and people fairly comfortable and safe again. Then we’ll be gearing up for snowstorms and ice.”<sup>28</sup> The flooding of 1993 predates NCEI data on financial impacts of flooding events, but Des Moines officials at the time estimated flood damage to the city and its residents exceeded \$250,000,000.<sup>29</sup>

#### 2008 Flooding

<sup>28</sup> Sahagun, Louis. “The Calm Before Cleanup in Des Moines: Flooding: The City Is ‘strangely Quiet’ While Residents Wait for Water to Be Restored. Then Will Come the Massive Chore of Clearing Away the Muck.” Los Angeles Times, July 22, 1993. <https://www.latimes.com/archives/la-xpm-1993-07-22-mn-15700-story.html>.

<sup>29</sup> Eash, David, and Barbara Koppensteiner. “Flood of July 9-11, 1993, In the Raccoon River Basin, West-Central Iowa.” Open-File Report. Open-File Report. U.S. Geological Survey, 1997. <https://pubs.usgs.gov/of/1997/0557/report.pdf>.

An unusually wet winter and spring resulted in significant flooding across the State of Iowa in late May and early June 2008. While the most severe flooding occurred in eastern Iowa, Polk County still experienced significant damage from floodwaters. NCEI data shows that between May 30<sup>th</sup> and June 12, 2008, flooding in Polk County resulted in approximately \$61,000,000 in damages.<sup>30</sup> The actions taken following the flooding of 1993 may have helped lessen the impact of the 2008 flood – improvements to levees and flood walls prevented the inundation of critical facilities including water and wastewater treatment facilities as well as most electrical substations. However, a portion of the levee near the Birdland area of Des Moines failed, flooding more than 200 homes and 30 businesses. Mandatory evacuations were issued for the most at-risk portions of the Des Moines area.

Gauges along streams and rain gauges throughout the state provide for an early flood warning system. Riverine flooding usually develops over the course of several hours or even days depending on the basin characteristics and the position of the particular reach of the stream. The National Weather Service and the Iowa Flood Center (through the Iowa Flood Information System – IFIS) both provide flood forecasting and early warning. Flood warnings are issued over emergency radio and television messages as well as the NOAA Weather Radio. The National Weather Service issues flood alerts described in Table 87 to give adequate time for people to take appropriate actions to limit harm to themselves and – if possible – their property.

**Table 87. National Weather Service Flood Alerts**

| Alert          | Description                                                                                                                                                                                                                                                                                                                                                   |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Flood Warning  | A Flood Warning is issued when the hazardous weather event is imminent or already happening. A Flood Warning is issued when flooding is imminent or occurring                                                                                                                                                                                                 |
| Flood Advisory | A Flood Advisory is issued when a specific weather event that is forecast to occur may become a nuisance. A Flood Advisory is issued when flooding is not expected to be bad enough to issue a warning. However, it may cause significant inconvenience, and if caution is not exercised, it could lead to situations that may threaten life and/or property. |
| Flood Watch    | A Flood Watch is issued when conditions are favorable for a specific hazardous weather event to occur. A Flood Watch is issued when conditions are favorable for flooding. It does not mean flooding will occur, but it is possible.                                                                                                                          |

<sup>30</sup> National Centers for Environmental Information. “Storm Events Database.” [ncdc.noaa.gov](https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28Z%29+Flood&beginDate_mm=12&beginDate_dd=01&beginDate_yyyy=1990&endDate_mm=12&endDate_dd=31&endDate_yyyy=2023&county=POLK%3A153&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=19%2CIOWA), April 4, 2024.  
[https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28Z%29+Flood&beginDate\\_mm=12&beginDate\\_dd=01&beginDate\\_yyyy=1990&endDate\\_mm=12&endDate\\_dd=31&endDate\\_yyyy=2023&county=POLK%3A153&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=19%2CIOWA](https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28Z%29+Flood&beginDate_mm=12&beginDate_dd=01&beginDate_yyyy=1990&endDate_mm=12&endDate_dd=31&endDate_yyyy=2023&county=POLK%3A153&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=19%2CIOWA).

#### 3.3.16.4 PREVIOUS OCCURRENCES

Since 1953 there have been 12 federal disaster declarations pertaining to flooding in Polk County. Flooding is the hazard most frequently identified across all federal disaster declarations affecting Polk County, and only 6 declarations (2 of which addressed COVID-19) are not related to flooding within the planning area. Additional details of the flood-related disaster declarations are provided in Table 88.

**Table 88. FEMA Flood Disaster Declarations that included Polk County 1965- 2024**

| Disaster Number | Description                                                 | Declaration Date<br>Incident Period    | Individual Assistance (IA)<br>Public Assistance (PA) |
|-----------------|-------------------------------------------------------------|----------------------------------------|------------------------------------------------------|
| DR-4421         | Severe Storms & Flooding                                    | 03-23-2019<br>03-12-2019 – continuing  | IA & PA                                              |
| DR-4386         | Severe Storms, Tornadoes, Straight-line Winds, and Flooding | 08-20-2018<br>06-06-2018 to 07-02-2018 | PA                                                   |
| DR-1930         | Severe Storms, Flooding, & Tornadoes                        | 7-29-2010<br>6-1-2010 to 8-31-2010     | IA & PA                                              |
| DR-1763         | Severe Storms, Tornadoes, & Flooding                        | 5-27-2008<br>5-25-2008 to 8-13-2008    | IA & PA                                              |
| DR-1518         | Severe Storms, Tornadoes, & Flooding                        | 5-25-2004<br>5-19-2004 to 6-24-2004    | IA                                                   |
| DR-1230         | Severe Weather, Tornadoes, & Flooding                       | 7-2-1998<br>6-13-1998 to 7-15-1998     | IA & PA                                              |
| DR-996          | Flooding, Severe Storm                                      | 7-9-1993<br>4-13-1993 to 10-1-1993     | IA & PA                                              |
| DR-868          | Flooding, Severe Storm                                      | 5-26-1990<br>5-18-1990 to 7-6-1990     | IA & PA                                              |
| DR-443          | Flooding, Severe Storm                                      | 6-24-1974<br>6-24-1974                 | IA & PA                                              |
| DR-269          | Heavy Rains, Flooding                                       | 8-14-69<br>8-14-69                     | IA & PA                                              |
| DR-259          | Flooding                                                    | 4-25-1969<br>4-25-1969 to 4-25-1969    | IA & PA                                              |
| DR-193          | Flooding                                                    | 4-22-1965<br>4-22-1965 to 4-22-1965    | IA & PA                                              |

The following descriptions of principle flooding issues and previous flooding events in the planning area were provided by planning committee members.

#### Unincorporated Polk County

Major flooding occurred on the Des Moines River near Saylorville in June 1954, July 1993, June 2008, and April 1965. Peak crests associated with these events are 24.50 ft, 24.22 ft, 24.03 ft, and 24.02 ft, respectively. Peak crests were taken from the Des Moines River near Saylorville, Iowa stream gauge (USGS Gauge No. 05481650). Significant flooding occurred on Beaver Creek on June 13, 1966 and May 19, 1974 and July 10, 1993 and June 13, 2008. Discharges associated with these events are 5,470 cfs, 7,340, 14,300 cfs, and 7,010 cfs, respectively, at the Beaver Creek near Grimes, Iowa stream gauge (USGS Gauge No. 05481950).



City of Ankeny

Fourmile Creek and its tributaries, Saylor Creek and its tributaries, and tributaries of Rock Creek are all subject to flooding although there no USGS gauging stations in the study area in Ankeny.

City of Clive

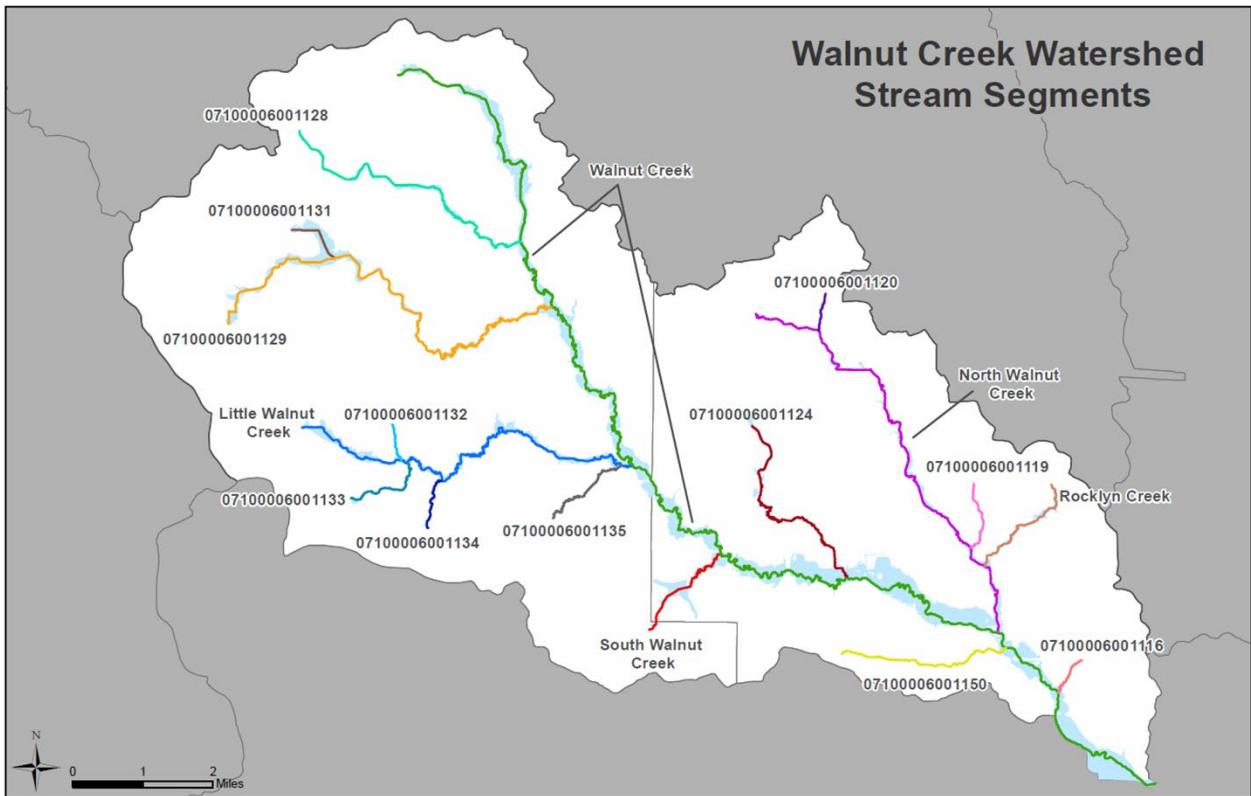
The current Flood Insurance Study (2019) characterizes Walnut Creek as an approximately 18.1 mile stream located within an approximately 84 square mile drainage area. At its confluence with the Raccoon River, the peak discharges have been estimated based on HEC-HMS 3.5 Hydrologic and HEC-RAS 4.1.0 Hydraulic models from 2014:

Table 89. Walnut Creek Watershed Stream Segments

| 10% Annual<br>Chance | 2% Annual<br>Chance | 1% Annual<br>Chance | .2% Annual<br>Chance |
|----------------------|---------------------|---------------------|----------------------|
| 7,300 cfs            | 13,450 cfs          | 17,000 cfs          | 27,000 cfs           |

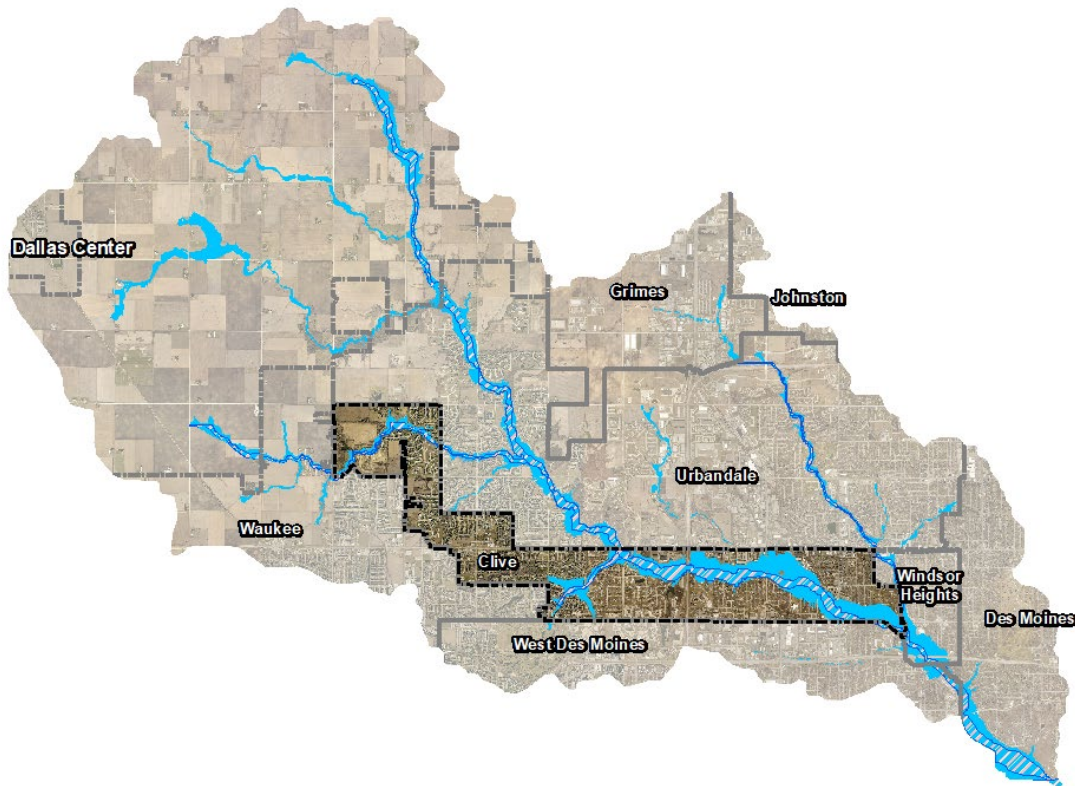
Within the City of Clive, approximately 8 miles of Walnut Creek runs generally through the middle of the community. Additionally, three Walnut Creek tributaries (North Walnut Creek, South Walnut Creek and Little Walnut Creek) are significant water resources within the community.

Figure 89. Walnut Creek Watershed Stream Segments



The City of Clive is solely located within the Walnut Creek Watershed and comprises approximately 10 percent of land area within the watershed. Due to its relative position within the watershed, over 90% of the watershed drains through Clive.

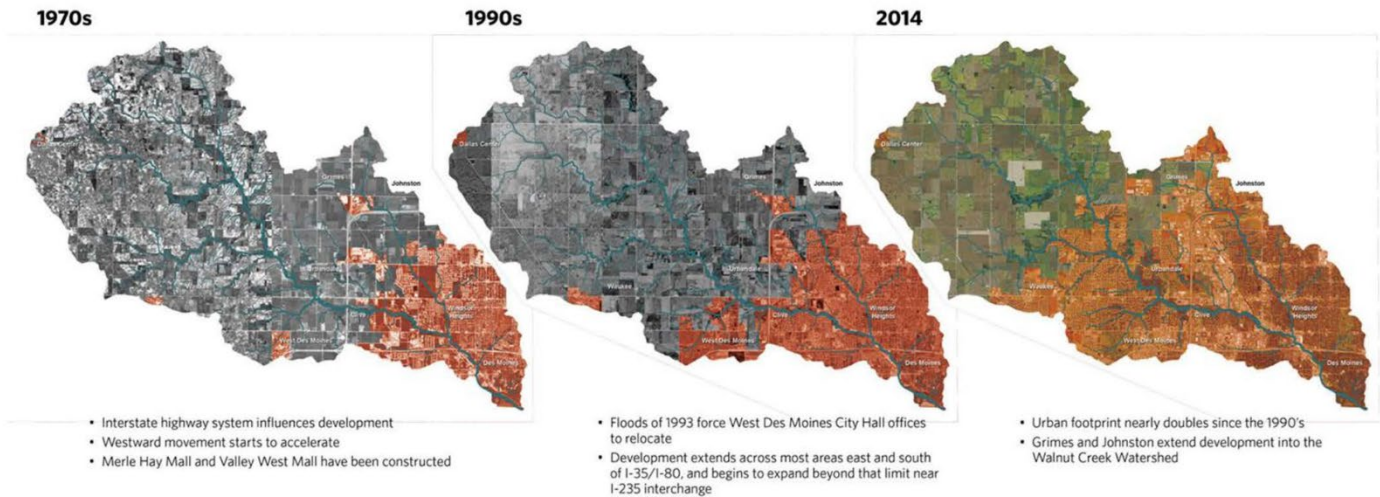
**Figure 90. Location of Clive within Walnut Creek Watershed**



The watershed is comprised of a range of land uses including agriculture, residential and commercial/industrial development. Presently, the watershed is approximately 50% agricultural land use, although the percentage is rapidly changing as the suburban communities continue to grow. For the last 40+ years, the communities have converted agricultural land to suburban landscape at a rate of approximately 400 acres per year. With the continued regional population growth expected and the readily available infrastructure to support growth, it is assumed that the rate of development in the watershed will likely continue which will result in the land use composition within the watershed to be approximately 75% suburban/25% agricultural by 2050.

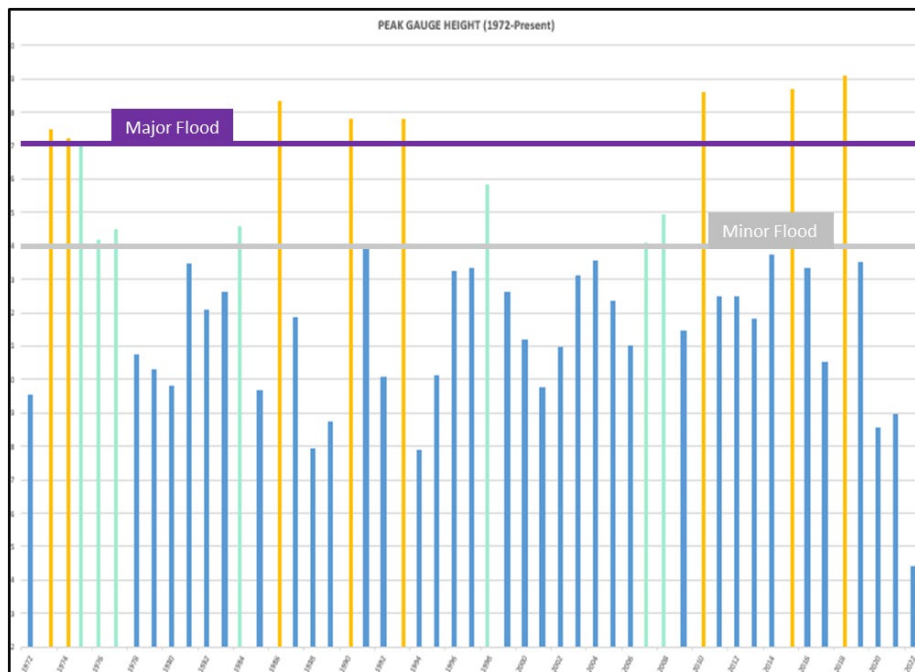
Figure 91. Walnut Creek Watershed Landscape Changes 1970s - 2014

#### Landscape Change



The City of Clive has had to deal with flooding along Walnut Creek and its tributaries since the community's inception in 1956. Early flood records indicate significant flooding events occurred along Walnut Creek in 1958, 1964, 1973 and 1986. The 1973 flood was identified as the greatest of the known floods at the time although the 1986 peak (12,500 cfs) has been suggested by local observers to have been as impactful as the 1973 flood.

Figure 92. Walnut Creek Flood Gauge Data 1972 - Present



Since the establishment of the USGS gauge at 63<sup>rd</sup> Street in 1973, the City of Clive has experienced a flood event more than a dozen times, including the last significant flood event in 2018 which caused over \$1.5 million in private property damage. During this period of record, Walnut Creek flooding events have generally occurred in late summer and have manifested following a period of generally higher precipitation. Once the watershed has reached general saturation, high intensity storms have produced sudden flooding with less than 6-hour warning from headwater flows reaching the vulnerable portions of the City (University Boulevard neighborhood area). Typically, flood waters have peaked in 9,000-12,500 cfs range which produces 1-3 foot flood inundation levels in those vulnerable areas. Provided that the Raccoon River is not simultaneously high, flood waters on Walnut Creek typically receded within 12 hours. Inundation levels in the University Boulevard neighborhood area are expected to exceed 7-feet in the event of a 100-year flood event.

Based on the Silver Jackets Walnut Creek Watershed Mitigation Benefits Estimator analysis (2019), there are approximately 787 insurable structures located in the Walnut Creek Watershed floodplain. From the City's 2023 Flood Insurance Assessment report, within the City of Clive there are an estimated 256 insurable structures (152 residential and 104 non-residential) located within the floodplain with an estimated value of nearly \$125 million or approximately 10% of the City's tax base. Approximately 1/3 of insurable structures are located in the University Boulevard Repetitive Loss area. Most the of the remaining insurable structures are located in the Indian Hills Repetitive Loss area.

The University Boulevard Repetitive Loss area has been of specific concern since the 2018 flood which caused significant private property damage and impacted life safety conditions for dozens of residents who were sleeping at the time of the event. Following the flood event, the City Council allocated funding to initiate a flood buyout program. Utilizing both local funding and Hazard Mitigation Grant Program funding, the City has complete the acquisition and demolition of 21 structures in the University Boulevard neighborhood. As funding becomes available, an additional 34 structures are anticipated to be acquired. The City intends for the buyout area to be converted to natural floodplain open space and incorporated into the adjacent Greenbelt Park.



Figure 93. University Boulevard Repetitive Loss Area- Acquisition Strategy

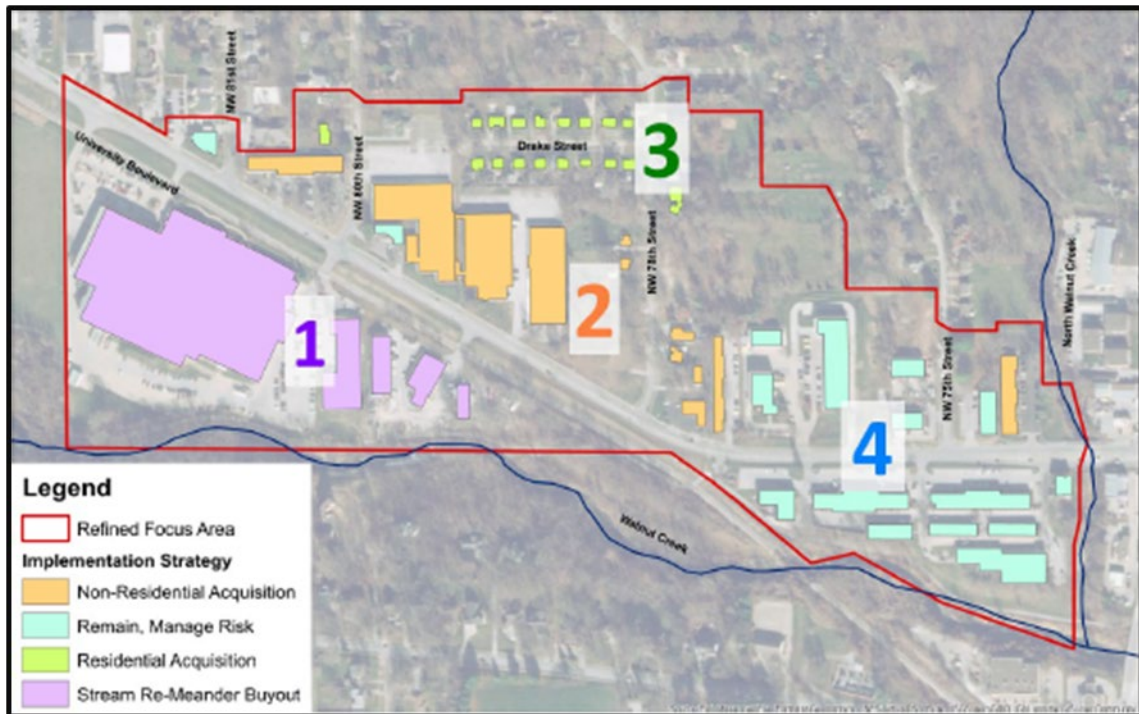
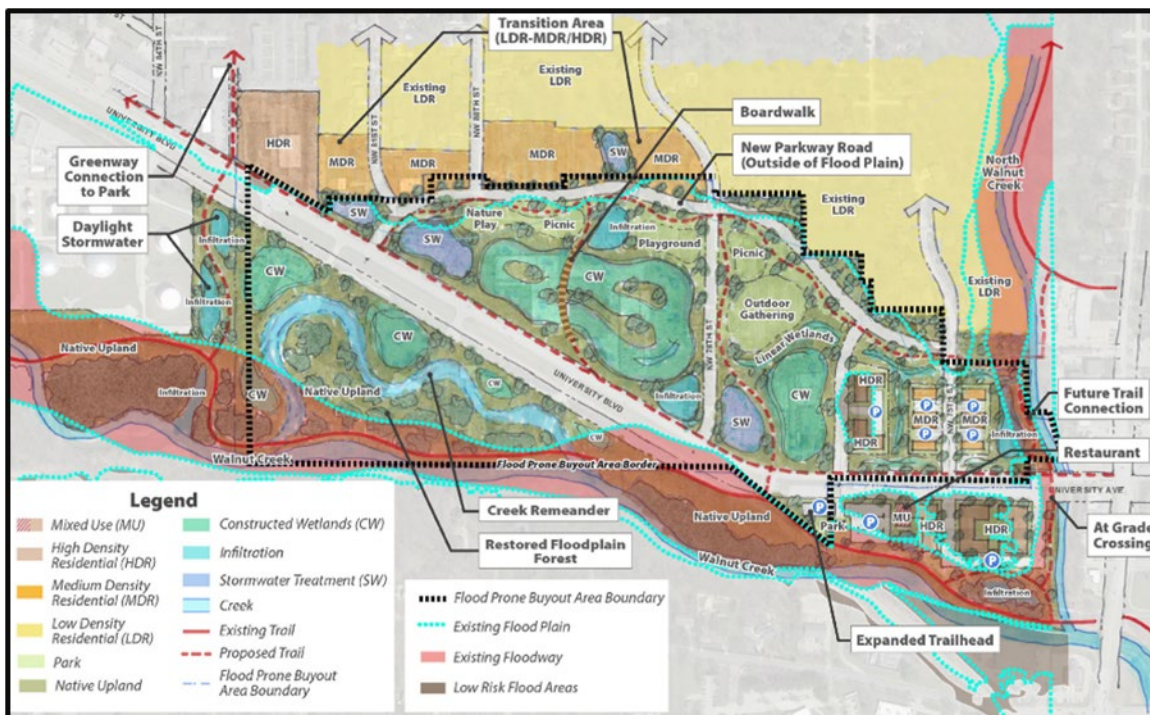


Figure 94. University Boulevard Repetitive Loss Area- Future Natural Floodplain Open Space Concept



To this point, the property owners in the Indian Hills Repetitive Loss area are generally concerned with flood insurance costs rather than the impacts of flooding as the typical flooding event experienced has not resulted in wide-spread impact in this neighborhood. Many of the homes built in the late 1970's and early 1980's were permitted to be constructed within the floodplain through a FEMA granted basement floodproofing exemption. At the time of construction, the homes were built with reinforced concrete basement walls protecting the structures to the then 100-year base flood elevation plus one foot level. Based on the current FEMA Flood Insurance Rate Map, many of those originally protected homes now have the potential to be inundated. As funding becomes available, the City anticipates the need for undertaking a specific flood mitigation planning process for this neighborhood in order to fully assess the risks and develop appropriate mitigation strategies for the long-term resiliency of the neighborhood.

Over the last several decades, the risks associated with flooding has continued to increase due to both natural and man-made changes. In 2019, the City of Clive, in partnership with FEMA and ACE through the Silver Jackets program, evaluated the potential impacts on the watershed from continued development as well as changing climate conditions. The Walnut Creek Watershed Mitigation Benefits Estimator Report identified that base flood elevations within the watershed should be anticipated to increase as development and climate change is experienced. Specifically, the analysis concluded that the increase in base flood elevations could result in approximately 300 additional structures could be at-risk. The total estimated annualized risk was calculated at approximately \$6 million dollars per year (1,098 existing insurable structures within the watershed).

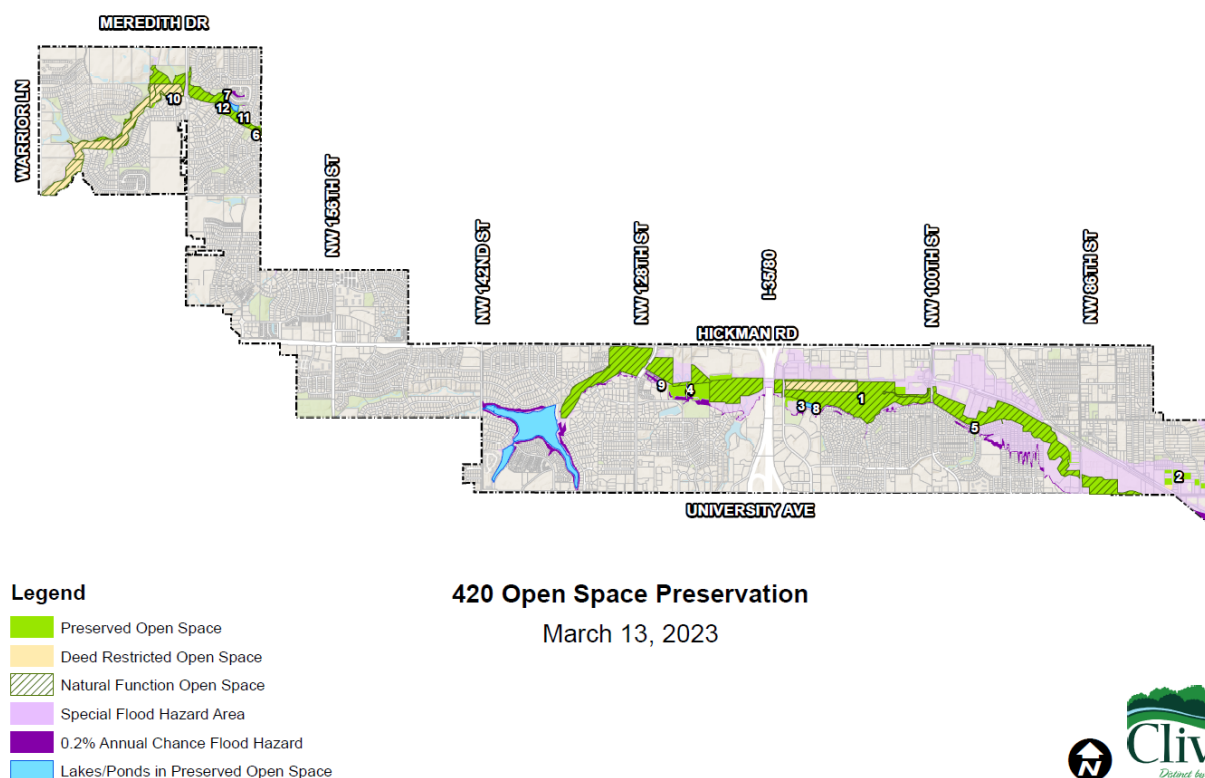
**Figure 95. Walnut Creek Watershed Mitigation Benefits Estimator Report Findings**

| METRIC                                                                                                                                                   | FEMA EXISTING<br>CONDITIONS<br>MBE RESULT           | USACE EXISTING<br>CONDITIONS<br>MBE RESULT            | USACE FUTURE<br>CONDITIONS<br>MBE RESULT              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|
| Total Number of Structures Analyzed by MBE                                                                                                               | 13,079                                              | 13,079                                                | 13,079                                                |
| Total Estimated Number of Structures at Risk<br>(Structure or Content Damage > \$0; Properties with Value > \$100; Building Footprints > 10 square feet) | 787<br>(6-percent of the total structures analyzed) | 1,070<br>(8-percent of the total structures analyzed) | 1,098<br>(8-percent of the total structures analyzed) |
| Total Estimated Annualized Risk<br>(Total Estimated Damage Annualized)                                                                                   | \$4.5 million                                       | \$10.2 million                                        | \$11.6 million                                        |
| Total Estimated Mitigation Cost Need<br>(Elevation)<br>(MBR ≥ 1.0)                                                                                       | \$10.6 million                                      | \$27.8 million                                        | \$32.2 million                                        |
| Total Estimated Mitigation Benefits<br>(Elevation)<br>(MBR ≥ 1.0)                                                                                        | \$41.1 million                                      | \$103.8 million                                       | \$122.1 million                                       |
| Total Estimated Mitigation Cost Need<br>(Acquisition)<br>(MBR ≥ 1.0)                                                                                     | \$20.4 million                                      | \$34.6 million                                        | \$38.7 million                                        |
| Total Estimated Mitigation Benefits<br>(Acquisition)<br>(MBR ≥ 1.0)                                                                                      | \$34.4 million                                      | \$80.4 million                                        | \$96.8 million                                        |
| Total Estimated Mitigation Cost Need<br>(Basement In-Fill)<br>(MBR ≥ 1.0)                                                                                | \$0.2 million                                       | \$0.6 million                                         | \$0.8 million                                         |
| Total Estimated Mitigation Benefits<br>(Basement In-Fill)<br>(MBR ≥ 1.0)                                                                                 | \$0.3 million                                       | \$1.0 million                                         | \$1.5 million                                         |

The resulting analysis of the future conditions has directly influenced the City's strategic planning for ensuring that the community is positively positioned to manage, respond and recover from Walnut Creek flooding.

Currently, the City of Clive owns nearly 50% of the floodplain ground within the community. Consistent with the City's Comprehensive Plan, it is anticipated that additional floodplain property will be acquired as it becomes available and incorporated into the Greenbelt Park. Acquisition of the floodplain and reserving the open space for natural floodplain function prevents the accumulation of additional at-risk structures while also aiding in the reduction of future flooding events through the maximization of flood conveyance.

**Figure 96. Clive Open Space Preservation Map**



In addition to the acquisition of floodplain property, the City of Clive has been active in the increase in the floodplain storage capacity of the land consistent with the vision established in the City's Greenbelt and Natural Resources Master Plan. Numerous stream channel (stabilization improvements and natural channel design reconstruction), constructed wetlands, ox-bow wetland excavations, and vegetation management projects have been completed within the Greenbelt Park. The multi-beneficial projects leverage floodplain management, water quality improvement, natural resource enhance and quality of life improvements to further the City's brand- Distinct by Nature.

Although the City has been active in both floodplain acquisition and flood buyouts, it is anticipated that there will continue to be approximately 200 insurable buildings at-risk in the Walnut



Creek floodplain well into the future. As those risks remain, the City of Clive will continue to be active in working in both upstream and downstream areas of the watershed in search of opportunities to partner in the creation of cost benefitted flood risk reduction mitigation efforts.

Consistent with the Walnut Creek Watershed Master Plan and the City's Water Resources Master Plan, the City will continue to investigate opportunities to increase on-site stormwater management and regionally scaled stormwater storage options for helping to buffer the anticipated future flood impacts. Enhanced stormwater management regulation, addressing both water quality and quantity, should also continue to be evolved even in light of the recent legislative preemption at the State level.

Evaluating the need for enhanced Floodplain Development and Building Code regulations are also a natural response to the anticipated future flood conditions. Considerations for higher regulatory standards, including increased freeboard requirements, "no net impact" floodplain filling requirements and cumulative substantial damage provisions, will be part of the City's review process moving forward. It will be important for the City to fully understand the potential impacts of the higher standards as well as the benefits. This more detailed assessment should be coupled with a robust public outreach effort.

As flood risks will remain a part of the community, early warning, flood response/operations and recovery will also continue to be a critical component of the City's flood mitigation efforts. Advancing the predictive nature of the existing flood alert early warning system should be a high priority. Deepening the warning system partnership through increased regionalization may allow for the development of a more advanced system which could aid in providing more warning/preparation time in advance of a flood event. Similarly, continual improvement of the City's Flood Response and Recovery plan will be vitally important as flood risks continue into the future. Incorporation of the future conditions data (including buildings and vulnerable populations), available advanced 2D H&H modeling mapping and further investigation of pluvial flood impacts associated with the City's storm sewer system are recommended improvement opportunities.

Continual property owner education and outreach will be necessary due to the transient nature of the business/home occupants and the expanding flood risks. Although the City allocates substantial resources to public outreach through its CRS program (including Informational handouts at City Hall, general outreach on water bills/newsletters/social media and targeted outreach projects such as the annually mailed Be Flood Ready Brochure), the program could be enhanced through the development of a specific Program for Public Information program. The committee structure for a PPI would aid in the coordination of the design of a holistic flood protection public education program that could enhance property owner knowledge of flood risks on their property, opportunities for flood risk reductions through mitigation and management of risks through proper flood insurance coverage.

#### City of Des Moines

The City of Des Moines has several rivers and streams that traverse the City, including the Des Moines River, Raccoon River, Walnut Creek, Fourmile Creek, and Seventh Ward Ditch. The areas adjacent to these streams frequently sustain substantial flood damages. During the Great Flood of

1993, Polk County suffered more than \$152,000,000 in flood damages, mostly in the Des Moines metropolitan area. In addition, Des Moines was without water service for 19 days causing the closure of most of the businesses and industry in the City. More than 3,000 properties were inundated. In 2008, residents and business were evacuated as flows exceeded the 1-percent-annual chance flood estimate. Birdland Levee on the Des Moines River failed and inundated the area behind it.

The Des Moines River has two USGS gauging stations within the City of Des Moines, the Des Moines River at 2<sup>nd</sup> Avenue (Gauge No. 05482000) and the Des Moines River below Raccoon River (Gauge No. 05485500). Significant floods occurred at the 2<sup>nd</sup> Avenue gauge in 1954 and 2008. The gauge was not in service between 1961 and 1997. The peak flows at the gauge on the Des Moines River below Raccoon River occurred in June 1947, April 1960, July 1993, and June 2008.

The Raccoon River and Walnut Creek inflicted flood damages on the City of Des Moines in the floods of 1973. Even though the flooding on the two streams resulted from the same storm system, the Walnut Creek flood crested on July 1, whereas, flood flows on the Raccoon River were relatively high during the period of July 1 through July 5, with the flood peak occurring on July 4. A USGS gauging station is located on the Raccoon River near Van Meter, Iowa, (Gauge No. 05484500) 15 miles upstream of the City of Des Moines. Other flooding events included July 1993, June 1998, and June 2008. A USGS gauging station on Raccoon River at Fleur Street has been in place since 1984. Peak discharges within the period of record occurred in July 1993 and June 2008.

A stream-gauging station on Walnut Creek at the 63<sup>rd</sup> Street Bridge (USGS Gauge No. 05484650) was established in October 1971. Fragmentary flood peak records prior to 1971 indicate that significant floods occurred in 1947, 1958, and 1964. The greatest of the known floods on Walnut Creek was the flood of July 1, 1973, but the 1947 flood may have been nearly equivalent. The recorded annual flood peaks for 1974 and 1975 were also relatively high and may have been greater than the 1958 and 1964 floods; however, flood peak data are not available at the same locations for direct comparisons. More recently, flood events in 2010 and 2018 significantly impacted the Walnut Creek watershed. The 2010 flood set a new peak gage height of 18.59 ft at this gauge, but the 2018 flood set a new record of 19.09 feet.

Significant floods have occurred on Fourmile Creek in 1947, 1966, 2008, 2010, and most recently 2018. A USGS stream gauge is located at Easton Boulevard on Fourmile Creek (Gauge No. 05485640) since 1972. The 2018 flood event set a new record crest elevation of 17.47 ft, which broke the previous peak in 2010 of 16.14 ft. Significant damage to homes in this watershed resulted in mass buyouts in this watershed and a plan to incorporate the floodplain area into park space.

In many areas of the Seventh Ward Ditch, floodplain development has taken place near the stream channel with little consideration given to the flood potential of the stream. The stream channel itself is small and overgrown with vegetation in many areas, and many culverts are partially or almost completely filled with sediment. These factors, combined with the increasing urbanization of the watershed, have combined to cause increasingly frequent flooding problems.

The Hamilton Drain area along the northern edge of the City is subject to inundation at times of heavy rainfall due primarily to poor drainage. The City of Des Moines has a multi-phased project that is currently ongoing to improve the drainage and flooding of this area.

#### City of Grimes

Little Beaver Creek and Little Beaver Creek Tributary within the City of Grimes are both subject to flooding. No USGS gauging stations are located in the City, and no high water marks are known to exist on either of these streams in Grimes.

#### City of Johnston

The City of Johnston is in the Des Moines River basin, which forms the eastern corporate boundary for much of the City. Flooding hazards from the Des Moines River are significantly reduced by Saylorville Dam, a major flood control structure at Johnston. Beaver Creek is another significant drainage way that affects flooding. Beaver Creek travels southeast through generally undeveloped areas in the City, and flows into the Des Moines River just southeast of Johnston. There is little development within the Beaver Creek floodplain. Current use is for municipal parks, private open space, agricultural fields and within the Camp Dodge facility. The majority of the floodplain is woodlands and farmlands. The development within the Des Moines River floodplain is mainly woodlands and parkland along Saylorville Lake.

As a result of the 2008 flood, the City of Johnston reported damages to 41 commercial buildings with varying degrees of flood related damage. Additional damages to infrastructure in Johnston included a lift station, meter pit, trails, trail bridges, roads, and erosion to creek banks. Several roads were closed including NW Beaver Drive, NW Johnston Drive, and NW 62nd Avenue.

In Johnston, the 2010 flood event caused damage to the sanitary sewer main and creek bank erosion.

#### City of Pleasant Hill

Little Fourmile Creek is subject to flooding hazards although there are no USGS gauging stations near the City. A 1-percent annual chance flood is estimated to have a peak discharge of 5,720 cfs. No high water marks are known to exist on Little Fourmile Creek in the study area.

#### City of Polk City

As a result of the 2010 flood, the Polk City wastewater treatment plant was threatened with flooding, but was saved as a result of sandbagging efforts.

#### City of West Des Moines

A USGS gauging station is located on the Raccoon River near Van Meter, Iowa, (Gauge No. 05484500) 15 miles upstream of the City of Des Moines. The gauge has been active since 1915 and indicated that the July 1973 event had a peak flow of 35,600 cfs. Other flooding events included July

1993, June 1998, and June 2008. The peak discharges for these events were 70,100 cfs, 47,400 cfs, and 43,500 cfs, respectively.

A stream gauging station on Walnut Creek at the 63<sup>rd</sup> Street Bridge was established in October 1917. Fragmentary flood peak records prior to 1971 indicate that significant floods occurred in 1947, 1958, and 1964. The greatest of the known floods on Walnut Creek was the flood of May 10, 1986, but the 1947 flood may have been nearly equivalent. The recorded annual flood peaks for 1974 and 1986 were also relatively high and may have been greater than the 1958 and 1964 floods; however, flood peak data are not available at the same locations for direct comparisons. The 1986 flood peak was 12,500 cfs. Other significant flooding events on Walnut Creek include 1973 and 1993 which was 9,000 cfs and 6,460 cfs, respectively.

#### Des Moines Water Works

In the July 1993 flooding, the Raccoon River crested at 26.8 feet which is 14.8 feet above flood stage. River water over-topped the water treatment plant's levee and inundated the plant leaving 200,000 customers without water for 19 days. Many businesses shut down for the duration of this water outage. The infrastructure damages were estimated at \$11.2 Million; \$9.2 Million of the losses were insured. \$1.2 Million was provided by federal/state disaster relief flooding. Improvements have since been made to the levee around the water treatment plan, but inundation could occur if flood levels are higher than the increased protection.

The second highest crest on the Raccoon River was 24.66 feet, which is 12.66 feet above flood stage. This occurred in the June 13, 2008 flood. The treatment plant was not inundated, but significant property damage occurred in large part to river bank erosion. The infrastructure damage caused as a result of this event was over \$1.4 Million of which \$883,000 was insured.

#### 3.3.16.5 PROBABILITY OF FUTURE OCCURRENCE

According to data from the National Climatic Data Center (NCEI), Polk County has experienced 147 flood events since 2000, which is an average of more than 6 events per year. NCEI estimates that these 147 flood events caused approximately \$100 million in damages. The frequency of previous flood events, as well as potential increases in rainfall resulting from climate change, indicates that flooding will remain one of the most common hazards in Polk County. Therefore, it is "highly likely" that flooding of various levels will continue to occur in the planning area.

#### 3.3.16.6 VULNERABILITY

Flooding events can have a profound impact on various community lifelines, disrupting the normal functioning of affected areas like the planning area. These lifelines are essential to the health, safety, and well-being of the community, and their quick restoration is crucial for recovery. The primary community lifelines likely to be affected by flooding are shown in the table below.

Table 90. Potential Impacts of River Flooding on Community Lifelines

| Lifelines                  | Impact Type                                                                         | Description                                                                                                                                                                                                                          |
|----------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Water & Wastewater Systems |    | Flooding can contaminate water supplies and damage water infrastructure, leading to shortages and health hazards. Wastewater treatment facilities may also be overwhelmed or damaged, increasing the risk of waterborne diseases.    |
| Food, Shelter, & Housing   |    | Flooding can lead to the displacement of people, necessitating immediate shelter solutions. The disruption in supply chains can affect the availability and distribution of food, especially fresh produce.                          |
| Health & Medical           |  | There is a heightened risk of injuries during floods, as well as increased potential for waterborne and vector-borne diseases. Healthcare facilities might be directly affected by floods, impacting their operational capabilities. |
| Communications             |  | Communication networks may be disrupted, which can hinder the coordination of rescue and relief efforts as well as the dissemination of important information to the public.                                                         |
| Energy                     |  | Flooding can cause power outages by damaging electrical infrastructure. Fuel supply may also be disrupted, affecting not just transportation but also heating and power generation.                                                  |

| Lifelines         | Impact Type                                                                       | Description                                                                                                                                                                                                     |
|-------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Safety & Security |  | Emergency services are crucial during flooding for rescue operations and maintaining public order. Flooding can also increase the risk of accidents and infrastructure failures, such as dam or levee breaches. |
| Transportation    |  | Floods can damage roads, bridges, and rail lines, severely limiting mobility and access. This disruption impacts not just daily commutes but also the delivery of essential goods and services.                 |

#### A) People

There are many factors which contribute to a person's overall vulnerability to flooding. One factor is location – individuals who reside in floodplains and flood-prone areas are inherently more exposed to the impacts of flooding. Another factor is age, as the elderly and young children may lack the mobility to evacuate from areas where flooding is anticipated. Mobility may also be a concern for people with physical or mental disabilities. Additionally, socially vulnerable populations such as those living under the poverty line or in unstable housing conditions may be among the most severely impacted by flooding. Socially vulnerable populations may have increased difficulty safely evacuating an area where flooding has occurred or is anticipated, finding temporary shelter/housing, accessing resources available to flood victims, and restoring normalcy to their lives. Concerns about socially vulnerable populations were highlighted by a 2021 study which found that socially vulnerable populations are more likely to reside in 100-year floodplains, in part due to a variety of social and economic factors.<sup>31</sup>

#### B) Structures

Flooding has the potential to impart widespread damage and destruction across the built environment, and FEMA states that flooding is both the most common and most costly natural disaster type in the U.S.<sup>32</sup> Flooding can inundate entire towns in a matter of just hours or days, and a relatively small volume of water is necessary to cause damage – just one inch of standing water can cause \$25,000 in damage. Floodwater can lead to rot and other phenomena which directly jeopardizes the

<sup>31</sup> Tate, Eric, Md Asif Rahman, Christopher T. Emrich, and Christopher C. Sampson. "Flood Exposure and Social Vulnerability in the United States." *Natural Hazards* 106, no. 1 (March 1, 2021): 435–57. <https://doi.org/10.1007/s11069-020-04470-2>.

<sup>32</sup> Federal Emergency Management Agency. "Story: Myths vs Facts: The True Cost of Flooding." *community.fema.gov*, January 2022. [https://community.fema.gov/story/Myths-vs-Facts-The-True-Cost-of-Flooding?lang=en\\_US.%2F%2F](https://community.fema.gov/story/Myths-vs-Facts-The-True-Cost-of-Flooding?lang=en_US.%2F%2F).



integrity of structures, and mold and other fungi can develop and create health hazards. In extreme events, floodwaters may be sufficient to wash away entire structures.

Pressure to develop in floodplains and higher-risk areas can grow as populations increase, and this can be particularly poignant when available space is limited. Any future development in floodplains would increase risk in those areas. For those communities that participate in the National Flood Insurance Program, enforcement of the floodplain management regulations is key to ensuring mitigation of future construction in those areas. Additionally, when land use changes from fields or woodlands to roads and parking lots, it loses its ability to absorb rainfall. Such urban development, with significant impervious surface, has been known to increase runoff two to six times over what would occur on natural terrain. If measures are not taken to limit or slow runoff in developing areas, flooding may become more frequent.

#### C) Systems

Critical infrastructure, including transportation, energy, communications, and water and wastewater systems, are vulnerable to flood damage. Flooding of system components and facilities can damage them and cause them to stop working. Quickly flowing water can erode soil, putting structures at risk. Floodwaters carrying sediment and debris can clog screens and pumps. In mild cases, disruption of critical systems may be caused by automatic activation of procedures meant to protect important components when unusual operating conditions are detected. In more extreme scenarios, critical systems can be physically destroyed or otherwise rendered inoperable, and restoration of normal operations may take weeks.

#### D) Natural, Historic, and Cultural Resources

Floods can cause significant damage to natural, historic, and cultural resources. It is not uncommon for these resources to be placed in floodplains and along riverbanks where other development is restricted. Such placement can cause these resources to be among the most exposed assets in the area. Additionally, debris generated during a flood can be strewn across riverside parks and create a hazard which may require extensive remediation.

#### E) Community Activities

Flooding can significantly disrupt community activities in the planning area. Severe flooding can necessitate the cancellation, postponement, or relocation of a variety of community activities. Relocation is likely the preferred option, but this may not be feasible if flooding is extensive -- finding adequate alternative sites for major activities like the Iowa State Fair will pose a serious challenge for community leaders. Other key activities like voting in local/state/federal elections may also be difficult to relocate as a large volume of buildings may be destroyed or rendered unsafe by floodwater.



#### 3.3.16.7 EXISTING DEVELOPMENT

This section will review the potential losses to existing development in Polk County as a result of river flooding. Included in the review are building losses (counts and values), NFIP participation and claims data by jurisdiction, Repetitive Loss (RL) and Severe Repetitive Loss (SRL) data, displaced populations, and impacted critical facilities and infrastructure.

The flood vulnerability and loss estimates for the unincorporated county and the incorporated cities were generated using the FEMA DFIRM data from February 1, 2019 as well as Polk County parcel and building valuation data provided by the Polk County GIS Department. GIS analysis was conducted to determine the number and values of buildings at risk to the 1% annual chance flood. For purposes of this analysis, if any portion of a parcel was within the 1% annual chance floodplain, then all buildings and the total value associated with the parcel were considered at risk to the 1% annual chance flood. Additionally, to determine the population at risk, the number of residential properties at risk was multiplied by the average household size.

Table 91 provides the numbers of buildings per jurisdiction by type that are in the 1% annual chance floodplain for the unincorporated county and cities. Table 92 that follows provides the building exposure values in the floodplain for the unincorporated county and the incorporated cities in the planning area. It is noted that in some cases, the parcel data did not include building value for parcels where buildings occur. Conversely, in some cases, the parcel included a building value and the building data did not include a building count for the parcel. Even with these limitations, the data still provides a fairly accurate representation of those buildings and values at risk to the 1% annual chance flood.

**Table 91. Polk County Building Counts in the 1% Annual Chance Floodplain**

| Jurisdiction               | Residential  | Commercial | Government   | School   | Industrial/<br>Utility | Agricultural | Total        |
|----------------------------|--------------|------------|--------------|----------|------------------------|--------------|--------------|
| Alleman                    | 1            | 0          | 8            | 0        | 0                      | 4            | 13           |
| Altoona                    | 10           | 1          | 28           | 0        | 0                      | 2            | 41           |
| Ankeny                     | 72           | 9          | 54           | 0        | 0                      | 14           | 149          |
| Bondurant                  | 55           | 1          | 28           | 0        | 0                      | 6            | 90           |
| Clive                      | 163          | 78         | 115          | 0        | 15                     | 0            | 371          |
| Des Moines                 | 512          | 95         | 1,083        | 1        | 56                     | 28           | 1,775        |
| Elkhart                    | 0            | 0          | 0            | 0        | 0                      | 0            | 0            |
| Grimes                     | 77           | 6          | 39           | 0        | 0                      | 2            | 124          |
| Johnston                   | 41           | 44         | 85           | 0        | 6                      | 8            | 184          |
| Mitchellville              | 0            | 0          | 0            | 0        | 0                      | 1            | 1            |
| Pleasant Hill              | 9            | 14         | 46           | 0        | 8                      | 2            | 79           |
| Polk City                  | 3            | 0          | 15           | 0        | 0                      | 0            | 18           |
| Runnells                   | 1            | 0          | 0            | 0        | 0                      | 0            | 1            |
| Urbandale                  | 48           | 6          | 45           | 0        | 0                      | 6            | 105          |
| West Des Moines            | 108          | 30         | 161          | 1        | 13                     | 15           | 328          |
| Windsor Heights            | 94           | 12         | 33           | 1        | 2                      | 0            | 142          |
| Polk County Unincorporated | 249          | 14         | 873          | 2        | 28                     | 445          | 1,611        |
| <b>Total</b>               | <b>1,443</b> | <b>310</b> | <b>2,613</b> | <b>5</b> | <b>128</b>             | <b>533</b>   | <b>5,032</b> |

Source: FEMA Map Services Center, Polk County DFIRM 2/1/2019. Parcel data provided by Polk County – GIS, 3/1/2024, building count is estimated at 1 building per parcel identified in the flood hazard area.

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

Table 92. Polk County Building Values in the 1% Annual Chance Floodplain

| Jurisdiction               | Residential          | Commercial           | Government | School     | Industrial/Utility  | Agricultural        | Total                |
|----------------------------|----------------------|----------------------|------------|------------|---------------------|---------------------|----------------------|
| Alleman                    | \$172,400            | \$0                  | \$0        | \$0        | \$0                 | \$637,920           | \$810,320            |
| Altoona                    | \$1,689,800          | \$800                | \$0        | \$0        | \$0                 | \$75,900            | \$1,766,500          |
| Ankeny                     | \$24,045,340         | \$2,174,810          | \$0        | \$0        | \$0                 | \$149,297           | \$26,369,447         |
| Bondurant                  | \$14,210,730         | \$15,600             | \$0        | \$0        | \$0                 | \$245,420           | \$14,471,750         |
| Clive                      | \$52,819,300         | \$80,637,600         | \$0        | \$0        | \$18,354,100        | \$0                 | \$151,811,000        |
| Des Moines                 | \$60,464,240         | \$50,996,576         | \$0        | \$0        | \$11,991,000        | \$893,720           | \$124,345,536        |
| Elkhart                    | \$0                  | \$0                  | \$0        | \$0        | \$0                 | \$0                 | \$0                  |
| Granger                    | \$0                  | \$0                  | \$0        | \$0        | \$0                 | \$449,650           | \$449,650            |
| Grimes                     | \$10,818,340         | \$2,189,750          | \$0        | \$0        | \$0                 | \$32,680            | \$13,040,770         |
| Johnston                   | \$5,520,930          | \$34,767,400         | \$0        | \$0        | \$800,130           | \$353,750           | \$41,442,210         |
| Mitchellville              | \$0                  | \$0                  | \$0        | \$0        | \$0                 | \$131,640           | \$131,640            |
| Pleasant Hill              | \$5,725,600          | \$2,543,800          | \$0        | \$0        | \$530,000           | \$91,260            | \$8,890,660          |
| Polk City                  | \$327,070            | \$0                  | \$0        | \$0        | \$0                 | \$0                 | \$327,070            |
| Runnells                   | \$1,900              | \$0                  | \$0        | \$0        | \$0                 | \$0                 | \$1,900              |
| Urbandale                  | \$11,035,600         | \$7,063,600          | \$0        | \$0        | \$0                 | \$465,990           | \$18,565,190         |
| West Des Moines            | \$41,646,040         | \$12,886,060         | \$0        | \$0        | \$3,437,200         | \$503,490           | \$58,472,790         |
| Windsor Heights            | \$16,061,300         | \$31,095,300         | \$0        | \$0        | \$0                 | \$0                 | \$47,156,600         |
| Polk County Unincorporated | \$67,375,640         | \$1,262,600          | \$0        | \$0        | \$5,922,700         | \$30,021,270        | \$104,582,210        |
| <b>Total</b>               | <b>\$311,914,230</b> | <b>\$225,633,896</b> | <b>\$0</b> | <b>\$0</b> | <b>\$41,035,130</b> | <b>\$34,051,987</b> | <b>\$612,635,243</b> |

Source: FEMA Map Services Center, Polk County DFIRM 2/1/2019. Parcel data provided by Polk County – GIS, 3/1/2024, building values provided are the full total value for the parcel which is the sum of the total land value, total building value, and total dwelling value for the Polk County Assessor's parcel values table. Parcel data does not contain values for School, Government, and Utility parcels.

Table 93 provides details on NFIP participation for the communities in the planning area, and Table 94 that follows provides the number of closed losses and total payments for each jurisdiction, where applicable. The claims information is for the period from January 1, 1978 to March 31, 2024.

**Table 93. NFIP Participation Among Polk County Communities**

| Community ID# | Community Name               | NFIP Participant (Y/N) | Current Effective Map Date                       | Regular-Emergency Program Entry Date | CRS Rating (if relevant) |
|---------------|------------------------------|------------------------|--------------------------------------------------|--------------------------------------|--------------------------|
| 190304        | Alleman, City of             | N                      | 02/01/2019                                       | N/A                                  | N/A                      |
| 190546        | Altoona, City of             | Y                      | 02/01/2019                                       | 11/10/1982                           | N/A                      |
| 190226        | Ankeny, City of              | Y                      | 02/01/2019                                       | 05/16/1983                           | N/A                      |
| 190707        | Bondurant, City of           | Y                      | 02/01/2019                                       | 04/02/1990                           | N/A                      |
| 190274        | Carlisle, City of            | Y                      | 11/16/2018                                       | 08/04/1987                           | N/A                      |
| 190488        | Clive, City of               | Y                      | 02/01/2019                                       | 11/1/1979                            | 5                        |
| 190227        | Des Moines, City of          | Y                      | 02/01/2019                                       | 02/04/1981                           | 6                        |
| 190229        | Elkhart, City of             | Y                      | (NSFHA)                                          | 09/13/2023                           | N/A                      |
| 190104        | Granger, City of             | Y                      | 12/07/2018                                       | 06/01/1987                           | N/A                      |
| 190228        | Grimes, City of              | Y                      | 02/01/2019                                       | 11/6/1985                            | N/A                      |
| 190745        | Johnston, City of            | Y                      | 02/01/2019                                       | 05/03/1982                           | N/A                      |
| 190619        | Mitchellville, City of       | Y                      | 02/01/2019(M)                                    | 01/18/2011                           | N/A                      |
| 190631        | Norwalk, City of             | Y                      | 11/16/2018                                       | 11/20/1998                           | N/A                      |
| 190489        | Pleasant Hill, City of       | Y                      | 02/01/2019                                       | 10/8/1982                            | N/A                      |
| 190933        | Polk City, City of           | Y                      | Adopted Polk County FIRM Panel B dated 03/1/1984 | 11/14/2014                           | N/A                      |
| 190901        | Polk County (unincorporated) | Y                      | 02/01/2019                                       | 03/01/1984                           | N/A                      |
| 190800        | Runnells, City of            | Y                      | 02/01/2019                                       | 02/01/2019                           | N/A                      |
| 190804        | Sheldahl, City of            | N                      | 02/01/2019                                       | N/A                                  | N/A                      |
| 190230        | Urbandale, City of           | Y                      | 02/01/2019                                       | 06/15/1979                           | 7                        |
| 190231        | West Des Moines, City of     | Y                      | 02/01/2019                                       | 11/1/1979                            | N/A                      |
| 190687        | Windsor Heights, City of     | Y                      | 02/01/2019                                       | 06/15/1979                           | N/A                      |

Source: NFIP Community Status Book, 02/26/2024; <http://www.fema.gov/national-flood-insurance-program/national-flood-insurance-program-community-status-book>; M= No elevation determined – all Zone A, C, and X: NSFHA = No Special Flood Hazard Area; E=Emergency Program

**Table 94. NFIP Claim Statistics as of 3/31/2024**

| Community Name | Closed Losses | Total Payments |
|----------------|---------------|----------------|
| Altoona        | 1             | \$2,625        |
| Ankeny         | 5             | \$45,053       |
| Berwick        | 6             | \$311,482      |
| Bondurant      | 1             | \$10,602       |
| Colfax         | 1             | \$12,761       |

|                 |    |             |
|-----------------|----|-------------|
| Des Moines      | 51 | \$1,309,760 |
| Granger         | 1  | \$3,442     |
| Grimes          | 1  | \$0         |
| Johnston        | 7  | \$48,756    |
| Maxwell         | 8  | \$160,728   |
| Pleasant Hill   | 1  | \$9,799     |
| Runnells        | 1  | \$12,282    |
| West Des Moines | 8  | \$80,709    |
| Total           | 92 | \$2,007,997 |

\*Community names reflect addresses as shown within the NFIP database. Individual properties may be physically located in a jurisdiction not listed here.

A county-wide map of the approximate locations of properties with closed flood insurance claims is provided in Figure 97. Figure 98 and Figure 99 show the approximate locations of properties with closed flood insurance claims in and around the cities of Des Moines and Urbandale, respectively. These communities are among the three in Polk County which participate in FEMA's Community Rating System (CRS). The City of Clive also participates in the CRS, but the available flood insurance data did not identify any claims in or near the City of Clive.

Figure 97. Map of Closed Flood Insurance Claims in Polk County

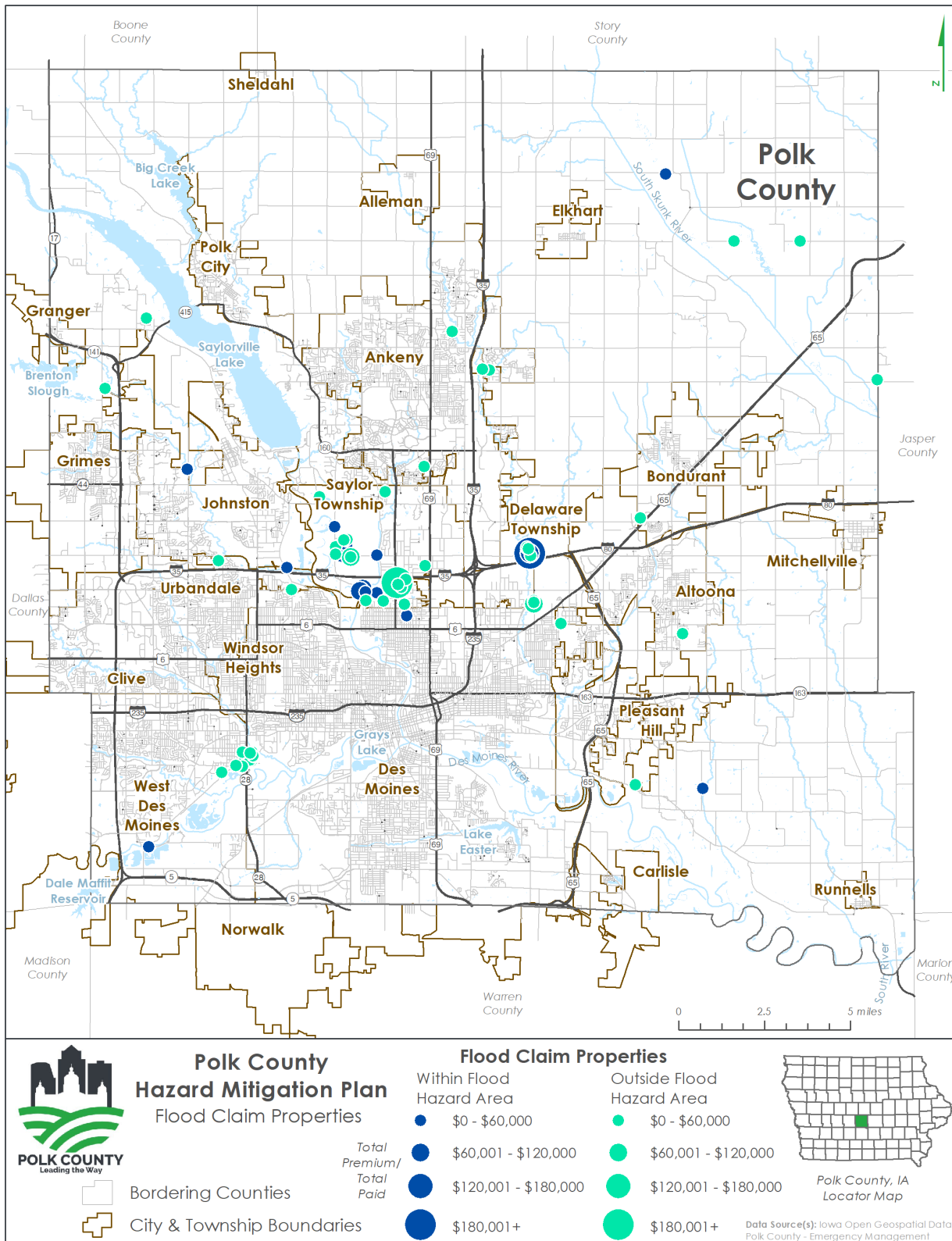


Figure 98. Map of Closed Flood Insurance Claims in and Around Des Moines

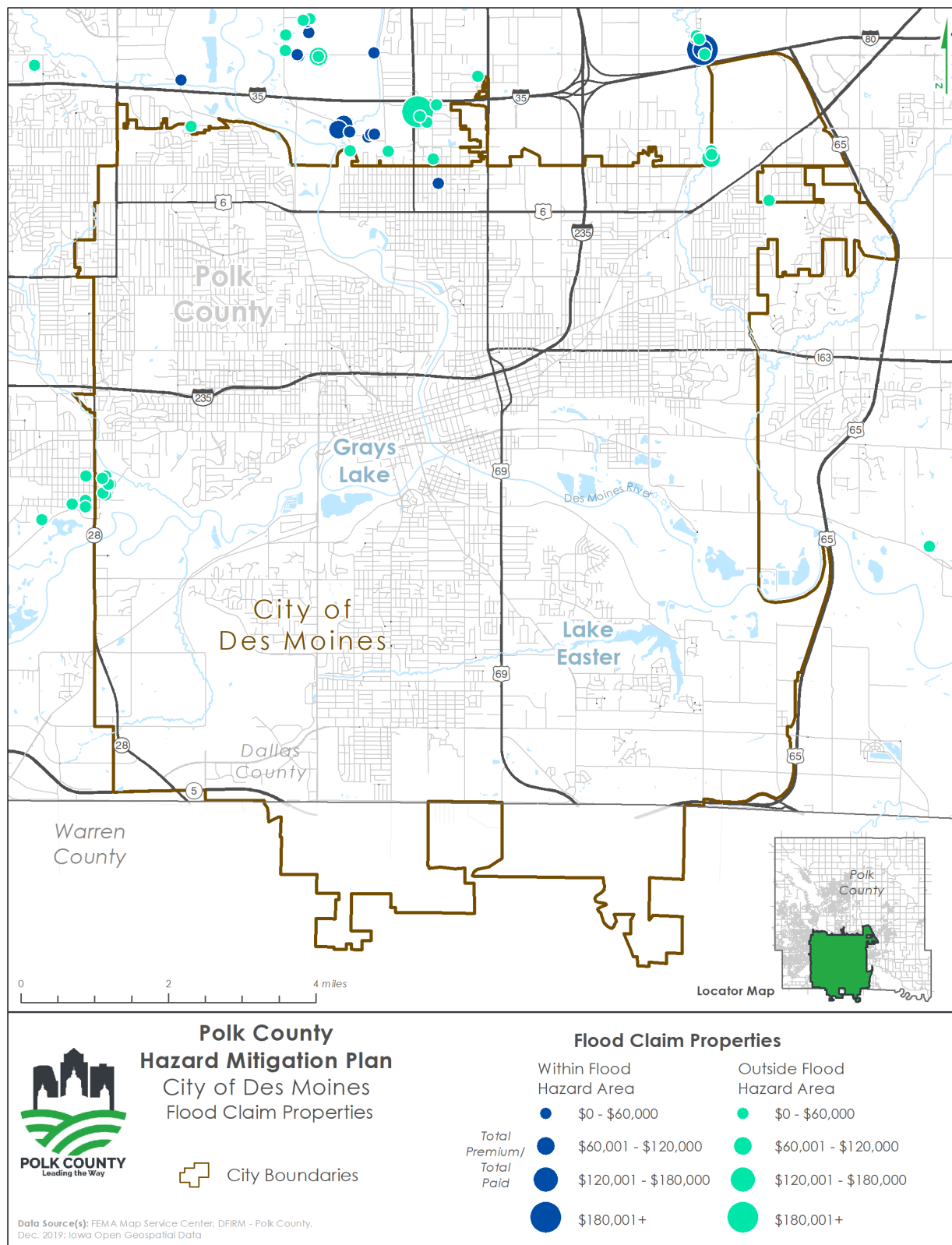
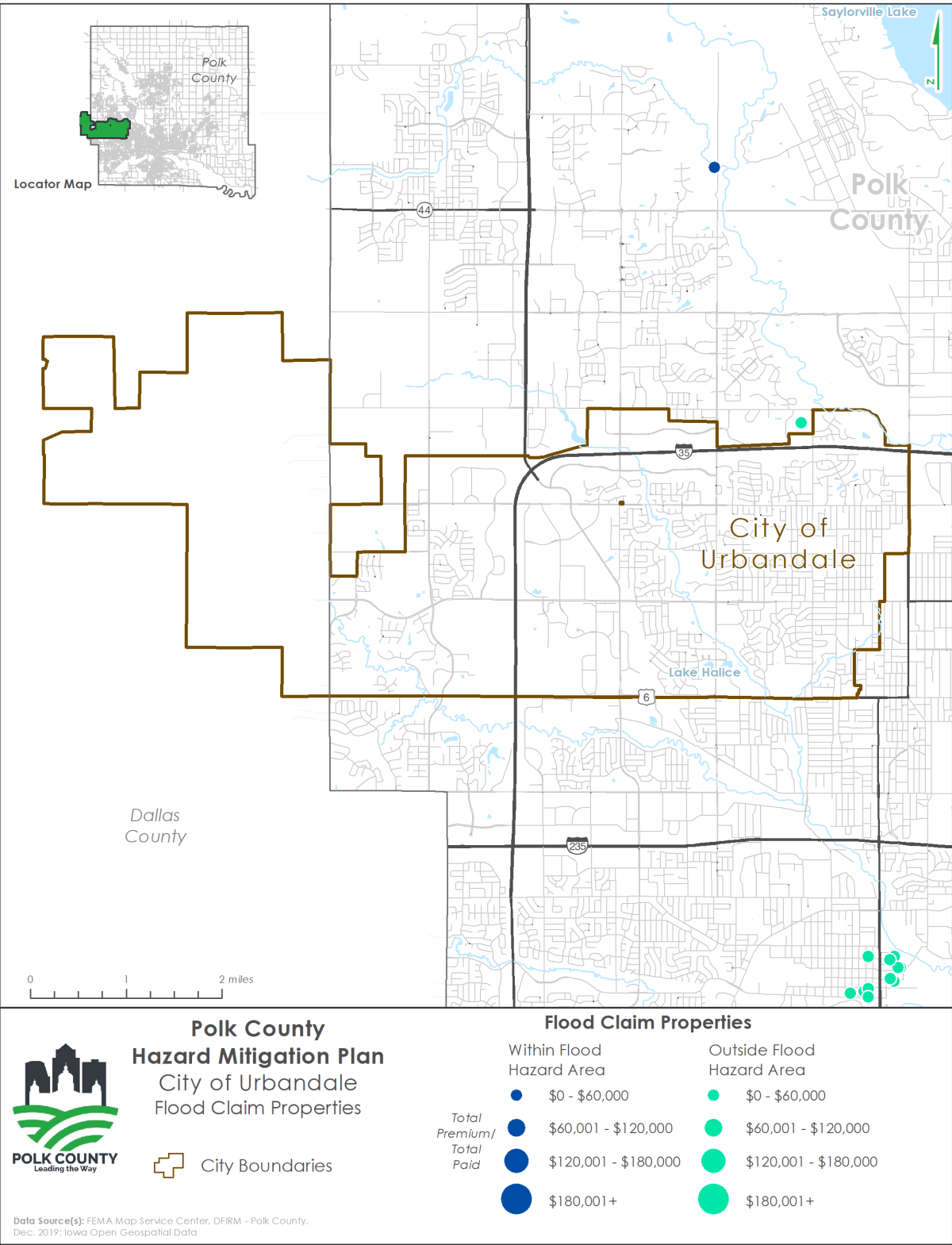


Figure 99. Map of Closed Flood Insurance Claims in and Around Urbandale





According to the available NFIP claims statistics, policy holders in the City of Des Moines have received the most in insurance payments with over \$1.3 million in payments.

#### Repetitive Loss/Severe Repetitive Loss Properties

**Repetitive Loss:** FEMA defines a Repetitive Loss property as “a structure covered under an NFIP flood insurance policy that (1) has incurred flood-related damage on two occasions, in which the cost of repair, on average, equaled or exceeded 25% of the value of the structure at the time of each such flood event; and (2) at the time of the second incident of flood-related damage, the contract for flood insurance contains increased cost of compliance coverage.” According to the Flood Insurance Administration, jurisdictions included in the planning area have a combined total of 56 unmitigated repetitive loss properties, as of February 26, 2024.

**Severe Repetitive Loss (SRL):** A Severe Repetitive Loss property is defined by FEMA as “a structure that is covered under an NFIP flood insurance policy and has incurred flood-related damage (1) for which four or more separate claims have been made under flood insurance coverage, with the amount of each claim (including building and contents payments) exceeding \$5,000 and with the cumulative amount of such claims payments exceeding \$20,000; or (2) for which at least two separate flood insurance claims payments (building payments only) have been made, with cumulative amount of such claims exceeding the value of the insured structure.” There are five Severe Repetitive Loss properties within the planning area as of February 26, 2024. Of these five properties, four are within the jurisdiction of the City of Des Moines and one is within the jurisdiction of the City of Clive.

Table 95 provides a summary of the Repetitive Loss properties and Severe Repetitive Loss properties in the planning area by jurisdiction. Jurisdictions which participate in the NFIP but have no recorded Repetitive Loss or Severe Repetitive Loss properties are not included in the table.

**Table 95. Polk County Repetitive and Severe Repetitive Losses**

|                               | Repetitive Loss Properties |        |                 | Severe Repetitive Loss Properties |        |                 | Total      |        |                 |
|-------------------------------|----------------------------|--------|-----------------|-----------------------------------|--------|-----------------|------------|--------|-----------------|
|                               | Structures                 | Losses | Value of Losses | Structures                        | Losses | Value of Losses | Structures | Losses | Value of Losses |
| Polk County -- Unincorporated |                            |        |                 |                                   |        |                 |            |        |                 |
| Residential                   | 4                          | 9      | \$361,981       | 0                                 | 0      | \$0.00          | 4          | 9      | \$361,981       |
| Non-Residential               | 1                          | 2      | \$181,000       | 0                                 | 0      | \$0.00          | 1          | 2      | \$181,000       |
| Total                         | 5                          | 11     | \$542,981       | 0                                 | 0      | \$0.00          | 5          | 11     | \$542,981       |
| City of Clive                 |                            |        |                 |                                   |        |                 |            |        |                 |
| Residential                   | 4                          | 10     | \$133,876       | 0                                 | 0      | \$0.00          | 4          | 10     | \$133,876       |
| Non-Residential               | 4                          | 9      | \$1,388,633     | 1                                 | 4      | \$1,001,984     | 5          | 13     | \$2,390,617     |
| Total                         | 8                          | 19     | \$1,522,509     | 1                                 | 4      | \$1,001,984     | 9          | 23     | \$2,524,493     |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)



|                         |    |     |             |   |    |             |    |     |             |
|-------------------------|----|-----|-------------|---|----|-------------|----|-----|-------------|
| City of Des Moines      |    |     |             |   |    |             |    |     |             |
| Residential             | 23 | 55  | \$1,349,788 | 1 | 4  | \$91,754    | 24 | 59  | \$1,441,542 |
| Non-Residential         | 4  | 9   | \$1,274,918 | 3 | 37 | \$2,180,005 | 7  | 46  | \$3,454,923 |
| Total                   | 27 | 64  | \$2,624,706 | 4 | 41 | \$2,271,759 | 31 | 105 | \$4,896,465 |
| City of Johnston        |    |     |             |   |    |             |    |     |             |
| Residential             | 2  | 6   | \$131,519   | 0 | 0  | \$0.00      | 2  | 6   | \$131,519   |
| Non-Residential         | 0  | 0   | \$0.00      | 0 | 0  | \$0.00      | 0  | 0   | \$0.00      |
| Total                   | 2  | 6   | \$131,519   | 0 | 0  | \$0.00      | 2  | 6   | \$131,519   |
| City of Pleasant Hill   |    |     |             |   |    |             |    |     |             |
| Residential             | 1  | 2   | \$24,440    | 0 | 0  | \$0.00      | 1  | 2   | \$24,440    |
| Non-Residential         | 1  | 2   | \$59,411    | 0 | 0  | \$0.00      | 1  | 2   | \$59,411    |
| Total                   | 2  | 4   | \$83,851    | 0 | 0  | \$0.00      | 2  | 4   | \$83,851    |
| City of West Des Moines |    |     |             |   |    |             |    |     |             |
| Residential             | 4  | 8   | \$67,648    | 0 | 0  | \$0.00      | 4  | 8   | \$67,648    |
| Non-Residential         | 6  | 16  | \$763,811   | 0 | 0  | \$0.00      | 6  | 16  | \$763,811   |
| Total                   | 10 | 24  | \$831,459   | 0 | 0  | \$0.00      | 10 | 24  | \$831,459   |
| City of Windsor Heights |    |     |             |   |    |             |    |     |             |
| Residential             | 2  | 4   | \$109,575   | 0 | 0  | \$0.00      | 2  | 4   | \$109,575   |
| Non-Residential         | 0  | 0   | \$0.00      | 0 | 0  | \$0.00      | 0  | 0   | \$0.00      |
| Total                   | 2  | 4   | \$109,575   | 0 | 0  | \$0.00      | 2  | 4   | \$109,575   |
| County-Wide Totals:     |    |     |             |   |    |             |    |     |             |
| Residential             | 40 | 94  | \$2,069,251 | 1 | 4  | \$91,754    | 41 | 98  | \$2,270,581 |
| Non-Residential         | 16 | 38  | \$3,667,773 | 4 | 41 | \$3,181,989 | 20 | 79  | \$6,849,762 |
| Total                   | 56 | 132 | \$5,846,599 | 5 | 45 | \$3,273,743 | 61 | 177 | \$9,120,343 |

The following maps illustrate the approximate locations of RL and SRL properties in Polk County, as well as the three Polk County jurisdictions which are currently participating in CRS (Clive, Des Moines, and Urbandale).

Figure 100. Map of RL and SRL Properties in Polk County

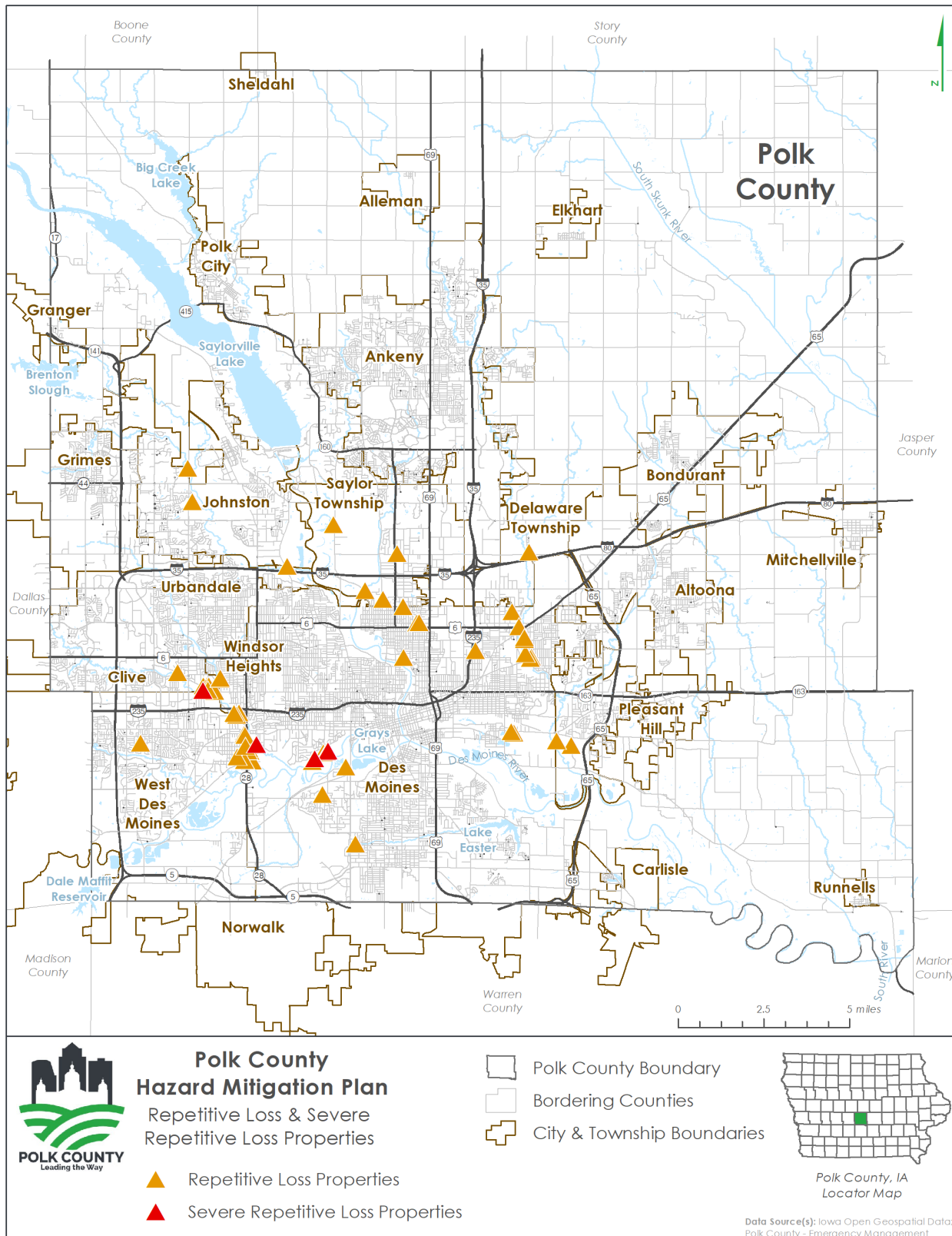


Figure 101. RL and SRL Properties in and Around Clive

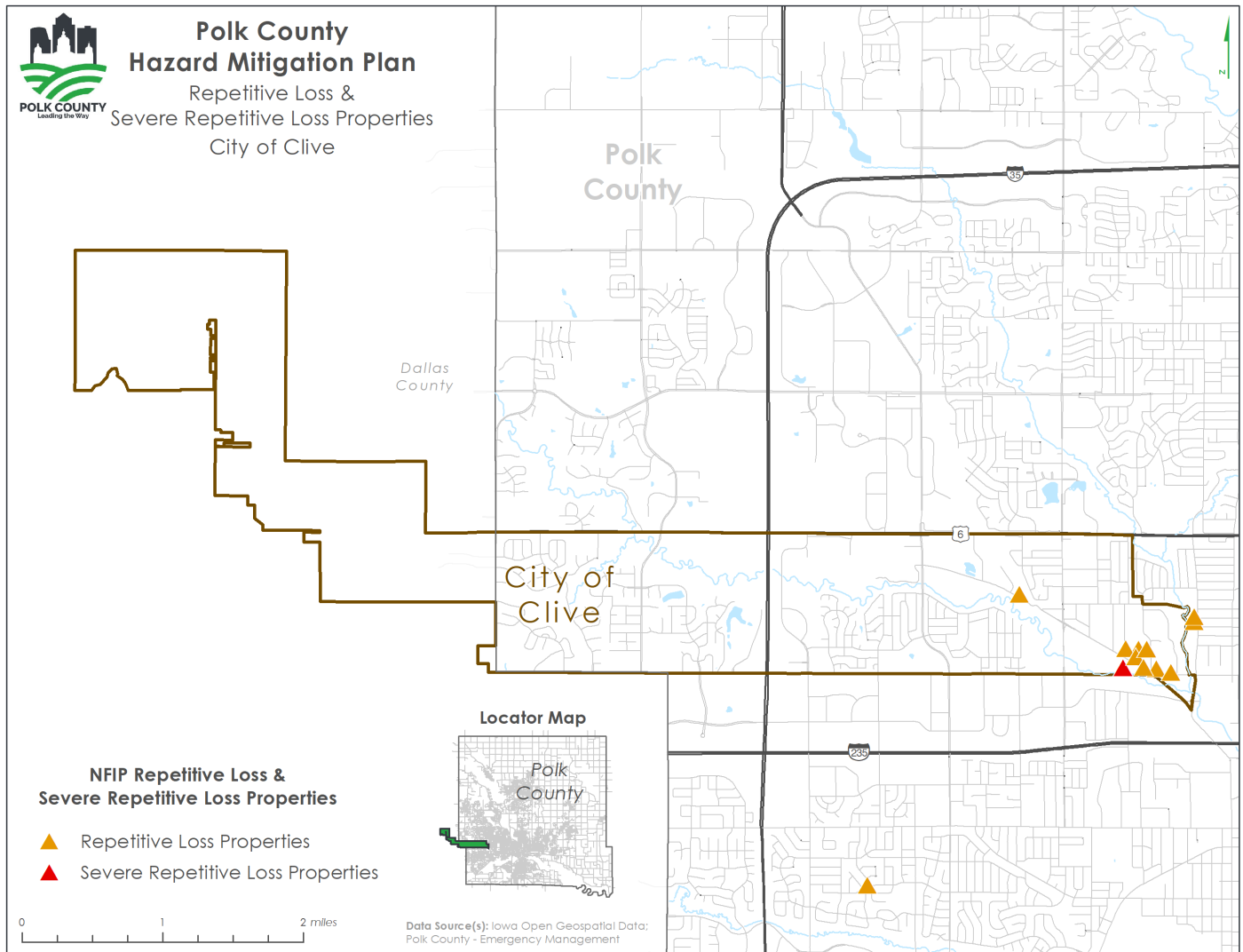


Figure 102. RL and SRL Properties in and Around Des Moines

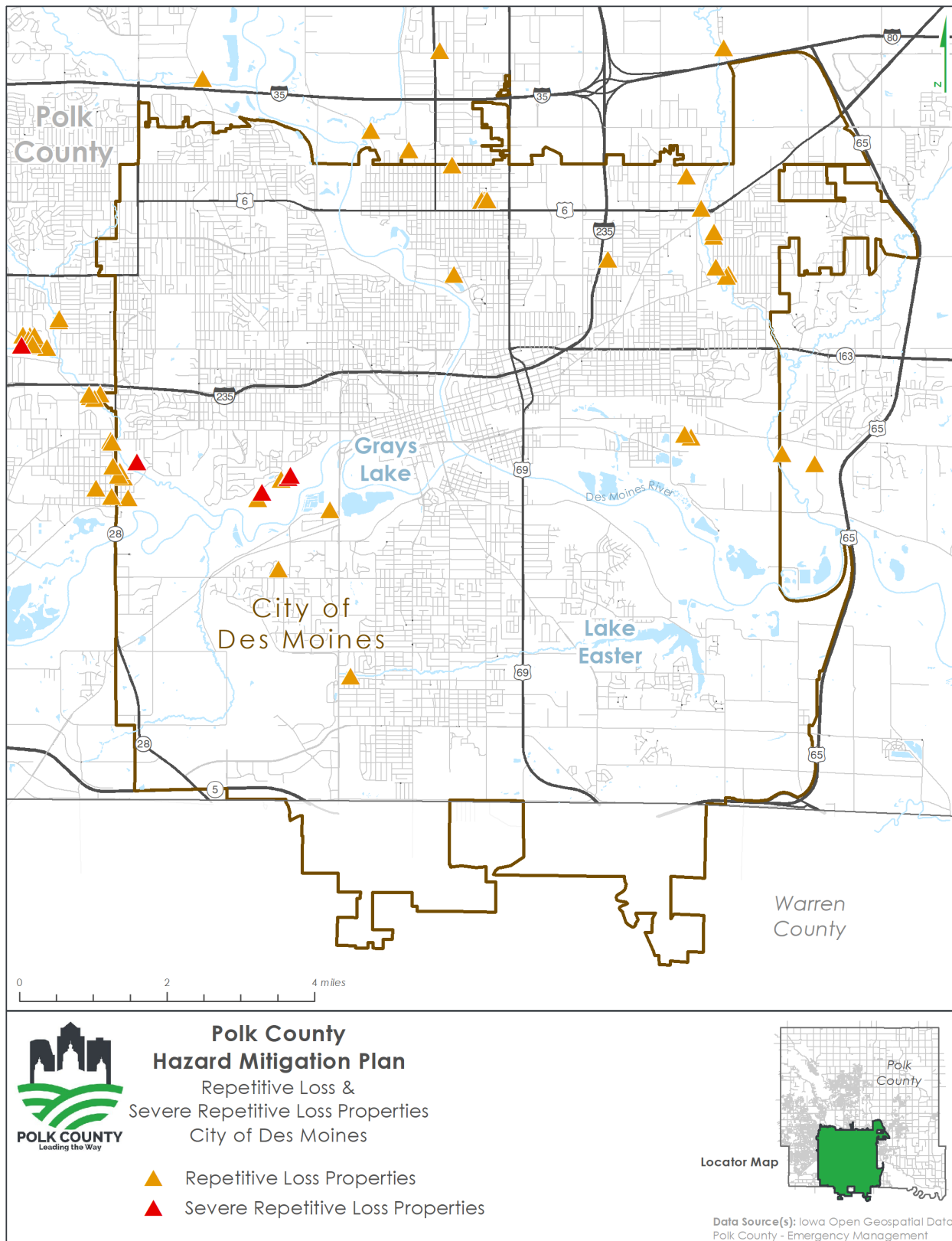
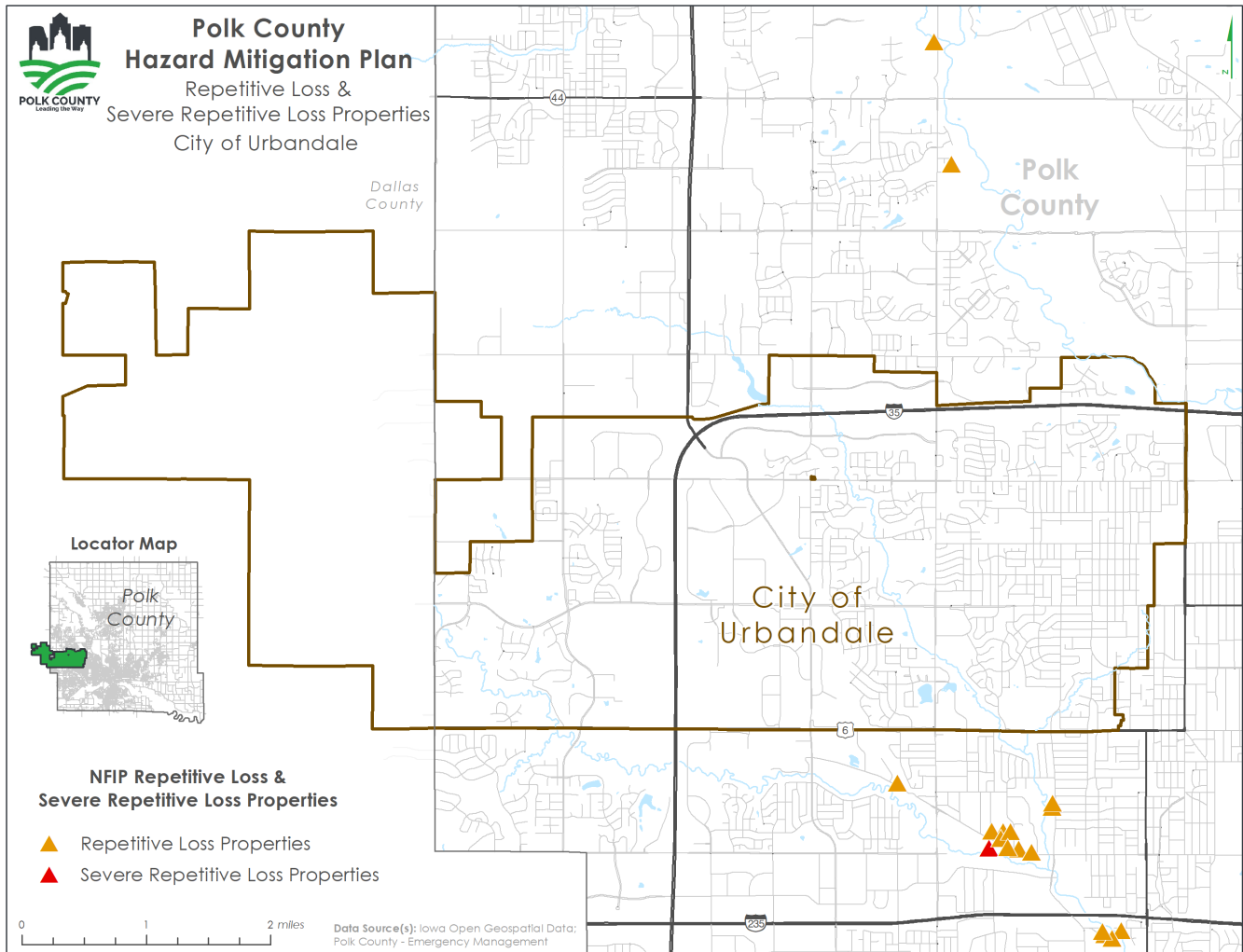


Figure 103. RL and SRL Properties in and Around Urbandale



The result of the exposure analysis summarizes the values at risk in the floodplain. When a flood occurs, seldom does the event cause total destruction of an area. Potential losses from flooding are related to a variety of factors including flood depth, flood velocity, building type and construction. Based on FEMA Flood Insurance Administration (FIA) flood depth-damage curves, the percent of damage is directly related to the flood depth

To determine the population that would be impacted and potentially displaced by a 1% annual chance flood event, the average household size, as determined by the 2010 census, was multiplied by the number of residential structures in the 1% annual chance floodplain for each jurisdiction. The population impacted is somewhat underestimated since some of the residential structures are multi-family structures. However, data was not available to determine the number of households in each multi-family structure.

Table 96 provides the summary of potential flood loss estimates and impacted population for the 1% annual chance flood by jurisdiction.



**Table 96. Flood Loss Estimates for 1% Annual Flood Chance**

| Jurisdiction            | Total Building Value at Risk | Number of Residential Parcels | Average household Size | Estimated Impacted Population |
|-------------------------|------------------------------|-------------------------------|------------------------|-------------------------------|
| Alleman                 | \$2,266,010                  | 7                             | 2.48                   | 17                            |
| Altoona                 | \$77,075,970                 | 82                            | 2.64                   | 216                           |
| Ankeny                  | \$267,954,660                | 599                           | 2.55                   | 1,527                         |
| Bondurant               | \$32,777,920                 | 127                           | 3.06                   | 389                           |
| Clive                   | \$217,335,690                | 392                           | 2.67                   | 1,047                         |
| Delaware Township       | \$26,066,270                 | 91                            | 2.51                   | 228                           |
| Des Moines              | \$255,212,630                | 1,255                         | 2.34                   | 2,937                         |
| Grimes                  | \$112,937,780                | 333                           | 2.68                   | 892                           |
| Johnston                | \$39,300,230                 | 127                           | 2.55                   | 324                           |
| Pleasant Hill           | \$13,307,320                 | 35                            | 2.67                   | 93                            |
| Polk City               | \$8,978,750                  | 18                            | 2.76                   | 50                            |
| Runnells                | \$266,700                    | 3                             | 2.55                   | 8                             |
| Saylor Township         | \$30,625,840                 | 170                           | 2.27                   | 386                           |
| Urbandale               | \$229,999,230                | 339                           | 2.64                   | 895                           |
| West Des Moines         | \$166,178,340                | 388                           | 2.31                   | 896                           |
| Windsor Heights         | \$37,160,200                 | 153                           | 2.40                   | 367                           |
| Unincorporated Polk Co. | \$230,647,930                | 579                           | 2.44*                  | 1,413                         |
| <b>Total</b>            | <b>\$1,748,091,470</b>       | <b>4,698</b>                  | <b>2.44*</b>           | <b>11,463</b>                 |

\*Household size reflects the average for all of Polk County, including incorporated communities. Parcel GIS data and Parcel valuations data table from Polk County – GIS, dated 3/1/2024.

#### Critical Facilities and Infrastructure at Risk

To analyze critical facilities at risk in the planning area, the planning committee reviewed and updated the inventory of critical and essential facilities and infrastructure in the planning area that was compiled as part of the latest HAZUS risk assessment study. After the critical facilities were validated and revised, a comparison was made with available flood maps to determine those facilities that would be damaged in a 1% annual chance flood event. This analysis revealed 179 critical or essential facilities that are in the 1% annual chance floodplain.

**Table 97. Critical Facilities in the 100-Year Floodplain**

| Facility Type                      | # in 100-year Floodplain |
|------------------------------------|--------------------------|
| Parks                              | 3                        |
| Communication Tower                | 2                        |
| Electric Power                     | 1                        |
| Potable Water                      | 1                        |
| Waste Water Treatment Facilities   | 2                        |
| Tier II Chemical Facility (HazMat) | 15                       |
| Bridges                            | 155                      |
| <b>Total</b>                       | <b>179</b>               |



Future Development

New development in floodplains in Polk County will likely be vulnerable to future instances of flooding. Additionally, the impacts of climate change may expose areas not previously considered vulnerable to flooding. According to FEMA, the NFIP paid \$9.4 billion in flood insurance claims between 1980 and 2000. Over the following 20-year period (2000 – 2020) the NFIP paid \$62.2 billion in flood insurance claims, and this constitutes an increase of more than 500%.<sup>33</sup> The increase in paid insurance claims by the NFIP may be attributable to some combination of increasing property values, increasing frequency and severity of flooding, and increasing amounts of impervious surface, which can increase runoff over what would occur on natural terrain.

Flooding is among the most significant hazards in terms of the potential to damage existing development. According to FEMA, flooding is the most common and most costly natural disaster in the U.S., and just one inch of water can cause up to \$25,000 in damage.<sup>34</sup> The economic consequences of flooding in an urban area can be substantial, with property damage, repair costs, and clean up costs. Buildings submerged in water can begin to rot, and this can jeopardize their structural integrity. Debris which is carried by floodwaters can also cause substantial damage to structures.

Climate Change

There are several ways in which climate change may alter both the frequency and severity of flooding. First, recent data suggests that climate change is increasing the frequency of heavy precipitation events. Secondly, increasing temperatures may lead to earlier snowmelts which can raise water levels ahead of rain which comes in late-spring and early-summer. Thirdly, there are indications that climate change may increase extreme weather events, and this may lead to heavy precipitation shortly after a drought. While it may seem counterintuitive, dried out soil actually is less effective at absorbing water compared to moist or well hydrated soil.<sup>35</sup> Therefore, heavy rainfall on dried out soil increases the likelihood of runoff.

Hazard Risk Score

Table 98. River Flooding Probability and Heath Impact Ratings

| Health Severity | Community Impact | Public Health System Impact | Healthcare System Impact | Total Health Hazard Score | Probability   |
|-----------------|------------------|-----------------------------|--------------------------|---------------------------|---------------|
| 1               | 3                | 1                           | 2                        | 7                         | Highly Likely |

<sup>33</sup> FEMA. “Climate Change Increases Risk of Flooding.” floodsmart.gov. Accessed March 22, 2024. <https://www.floodsmart.gov/climate-change>.  
<sup>34</sup> FEMA. “Myths vs Facts: The True Cost of Flooding.” fema.gov. Accessed March 22, 2024. <https://community.fema.gov/PreparednessConnect/s/article/Myths-vs-Facts-The-True-Cost-of-Flooding>.  
<sup>35</sup> O’Geen, Anthony Toby. “Soil Water Dynamics.” *Nature*, 2013. <https://www.nature.com/scitable/knowledge/library/soil-water-dynamics-103089121/>.

#### 3.3.17 SINKHOLES/LANDSLIDES

##### 3.3.17.1 DESCRIPTION

###### Sinkholes

Sinkholes are common where the rock below the land surface is limestone, carbonate rock, salt beds, or rocks that can naturally be dissolved by ground water circulating through them. As the rock dissolves, spaces and caverns develop underground. The sudden collapse of the land surface can be dramatic and range in size from broad, regional lowering of the land surface to localized collapse. The primary causes of most subsidence are human activities: underground mining of coal, groundwater or petroleum withdraw, and drainage of organic soils. In addition, sinkholes can develop as a result of subsurface void spaces created over time due to the erosion of subsurface limestone (karst).

###### Landslides

A landslide is the downhill movement of masses of soil and rock by gravity. They are typically associated with mountainous regions, but they can also occur in areas of low relief. In these areas, the landslides are often the result of cut-and-fill failures (from roadway and building excavations), river bluff failures, lateral spreading, or mine collapse. The basic ingredients for landslides are gravity, susceptible soil or rock, sloping ground, and water. Landslides occur when susceptible rock, earth, or debris moves down a slope under the force of gravity and water. Landslides may be very small or very large, and can move at slow to very high speeds. New landslides can occur because of rainstorms, fires, earthquakes, and various human activities that modify slope and drainage.

##### 3.3.17.2 LOCATION

According to the Iowa Department of Natural Resources, Polk County is considered a low karst area. As a result, erosion of subsurface limestone resulting in sinkholes is not considered very likely. However, Polk County is situated within a portion of the State of Iowa underlain by abundant coal resources. Recorded production totaled over 50 billion tons when in production for over 100 years (1840 to 1947). Beginning in 1902, the state of Iowa required companies to document and map out the underground tunnels and veins for state records. Abandoned mines can contribute to sinkholes if there is inadequate support to hold the weight of development above ground.

According to Iowa Department of Natural Resources, Mines and Minerals Bureau there are 187 documented closed-off underground mining locations in Polk County. These sites are detailed in Table 99. In the city of Runnells, mining began in the 1880s so there are no detailed maps. The City also used to be a final coal stop for steam-paddled boats headed up the Des Moines River so several “mom and pop mines” operated within the community. Any mining activity that occurred prior to 1902 is typically not mapped.

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

Table 99. List of Underground Mining Locations in Polk County

| Mine Name                                        | Acreage | First year of operation | Last year of operation | Data Type                    | Mining Method             | Shaft Depth | No. maps |
|--------------------------------------------------|---------|-------------------------|------------------------|------------------------------|---------------------------|-------------|----------|
| Acme Coal Co.                                    | 0       | unknown                 | 1895                   | Point location, ¼ section    | unknown                   | unknown     | 0        |
| Acme Coal Mine                                   | 38.5    | 1918                    | 1926                   | Surveyed map                 | room and pillar           | unknown     | 1        |
| Adams And Hastie Mine                            | 0       | unknown                 | unknown                | Point location, ¼ section    | room and pillar           | 100         | 0        |
| Altoona Mine                                     | 61.5    | unknown                 | unknown                | Unmapped, extent approx.     | unknown                   | 215         | 0        |
| American Coal Mining Co.                         | 91.2    | 1912                    | 1919                   | Surveyed map                 | room and pillar           | unknown     | 3        |
| Anderson Coal Co.                                | 34.5    | 1907                    | unknown                | Unmapped, extent approx.     | unknown                   | 285         | 0        |
| Anderson Mine                                    | 0       | unknown                 | unknown                | Point location, ¼ section    | unknown                   | unknown     | 0        |
| Atlas Mine                                       | 24      | unknown                 | unknown                | Unmapped, extent approx.     | unknown                   | 100         | 0        |
| Avon Coal Co.                                    | 0       | unknown                 | unknown                | Point location, ¼ section    | unknown                   | 34          | 0        |
| Beck Coal Co. (2 <sup>nd</sup> Vein)             | 98.4    | 1908                    | 1942                   | Surveyed map                 | room and pillar           | unknown     | 4        |
| Beck Coal Co. (3 <sup>rd</sup> Vein)             | 24.1    | 1908                    | 1922                   | Surveyed map                 | unknown                   | unknown     | 1        |
| Beck Mine                                        | 0       | unknown                 | unknown                | Point location, w/in section | unknown                   | unknown     | 0        |
| Bennett Brothers Coal Co. (3 <sup>rd</sup> Vein) | 42.8    | 1908                    | 1914                   | Surveyed map                 | room and pillar           | unknown     | 7        |
| Bennett Brothers Coal Co. Mine No. 1             | 79.7    | 1903                    | 1916                   | Surveyed map                 | room and pillar           | 125         | 2        |
| Bennett Brothers Coal Co. Mine No. 2             | 120.3   | 1917                    | 1936                   | Surveyed map                 | room and pillar           | 125         | 4        |
| Bloomfield Coal Co. Marquisville Mine            | 410.8   | 1914                    | 1927                   | Surveyed map                 | longwall, room and pillar | 271         | 10       |
| Bloomfield Coal Co. Mine No. 2                   | 100.9   | 1896                    | 1905                   | Surveyed map                 | room and pillar           | 102         | 1        |
| Bloomfield Coal Co. Mine No. 6                   | 58.6    | 1889                    | 1895                   | Surveyed map                 | room and pillar           | 181         | 4        |
| Blount And Evans Coal Co.                        | 62.2    | 1908                    | unknown                | Unmapped, extent approx.     | unknown                   | 218         | 0        |
| Blount And Evans Coal Co.                        | 51.2    | 1908                    | 1913                   | Surveyed map                 | room and pillar           | 135         | 3        |
| Caleb Johns Mine                                 | 0       | unknown                 | unknown                | Point location, ¼ section    | unknown                   | unknown     | 0        |
| Caleb Johns Mine                                 | 0       | unknown                 | unknown                | Point location, ¼ section    | unknown                   | unknown     | 0        |
| Camp Creek Coal Co.                              | 0       | 1887                    | 1894                   | Point location, w/in section | unknown                   | 40          | 0        |
| Campfield Coal Co.                               | 21.1    | unknown                 | 1895                   | Unmapped, extent approx.     | unknown                   | 118         | 0        |
| Capital City Coal Co. Mine No. 1                 | 36.1    | 1930                    | 1936                   | Surveyed map                 | room and pillar           | unknown     | 3        |
| Capital Coal Co. Mine No. 1                      | 15.5    | 1903                    | 1908                   | Surveyed map                 | room and pillar           | unknown     | 3        |
| Carbon Mining Co. Mine No. 9                     | 78.5    | 1929                    | 1941                   | Surveyed map                 | room and pillar           | 212         | 3        |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

| Mine Name                             | Acreage | First year of operation | Last year of operation | Data Type                 | Mining Method             | Shaft Depth | No. maps |
|---------------------------------------|---------|-------------------------|------------------------|---------------------------|---------------------------|-------------|----------|
| Carbondale Coal Co. Mine No. 1        | 28.9    | 1896                    | 1897                   | Surveyed map              | room and pillar           | 108         | 2        |
| Center Coal And Mining Co.            | 78.4    | 1903                    | 1908                   | Surveyed map              | room and pillar           | unknown     | 1        |
| Central Service Coal Co. Mine No. 6   | 328.9   | 1930                    | 1947                   | Surveyed map              | longwall, room and pillar | 225         | 14       |
| Charles Reilley Mine                  | 1       | unknown                 | unknown                | Surveyed map              | room and pillar           | unknown     | 1        |
| Christy Coal Co. Mine No. 2           | 200.9   | 1892                    | 1901                   | Surveyed map              | room and pillar           | 115         | 2        |
| Cliffton Heights Coal Co.             | 54.7    | 1895                    | 1895                   | Surveyed map              | room and pillar           | 120         | 2        |
| Clover Leaf Mine                      | 19      | 1929                    | 1934                   | Surveyed map              | longwall, room and pillar | unknown     | 4        |
| Clover Leaf Mine Shaft                | 0       | 1911                    | 1913                   | Point location, ¼ section | unknown                   | unknown     | 0        |
| Coal Hill Coal And Mining Co.         | 46      | 1901                    | 1901                   | Surveyed map              | room and pillar           | 45          | 2        |
| Coaldale Fuel Co.                     | 136.4   | 1904                    | 1910                   | Surveyed map              | room and pillar           | unknown     | 3        |
| Cooperative Coal Co.                  | 0       | 1901                    | 1903                   | Point location, ¼ section | unknown                   | unknown     | 0        |
| Cooperative Coal Co. Mine No. 1       | 0       | unknown                 | unknown                | Point location, ¼ section | unknown                   | 125         | 0        |
| Dahl Mine                             | 0       | unknown                 | unknown                | Point location, ¼ section | unknown                   | unknown     | 0        |
| Des Moines Coal Co.                   | 0       | 1865                    | 1873                   | Point location, ¼ section | unknown                   | unknown     | 0        |
| Des Moines Coal Co. Iowa Mine         | 19.3    | 1913                    | 1916                   | Surveyed map              | room and pillar           | 150         | 1        |
| Des Moines Coal Co. Iowa Mine         | 222     | 1913                    | 1916                   | Surveyed map              | room and pillar           | 150         | 2        |
| Des Moines Coal Co. Marquisville Mine | 457.1   | 1894                    | 1907                   | Surveyed map              | room and pillar           | 180         | 3        |
| Des Moines Coal Co. Mine No. 1        | 0       | unknown                 | 1895                   | Point location, ¼ section | unknown                   | 105         | 0        |
| Des Moines Coal Co. Mine No. 4        | 83.8    | 1920                    | 1936                   | Surveyed map              | room and pillar           | unknown     | 4        |
| Des Moines Ice And Fuel Co.           | 66.1    | 1917                    | 1925                   | Surveyed map              | room and pillar           | unknown     | 2        |
| Diamond Jo Coal Mine                  | 3.9     | 1901                    | 1928                   | Surveyed map              | room and pillar           | unknown     | 1        |
| Diamond Mine                          | 25.3    | unknown                 | 1884                   | Unmapped, extent approx.  | unknown                   | unknown     | 0        |
| Eagle Coal Co. Mine No. 2             | 46.6    | 1908                    | 1915                   | Surveyed map              | Room and pillar           | 170         | 2        |
| Eagle Mine No. 3                      | 88.1    | 1910                    | 1919                   | Surveyed map              | room and pillar           | unknown     | 2        |
| Eclipse Coal Co.                      | 60.3    | 1873                    | 1885                   | Surveyed map              | room and pillar           | unknown     | 1        |
| Economy Coal Co.                      | 81.7    | unknown                 | unknown                | Surveyed map              | unknown                   | unknown     | 1        |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

| Mine Name                               | Acreage | First year of operation | Last year of operation | Data Type                    | Mining Method   | Shaft Depth | No. maps |
|-----------------------------------------|---------|-------------------------|------------------------|------------------------------|-----------------|-------------|----------|
| Economy Coal Co. Mine No. 1             | 205.9   | unknown                 | unknown                | Surveyed map                 | room and pillar | 110         | 2        |
| Economy Coal Co. Mine No. 2             | 365.6   | 1924                    | 1935                   | Surveyed map                 | room and pillar | unknown     | 10       |
| Economy Coal Co. Mine No. 3             | 258.4   | 1932                    | 1945                   | Surveyed map                 | room and pillar | 220         | 3        |
| Elko Coal Co.                           | 36.6    | 1901                    | 1907                   | Surveyed map                 | room and pillar | unknown     | 1        |
| Enterprise Coal Co. No.3                | 0       | unknown                 | unknown                | Point location, w/in section | unknown         | unknown     | 0        |
| Enterprise Coal Mining Co. Mine No. 1   | 536.2   | 1903                    | 1917                   | Surveyed map                 | room and pillar | 212         | 1        |
| Enterprise Coal Mining Co. Mine No. 2   | 503.4   | 1907                    | 1917                   | Surveyed map                 | room and pillar | 210         | 1        |
| Eureka Coal Co. Mine No. 1              | 130.4   | 1874                    | 1894                   | Unmapped, extent approx.     | room and pillar | 160         | 0        |
| Eureka Coal Co. Mine No. 2              | 306.1   | 1896                    | unknown                | Unmapped, extent approx.     | room and pillar | 107         | 0        |
| Evergreen Coal Co.                      | 0.8     | 1934                    | 1936                   | Surveyed map                 | room and pillar | unknown     | 1        |
| Extra Mine                              | 0       | 1884                    | unknown                | Point location, ¼ section    | unknown         | unknown     | 0        |
| Flint Brick Co. Mine No. 1              | 37      | 1894                    | 1901                   | Surveyed map                 | room and pillar | 122         | 3        |
| Flint Brick Co. Mine Shafts No. 2 And 3 | 90.5    | unknown                 | unknown                | Surveyed map                 | room and pillar | 180         | 6        |
| Flint Coal Co. Mine No. 4               | 86.3    | 1927                    | 1928                   | Surveyed map                 | room and pillar | unknown     | 4        |
| Flint Valley Mine                       | 0       | unknown                 | unknown                | Point location, ¼ section    | unknown         | unknown     | 0        |
| Fort Des Moines Mine                    | 108.7   | unknown                 | unknown                | Unmapped, extent approx.     | room and pillar | unknown     | 0        |
| Four Mile Coal Co.                      | 86.5    | 1928                    | 1931                   | Surveyed map                 | room and pillar | unknown     | 6        |
| Fuller And Coggsshell Coal Co.          | 5.2     | 1882                    | 1885                   | Surveyed map                 | room and pillar | unknown     | 1        |
| Giant Coal Co. Mine No. 1               | 166.4   | unknown                 | 1894                   | Unmapped, extent approx.     | room and pillar | unknown     | 0        |
| Giant Coal Co. Mine No. 2               | 54.4    | unknown                 | unknown                | Unmapped, extent approx.     | unknown         | 145         | 0        |
| Giant Coal Co. Mine No. 3               | 47.6    | 1885                    | unknown                | Unmapped, extent approx.     | unknown         | unknown     | 0        |
| Gibson Coal Co. Mine No. 4              | 86.4    | 1903                    | 1909                   | Surveyed map                 | room and pillar | 190         | 1        |
| Gibson Coal Co. Mine No.1               | 66.4    | 1889                    | 1895                   | Unmapped, extent approx.     | unknown         | 105         | 0        |
| Gibson Coal Mining Co. Mine No. 2       | 42.3    | 1895                    | 1899                   | Surveyed map                 | room and pillar | unknown     | 2        |
| Gibson Coal Mining Co. Mine No. 5       | 126.7   | 1908                    | 1918                   | Surveyed map                 | room and pillar | 160         | 2        |
| Gibson Mine No. 3                       | 0       | 1901                    | 1903                   | Point location, ¼ section    | room and pillar | unknown     | 0        |
| Glenwood Coal Co. Mine No. 2            | 61.7    | 1901                    | 1914                   | Surveyed map                 | room and pillar | unknown     | 1        |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

| Mine Name                       | Acreage | First year of operation | Last year of operation | Data Type                    | Mining Method   | Shaft Depth | No. maps |
|---------------------------------|---------|-------------------------|------------------------|------------------------------|-----------------|-------------|----------|
| Glenwood Coal Co. Mine No. 3    | 0       | unknown                 | unknown                | Point location, ¼ section    | room and pillar | 110         | 0        |
| Glenwood Mine                   | 10.5    | 1899                    | 1901                   | Surveyed map                 | room and pillar | unknown     | 1        |
| Gross Coal Mine                 | 1.8     | 1928                    | 1936                   | Surveyed map                 | room and pillar | unknown     | 3        |
| Hall's Bank                     | 0       | 1850                    | unknown                | Point location, w/in section | room and pillar | unknown     | 0        |
| Highland Park Mine              | 168.2   | unknown                 | unknown                | Unmapped, extent approx.     | unknown         | unknown     | 0        |
| Hollingsworth Coal Co.          | 15      | 1905                    | 1912                   | Surveyed map                 | room and pillar | 156         | 5        |
| Hulme Mine                      | 26.7    | unknown                 | unknown                | Unmapped, extent approx.     | longwall        | 95          | 0        |
| Independent Coal Co.            | 96.4    | 1927                    | 1945                   | Surveyed map                 | room and pillar | 60          | 11       |
| Interurban Coal Co.             | 17.8    | 1919                    | 1920                   | Surveyed map                 | room and pillar | unknown     | 1        |
| Iowa Central Mine               | 0       | unknown                 | unknown                | Point location, ¼ section    | unknown         | unknown     | 0        |
| Iowa Coal And Mining Co.        | 127.9   | unknown                 | unknown                | Unmapped, extent approx.     | unknown         | 65          | 0        |
| J. M. Christy Mine              | 0       | unknown                 | unknown                | Point location, ¼ section    | unknown         | unknown     | 0        |
| James Kyle Coal Co.             | 0       | 1891                    | 1895                   | Point location, w/in section | unknown         | unknown     | 0        |
| Johns Coal Co.                  | 17.8    | 1907                    | 1913                   | Surveyed map                 | room and pillar | unknown     | 3        |
| Joplin Coal Company #3          | 6       | 1930                    | 1941                   | Surveyed map                 | room and pillar | 90          | 1        |
| Keating – Stanford Coal Co.     | 28.8    | 1934                    | 1938                   | Surveyed map                 | room and pillar | unknown     | 5        |
| Keystone Coal Co. Mine          | 193.9   | 1908                    | 1922                   | Surveyed map                 | room and pillar | 165         | 1        |
| Keystone Coal Co. Mine No. 1    | 40.3    | 1894                    | 1908                   | Surveyed map                 | room and pillar | 142         | 1        |
| Keystone Coal Co. Mine No. 2    | 49.1    | 1894                    | 1908                   | Unmapped, extent approx.     | unknown         | unknown     | 0        |
| Kring Coal Co.                  | 1       | 1937                    | 1943                   | Surveyed map, poor location  | longwall        | 58          | 1        |
| Lake Park Mine                  | 0       | 1895                    | unknown                | Point location, ¼ section    | unknown         | unknown     | 0        |
| Levey Coal Co.                  | 2.2     | 1936                    | 1941                   | Surveyed map                 | room and pillar | 90          | 1        |
| Levey Coal Co.                  | 1.8     | 1941                    | 1941                   | Surveyed map                 | longwall        | unknown     | 1        |
| Logan Mine                      | 0       | 1891                    | 1893                   | Point location, ¼ section    | room and pillar | 40          | 0        |
| M. Quinn Mine                   | 0       | 1893                    | unknown                | Point location, ¼ section    | unknown         | unknown     | 0        |
| Madison Coal Co.                | 103.9   | 1908                    | 1916                   | Surveyed map                 | room and pillar | 165         | 1        |
| Maple Block Coal Co. Mine No. 1 | 297.9   | 1906                    | 1917                   | Surveyed map                 | room and pillar | 168         | 2        |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

| Mine Name                         | Acreage | First year of operation | Last year of operation | Data Type                   | Mining Method   | Shaft Depth | No. maps |
|-----------------------------------|---------|-------------------------|------------------------|-----------------------------|-----------------|-------------|----------|
| Maple Block Coal Co. Mine No. 2   | 48      | 1905                    | 1922                   | Surveyed map                | room and pillar | unknown     | 1        |
| Maple Grove Mine Shaft No. 1      | 23.1    | 1891                    | 1903                   | Surveyed map                | Room and pillar | 105         | 3        |
| Maple Grove Mine Shaft No. 2      | 40.8    | 1891                    | 1903                   | Surveyed map                | room and pillar | 105         | 2        |
| Merchants Mine                    | 0       | unknown                 | unknown                | Point location, ¼ section   | longwall        | unknown     | 0        |
| Merle Hay Coal Co.                | 191.2   | 1942                    | 1947                   | Surveyed map                | room and pillar | 200         | 10       |
| Midland Coal And Mining Co.       | 0       | 1891                    | 1896                   | Point location, ¼ section   | unknown         | 45          | 0        |
| Midway Coal Co. Shaw Mine         | 0       | unknown                 | unknown                | Point location, ¼ section   | unknown         | 140         | 0        |
| Miller Mine                       | 15.9    | 1882                    | 1883                   | Unmapped, extent approx.    | unknown         | unknown     | 0        |
| Moore Coal Co.                    | 3.2     | unknown                 | 1926                   | Surveyed map                | longwall        | unknown     | 1        |
| no name                           | 0.7     | unknown                 | unknown                | Surveyed map, poor location | unknown         | unknown     | 1        |
| None                              | 7.5     | unknown                 | unknown                | Surface                     | surface         | unknown     | 0        |
| Norris Brothers Coal Co.          | 0       | unknown                 | unknown                | Point location, ¼ section   | unknown         | unknown     | 0        |
| Norris Coal Company               | 1.1     | unknown                 | unknown                | Surveyed map                | room and pillar | unknown     | 1        |
| Norwood Coal And Mining Co. No.1  | 0       | 1901                    | 1903                   | Point location, ¼ section   | room and pillar | unknown     | 0        |
| Norwood-White Coal Co. Mine No. 1 | 321.7   | 1908                    | 1911                   | Surveyed map                | room and pillar | 215         | 1        |
| Norwood-White Coal Co. Mine No. 2 | 105.8   | 1908                    | 1912                   | Surveyed map                | room and pillar | unknown     | 1        |
| Norwood-White Coal Co. Mine No. 3 | 292.8   | 1919                    | 1926                   | Surveyed map                | room and pillar | unknown     | 1        |
| Norwood-White Coal Co. Mine No. 4 | 393.2   | 1911                    | 1918                   | Surveyed map                | room and pillar | 170         | 2        |
| Norwood-White Coal Co. Mine No. 5 | 186.7   | 1914                    | 1920                   | Surveyed map                | room and pillar | unknown     | 1        |
| Norwood-White Coal Co. Mine No. 6 | 93.7    | 1919                    | 1924                   | Surveyed map                | room and pillar | unknown     | 1        |
| Norwood-White Coal Co. Mine No. 8 | 2.7     | 1922                    | 1943                   | Surveyed map                | room and pillar | 210         | 1        |
| Norwood-White Coal Co. Mine No. 8 | 636.3   | 1922                    | 1943                   | Surveyed map                | room and pillar | 210         | 1        |
| O. K. Coal Co.                    | 9.3     | 1903                    | 1906                   | Surveyed map                | room and pillar | unknown     | 1        |
| Old Clover Leaf Mine              | 3.9     | 1923                    | 1925                   | Surveyed map                | room and pillar | unknown     | 1        |
| Pennsylvania Mine                 | 0       | 1869                    | 1896                   | Point location, ¼ section   | room and pillar | unknown     | 0        |
| Pioneer Coal Co.                  | 114.8   | 1876                    | 1896                   | Surveyed map                | room and pillar | 150         | 2        |
| Pioneer Coal Co.                  | 31.8    | 1940                    | 1941                   | Surveyed map                | room and pillar | 100         | 7        |
| Pittsburg Mine                    | 0       | unknown                 | 1885                   | Point location, ¼ section   | unknown         | unknown     | 0        |



### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

| Mine Name                                                         | Acreage | First year of operation | Last year of operation | Data Type                    | Mining Method             | Shaft Depth | No. maps |
|-------------------------------------------------------------------|---------|-------------------------|------------------------|------------------------------|---------------------------|-------------|----------|
| Pleasant Hill Coal Co.                                            | 0       | unknown                 | unknown                | Point location, ¼ section    | unknown                   | 68          | 0        |
| Polk City Mine                                                    | 0       | 1887                    | 1897                   | Point location, w/in section | unknown                   | 238         | 0        |
| Preston Coal Co. (Schulz lease)                                   | 2.2     | unknown                 | unknown                | Surveyed map                 | room and pillar           | unknown     | 1        |
| Preston Coal Co. (seam 1)                                         | 1.5     | 1926                    | 1929                   | Surveyed map                 | room and pillar           | unknown     | 8        |
| Proctor Coal Company                                              | 55.7    | unknown                 | unknown                | Unmapped, extent approx.     | unknown                   | 197         | 0        |
| Ramsey Mine No. 2                                                 | 0       | unknown                 | unknown                | Point location, ¼ section    | unknown                   | unknown     | 0        |
| Rawson Mine                                                       | 24.6    | unknown                 | unknown                | Unmapped, extent approx.     | unknown                   | unknown     | 0        |
| Reese Mine                                                        | 0       | unknown                 | unknown                | Point location, ¼ section    | unknown                   | unknown     | 0        |
| Rider Cooperative Coal Co.                                        | 186     | 1931                    | 1939                   | Surveyed map                 | room and pillar           | 365         | 5        |
| Rose Hill Mine                                                    | 62      | 1889                    | 1896                   | Unmapped, extent approx.     | unknown                   | 90          | 0        |
| Runnells Coal Co.                                                 | 0       | 1939                    | 1942                   | Point location, w/in section | room and pillar           | 20          | 0        |
| Samuel Dale Mine                                                  | 0       | 1889                    | 1893                   | Point location, ¼ section    | unknown                   | 100         | 0        |
| Saylor Coal Co. Mine No. 2a                                       | 884.5   | 1906                    | 1928                   | Surveyed map                 | room and pillar           | unknown     | 1        |
| Saylor Coal Co. Mine No. 2b                                       | 54.5    | 1906                    | 1928                   | Surveyed map                 | room and pillar           | unknown     | 1        |
| Scandia Coal Company Mine #4                                      | 1470    | unknown                 | unknown                | Surveyed map                 | room and pillar           | unknown     | 30       |
| Scandia Mine #2                                                   | 510.8   | 1912                    | 1926                   | Surveyed map                 | room and pillar           | unknown     | 1        |
| Scandia Mine No. 2 Second Vein                                    | 136.3   | 1912                    | 1926                   | Surveyed map                 | room and pillar           | unknown     | 1        |
| Schell Coal Co.                                                   | 0       | 1939                    | 1944                   | Point location, w/in section | room and pillar           | 20          | 0        |
| Scott Mine                                                        | 0       | 1908                    | unknown                | Point location, ¼ section    | unknown                   | unknown     | 0        |
| Shuler Mine ( <i>In Dallas County; affects Grimes and Clive</i> ) | 1451    | 1921                    | 1949                   | Surveyed map                 | Room and pillar           | 387         | 13       |
| Skandia Mine                                                      | 0       | unknown                 | unknown                | Point location, w/in section | unknown                   | unknown     | 0        |
| small unnamed mine                                                | 1       | unknown                 | unknown                | unknown                      | unknown                   | unknown     | 1        |
| Smith And Lowe Coal Co. Mine No. 2                                | 1.4     | 1902                    | 1908                   | Surveyed map                 | room and pillar           | 110         | 1        |
| Smith And Lowe Coal Co. Mine No. 3                                | 18.3    | 1902                    | 1908                   | Surveyed map                 | room and pillar           | unknown     | 2        |
| Smith And Lowe Coal Co. Mine No. 4                                | 0       | 1903                    | 1905                   | Point location, ¼ section    | room and pillar           | unknown     | 0        |
| South Des Moines Coal Co.                                         | 203.7   | 1912                    | 1922                   | Surveyed map                 | longwall, room and pillar | unknown     | 6        |
| Standard Coal Co.                                                 | 73.1    | unknown                 | unknown                | Unmapped, extent approx.     | unknown                   | unknown     | 0        |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

| Mine Name                    | Acreage | First year of operation | Last year of operation | Data Type                    | Mining Method             | Shaft Depth | No. maps |
|------------------------------|---------|-------------------------|------------------------|------------------------------|---------------------------|-------------|----------|
| Standard Coal Co. Mines      | 1.3     | 1933                    | 1936                   | Surveyed map                 | room and pillar           | unknown     | 1        |
| Standard Coal Co. Mines      | 2.2     | 1929                    | 1933                   | Surveyed map                 | room and pillar           | unknown     | 1        |
| Stanford Coal Co. Mine No. 1 | 15.1    | 1931                    | 1932                   | Surveyed map                 | room and pillar           | unknown     | 3        |
| Star Coal Co.                | 0       | unknown                 | unknown                | Point location, w/in section | unknown                   | unknown     | 0        |
| Swanwood Coal Co.            | 0       | 1908                    | 1910                   | Point location, ¼ section    | room and pillar           | unknown     | 0        |
| Two Rivers Coal Co.          | 29.5    | unknown                 | unknown                | Unmapped, extent approx.     | unknown                   | unknown     | 0        |
| Union Mine                   | 18.4    | 1894                    | 1894                   | Surveyed map, poor location  | room and pillar           | unknown     | 2        |
| Union Mine                   | 0       | unknown                 | unknown                | Point location, ¼ section    | unknown                   | unknown     | 0        |
| Union Mine (3rd Vein)        | 20.7    | 1887                    | 1894                   | Surveyed map, poor location  | room and pillar           | 150         | 1        |
| University Coal Co.          | 86.9    | unknown                 | unknown                | Unmapped, extent approx.     | room and pillar           | unknown     | 0        |
| unnamed                      | 1       | unknown                 | unknown                | unknown                      | unknown                   | unknown     | 0        |
| Urbandale Coal Co.           | 146.4   | 1920                    | 1942                   | Surveyed map                 | room and pillar           | 180         | 2        |
| Valley-Union Coal Co.        | 0.6     | 1906                    | 1912                   | Surveyed map                 | room and pillar           | 150         | 3        |
| Van Ginkel Mine (2nd Vein)   | 57.5    | 1885                    | 1897                   | Surveyed map                 | room and pillar           | 75          | 3        |
| W. V. Stoughtenberg Mine     | 0       | 1889                    | 1894                   | Point location, w/in section | unknown                   | unknown     | 0        |
| Wabash Mine No. 1            | 6.8     | unknown                 | unknown                | Surveyed map                 | room and pillar           | unknown     | 1        |
| Wabash Mine No. 2            | 129.5   | 1886                    | unknown                | Unmapped, extent approx.     | unknown                   | 100         | 0        |
| Walnut Creek Coal Co.        | 2       | 1905                    | 1910                   | Surveyed map                 | room and pillar           | 150         | 2        |
| Walnut Creek Coal Mine       | 5.1     | 1885                    | 1894                   | Surveyed map                 | longwall, room and pillar | 140         | 1        |
| Watson Mine                  | 0       | 1866                    | 1876                   | Point location, ¼ section    | unknown                   | 40          | 0        |
| West Riverside Coal Co.      | 52.7    | 1894                    | 1911                   | Surveyed map                 | room and pillar           | 160         | 2        |
| Western Coal Co.             | 1.8     | 1896                    | 1902                   | Surveyed map                 | room and pillar           | unknown     | 1        |
| Western Coal Co. Saylor Mine | 587.6   | 1898                    | 1910                   | Unmapped, extent approx.     | room and pillar           | 216         | 1        |
| Wild Rose Mine               | 18.8    | 1899                    | 1899                   | Surveyed map                 | room and pillar           | unknown     | 1        |
| Woodlawn Mine                | 0       | unknown                 | unknown                | Point location, ¼ section    | unknown                   | unknown     | 0        |
| Wright Coal Co.              | 703.4   | 1910                    | 1924                   | Surveyed map                 | room and pillar           | unknown     | 1        |

Source: Iowa Department of Natural Resources, 2023

All Polk County jurisdictions are considered to be equally vulnerable to landslides. Polk County's topography is relatively flat overall, but all communities in the county have slopes where landslides could potentially occur. The U.S. Geological Survey considers the entirety of Polk County to have moderate susceptibility to landslides, primarily due to the limited presence of shale. Shale is sometimes associated with landslides, but the lack of large, steep slopes has resulted in low incidence of landslides in Polk County. Heavy rainfall, fires, mineral extraction, and other human activity can create instability and increase the likelihood of landslides.

#### 3.3.17.3 EXTENT

Landslides and sinkholes exhibit unique characteristics in terms of size, shape, timing, and location relative to human development, all of which influence the extent of the damage they cause. These geological occurrences can range from subtle shifts in elevation to dramatic, wide openings on the Earth's surface. In urban settings, subsidence and sinkhole events pose a significant risk, potentially causing extensive damage. Key issues include disruptions to utilities and damage to both private and public assets, such as buildings, roads, and underground facilities. Prolonged subsidence or sinkhole development can lead to severe outcomes, including fractured or collapsed building foundations and roadways. Sinkholes also pose environmental risks, particularly to local groundwater systems in carbonate rock formations. These areas are prone to pollution as water can easily permeate from the surface into the subsurface through cavities and fractures, bypassing natural filtration processes.

Landslides can be very small or very large in size, and they can move slowly or very rapidly. There have been numerous small-scale landslide events in Iowa, none resulting in injury or death. The extent of past events has been limited to less than a city block in size and has "run out" over the stretch of less than 100 yards. For both landslides and sinkholes, development near chemical infrastructure – such as pipelines and hazardous material storage facilities – heightens the risk of environmental contamination due to potential breaches and hazardous material releases. Contaminants of concern include sewage, fertilizers, herbicides, pesticides, and industrial chemicals. While abrupt subsidence events can initially damage vegetation, natural regrowth typically occurs over time.

#### 3.3.17.4 PREVIOUS OCCURRENCES

##### Sinkholes

There is limited documentation of sinkhole occurrences in Polk County. Although there is no County, State, or Federal database of sinkholes, news articles and anecdotal evidence provide some detail about previous occurrences of sinkholes within Polk County. The City of Windsor Heights had a few minor sinkholes open up in 2018. In the City of Des Moines a number of sinkholes have opened up, two of the most recent and notable are below. In the city of Runnells, the Mayor stated that over the last 20 years, multiple sinkholes have appeared in a field on the east side of town where two entrances to mines were located. Notable instances of sinkholes within Polk County are described below.

**July 5, 2018** – A sinkhole was found along the Walnut Creek Bike Trail in Windsor Heights.

**May 29, 2018** – A 17-foot sinkhole (deep and wide) opened up on Des Moines' south side's 3600 block of Thorton Avenue.

**Figure 104. Photo of Sinkhole Near Runnells, July 2010**



Source: Des Moines Register

**May 30, 2013**—Sinkhole in Runnells in a residential front yard was 10 feet deep and 10 feet wide eroded around a power pole. The sinkhole was caused by an old septic tank.

**July 28, 2010**—Sinkhole on property near Runnells. See Figure 105.

**Figure 105. Photo of Sinkhole Near Runnells, July 2010**



Source: Photo courtesy of DSC—IDALS



**1980s**—Sinkhole in east side of Runnells that was 25 feet in diameter, and it caved in a portion of two residential roads. No homes were impacted in the incident.

#### Landslides

Reporting of landslide events in Iowa is sporadic. No state agency collects and maintains reports of landslides in Iowa. Recently the USGS published and posted an inventory of known landslides, but as stated in the summary of the publication, such “inventories are typically collected and maintained by different agencies and institutions, usually within specific jurisdictional boundaries, and often with varied objectives and information attributes or even in disparate formats.” There is only a single documented landslide within the U.S. Landslides Inventory which occurred in Polk County.

According to the USGS, in 2017 a hole in a sewage box in the Des Moines River caused a riverbank to collapse. A spokesperson with the City of Des Moines explained that the constant flow of water over time on the bottom of the box scoured a hole in the sewage box. Once that hole was created, soil filled in the void, and that shift in pressure caused the land erosion.<sup>36</sup>

**Figure 106. Landslide along the bank of the Des Moines River 2017**



Source: Zachary Boyden-Holmes/The Register

<sup>36</sup> U.S. Geological Survey. “U.S. Landslide Inventory.” [usgs.maps.arcgis.com](https://usgs.maps.arcgis.com/apps/webappviewer/index.html?id=ae120962f459434b8c904b456c82669d), January 22, 2017.  
<https://usgs.maps.arcgis.com/apps/webappviewer/index.html?id=ae120962f459434b8c904b456c82669d>.

3.3.17.5 PROBABILITY OF FUTURE OCCURRENCES

Due to the limitations of available data, it is not practical to extrapolate the probability of future landslides from past events. Data on sinkholes is also limited, but news reports indicate that sinkholes occur somewhere in Polk County roughly once every few years. The HMPC determined the probability of future occurrence of sinkholes and landslide in the planning area to be “occasional.”

3.3.17.6 VULNERABILITY

Sinkholes and landslides – often triggered by factors like heavy rainfall, earthquakes, or human activities – can have a significant impact on various community lifelines. The primary community lifelines likely to be affected by landslides are shown in the table below.

Table 100. Potential Impacts of Sinkholes/Landslides on Community Lifelines

| Lifelines                | Impact Type                                                                         | Description                                                                                                                                                                                                                                                  |
|--------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Food, Shelter, & Housing |   | Landslides and sinkholes can destroy or damage homes and buildings, leading to displacement of residents and the need for temporary housing solutions. The rebuilding process can be extensive and resource intensive.                                       |
| Health & Medical         |  | The immediate threat of injury during a landslide or sinkhole, as well as the potential for public health concerns afterward (due to disrupted water and sanitation systems), can increase the demand for medical services and strain healthcare facilities. |
| Utilities                |  | Landslides and sinkholes can damage utility lines and infrastructure, leading to power outages, water supply disruptions, and communication breakdowns. Restoring these services is crucial for recovery and normalcy.                                       |
| Transportation           |  | Landslides and sinkholes can block roads and railways, disrupting transportation and access, including emergency response routes. Repairing these routes can be time-consuming and costly.                                                                   |

#### A) People

The vulnerability of people in Polk County to the impacts of landslides and sinkholes is primarily determined by their location. Individuals who reside on or near the bottom of slopes are at the most risk of landslides, while those living on karst terrain or above old mines are more vulnerable to sinkholes. The vulnerability to landslides increases if the slope has been impacted by a fire, heavy rain, or human activity which can make soil more susceptible to sloughing. A person's mobility may also be a factor contributing to their overall vulnerability, but many landslides and sinkholes develop at a rapid pace.

#### B) Structures

Structures located on or near slopes are the most susceptible to damage from landslides. Likewise, structures built on karst terrain or near old mines are at an increased risk of damage from sinkholes. Lightweight structures are more likely to be damaged and collapse from the lateral forces of moving land and debris. Conversely, heavy structures may be better suited to resist the force of land and debris pushing up against the walls, but these structures can be damaged or destroyed if the ground they are built on begins to move.

#### C) Systems

Landslides and sinkholes can damage and destroy numerous systems which communities rely upon, including roads and bridges, underground pipelines, power transmission lines, and communications infrastructure. The extent of damage to these systems is primarily determined by the location and magnitude of the event.

#### D) Natural, Historic, and Cultural Resources

The impact of landslides and sinkholes on historic and cultural resources in Polk County is largely determined by the severity of the event and the characteristics of the historic/cultural resource. The natural environment may be temporarily damaged or altered by a landslide or sinkhole, but the impact of these events on flora and fauna is typically short-lived.

#### E) Community Activities

Community activities may need to be postponed, cancelled, or relocated if they rely on a structure or site that has been damaged by a landslide.

#### Existing Development

Due to the lack of information regarding previous occurrences of this hazard, it is not possible to estimate potential losses. However, since Polk County is considered a low karst area according to Iowa Department of Natural Resources, sinkholes are not prevalent from erosion of subsurface limestone, but are possible from the extensive abandoned coal mines to affect existing development. Ruptures along water pipelines may also cause sinkholes by creating voids below the surface of the ground.



Future Development

Future development over abandoned coal mines may increase vulnerability to sinkholes, and future development along slopes may increase vulnerability to landslides. Structures add weight which can make sloughing more likely, and construction and other human activity may reduce the stability of sloped ground.

Climate Change

Climate change is not anticipated to have a noticeable impact on sinkhole occurrences in the planning area. Landslides may become more frequent as climate change appears to be increasing the overall precipitation in the planning area, and the added weight of water on a slope may exceed the strength of the earth materials that compose the slope.

Hazard Risk Score

Table 101. Sinkholes/Landslides Probability and Health Impact Ratings

| Health Severity | Community Impact | Public Health System Impact | Healthcare System Impact | Total Health Hazard Score | Probability |
|-----------------|------------------|-----------------------------|--------------------------|---------------------------|-------------|
| 0               | 0                | 0                           | 2                        | 2                         | Occasional  |

3.3.18 STRUCTURAL FIRE

3.3.18.1 DESCRIPTION

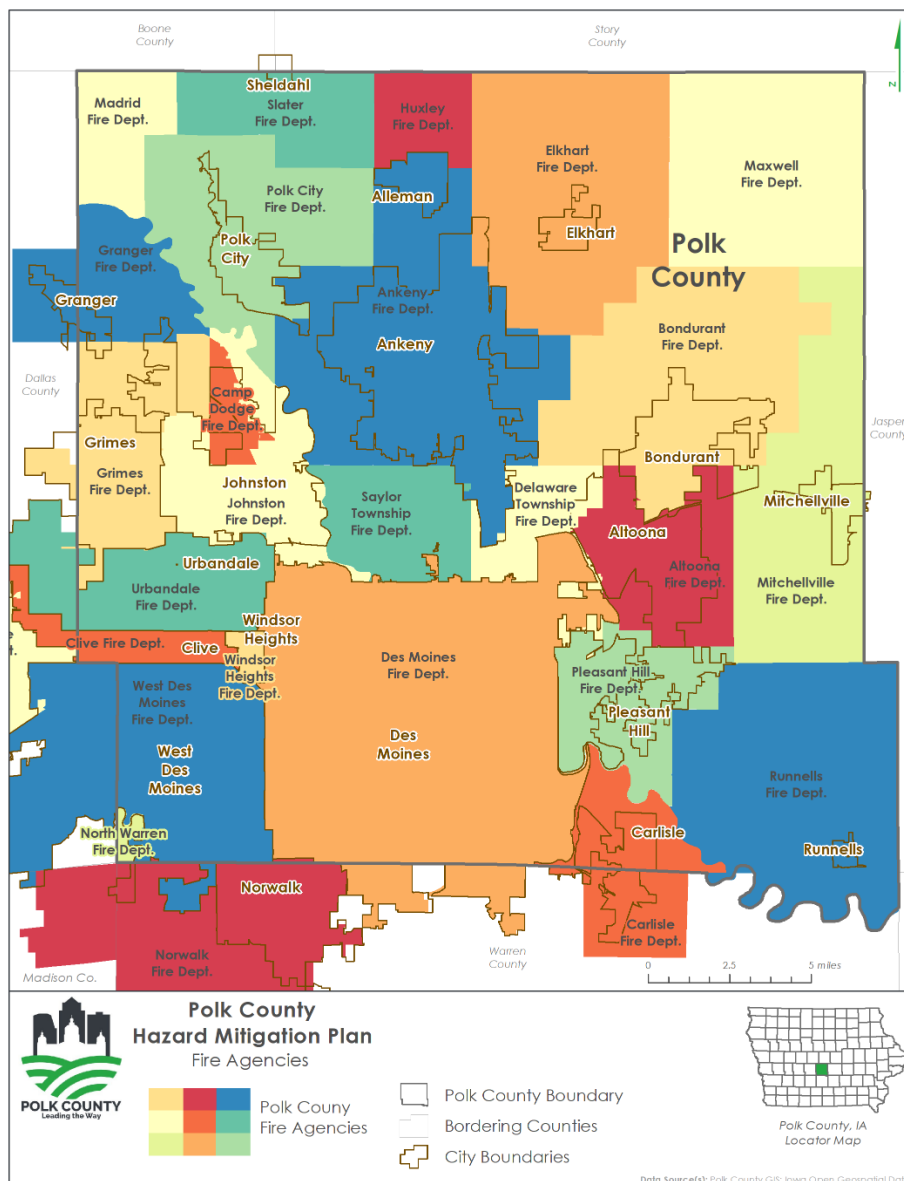
A structural or urban fire is an uncontrolled fire in populated area that threatens life and property and is beyond normal day-to-day response capabilities. Historically, structural fires which spread to nearby buildings caused several catastrophic urban fires in the 1800s. Today, modern fire codes and fire suppression requirements in new construction and building renovations, coupled with improved firefighting equipment, training, and techniques, lessen the chance and impact of a major urban fire. However, structural fires still pose a challenge to communities, and fires in large structures like apartments, hotels, and offices can quickly threaten hundreds of lives.

3.3.18.2 LOCATION

All Fire Departments respond to structural fires on a regular basis. Structural fires are inherently more likely in places with more structures – the urban core of the Des Moines Metropolitan area will experience more frequent structural fires than the northern and eastern portions of the county which largely consist of agricultural land. Urban fires most frequently occur in residential structures, and the age and density of a particular neighborhood can make it more vulnerable to fire due to the increased possibility of fire spreading amongst neighboring structures. Structures in areas served by older, smaller, or otherwise inadequate water distribution infrastructure are also at significant risk. Broadly, all jurisdictions in Polk County have structures which can ignite; therefore, these jurisdictions are

considered equally vulnerable to this hazard. The figure below shows the jurisdictional boundaries of the fire agencies serving Polk County.

**Figure 107. Polk County Fire Agencies Map**



#### 3.3.18.3 EXTENT

Structural fires in urban settings can vary significantly in their effects, which can range from minor smoke or water-related issues to the complete destruction of homes, businesses, and public spaces. In extreme cases, these fires can spread to additional structures and damage a significant portion of building stock. Structural fires can result in injuries and fatalities, and residents may be displaced for an extended period of time.

Nationally, fires caused over 3,790 civilian fire deaths and 13,250 injuries in 2022. The deaths from residential fires constitute most fire deaths, accounting for 72% of all civilian fire deaths in 2022.<sup>37</sup> Statistically, urban fires are most likely to start because of human actions; in particular, cooking was identified as the cause of nearly 66% of residential fires in 2021.<sup>38</sup> For comparison, electrical malfunctions were identified as the cause of only 9% of residential fires in that same year.<sup>39</sup> Urban fires can also begin as a result of other hazards, such as storms, lightning strikes, drought, transportation accidents, hazardous material releases, criminal activity (arson), and terrorism.

Residential fires, given their timing and the materials often found in homes, pose a higher risk of fatalities compared to commercial or industrial fires. Most structural fires tend to be minor, predominantly impacting residential properties. These incidents are typically short-lived and fall within local jurisdictional control. Yet, it's crucial to recognize that the threat of larger, more destructive fires exists

Industrial and commercial facilities in the area are also susceptible to fires, which, if not managed promptly, can rapidly escalate in severity. The presence of volatile materials in many of these locations means that fires may exhibit characteristics which are not commonly seen in residential fires. Examples of these characteristics include the temperature of the fire, amount of toxic fumes generated, and likelihood of reignition. Additionally, 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 size and/or contents of the structures.

The community impact of such fires is partially determined by the type and significance of the structure. While a single home's destruction might have a limited economic effect, the loss of a large manufacturing facility, critical facility, or community resource can have extensive economic repercussions. Similarly, the environmental consequences of a residential fire might be negligible, but an industrial or commercial blaze can leave an environmental imprint that lasts for years.

Fire risks in the region are constantly evolving as changes in building materials, building codes, safety procedures, industry standards, and other factors continue to shift.

#### 3.3.18.4 PREVIOUS OCCURRENCES

The building stock in some jurisdictions means that small structural fires can be a near-daily occurrence. The majority of structural fires in the planning area do not result in fatalities and are contained before the fire can spread to other structures. The National Fire Incident Reporting System (NFIRS) is a repository of statistical data submitted by reporting fire departments. Table 102 below

---

<sup>37</sup> NFPA Research. "Fire Loss in the United States." [nfpa.org](https://www.nfpa.org/education-and-research/research/nfpa-research/fire-statistical-reports/fire-loss-in-the-united-states), October 31, 2023. <https://www.nfpa.org/education-and-research/research/nfpa-research/fire-statistical-reports/fire-loss-in-the-united-states>. 3-293

<sup>38</sup> U.S. Fire Administration. "Residential Building Fire Causes," April 28, 2023. Retrieved on 07/20/2023 from: <https://www.usfa.fema.gov/statistics/residential-fires/causes.html>.

<sup>39</sup> U.S. Fire Administration. "Residential Building Fire Causes," April 28, 2023. Retrieved on 07/20/2023 from: <https://www.usfa.fema.gov/statistics/residential-fires/causes.html>.

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

shows the number of fire reports received, total incident property loss, incident content loss, and civilian injury and deaths from 2019-2022 submitted by reporting fire departments located in Polk County. Note that the data used to generate the table below does not include specific information about the type of fire incident. It is unknown, based on the statistical data available if any of these structural fires were beyond normal day-to-day response capabilities.

**Table 102. NFIRS Fire Events and Related Damages, Injuries, and Fatalities in Polk County 2019-2022**

| Agency                                | Count of Fire Incidents | Basic Content Losses | Basic Property Losses | Basic Civilian Injuries Count | Basic Incident Civilian Deaths |
|---------------------------------------|-------------------------|----------------------|-----------------------|-------------------------------|--------------------------------|
| Altoona Fire Department               | 9,891                   | \$846,950            | \$2,194,780           | 5                             | 2                              |
| Ankeny Fire Department                | 25,614                  | \$2,440,166          | \$5,957,126           | 3                             | 2                              |
| Bondurant Emergency Services          | 2,543                   | \$512,413            | \$1,060,401           | 0                             | 0                              |
| Camp Dodge Fire Department            | 17                      | \$0                  | \$0                   | 0                             | 1                              |
| Clive Fire Department                 | 13,549                  | \$622,500            | \$1,854,790           | 5                             | 4                              |
| Des Moines Fire Department            | 119,498                 | \$6,055,684          | \$21,916,131          | 54                            | 10                             |
| Elkhart Fire Department               | 126                     | \$356,000            | \$873,000             | 1                             | 0                              |
| Johnston Metropolitan Fire Department | 13,420                  | \$1,362,950          | \$2,180,460           | 11                            | 1                              |
| Pleasant Hill Fire Department*        | 2,053                   | \$223,850            | \$524,962             | 5                             | 0                              |
| Polk City Fire Department**           | 2,794                   | \$258,600            | \$562,701             | 4                             | 2                              |
| Runnells Fire Department***           | 547                     | \$1,605,500          | \$1,319,500           | 6                             | 0                              |
| Saylor Township Fire Department       | 4,267                   | \$0                  | \$0                   | 0                             | 3                              |
| Urbandale Fire Department             | 19,944                  | \$1,267,876          | \$8,549,175           | 14                            | 0                              |
| West Des Moines Fire Department       | 19,441                  | \$1,751,126          | \$20,403,760          | 20                            | 0                              |
| Windsor Heights Fire Department       | 2,817                   | \$613,471            | \$2,785,910           | 8                             | 0                              |

|                                                                                                                   |                |                     |                     |            |           |
|-------------------------------------------------------------------------------------------------------------------|----------------|---------------------|---------------------|------------|-----------|
| <b>Totals</b>                                                                                                     | <b>236,521</b> | <b>\$17,917,086</b> | <b>\$70,182,696</b> | <b>136</b> | <b>25</b> |
| *Data is only available for 2022; **Data is only available for 2021-2022; ***Data is only available for 2019-2020 |                |                     |                     |            |           |

Several of the fire departments located in Polk County have jurisdictional boundaries outside Polk County (Clive, Des Moines, Grimes, Mitchellville, Urbandale, and West Des Moines) and the NFIRS data includes fires reported by fire departments that occurred in their entire jurisdictional area. In addition, there is the opposite situation where fire departments are based in neighboring counties and have portions of their jurisdictional boundaries that overlap into Polk County. Fire departments with this situation include: Madrid, Slater, Maxwell, Granger, Carlisle, Northern Warren, and Norwalk Fire Departments. Their NFIRS data is not included in this analysis since the majority of their coverage areas are in adjacent counties.

#### 3.3.18.5 PROBABILITY OF FUTURE OCCURRENCES

Much of the fire prevention efforts by the municipalities participating in this plan have gone into prevention of nonresidential fires and the results have been highly effective. However, even with an increase in the prevention efforts in residential fires, both residential and nonresidential fires will continue to occur. Minor urban fires can be expected every day, and research by the National Fire Prevention Association (NFPA) found that a U.S. fire department responds to a fire every 24 seconds.<sup>40</sup> The probability of structural fires in the planning area is likely to increase during colder months when clogged chimneys and faulty furnaces and fire places can lead to structural fires. Based on previous occurrences, the chance that there will be structural fires in Polk County in any given year is considered “highly likely.”

#### 3.3.18.6 VULNERABILITY

Urban and structural fires, ranging from small-scale residential fires to large-scale industrial blazes, pose significant threats to people and property in the planning area. These fires can result from various causes, including accidents, negligence, or, in some cases, arson. The impact of such fires on community lifelines can be profound and multifaceted as shown below. While larger jurisdictions have more structures, structural fires can occur virtually anywhere. Additionally, large jurisdictions are more likely to have adequate equipment and first responders nearby, whereas smaller communities may need additional support to subdue major fires. Therefore, all jurisdictions in Polk County are considered to be equally vulnerable to this hazard. The specific impacts of structural fires on community lifelines are described in the table below.

<sup>40</sup> National Fire Prevention Association, Marty Ahrens, and Birgitte Messerschmidt. “Fire Safety in the United States since 1980,” 2021. Retrieved on 07/19/2023 from: [https://www.nfpa.org/~media/Files/News%20and%20Research/Fire%20statistics%20and%20reports/US%20Fire%20Problem/osNFPAEcosystemFireSafetyReport2021.ashx?utm\\_source=email&utm\\_medium=email&utm\\_campaign=email0358&utm\\_content=mbrs&order\\_src=e827](https://www.nfpa.org/~media/Files/News%20and%20Research/Fire%20statistics%20and%20reports/US%20Fire%20Problem/osNFPAEcosystemFireSafetyReport2021.ashx?utm_source=email&utm_medium=email&utm_campaign=email0358&utm_content=mbrs&order_src=e827)

Table 103. Potential Impacts of Structural Fires on Community Lifelines

| Lifelines                          | Impact Type                                                                         | Description                                                                                                                                                                                                                                                         |
|------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Safety & Security                  |    | Fires pose immediate threats to life and property. Emergency services, including fire departments and law enforcement, are crucial for firefighting, evacuation, and maintaining public order. Ensuring the safety of residents and responders is the top priority. |
| Health & Medical                   |    | Fires can result in injuries from burns and smoke inhalation, necessitating emergency medical response and treatment. Healthcare facilities must be prepared for the sudden influx of patients during major fire incidents.                                         |
| Housing & Building Infrastructure  |   | Fires can destroy homes and businesses, leading to displacement and long-term housing needs for affected residents. The rebuilding process can be lengthy and complex, involving insurance claims, construction services, and community support.                    |
| Utilities                          |  | Fires can damage utility infrastructure, leading to disruptions in electricity, gas, water supply, and telecommunications. Restoring these services is critical for recovery and normalcy.                                                                          |
| Environmental & Ecological Systems |  | Urban and structural fires can release pollutants and toxic materials into the environment, affecting air quality and potentially contaminating water and soil.                                                                                                     |

A) People

Smoke, evacuation injuries, and other various injuries would moderately elevate rates of injury, hospitalizations, and deaths. This could be a higher scoring if the prevalence of smoke detection systems were less prevalent, but much of the county’s structures do contain a warning system. However, socially vulnerable populations including those living below the poverty line may be at an increased risk of this hazard because they are more likely to reside in older dwellings which may not

contain all of the appropriate warning systems nor utilize or adhere to the latest building and fire codes. Additionally, the elderly, young children, and those with physical or mental disabilities may be more vulnerable if they require additional time and care in order to safely evacuate a burning structure.

#### B) Structures

Urban fires are a more significant threat in areas where a relatively high number of buildings are more than 50 years old. Older residential structures that were built with lower standards for building construction and materials have created a regularly occurring threat of fire loss. Additionally, structural fires most frequently begin in residential structures, and they are often caused by human activity such as cooking and smoking. Troublingly, there is some indication that fires in residences are becoming more dangerous – a 2022 study found that individuals caught in these fires now have less time to reach safety than they would 50 years ago.<sup>41</sup> Some of the possible reasons for this include increased use of flammable synthetic materials like polyurethane and increased popularity of open concept floorplans which make it harder to contain a fire. The risks posed by structural fires in large commercial and industrial buildings are largely determined by the contents of the building.

#### C) Systems

Structural fires can cause local utility outages if infrastructure is damaged. However, built in redundancy makes it unlikely that structural fires will cause countywide utility outages. If outages occur, backup power should be available to keep critical facilities open and operating. Access to Polk County may be temporarily limited in the event that a large structural fire impacts the Des Moines International Airport. Following any structural fire, it is imperative to restore any services which were interrupted in order to minimize the possibility of cascading issues caused by diminution of critical community systems.

#### D) Natural, Historic, and Cultural Resources

Structural fires generally do not represent a significant risk to natural and cultural resources. Historic structures may be more susceptible to fires as they often predate the widespread implementation of features and codes meant to minimize the frequency and severity of structural fires.

#### E) Community Activities

Individual community activities may need to be postponed, relocated, or cancelled if the host structure is damaged or destroyed by a fire. Widespread disruption of community activities is unlikely but not impossible. In an extreme example, a major fire at an industrial facility may produce harmful fumes which may prompt community leaders to urge citizens to temporarily remain indoors.

---

<sup>41</sup> Crown, Courtney. "Why Home Fires Burn Significantly Faster Now." *WTTV CBS4Indy*, November 3, 2022. <https://cbs4indy.com/cbs4-investigates/why-home-fires-burn-significantly-faster-now/>.



Existing Development

Structural fires are capable of damaging most structures, but there is an increased risk for older, residential structures. Structures which are several decades old may lack safety features such as smoke detectors in each bedroom and egress windows, and aged electrical wiring may increase the likelihood of a fire starting.

Future Development

New development is expected to adhere to the latest building and fire codes which are intended to increase the safety of occupants. However, there is some evidence suggesting that sythetic materials which are being used with increasing frequency can burn relatively quickly, and these materials may actually reduce the time individuals have to reach safety. When some synthetic materials begin burning they can produce highly toxic smoke which can quickly incapacitate anyone nearby. Future development which increases the local building density may also make it easier for a structural fire to reach new fuel sources (other structures) which can expand and prolong the fire.

Climate Change

The primary concerns pertaining to the impacts of climate change on structural fires center around the increased likelihood of intense and prolonged periods of heat and drought. Hot, dry conditions can make it easier for fires to ignite and more difficult to extinguish. See the sections on extreme temperature and drought for additional information.

Hazard Risk Score

Table 104. Structural Fire Probability and Health Impact Ratings

| Health Severity | Community Impact | Public Health System Impact | Healthcare System Impact | Total Health Hazard Score | Probability   |
|-----------------|------------------|-----------------------------|--------------------------|---------------------------|---------------|
| 2               | 1                | 2                           | 2                        | 7                         | Highly Likely |

3.3.19 THUNDERSTORM WITH LIGHTNING AND HAIL

3.3.19.1 DESCRIPTION

Thunderstorms are formed from a combination of moisture, rapidly raising warm air, and a lifting mechanism such as clashing warm and cold air masses. Atmospheric imbalance and turbulence may result in thunder, heavy rains (which may cause flooding), strong winds, microbursts, high straight-line winds (often mistaken for tornadoes), tornadoes, surface hail, or lightning. “Dry” thunderstorms that do not produce rain that reaches the ground are most prevalent in the western United States. Falling raindrops evaporate, but lightning can still reach the ground and can start wildfires. Thunderstorms can occur singly, in clusters, or in lines, and one system may spawn multiple events.

Most thunderstorms produce only lightning, thunder, and rain. The National Weather Service considers a thunderstorm severe if it produces hail at least one inch in diameter, wind 58 mph or

higher, or tornadoes. Typically, only 10% of thunderstorms reach severe levels. However, all thunderstorms are dangerous, according to FEMA.

Lightning is an electrical discharge between positive and negative regions of a thunderstorm. It is sudden, extremely destructive and potentially deadly. When the buildup becomes strong enough, lightning appears as a “bolt.” This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning heats the air to temperatures approaching 50,000 degrees Fahrenheit. The average duration of a typical lightning stroke is around 30 microseconds.

Hailstones are formed when raindrops are carried upward by thunderstorm updrafts into cold areas of the atmosphere and freeze. Hailstones then grow by colliding with liquid water drops that freeze onto the hailstone’s surface. The hail falls when the thunderstorm’s updraft can no longer support the weight of the hailstone, which can occur if the stone becomes large enough or the updraft weakens. Hail can be smaller than a pea or as large as a softball. Hail can damage property and harm people, pets, and livestock. Hail is also particularly destructive to plants and crops. Descriptions of hail sizes and typical damage impacts provided by the Tornado and Storm Research Organization are listed in the table below.

**Table 105. List Tornado and Storm Research Organization Hailstorm Intensity Scale**

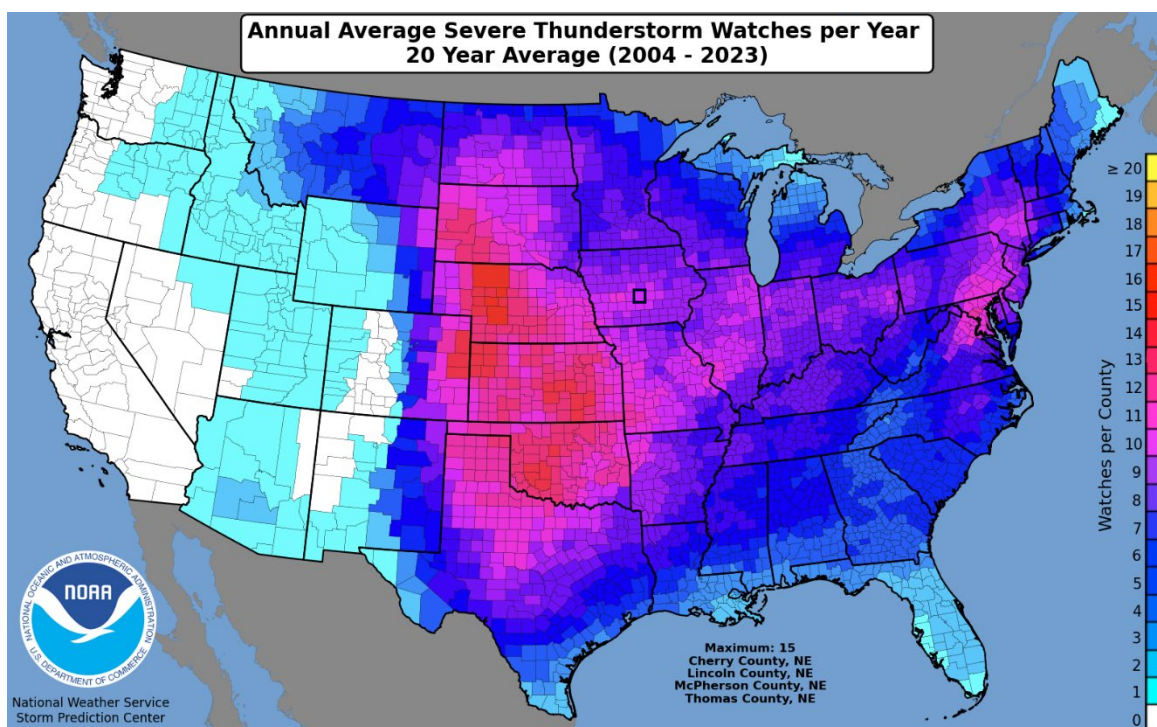
| Intensity Category   | Diameter (mm) | Diameter (inches) | Size Description           | Typical Damage Impacts                                                                           |
|----------------------|---------------|-------------------|----------------------------|--------------------------------------------------------------------------------------------------|
| Hard Hail            | 5-9           | 0.2-0.4           | Pea                        | No damage                                                                                        |
| Potentially Damaging | 10-15         | 0.4-0.6           | Mothball                   | Slight general damage to plants, crops                                                           |
| Significant          | 16-20         | 0.6-0.8           | Marble, grape              | Significant damage to fruit, crops, vegetation                                                   |
| Severe               | 21-30         | 0.8-1.2           | Walnut                     | Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored  |
| Severe               | 31-40         | 1.2-1.6           | Pigeon’s egg > squash ball | Widespread glass damage, vehicle bodywork damage                                                 |
| Destructive          | 41-50         | 1.6-2.0           | Golf ball > Pullet’s egg   | Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries              |
| Destructive          | 51-60         | 2.0-2.4           | Hen’s egg                  | Bodywork of grounded aircraft dented; brick walls pitted                                         |
| Destructive          | 61-75         | 2.4-3.0           | Tennis ball > cricket ball | Severe roof damage, risk of serious injuries                                                     |
| Destructive          | 76-90         | 3.0-3.5           | Large orange > Soft ball   | Severe damage to aircraft bodywork                                                               |
| Super Hailstorms     | 91-100        | 3.6-3.9           | Grapefruit                 | Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open |
| Super Hailstorms     | >100          | 4.0+              | Melon                      | Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open |

Source: Tornado and Storm Research Organization (TORRO) Note: In addition to hail diameter, factors including number and density of hailstones, hail fall speed and surface wind speeds affect severity.

#### 3.3.19.2 LOCATION

Severe thunderstorms are regular events in Iowa. On average, Iowa sees hundreds of severe thunderstorms and thousands of non-severe thunderstorms each year.<sup>42</sup> Thunderstorms (both severe and non-severe) can occur anywhere in the planning area, and Polk County jurisdictions are generally considered equally vulnerable to the hazard. In more densely developed urban areas, severe thunderstorms are especially likely to damage homes and cars simply due to the number of these assets which can be impacted. In rural areas, severe thunderstorms – particularly those which produce large hail -- can cause extensive damage to crops, and this can significantly reduce agricultural yields. Figure 108 illustrates the average number of severe thunderstorm watches issued annually by County, and Figure 109 shows the frequency of lightning strikes by County. Figure 110 shows the location of hailstorms in Polk County as documented by the NCEI.

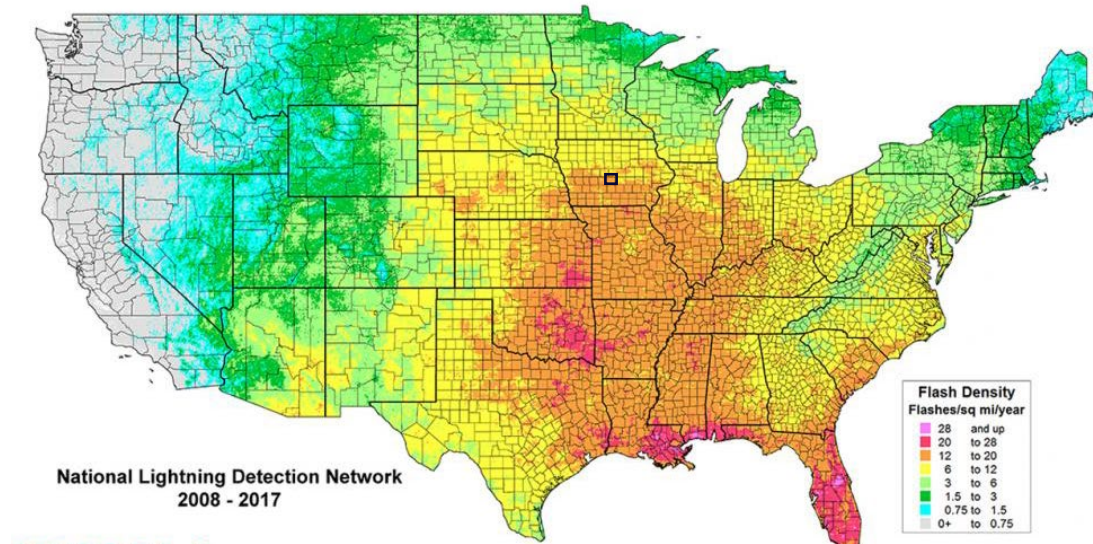
**Figure 108. Average Annual Number of Severe Thunderstorm Watches by County 2004-2023**



Note: Black Square indicates approximate location of Polk County

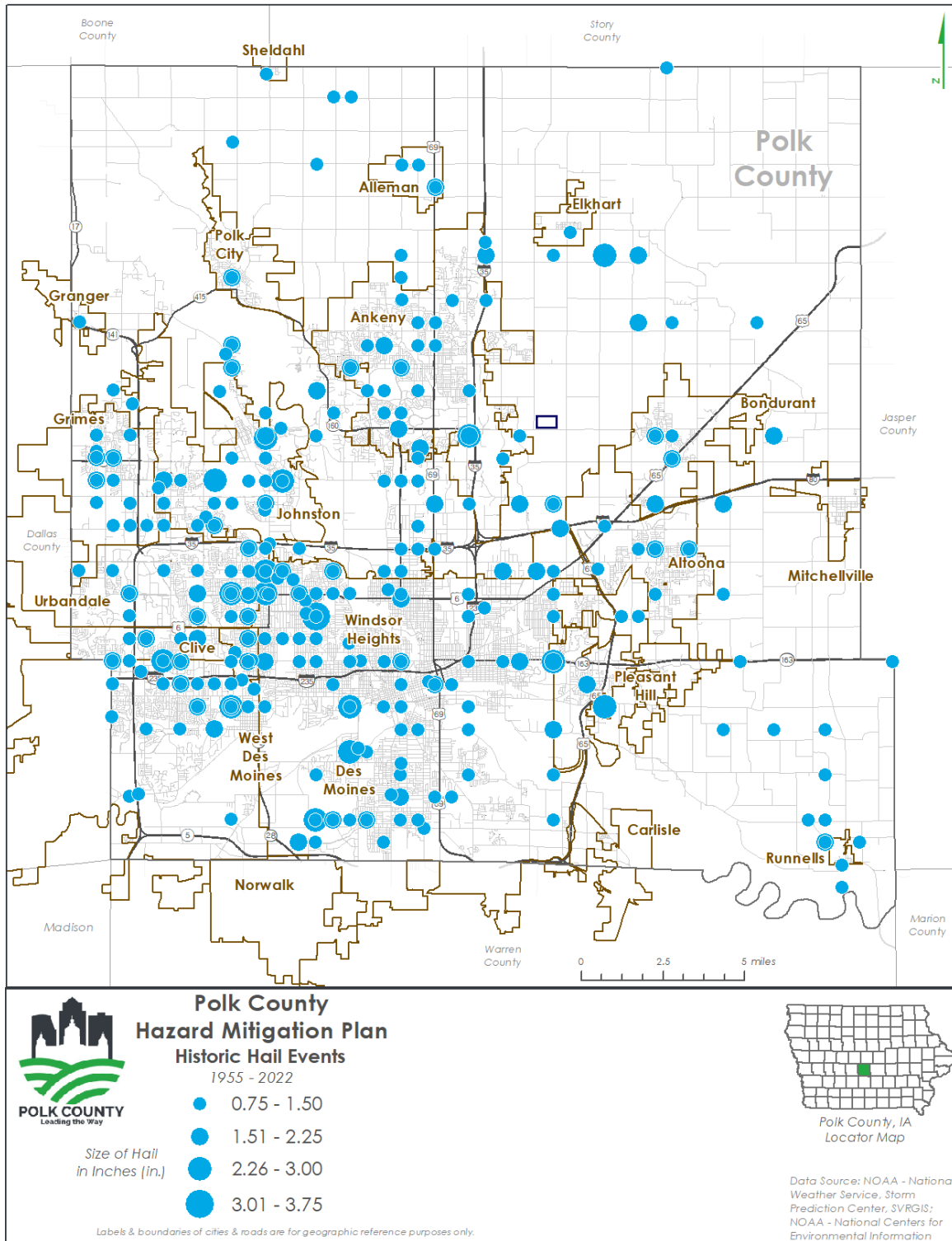
<sup>42</sup> Iowa Department of Homeland Security. "Severe Thunderstorms | READY IOWA." ready.iowa.gov, 2021.  
<https://ready.iowa.gov/severe-thunderstorms/>.

Figure 109. Frequency of Lightning in the U.S. 2008-2017



Note: Black Square indicates approximate location of Polk County

Figure 110. Hailstorm Events from 1955 – 2022 in Polk County, Iowa





### 3.3.19.3 EXTENT

Severe thunderstorms will typically affect an area for less than 60 minutes, although the storm system may exist for much longer than this. Severe thunderstorms are most common in the late spring and early summer months, but it is possible for them to occur at any point in the year as long as conditions are favorable. Severe thunderstorms can produce heavy rain which may lead to flash flooding, and lightning and hail can cause significant property damage. In rare instances, hail and lightning can result in injuries and death. According to the National Weather Service, lightning causes an average of 55-60 fatalities and 400 injuries annually.<sup>43</sup> However, there are no documented instances of lightning-related fatalities in Polk County. Hail – which can be as large as 7 inches in diameter and fall at speeds exceeding 100 mph – causes more than \$1 billion in crop and property damage each year.<sup>44</sup>

### 3.3.19.4 PREVIOUS OCCURRENCES

Since 1953, Polk County has been included in eleven presidential disaster declarations pertaining to severe storms (see Table 106). Some of the damages that resulted in the declarations were from windstorms that accompanied the severe weather.

**Table 106. Presidential Disaster Declarations for Severe Storms/Severe Weather that included Polk County (1953-2024)**

| Disaster Number | Description                                                 | Declaration Date (Incident Period)      | Individual Assistance (IA)<br>Public Assistance (PA) |
|-----------------|-------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|
| DR-4784         | Severe storms, tornadoes, and flooding                      | 05-24-2024<br>(05-20-2024 – 05-21-2024) | IA                                                   |
| DR-4557         | Severe storms                                               | 8-17-2020<br>(8-10-2020)                | IA & PA                                              |
| DR-4421         | Severe storms and Flooding                                  | 3-23-2019<br>(3-12-2019 to continuing)  | IA & PA                                              |
| DR-4386         | Severe Storms, Tornadoes, Straight-line winds, and Flooding | 8-20-2018<br>(6-6-2018 to 7-2-2018)     | PA                                                   |
| DR-1930         | Severe Storms, Flooding, & Tornadoes                        | 7-29-2010<br>(6-1-2010 to 8-31-2010)    | IA & PA                                              |
| DR-1763         | Severe Storms, Tornadoes, & Flooding                        | 5-27-2008<br>(5-25-2008 to 8-13-2008)   | IA & PA                                              |
| DR-1518         | Severe Storms, Tornadoes, & Flooding                        | 5-25-2004<br>(5-19-2004 to 6-24-2004)   | IA & PA                                              |
| DR-1230         | Severe Weather, Tornadoes, & Flooding                       | 7-2-1998<br>(6-13-1998 to 7-15-1998)    | IA & PA                                              |

<sup>43</sup> National Weather Service. “Thunderstorms, Tornadoes, Lightning... Nature’s Most Violent Storms.” weather.gov, June 25, 2010. <https://www.weather.gov/media/owlie/ttl6-10.pdf>.

<sup>44</sup> National Weather Service. “Thunderstorms, Tornadoes, Lightning... Nature’s Most Violent Storms.” weather.gov, June 25, 2010. <https://www.weather.gov/media/owlie/ttl6-10.pdf>.

|        |                        |                                      |         |
|--------|------------------------|--------------------------------------|---------|
| DR-996 | Flooding, Severe Storm | 7-9-1993<br>(4-13-1993 to 10-1-1993) | IA & PA |
| DR-868 | Flooding, Severe Storm | 5-26-1990<br>(5-18-1990 to 7-6-1990) | IA & PA |
| DR-443 | Flooding, Severe Storm | 6-24-1974<br>(6-24-1974)             | IA & PA |

Source: FEMA

Regarding lightning, there are 41 lightning events documented by the NCEI which occurred in Polk County between 1998 and April 2024. During this time period there were six lightning-related injuries and no lightning-related deaths. Reported property damages resulting from these events total \$1,756,000. There has been no reported lightning-related crop damage in Polk County according to data from the NCEI. Some of the more notable damaging lightning events are described in additional detail below. Information on these events is from NCEI:

- **May 8, 2022**—As storms moved across the Des Moines metro, a lightning strike is believed to have started a fire which caused significant damage to several condos.
- **August 20, 2019**—Emergency manager reported a house fire started by lightning.
- **May 1, 2018**—Public shared video of a lightning strike that resulted in setting a tree on fire and rupturing a gas line near Clive.
- **June 7, 2015**—Lightning struck a house in the early morning hours starting a fire in the garage and was soon fully engulfed in flames. The house was in a rural area of Polk County. The development also had no fire hydrants.
- **June 11, 2012**—As the thunderstorms moved through Bondurant, lightning struck a house setting it on fire.
- **August 18, 2010**—Lightning caused a house fire in Ankeny.
- **June 12, 2010**—Lightning struck a business in Runnells. Bakeris Roofing was struck and set on fire. The fire took eight fire departments two hours to put out the fire and the business was destroyed.
- **February 26, 2009**—Lightning struck an overpass along Interstate 80/35 along the north side of the Des Moines metro area and knocked a chunk of concrete off it. The concrete fell onto the windshield of a moving van, smashing through the glass. The driver was injured and admitted to the hospital with minor injuries.
- **August 7, 2007**—Lighting struck a house in Urbandale causing damage.
- **April 20, 2004**—Lightning struck a large multi-bay garage at a condominium complex in West Des Moines that caused \$15,000 in estimated damages.
- **April 8, 2001**—Lightning caused a house fire in Johnston, and it was completely burned to the ground.
- **August 8, 2000**—Lightning struck a clubhouse at a recreational facility in Grimes. The clubhouse was set on fire and was a total loss.

Hail: The NCEI reports 574 hail events in Polk County between 1994 and April 2024 causing \$15,156,500 in property damages and \$847,000 in crop damages. There are no injuries or deaths associated with any of these events. Table 107 shows the number of hail events documented by the NCEI by the size of the hail.



Table 107. Hail Events Summarized by Hail Size

| Hail Size (inches) | Number of Events 1994- 2024 |
|--------------------|-----------------------------|
| 3.25               | 1                           |
| 3.00               | 3                           |
| 2.75               | 6                           |
| 2.50               | 3                           |
| 2.00               | 17                          |
| 1.75               | 68                          |
| 1.50               | 33                          |
| 1.25               | 28                          |
| 1.00               | 219                         |
| 0.88               | 107                         |
| 0.80               | 1                           |
| 0.75               | 87                          |
| 0.52               | 1                           |
| <b>Total</b>       | <b>574</b>                  |

Source: National Climatic Data Center

Some of the more notable damaging hail events are described in additional detail below. Information on these events is from NCEI:

- **July 9, 2021**—The largest documented hail in Polk County occurred. Social media showed 3.25-inch hail near Beaverdale neighborhood.
- **May 16, 2019**—The local media reported hail caused damage to the roofs of Hoover High School and Meredith Middle School, making some spaces unusable. Some classes had to be moved, and some of the classes were dismissed early on Friday for repairs to be made. Some of the classrooms were flooded as well.
- **May 8, 2014**—Polk County experienced widespread hail ranging in sizes from 2.75 to 1.00 inch in diameter causing an estimated \$561,000 in property damages
- **June 9, 2011**—Polk County experienced hail ranging in sizes from 1.75 to .88 inch in diameter causing an estimated \$211,000 in property damages.
- **July 14, 2009**—The cities of Johnston, Grimes, Polk City and Des Moines experienced hail ranging in sizes from 3.00 to 1.00 inch in diameter causing an estimated \$351,000 in property damages. The 3.00-inch diameter hail is the largest size hail recorded for Polk County during this timeframe.
- **May 25, 2008**—The cities of Ankeny, Des Moines, and Bondurant experienced hail ranging in sizes from 1.75 to .88 inch in diameter causing an estimated \$56,000 in property damages.
- **March 30, 2006**—The Des Moines metropolitan area experienced an early spring thunderstorm with hail ranging in sizes from 2.00 to .88 inch in diameter causing an estimated \$145,000 in property damages.
- **June 12, 2001**—On this day, the Des Moines metropolitan area got hit with record hail ranging in sizes from 2.75 to 1.00 inch in diameter causing over \$10 million in property damages.

- **May 19, 1998**—The cities of Runnells, Ankeny, Johnston, and Clive reported hail ranging in size from 1.75 to .75 inch in diameter causing an estimated \$408,050 in property damages.

The National Weather Service will issue a Severe Thunderstorm Watch when severe thunderstorms are considered possible in and near the area covered by the issued watch. A Severe Thunderstorm Warning will be issued when a severe thunderstorm has been reported by trained spotters or indicated by radar. Table 108 shows the number of Severe Thunderstorm Watches and Warnings issued by NOAA's National Weather Service Des Moines Weather Forecast Office between 2005 and 2022.

Table 108. Severe Thunderstorm Watch and Warning Issuance in Polk County 2005-2022

| Year         | Severe Thunderstorm Watches | Severe Thunderstorm Warnings |
|--------------|-----------------------------|------------------------------|
| 2022         | 8                           | 12                           |
| 2021         | 4                           | 13                           |
| 2020         | 9                           | 12                           |
| 2019         | 7                           | 26                           |
| 2018         | 8                           | 25                           |
| 2017         | 7                           | 20                           |
| 2016         | 6                           | 8                            |
| 2015         | 4                           | 9                            |
| 2014         | 4                           | 18                           |
| 2013         | 11                          | 8                            |
| 2012         | 5                           | 19                           |
| 2011         | 9                           | 30                           |
| 2010         | 23                          | 25                           |
| 2009         | 13                          | 22                           |
| 2008         | 15                          | 54                           |
| 2007         | 15                          | 18                           |
| 2006         | 12                          | 15                           |
| 2005         | 0                           | 17                           |
| <b>Total</b> | <b>132</b>                  | <b>288</b>                   |

Source: NOAA's National Weather Service Des Moines Weather Forecast Office

#### 3.3.19.5 PROBABILITY OF FUTURE OCCURRENCE

Data from the NCEI on lightning and hail events in Polk County, as well as the Iowa Department of Homeland Security stating that there are hundreds of severe thunderstorms in Iowa each year, indicates that the probability of this hazard impacting Polk County in any given year is “highly likely.” This is further supported by the number of past Severe Thunderstorm Warnings issued by the National Weather Service. Between 2005 and 2022 an average of 16 Severe Thunderstorm Warnings were issued for parts of Polk County each year (288 warnings over 18 years).

#### 3.3.19.6 VULNERABILITY

Thunderstorms with lightning and hail can develop anywhere in Polk County, and all jurisdictions are considered equally vulnerable to the hazard. The potential impacts of thunderstorms with lightning and hail on specific community lifelines are described in the following table.

Table 109. Potential Impacts of Thunderstorms with Lighting and Hail on Community Lifelines

| Lifelines                  | Impact Type                                                                         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Water & Wastewater Systems |    | Thunderstorms and hail can often lead to excessive rainfall and overwhelm drainage systems or other water systems. A potential to causes erosion to the environment causing sediment contamination seepage into utility operations such as wastewater and water treatment plants is also likely.                                                                                                                                                     |
| Food, Shelter, & Housing   |   | Thunderstorms and hail often lead to heavy rainfalls that can damage homes, displacing residents from their homes. Hail, if large enough, can damage crops and impact agriculture production. This can lead to reduced yields, economic losses for farmers, and potential food shortages. Thunderstorms often create power outages which impact essential electrical components that are critical for many residents' quality of life and wellbeing. |
| Energy                     |  | Power outages are common following thunderstorms and hail due to damage to power stations and distribution lines. This can affect not only homes and businesses but also critical facilities like hospitals and emergency response centers.                                                                                                                                                                                                          |
| Safety & Security          |  | Thunderstorms and hail can be particularly dangers to any resident outside during the onset of a storm due to the risk of physical damage to hail, electrocution from lighting strikes, risk to flashfloods, and damage or injury from high winds. Secondary impacts can include communication interruptions, impacted response from first responders, and transportation interruptions.                                                             |
| Transportation             |  | Thunderstorms and hailstorms can damage roads, bridges, and public transportation systems, impeding mobility and rescue efforts. Restoring transportation is vital for response operations and for the community to begin returning to normalcy. Restoration to the                                                                                                                                                                                  |

|  |  |                                                                              |
|--|--|------------------------------------------------------------------------------|
|  |  | transportation systems can potentially take weeks to restore back to normal. |
|--|--|------------------------------------------------------------------------------|

A) People

Certain groups and individuals are more vulnerable to the impacts of thunderstorms and hailstorms due to various factors. Vulnerability is often influenced by socioeconomic, geographical, and demographic factors. Particularly vulnerable population include elderly who rely on electrical medical equipment, low-income populations who don't have the means to prepare for or recover from these storms, homeless populations who are unable to take more substantial shelter from the storms, and communities located in low-lying and flood prone areas.

B) Structures

Thunderstorms and hail can impact structures in various ways, presenting risks ranging from direct strikes to indirect effects. Direct lightning strikes can cause structural damage, fires, or electrical system failures, posing immediate threats to buildings. Additionally, lightning strikes can ignite fires in nearby vegetation or materials, exacerbating the risk of damage or destruction. Electrical damage from lightning can lead to power surges, equipment malfunction, or electrical fires within structures. Structural damage can also result from thunderstorms with strong winds, hail, or heavy rain, causing roof damage, window breakage, or flooding. Even without direct damage, thunderstorms can disrupt utilities and transportation, hindering access to affected areas and complicating emergency response efforts.

C) Systems

Power grids are vulnerable to damage from thunderstorms, resulting in power outages that disrupt lighting, heating, and medical equipment. Water and wastewater systems may face overflow and contamination issues due to intense rainfall. Transportation infrastructure can be damaged, leading to road closures and hindering emergency response services. Communication networks may experience disruptions, affecting the dissemination of critical information. Emergency services, healthcare facilities, and schools can be strained, impacting their ability to respond and provide essential services. Critical infrastructure, including government facilities and communication towers, is susceptible to damage. Businesses and industries may suffer disruptions, affecting employment and economic activities. Emergency shelters and evacuation centers must be prepared to accommodate displaced individuals. To mitigate these impacts, communities should invest in resilient infrastructure, develop comprehensive emergency response plans, and prioritize measures to protect key facilities. Regular maintenance, early warning systems, and community preparedness efforts are crucial for enhancing the overall resilience of critical systems in the face of severe weather events.

D) Natural, Historic, and Cultural Resources

Thunderstorms and hail storms can exert profound impacts on natural, historic, and cultural resources across various dimensions. These weather events pose threats to natural ecosystems, causing vegetation damage, soil erosion, and habitat disruption. Historic sites and structures face structural damage, erosion, and deterioration due to hail and intense rainfall, affecting the preservation of architectural heritage. Cultural resources, including artifacts and collections in museums, are at risk of water damage and humidity-related issues. Archaeological sites may suffer from exposure and damage during severe weather events. Wildlife in natural habitats can be disrupted, with flooding and habitat destruction impacting breeding and nesting sites. Recreational areas, including parks and trails, may experience damage, affecting outdoor spaces and visitor experiences. Agricultural lands are vulnerable to crop loss, impacting both farmers and the food supply chain. Water bodies and forest ecosystems face challenges such as sedimentation, affecting water quality and biodiversity.

#### E) Community Activities

Thunderstorms and hailstorms can significantly impact a range of community activities, disrupting normal routines and creating challenges across social, recreational, and economic spheres. Outdoor events, festivals, and recreational activities often face cancellations or postponements to ensure participant safety. Social gatherings, community meetings, and festivals may be rescheduled, affecting local businesses and community spirit. Public services such as transportation and schools may experience disruptions, and community facilities like parks and recreational areas might temporarily close for safety reasons. Economic activities, especially in outdoor industries like construction and agriculture, can be interrupted, leading to economic losses. School closures due to thunderstorms affect education and childcare arrangements, impacting parents and educators.

#### Existing Development

Most lightning damages occur to electronic equipment located inside buildings. But structural damage can also occur when a lightning strike causes a building fire. In addition, lightning strikes can cause damages to crops if fields light on fire. Communications equipment and warning transmitters and receivers can also be knocked out by lightning strikes. Hail can cause extensive property damage – windows may be shattered, roofing and siding can be punctured or dented, and wood may splinter.

#### Future Development

Current development trends for Polk County are likely to increase vulnerability to severe thunderstorms and the accompanying lightning and hail. Additional development means more households and businesses vulnerable to damages from severe thunderstorms, lightning and hail.

#### Climate Change

Climate change is influencing the dynamics of thunderstorms, lightning, and hailstorms in Polk County, Iowa. The rising temperatures associated with climate change contribute to increased atmospheric instability, fostering the development of more frequent and intense thunderstorms with strong updrafts and potential severe weather events. Altered precipitation patterns, a consequence of climate change, affect the distribution and intensity of rainfall within thunderstorms, potentially leading

to localized heavy rainfall and an elevated risk of flash floods. Changes in atmospheric conditions may impact lightning activity, with warmer air potentially contributing to more frequent lightning strikes during thunderstorms. The conditions conducive to hailstorm formation are also influenced by climate change, as warmer surface temperatures combined with cooler air aloft may create an environment favoring larger hailstones and more intense hailstorms. Additionally, climate change can affect storm tracks, potentially altering the geographic distribution of these weather phenomena in Polk County.

Hazard Ranking Score

Table 110. Thunderstorm, Lightning, and Hail Probability and Health Impact Ratings

| Health Severity | Community Impact | Public Health System Impact | Healthcare System Impact | Total Health Hazard Score | Probability   |
|-----------------|------------------|-----------------------------|--------------------------|---------------------------|---------------|
| 2               | 1                | 1                           | 1                        | 5                         | Highly Likely |

3.3.20 TORNADO

3.3.20.1 DESCRIPTION

The NWS defines a tornado as a violently rotating column of air extending from a thunderstorm to the ground. The exact mechanics behind tornado generation are still not fully understood, but they broadly result from powerful thunderstorms or supercells, which are created by the contrast of warm, moist air, to the south, and cool, dry air, to the north. Often, vortices remain suspended in the atmosphere as funnel clouds. When the lower tip of a vortex touches the ground, it becomes a tornado.

Generally, the destructive path of a tornado is only a couple hundred feet in width, but stronger tornadoes can leave a path of devastation up to a mile or two wide. Usually, a tornado will stay on the ground for no more than 20 minutes, although a tornado can touch ground several times in different areas. Large hail, strong straight-line winds, heavy rains, flash flooding, and lightning are also associated with severe, tornado-producing storms and may cause significant damage to a wider area. Injury or death related to tornadoes most often occurs when buildings collapse; people are hit by flying objects or are caught trying to escape a tornado in a vehicle.

High winds not associated with tornadoes are profiled separately in this document in a separate section.

3.3.20.2 LOCATION

Iowa is typically considered to be part of the tornado-prone region of the U.S. often called “Tornado Alley”. The region’s boundaries can vary slightly depending on the source, but Tornado Alley most often consists of Texas, Oklahoma, Kansas, Missouri, Nebraska, and Iowa. Tornadoes can occur throughout the state, and they can impact both urban and rural areas. Tornadoes most frequently occur during the months of April, May, and June, but it is possible for them to occur in any month of the year. Tornadoes are possible in all portions of Polk County.



#### 3.3.20.3 EXTENT

Tornadoes are among the most violent atmospheric storms and are capable of tremendous destruction. Wind speeds can exceed 250 miles per hour, and damage paths can be more than one mile wide and 50 miles long. Tornadoes have been known to lift and move objects weighing more than 300 tons a distance of 30 feet, toss homes more than 300 feet from their foundations, and siphon millions of tons of water from water bodies. Tornadoes also generate a tremendous amount of flying debris or “missiles,” which often become airborne shrapnel that causes additional damage. If wind speeds are high enough, missiles can be thrown at a building with enough force to penetrate windows, roofs, and walls. However, the less spectacular damage is much more common.

Tornadoes are classified according to the EF- Scale (the original F – Scale was developed by Dr. Theodore Fujita, a renowned severe storm researcher). This update to the original F scale was implemented in the U.S. on February 1, 2007. The Enhanced Fujita scale is similar to the original scale but takes into account the quality of construction and standardizes different kinds of structures. The wind speeds for the EF scale and damage descriptions in Table 92 are based on information from the National Oceanic and Atmospheric Administration Storm Prediction Center.

**Table 111 – The Enhance Fujita Scale**

| Scale | Wind Speed (mph) | Relative Frequency | Potential Damage Description                                                                                                                                                                                                                                                                 |
|-------|------------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EF0   | 65-85            | 53.5%              | Light. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over. Confirmed tornadoes with no reported damage (i.e. those that remain in open fields) are always rated EF0).                                               |
| EF1   | 86-110           | 31.6%              | Moderate. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.                                                                                                                                                         |
| EF2   | 111-135          | 10.7%              | Considerable. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes complete destroyed; large trees snapped or uprooted; light object missiles generated; cars lifted off ground.                                                                         |
| EF3   | 136-165          | 3.4%               | Severe. Entire stores of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.                              |
| EF4   | 166-200          | 0.7%               | Devastating. Well-constructed houses and whole frame houses completely levelled; cars thrown, and small missiles generated.                                                                                                                                                                  |
| EF5   | >200             | <0.1%              | Explosive. Strong frame houses levelled off foundations and swept away; automobile-sized missiles fly through the air in excess of 300 ft.; steel reinforced concrete structure badly damaged; high rise buildings have significant structural deformation; incredible phenomena will occur. |

Source: NOAA Storm Prediction Center

Information on the Enhanced Fujita Scale’s damage indicators and degrees of damage is located online at [www.spc.noaa.gov/efscale/ef-scale.html](http://www.spc.noaa.gov/efscale/ef-scale.html).

The advancement in weather forecasting has provided for the ability to predict severe weather that is likely to produce tornadoes days in advance. Tornado watches can be delivered to those in the

path of these storms several hours in advance. Lead time for actual tornado warnings is about 30 minutes. Tornadoes have been known to change paths very rapidly, thus limiting the time in which to take shelter. Tornadoes may not be visible on the ground if they occur after sundown or due to blowing dust or driving rain and hail.

3.3.20.4 PREVIOUS OCCURRENCES

Historically, 40 - 50 tornadoes are confirmed in Iowa per year. The majority of tornadoes are rated F/EF-0 and F/EF-1, and F/EF-5 tornadoes are exceedingly rare. Data from the 2023 Iowa Hazard Mitigation Plan indicates that less than 1% of tornadoes which impact Iowa are rated F/EF-4 or F/EF-5. According to the National Weather Service, there have only been 6 F/EF-5 tornadoes to hit Iowa since 1871, and only 1 of them occurred within the last 40 years (2008 Parkersburg tornado).

According to statistics reported by the National Centers for Environmental Information, Polk County had 49 recorded tornado events from 1980 to 2024. Of these, 1 was rated F/EF-4, 7 rated F/EF-2, 13 rated F/EF-1, and 28 rated F/EF-0 or not rated. These tornadoes caused no fatalities, a combined 99 injuries, over \$96 million in property damages, and \$102,200 in crop damages. A significant majority of the property damage resulting from tornado damage in Polk County came from one event in 2022. On March 5, 2020, an EF-2 tornado travel approximately 13.62 miles and caused an estimated \$75,000,000 in damage.

On April 26, 2024, a series of severe storms spawned at least 19 tornadoes across Iowa. Assessment of the event was still ongoing as this plan was finalized, and these events have not yet been added to the database from which the table below was generated. Preliminary reports found that the storm created one tornado in Pleasant Hill, with estimated peak winds of 125 mph and rating of EF-2.

Table 112. Tornadoes in Polk County 1980-2023 by F/EF Rating

| Enhanced Fujita Scale Rating | Number of Tornadoes | Property Damage | Crop Damage | Injuries | Deaths |
|------------------------------|---------------------|-----------------|-------------|----------|--------|
| F/EF-0                       | 28                  | \$110,750       | \$2,700     | 0        | 0      |
| F/EF-1                       | 13                  | \$1,440,000     | \$20,000    | 1        | 0      |
| F/EF-2                       | 7                   | \$92,785,000    | \$79,500    | 98       | 0      |
| F/EF-3                       | 0                   | 0               | 0           | 0        | 0      |
| F/EF-4                       | 1                   | \$2,500,000     | 0           | 0        | 0      |

|        |   |   |   |   |   |
|--------|---|---|---|---|---|
| F/EF-5 | 0 | 0 | 0 | 0 | 0 |
|--------|---|---|---|---|---|

Table 113. Damage Caused by Tornadoes in Polk County 1980-2023

| Total Property Damage | Total Crop Damage | Total Injuries | Total Deaths |
|-----------------------|-------------------|----------------|--------------|
| \$96,835,750          | \$102,200         | 99             | 0            |

Polk County has been included in seven presidential disaster declarations that involved tornadoes since 1953. The date of declaration, disaster number, and descriptions of these events are provided below in Table 114.

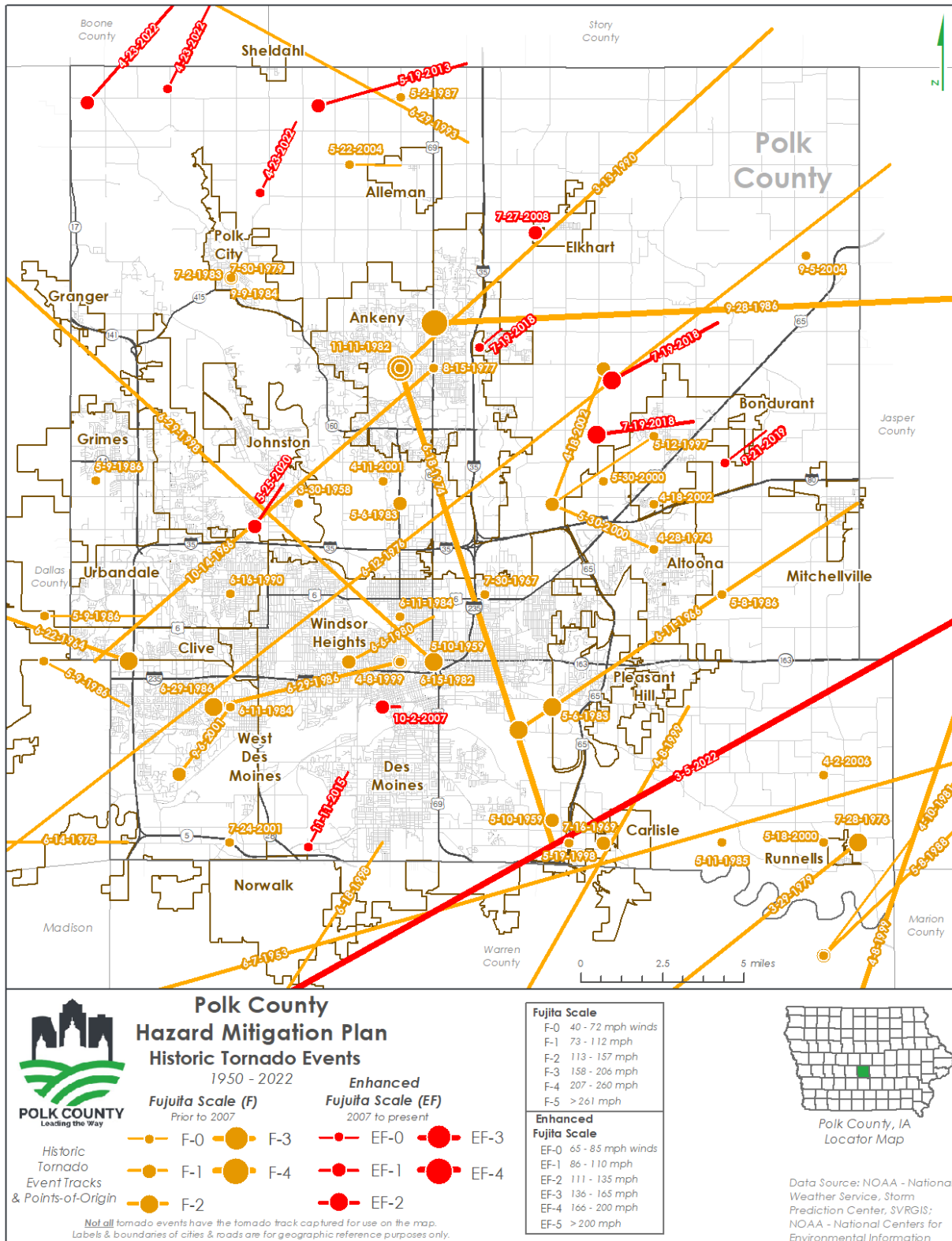
Table 114. FEMA Disaster Declarations Pertaining to Tornadoes in Polk County

| Disaster Number | Date of Disaster Declaration | Disaster Description                                                                                                                                                                                                                                                                                                                                |
|-----------------|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4386            | 5/24/2024                    | Strong tornadoes impacted communities in the state of Iowa, with multiple reported fatalities.                                                                                                                                                                                                                                                      |
| 4779            | 05/14/2024                   | I strong tornadoes impacted communities in the state of Iowa, with multiple reported fatalities. The President approved a Major Disaster Declaration on May 14,                                                                                                                                                                                     |
| 4386            | 08/20/2018                   | In July 2018, an outbreak of tornadoes swept across Central Iowa, three touched down in Polk County. In total, 76 properties were damaged: 49 residential properties and 3 public facilities were assessed with minor damage, 19 residential and one commercial property were assessed with major damage, and 4 homes were classified as destroyed. |
| 1930            | 07/29/2010                   | Severe storms, flooding, & tornadoes resulted in damages in Polk County.                                                                                                                                                                                                                                                                            |
| 1763            | 05/27/2008                   | The primary damages in Polk County associated with this declaration were for severe storms and flooding. However, an EF1 tornado touched down southwest of Elkhart on July 27 <sup>th</sup> . The tornado damaged two houses and caused considerable tree damage. Parts of the house were blown up into the trees.                                  |



|      |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1518 | 05/25/2004 | The primary damages in Polk County associated with this declaration were for severe storms and flooding. However, on May 22, 2004, a F0 tornado touched down in Alleman. No damages were reported.                                                                                                                                                                                                                                                                                                         |
| 1230 | 07/02/1998 | On June 29 <sup>th</sup> , a complex weather situation occurred over much of central and southern Iowa. Many places reported winds over 80 mph with incredible tree damage and numerous buildings damaged or destroyed. At least 38 counties were declared disaster areas by the Federal Government due to the severe damage and flooding. An F2 tornado touched down in Grimes. But most of the damage appeared to be from straight line winds based on a storm survey that was done following the event. |

Figure 111. Polk County Map of Historic Tornado Events, 1950-2022



2024 Tornadoes

Polk County experienced multiple tornadoes during April and May 2024. These tornadoes were occurred as part of a two larger tornado outbreaks which impacted the State of Iowa on April 26 and May 21. During the first outbreak, it is known that an EF-2 tornado touched down in southern Des Moines and moved in a notheast direction, impacting the community of Pleasant Hill. This tornado lifted just as it was reaching the southern end of the City of Altoona. During the second outbreak, an EF-2 tornado touched down near the City of Johnston and traveled in a northeastern direction for approximately 41 miles. This tornado passed by the communities of Polk City, Ankeny, and Alleman before moving into Story County. Due to the recency of these tornadoes, assessments are still ongoing. Since these events are not yet documented in the NCEI Storm Events Database they are not included in Table 112, Table 113, and Figure 111, and they are not factored into the assessment of the probability of future occurrences.

3.3.20.5 PROBABILITY OF FUTURE OCCURRENCE

According to data provided by the National Centers for Environmental Information, there have been 49 reported tornadoes in Polk County in a 44 year time period, which averages out to more than one tornado per year. However, only 24 of the 44 years between 1980 and 2024 were years with recorded tornadoes, and this is an indication that tornadoes have often occurred in clusters in Polk County. With tornadoes occuring in more than 50% of the years since 1980, it is “highly likely” that some portion of Polk County will experience tornado activity in any given year.

3.3.20.6 VULNERABILITY AND IMPACTS

Tornadoes can occur anywhere in Polk County, and all jurisdictions in the county are considered equally vulnerable to the hazard. The potential impacts of tornadoes on specific community lifelines are shown in the table below.

Table 115. Potential Impacts of Tornadoes on Community Lifelines

| Lifelines         | Impact Type                                                                         | Description                                                                                                                                                                                                                 |
|-------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Safety & Security |  | Immediate threats to life and property necessitate rapid emergency response, including search and rescue operations, medical assistance, and maintaining public order to prevent looting or other crimes in affected areas. |

| Lifelines                         | Impact Type                                                                         | Description                                                                                                                                                                                                                                               |
|-----------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Health & Medical                  |    | Tornadoes can cause injuries ranging from minor to severe, placing a sudden demand on healthcare facilities. Hospitals and clinics must be prepared for an influx of patients and possible damages to their own infrastructure.                           |
| Housing & Building Infrastructure |    | Tornadoes can cause significant damage to homes, businesses, and public buildings, leading to displacement of residents and the need for temporary shelters and long-term rebuilding efforts.                                                             |
| Utilities                         |   | Tornadoes can disrupt essential services by damaging power lines, water mains, and communication networks. Restoring these services is crucial for recovery and supporting other lifeline sectors.                                                        |
| Transportation                    |  | Damage to roads, bridges, and transportation infrastructure can hinder emergency response efforts and the movement of goods and people. Clearing debris and repairing infrastructure are critical post-tornado activities.                                |
| Economic Stability                |  | The economic impacts of tornadoes include the costs of emergency response, rebuilding, and the broader effects of property destruction and business interruptions. Insurance claims and financial assistance play significant roles in economic recovery. |

#### A) People

Those most at risk from tornadoes include people living in mobile homes, campgrounds and other dwellings without secure foundations or basements. People in automobiles are also very vulnerable to twisters. The elderly, very young, and the physically and mentally handicapped are most vulnerable because of the lack of mobility to escape the path of destruction. People who may not



understand watches and warnings due to language barriers are also at risk. Additionally, individuals who live in remote areas may be less likely to hear or receive warnings about tornadoes, and it be more difficult to for emergency services to reach these individuals following a tornado strike.

#### B) Structures

In terms of the built environment, mobile homes are consistently identified as structures which are especially vulnerable to tornadoes (and high winds in general). Although it is not uncommon for these structures to utilize lightweight construction, mobile homes are vulnerable to tornadoes mainly because they lack the robust anchoring used for permanent structures. Furthermore, mobile homes typically do not have attached basements which can serve as shelters in the event of a tornado. According to the National Weather Service, approximately 40% of all tornado-related fatalities occur in mobile homes. Additionally, individuals are 15-20 times more likely to lose their life in a tornado compared to individuals in permanent structures hit by tornadoes. Due to the vulnerability of mobile homes, the National Weather Service does not recommend that mobile home residents stay in their home during a tornado. Instead, the National Weather Service recommends that these individuals take shelter in the community storm shelters which are usually found in mobile home parks.

Additionally, structures often associated with agriculture sometimes utilize light-weight construction that is vulnerable to tornadoes. Types of structures which may fall into this category include machine sheds, barns, and grain silos. These structures may also contain various items which can easily become airborne projectiles, and they should not be used as a shelter from tornadoes.

#### C) Systems

Tornadoes can damage or disrupt many of the systems that communities often rely upon, including emergency services, electricity, and internet connectivity. Downed power lines can be both a hazard and an obstacle for victims and first responders. Strong tornadoes and windstorms can also directly damage roads, bridges, and transportation infrastructure, and this may further hinder emergency response efforts and the movement of goods and people. There are also multiple rail corridors passing through Polk County, and strong tornadoes are capable of damaging railroad infrastructure. Any trains which happen to be in the path of a tornado could be derailed, and this could have serious consequences if hazardous materials are being transported.

#### D) Natural, Historic, and Cultural Resources

Tornadoes and windstorms can damage virtually all structures in Polk County, including sensitive natural, historic, and cultural resources. Historic structures may be particularly vulnerable to these events if they were built prior to the widespread adoption of building codes and regulations. Any suspected damage would likely need to be thoroughly inspected, and the time required to do this could have negative impacts on the local economy.

#### E) Community Activities

Tornadoes and windstorms have the potential to disrupt community events across Polk County. Both outdoor and indoor events may be cancelled or postponed if there is a sufficient risk of tornadic activity or high winds in the day’s forecast, although these events are often difficult to accurately predict. Any structures which are impacted by a tornado or high winds may be destroyed or damaged to the point where the structural integrity needs to be evaluated before further use.

Existing Development

To estimate vulnerability to tornadoes, a potential tornado scenario was analyzed for each jurisdiction in the planning area. The scenario chosen was an F1/EF1 tornado with wind speed of approximately 100 mph. From the NCEI reports, it was determined that there have been 10 F1 tornadoes in Polk County since 1980. Of these 10 reported tornadoes, the average width was 50 yards and the average length was 3 miles.

To provide estimated damage results from an F1/EF1 tornado with these dimensions, a hypothetical tornado track was considered at a 45 degree angle running through the approximate center of each jurisdiction in the planning area. For Unincorporated Polk County and the incorporated cities, the parcel data provided by the Des Moines Area Regional GIS Partnership was utilized as the basis for determining damage estimates. Separate analyses were not conducted for the public school districts. Since the public school districts have a relatively small number of buildings, it was not possible to apply this same type of random tornado path scenario to provide meaningful results.

With the infinite variables associated with tornado occurrences such as wind speed, direction, length, width, time on the ground, etc., it is not possible to accurately estimate future losses. However, this methodology provides loss estimates for a defined scenario. Utilizing GIS data with associated building values considers variations in density of the built environment as well as variations in values. Although it is not possible to accurately predict tornado losses, this analysis demonstrates how the impacts of specific tornado scenario would vary among jurisdictions in Polk County.

Once the number and values of buildings within the hypothetical tornado track were determined, a 10% damage calculation was made. This damage percent is based on information from the NOAA Storm Prediction Center, which estimates that a F1/EF1 tornado of this magnitude would severely strip roofs; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.

Table 116 provides the results of the analysis in terms of the number and value of buildings in the scenario tornado path and estimated losses in Polk County. A planning area total was not calculated as this scenario is not meant to indicate that these damages would occur simultaneously.

Table 116 - F/EF 1 Tornado Scenario Loss Estimates for Jurisdictions in Polk County

| Jurisdiction            | # of Parcels in Path | Total Building Values in Path | 10% Loss Estimate |
|-------------------------|----------------------|-------------------------------|-------------------|
| Unincorporated Polk Co. | 152                  | \$16,834,660                  | \$1,683,466       |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

| Jurisdiction            | # of Parcels in Path | Total Building Values in Path | 10% Loss Estimate    |
|-------------------------|----------------------|-------------------------------|----------------------|
| City of Alleman         | 32                   | \$4,963,880                   | \$496,388            |
| City of Altoona         | 75                   | \$93,963,110                  | \$9,396,311          |
| City of Ankeny          | 729                  | \$272,097,878                 | \$27,209,788         |
| City of Bondurant       | 122                  | \$57,621,110                  | \$5,762,111          |
| City of Carlisle        | 19                   | \$741,010                     | \$74,101             |
| City of Clive           | 137                  | \$111,876,600                 | \$11,187,660         |
| Delaware Township       | 200                  | \$49,420,930                  | \$4,942,093          |
| City of Des Moines      | 1,472                | \$256,292,710                 | \$25,629,271         |
| City of Elkhart         | 102                  | \$10,800,670                  | \$1,080,067          |
| City of Granger         | 4                    | \$246,480                     | \$24,648             |
| City of Grimes          | 181                  | \$47,386,400                  | \$4,738,640          |
| City of Johnston        | 195                  | \$148,488,210                 | \$14,848,821         |
| City of Mitchellville   | 67                   | \$9,425,960                   | \$942,596            |
| City of Pleasant Hill   | 55                   | \$8,110,540                   | \$811,054            |
| City of Polk City       | 171                  | \$39,019,910                  | \$3,901,991          |
| City of Runnells        | 25                   | \$1,694,270                   | \$169,427            |
| Saylor Township         | 196                  | \$66,517,570                  | \$6,651,757          |
| City of Sheldahl        | 17                   | \$2,009,290                   | \$200,929            |
| City of Urbandale       | 256                  | \$270,897,900                 | \$27,089,790         |
| City of West Des Moines | 556                  | \$247,856,890                 | \$24,785,689         |
| City of Windsor Heights | 182                  | \$50,608,400                  | \$5,060,840          |
| <b>Totals</b>           | <b>4,945</b>         | <b>\$1,766,874,378</b>        | <b>\$176,687,438</b> |

For those cities in which only a portion of their boundary is within Polk County, only Polk County parcels and values were included in the results

The City of Des Moines would have the highest number of buildings impacted and the third highest dollar losses. The City of West Des Moines has the highest total building values in this scenario path. This is expected due to the high building density in City of West Des Moines and it being one of wealthiest cities in Iowa.

#### Future Development

Vulnerability to tornadoes is likely to increase in the planning area as both the population and urban fabric of Polk County continues to grow. Public buildings such as schools and government offices as well as mobile home parks and high-occupancy structures should consider inclusion of a tornado shelter to protect occupants in the event of a tornado. Additionally, future development of structures utilizing light-weight construction such as mobile homes should be carefully planned to ensure that occupants of these dwellings will have quick access to shelters which are adequately designed to protect lives when a tornado strikes.

#### Climate Change

There is ongoing research of the dynamics between climate change and tornadic activity. Establishing a connection between the two phenomena is particularly difficult as the formation of tornadoes is still not fully understood. Polk County is encouraged to monitor this field for any forthcoming developments.

Hazard Risk Score

Table 117. Tornado Probability and Health Impact Ratings

| Health Severity | Community Impact | Public Health System Impact | Healthcare System Impact | Total Health Hazard Score | Probability   |
|-----------------|------------------|-----------------------------|--------------------------|---------------------------|---------------|
| 1               | 3                | 3                           | 2                        | 9                         | Highly Likely |

3.3.21 TRANSPORTATION INCIDENT

3.3.21.1 DESCRIPTION

This hazard encompasses the following: air transportation, highway transportation, railway transportation, and waterway transportation incidents. The transportation incidents can involve any mode of transportation that directly threatens life and which results in property damage and/or adversely impact a community’s capabilities to provide emergency services.

Air Transportation

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 and helicopters 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 fire can all lead to an air transportation incident.

Highway Transportation

A highway transportation incident can involve a single vehicle or multiple vehicles, requiring responses exceeding normal day-to-day capabilities. An extensive surface transportation network exists in Iowa with local residents, travelers, and business and industry relying 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. When the designed capacity of the roadway is exceeded, the potential for a major highway incident increases. Weather conditions play a major factor in the ability of traffic to flow safely in and through the state as does the time of day and week. Incidents involving buses and other high-occupancy vehicles could trigger a response that exceeds the normal day-to-day capabilities of response agencies.

Railway Transportation

A railway transportation incident is a train accident that directly threatens life and/or property, or adversely impacts a community’s capabilities to provide emergency services. Railway incidents may include derailments, collisions, and highway/rail crossing accidents. Train incidents can result from a variety of causes including human error, mechanical failure, faulty signals, 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 so many miles of track in Iowa, vehicles must cross the railroad tracks at numerous at-grade crossings.

#### Waterway Transportation

A waterway incident is an accident involving any water vessel that threatens life and/or adversely affects a community's capability to provide emergency services. Waterway incidents primarily involve pleasure crafts on rivers and lakes.

### 3.3.21.2 LOCATION

#### Air Transportation

Polk County and central Iowa are primarily served by the Des Moines International Airport (DSM). As Iowa's largest airport, DSM handles a great deal of passengers and goods. The Des Moines International Airport is owned by the City of Des Moines and is governed through a seven member Airport Board of Trustees. The Board is comprised of Des Moines citizens appointed by the Des Moines City Council. The Des Moines International Airport serves as the major air passenger and airfreight center for the State. The Ankeny Regional Airport is the principal reliever facility for the Des Moines International Airport. The other airports within the CIRTPA area are all classified as general aviation airports with no commercial air service.

#### Highway Transportation

The entire planning area is subject to transportation incidents and all participating jurisdictions are affected. The transportation routes include Interstates 35 and 80, US Highways 6, 65 and 69, Iowa State Highways 5, 17, 141, 44, 415, and 163. According to the Iowa Department of Transportation (DOT), Polk County is one of 12 counties included in DOT District 1 that maintains 770 bridges and 1,781 centerline miles (4,561 lane miles) within the District. The interstate corridors of I-35 and I-80 are critical trade corridors for transporting cargo, and segments of I-35 and I-80 within Polk County and the Des Moines metropolitan area have truck traffic counts above 13,000 vehicles per day.

#### Railway Transportation

Polk County has three Class I railroad companies: the Union Pacific (UP) Railroad Company, the Burlington Northern Santa Fe (BNSF), and the Norfolk Southern (NS) Railroad and one Class II railroad company serving the area is Iowa Interstate Railroad (IAIS). According to the Iowa DOT, in 2020 Polk County had 189 miles of active rail.

#### Waterway Transportation

Polk County does not have navigable waterways for commercial purposes but has the following recreational boating lakes and rivers.

**Table 118. Recreational Boating Lakes/Rivers in Polk County**

| Lake/River                           | Location                                         |
|--------------------------------------|--------------------------------------------------|
| Saylorville Reservoir                | North edge of Des Moines                         |
| Big Creek Lake                       | 2 miles north of Polk City                       |
| Blue Heron Lake (Raccoon River Park) | Southwest of West Des Moines; Raccoon River Park |
| Dale Maffitt Reservoir               | 6 miles southwest of Des Moines                  |
| Easter Lake                          | Southeast edge of Des Moines                     |
| Grays Lake                           | Fleur Drive, Des Moines                          |
| Des Moines River                     | Stratford to Saylorville                         |
| Chichaqua Bottoms (Skunk River)      | Northeast Polk County                            |
| Raccoon River                        | Southwest West Des Moines & Southwest Des Moines |
| Lake Petoka                          | Northeast edge of Bondurant                      |

#### 3.3.21.3 EXTENT

##### Air Transportation

DSM is Iowa's busiest airport – more than 2,800,000 passengers enplaned and deplaned at the airport in 2022.<sup>45</sup> Freight that is moved through the DSM includes mail and cargo such as bulk freight and express/small packages. In 2022, more than 75,750,000 lbs of cargo was enplaned and deplaned as DSM.<sup>46</sup> The DSM is ranked among the top 50 airports in the nation in terms of the amount of cargo shipped. Air transportation accidents are unlikely, but mechanical issues and human errors are not impossible. According to the NTSB, air accidents occur most frequently during the landing phase of flight, but less than 2% of these accidents result in fatalities. Less than 10% of air accidents occur during mid-air maneuvering, but nearly 60% of these accidents result in fatalities.<sup>47</sup> It is probable that the volume of flights in and out of DSM inherently increases the vulnerability of the surrounding area to the consequences of air transportation accidents.

##### Highway Transportation

Highway transportation incidents are very complex. Contributing factors can include a roadway's design and/or pavement conditions (e.g. rain, snow and ice), a vehicle's mechanical condition (e.g. tires, brakes, lights), a driver's behavior (e.g. speeding, inattentiveness and seat belt usage), as well as the driver's condition (e.g. alcohol use, age-related conditions, physical impairment). In fact, the driver's behavior and condition factors are the primary cause in an estimated 67% of highway crashes and a

<sup>45</sup> Des Moines Airport Authority. "December 2023 Airport Traffic Statistics." flydsm.com, December 2023. <https://www.flydsm.com/filesimages/ABOUT%20US/NEWS%20AND%20STATISTICS/December%202023%20Airport%20Traffic%20Statistics.pdf>.

<sup>46</sup> Des Moines Airport Authority. "December 2023 Airport Traffic Statistics." flydsm.com, December 2023. <https://www.flydsm.com/filesimages/ABOUT%20US/NEWS%20AND%20STATISTICS/December%202023%20Airport%20Traffic%20Statistics.pdf>.

<sup>47</sup> National Transportation Safety Board. "General Aviation Accident Dashboard: 2012-2021." ntsb.gov. Accessed February 12, 2024. <https://www.nts.gov/safety/data/Pages/GeneralAviationDashboard.aspx>.



contributing factor in an estimated 95 percent of all crashes. As such, highway safety needs go beyond just physical improvements to a specific roadway or intersection and include changes to driver behavior. These are best addressed with a multi-disciplinary approach using engineering, enforcement, emergency response, and education strategies. Most traffic accidents are relatively minor and do not result in injuries, but major traffic accidents involving multiple vehicles (sometimes called pile-ups) can cause multiple fatalities and significantly disrupt traffic.

#### Railway Transportation

The severity of railway transportation accidents is largely determined by the location of the accident and the cargo being transported. The derailment of a mile-long freight train carrying hazardous materials in a dense urban setting can be catastrophic. Such an event would likely require a mandatory evacuation of the surrounding population, and a major cleanup operation could be required to minimize the impact of hazardous materials contamination. A railway accident in rural settings can also pose unique challenges like difficulty in accessing the area with adequate equipment and personnel for rescue or cleanup. Even accidents which do not directly result in injuries can have economic consequences as passing a stricken train is more difficult than passing a stricken car on the road.

Stretches of railway in Polk County facilitate the movement of than 20 million tons per mile, annually. In 2013, the leading commodities, comprising approximately 83% of rail-borne tons, are: coal (134.4 million tons); food or kindred products (38.0 million tons); chemicals and allied products (31.2 million tons); farm products (20.0 million tons); and nonmetallic minerals (17.4 million tons).<sup>48</sup>

#### Waterway Transportation

The primary risks of accidents involving recreational watercraft are injuries and/or fatalities resulting from the force of impact or drowning. Like highway transportation accidents, the condition of the occupants often contributes to waterway transportation accidents.

### 3.3.21.4 PAST OCCURRENCES

#### Air Transportation

According to the National Transportation Safety Board (NTSB) Polk County has had very few air transportation incidents in the past decade. During the period from January 1, 2014 to January 1, 2024, there were only 5 air accidents documented by the NTSB in Polk County. Of these 5 accidents, none were fatal, but 2 were classified as “significant” by the NTSB. Both fixed-wing and rotary-wing aircraft were involved in air accidents in Polk County. For information and details about other air transportation incidents in Iowa, see <https://www.nts.gov/layouts/nts.aviation/index.aspx>.

---

<sup>48</sup> Iowa Department of Transportation. “Iowa State Rail Plan.” iowadot.gov, November 2022. <https://iowadot.gov/iowainmotion/railplan/2017/IowaSRP2022.pdf>.



#### Highway Transportation

The Iowa Department of Transportation's Office of Traffic and Safety maintains traffic crash statistics and locations in Iowa. Table 119 shows the number of crashes reported in Polk County from 2014 through 2023 by jurisdiction. Crashes are categorized by the following: fatal, major, minor, possibility unknown, and property damage only.

**Table 119. Severity of Traffic Accidents in Polk County by Jurisdiction 2014-2023**

| <b>Jurisdiction</b>      | <b>Property Damage Only</b> | <b>Possible / Unknown Injuries</b> | <b>Minor Injuries Suspected</b> | <b>Serious Injuries Suspected</b> | <b>Fatal Crash</b> | <b>Total Crashes</b> |
|--------------------------|-----------------------------|------------------------------------|---------------------------------|-----------------------------------|--------------------|----------------------|
| City of Alleman          | 33                          | 5                                  | 8                               | 1                                 | 0                  | 47                   |
| City of Altoona          | 2,086                       | 635                                | 234                             | 27                                | 6                  | 2,988                |
| City of Ankeny           | 7,204                       | 1,695                              | 808                             | 135                               | 12                 | 9,854                |
| City of Bondurant        | 363                         | 81                                 | 65                              | 8                                 | 7                  | 524                  |
| City of Clive            | 2,194                       | 459                                | 201                             | 32                                | 4                  | 2,890                |
| Delaware Township        | N/A                         | N/A                                | N/A                             | N/A                               | N/A                | N/A                  |
| City of Des Moines       | 33,872                      | 14,121                             | 4,684                           | 808                               | 149                | 53,634               |
| City of Elkhart          | 20                          | 4                                  | 1                               | 0                                 | 0                  | 25                   |
| City of Grimes           | 1,411                       | 224                                | 112                             | 12                                | 4                  | 1,763                |
| City of Johnston         | 1,291                       | 218                                | 142                             | 25                                | 4                  | 1,680                |
| City of Mitchellville    | 49                          | 5                                  | 6                               | 3                                 | 0                  | 63                   |
| City of Pleasant Hill    | 1,171                       | 264                                | 157                             | 26                                | 6                  | 1,624                |
| City of Polk City        | 314                         | 42                                 | 36                              | 6                                 | 1                  | 399                  |
| City of Runnells         | 20                          | 6                                  | 3                               | 2                                 | 0                  | 31                   |
| City of Urbandale        | 5,067                       | 1,031                              | 499                             | 71                                | 12                 | 6,680                |
| City of West Des Moines  | 5,731                       | 1,551                              | 772                             | 121                               | 17                 | 8,192                |
| City of Windsor Heights  | 880                         | 229                                | 81                              | 12                                | 1                  | 1,203                |
| Saylor Township          | N/A                         | N/A                                | N/A                             | N/A                               | N/A                | N/A                  |
| Unincorporated*          | 7,924                       | 1,669                              | 1,048                           | 214                               | 64                 | 10,919               |
| <b>Polk County Total</b> | <b>69,630</b>               | <b>22,239</b>                      | <b>8,857</b>                    | <b>1,503</b>                      | <b>287</b>         | <b>102,516</b>       |

\*Unincorporated crash data estimated by subtracting city crashes from total Polk County crash data

#### Railway Transportation

According to the U.S. Department of Transportation's Federal Railroad Administration, there were 96 railroad-related accidents/incidents reported over the past decade (2014-2023). Those events resulted in a total of 41 injuries and 2 fatalities. The most recent fatality occurred in 2019. Table 120 shows the accidents/incidents, injuries, and fatalities reported each year from 2014 through 2023. According to the Iowa Department of Transportation, throughout Iowa, rail car traffic has increased but the number of derailments in relationship to the traffic is trending downward.

Table 120. Railroad Accidents/Incidents, Injuries, and Fatalities in Polk County 2014-2023

|                             | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 10-Year Totals |
|-----------------------------|------|------|------|------|------|------|------|------|------|------|----------------|
| Total Accidents / Incidents | 17   | 7    | 10   | 4    | 9    | 11   | 6    | 10   | 10   | 12   | 96             |
| Total Injuries              | 11   | 1    | 7    | 3    | 2    | 2    | 2    | 3    | 6    | 4    | 41             |
| Total Fatalities            | 1    | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 0    | 2              |

Waterway Transportation

There have been few significant waterway incidents in Iowa and even less in Polk County. The presence of low-head dams along the Des Moines River limits the viability of commercial waterway transportation in Polk County. Previous waterway transportation incidents are likely limited to recreational vehicles, primarily on Saylorville Reservoir.

3.3.21.5 PROBABILITY OF FUTURE OCCURRENCES

A major transportation incident can occur at any time, even though traffic engineering, inspection of traffic facilities, and land use management of areas adjacent to roads and highways has increased, incidents continue to occur. As the volume of traffic on the county streets, highways and interstates increases, the number of traffic accidents will likely also increase. The combination of large numbers of people on the road, wildlife, unpredictable weather conditions, potential mechanical problems and human error always leaves the potential for a transportation accident.

Based on the available information, the probability of air transportation, highway, railway or waterway incidents which directly threaten life and results in property damage and/or adversely impact a community’s capabilities to provide emergency services is “Highly Likely” in any given year.

3.3.21.6 VULNERABILITY AND IMPACTS

Transportation incidents can almost always be expected to occur in specific areas, on or near airports, roadways, railroads, lakes, rivers or other transportation infrastructure. The exception is air transportation incidents can occur anywhere. However, it is difficult to predict the magnitude of any specific event because these types of events are accidental and the circumstances surrounding these events will impact the extent of damage or injuries that occur. Highway transportation incidents, which are the most common type of transportation incident, generally involve isolated impacts to a few vehicles and persons per incident. While larger jurisdictions tend to have more miles of roadway where these crashes can happen, it is entirely possible for such incidents to occur even in communities with extremely limited roadway networks. Therefore, all communities in Polk County are considered equally vulnerable to this hazard.

Table 121. Potential Impact of Transportation Incidents on Community Lifelines

| Lifelines                         | Impact Type                                                                         | Description                                                                                                                                                                                                                                                                                 |
|-----------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Safety & Security                 |    | Immediate response is essential for ensuring public safety, managing traffic, securing the crash site, and preventing secondary incidents. Emergency services, including police, fire, and rescue teams, are vital for controlling the situation.                                           |
| Health & Medical                  |    | Crashes often result in injuries or fatalities, requiring prompt medical attention. Emergency medical services provide on-site treatment and transport victims to hospitals. Healthcare facilities must be prepared for a sudden influx of patients, especially in mass casualty incidents. |
| Housing & Building Infrastructure |   | Significant crashes, especially those involving large vehicles or trains, can cause damage to nearby buildings and infrastructure. This may lead to temporary displacement of residents and businesses.                                                                                     |
| Utilities                         |  | Crashes can disrupt utility services, particularly if infrastructure like power lines, water pipes, or communication towers are damaged. Restoring these services is crucial for community functioning.                                                                                     |
| Transportation Services           |  | Transportation crashes directly impact the transport network. Roads may be closed, rail services disrupted, and air or sea travel affected. This disrupts the movement of people and goods and can have wider economic implications.                                                        |

| Lifelines          | Impact Type                                                                       | Description                                                                                                                                                                                |
|--------------------|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Economic Stability |  | The economic impacts include direct costs associated with emergency response, medical care, and infrastructure repair, as well as indirect costs like traffic delays and loss of business. |

A) People

The people most vulnerable to transportation accidents are those involved in the accident. The energy imparted on the occupants of the vehicle(s) in an accident can cause serious injury and death. Particularly violent events may also produce projectiles which can harm anyone in the immediate vicinity. When transportation accidents result in fires and/or the release of hazardous materials, the wider public may suffer from exposure, and evacuations could be necessary.

B) Structures

Significant crashes, especially those involving large road vehicles, trains, or aircraft can cause damage to nearby buildings and infrastructure. Damages may result from direct impact by the vehicle, projectiles produced by a crash, and fire. Such impacts may lead to temporary displacement of residents and businesses.

C) Systems

Significant transportation accidents can cause extensive damage to transportation infrastructure (roads, railways, airport tarmac, etc.), power transmission lines, communications, pipelines, and other community systems. Additionally, the release of hazardous materials could contaminate the local water supply. Impacts of transportation accidents on key community systems are of particular concern due to the consequences as well as the frequency with which these systems are in close proximity to each other. In many areas it is normal for railways, highways, communication and power lines, and even water and wastewater infrastructure to utilize the same land.

D) Natural, Historic, and Cultural Resources

The primary impact of transportation accidents on natural resources is contamination. It is not uncommon for transportation accidents to result in minor fuel spills, but these can often be remedied in a relatively quick manner. However, larger spills like those which can result from transportation accidents involving bulk shipments can be much more difficult and time consuming to contain. A significant release of hazardous materials can kill wildlife, livestock, and pets, cause widespread crop failure, and destroy nature preserves.

E) Community Activities

Community activities may need to be postponed, cancelled, or relocated if transportation accidents damage or destroy sites which are used to facilitate them. Evacuations may also interrupt normal community activities.

Existing Development

As alluded to in previous sections, there is a significant network of transportation infrastructure inside Polk County. The impacts of most transportation incidents are limited to the immediate area. However, transportation incidents in densely populated areas have the potential to damage buildings, and many types of transportation incidents could result in hazardous materials incidents as discussed in a previous hazard profile.

Future Development

As the populations of many Polk County communities continue to grow, it is highly likely that transportation infrastructure – particularly highways – will continue to grow, as well. The Des Moines Area Metropolitan Planning Organization’s *Year 2030 Long-Range Transportation Plan* addresses the metro’s growing population and employment that are supplemented with increased transportation needs. This plan includes roadways, pedestrian, bicycle and transit system of the Des Moines area and makes recommendations for future transportation needs.

Additionally, The Iowa Department of Transportation, Office of Aviation, produced the Aviation System Plan 2010-2030 that makes recommendations for future development of the air transportation system until 2030. The plan describes the role of air transportation for Iowans for moving people and goods. In regard to rail transportation, the Iowa Department of Transportation produced the Iowa State Rail Plan in 2021 – this plan describes the anticipated role of rail transportation through 2040. The plan anticipates a 52% increase in overall freight moved via rail through Iowa, as well as an 8% increase in ridership for passenger services by 2040.

Climate Change

There is a lack of evidence suggesting that climate change will directly impact the frequency and severity of transportation incidents in the planning area. However, recent evidence linking greenhouse emissions and climate change has spurred community leaders to consider the impact of transportation on climate change. To this end, the Iowa Department of Transportation is assessing the ways in which transportation networks can be improved. One example of this is the recommendation that, as possible, railways should be the option of choice for freight transportation. Railroads are up to three times more fuel efficient than trucks on the basis of ton-miles transported, and as greenhouse gas emissions directly relate to fuel consumption, every ton-mile of freight moved by rail instead of truck reduces environmental damages and costs by 84%.

Hazard Risk Score

Table 122. Transportation Incident Probability and Health Impact Ratings

| Health Severity | Community Impact | Public Health System Impact | Healthcare System Impact | Total Health Hazard Score | Probability |
|-----------------|------------------|-----------------------------|--------------------------|---------------------------|-------------|
|-----------------|------------------|-----------------------------|--------------------------|---------------------------|-------------|

|   |   |   |   |   |               |
|---|---|---|---|---|---------------|
| 2 | 1 | 1 | 3 | 7 | Highly Likely |
|---|---|---|---|---|---------------|

3.3.22 WINDSTORM

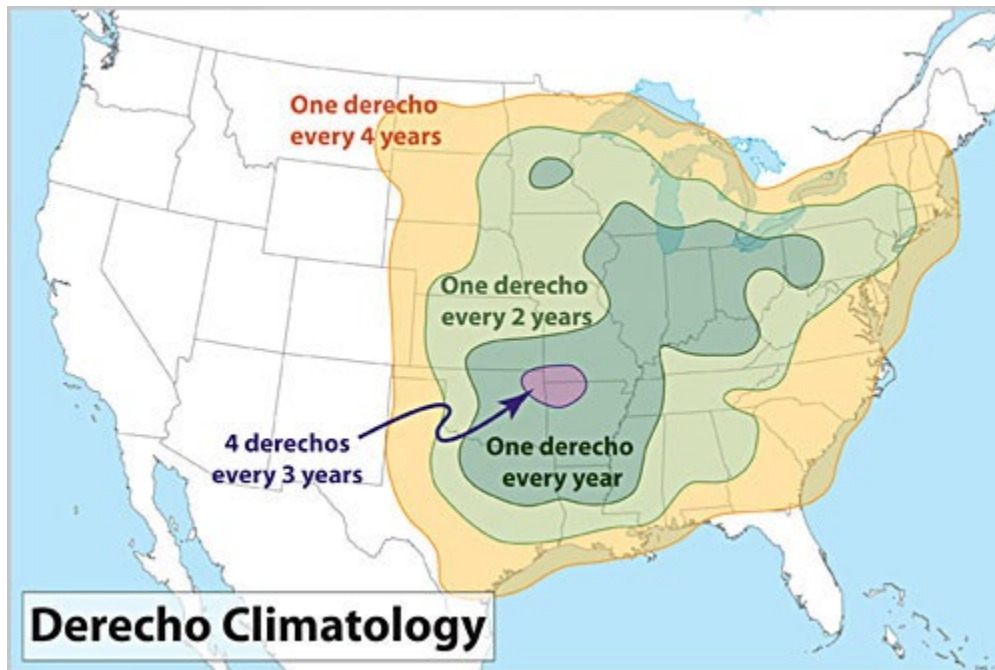
3.3.22.1 DESCRIPTION

Windstorms are created when extreme winds, typically associated with thunderstorms or downbursts, generate excessive and damaging wind speeds and can be responsible for structural and property damage. Windstorms may have a destructive path that is several miles wide, like that of a thunderstorm. Large hail, strong straight-line winds, heavy rains, flash flooding, and lightning are also associated with severe storms and may cause significant damage to a wider area. Large-scale extreme windstorms are often referred to as “Derechos” and can cause destruction similar to tornadoes but across a wider geographic extent.

3.3.22.2 LOCATION

According to the National Oceanic and Atmospheric Administration, derechos in the U.S. typically occur along two axes. The first axis extends from Mississippi Valley into the Ohio Valley, and the other stretches from the southern plains into the mid-mississippi valley. All of Iowa, including Polk County, is susceptible to windstorms and derechos. Derechos tend to occur in families or groups. This means that once the first one occurs, there is a good chance that more derechos will occur within the following few days, although not necessarily in the same location. Approximately 70% of all U.S. derechos occur between May and August.

Figure 112. Frequency of Derecho Occurrences in the U.S.



Source: National Weather Service Forecast Office Cleveland, OH, public domain. Accessed 2/21/2024  
<https://upload.wikimedia.org/wikipedia/commons/0/04/Derechoclimo.png>

#### 3.3.22.3 EXTENT

Derechos are most common in the warm season, and those involved in outdoor activities are especially at risk. Campers or hikers in forested areas are vulnerable to being injured or killed by falling trees. Occupants of cars and trucks also are vulnerable to falling trees and utility poles. Further, high profile vehicles such as semi-trailer trucks, tractors, buses, and sport utility vehicles may be blown over. Strong windstorms/derechos have been documented producing wind speeds of more than 140 miles per hour.

The National Weather Service can issue High Wind Watch, High Wind Warning, and Wind Advisory to the public. The following are the definitions of these issuances:

- High Wind Watch—This is issued when there is the potential of high wind speeds developing that may pose a hazard or is are life-threatening.
- High Wind Warning—The 1-minute surface winds of 35 knots (40 mph) or greater lasting for one hour or longer, or winds gusting to 50 knots (58 mph) or greater, regardless of duration, that are either expected or observed over land.
- High Wind Advisory—This is issued when high wind speeds may pose a hazard. Sustained winds 25 to 39 mph and/or gusts to 57 mph.



Windstorms can also be dangerous for people who are indoors. As with tornadoes, mobile homes, in particular, may be overturned or destroyed, and barns, machine sheds, and similar buildings can collapse. People inside homes, businesses, and schools are sometimes victims of falling trees and branches that crash through walls and roofs; they also may be injured by debris such as flying glass from broken windows. Power windstorms can also cause structural damage to buildings (for example, removal of a roof) which can pose danger to those within.

Typically, derecho-producing storm systems move at speeds of 50 mph or greater, and a few have been clocked at 70 mph. For anyone caught outside, such rapid movement means that the typical warning signs of inclement weather like darkening skies and other visual cues appear on very short notice. The advance notice given by a derecho often is not sufficient for one to take protective action.

3.3.22.4 PAST OCCURRENCES

According to Polk County Emergency Management, the Outdoor Warning Siren System (OWSS) will sound when forecasted or actual wind speeds reach or exceed 70 miles per hour (61 knots). According to data from the National Centers for Environmental Information, there have been 178 instances of storms producing winds which would trigger the Polk County OWSS. These events caused approximately \$74,908,100 worth of damage and injured 40 people. There have been no reported fatalities associated with windstorms in Polk County since 1980.

Table 123. Windstorm Damages in Polk County Since 1980

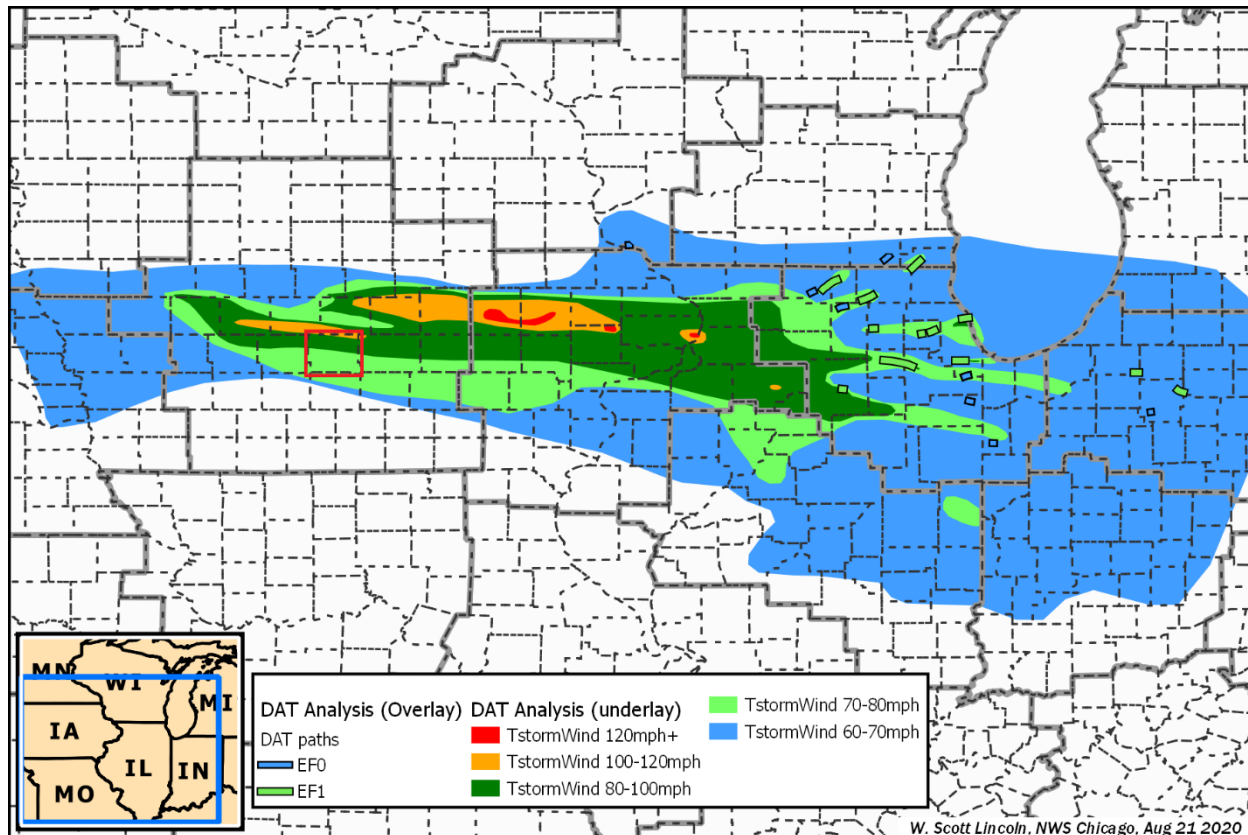
| Total Property Damage (\$) | Total Crop Damage (\$) | Total Injuries | Total Deaths |
|----------------------------|------------------------|----------------|--------------|
| \$72,850,000               | \$2,058,100            | 40             | 0            |

2020 Derecho

One of the largest windstorms to impact the planning area in recent history occurred in August 2020. Polk County was one of many counties across Iowa, Illinois, and several other midwest states which experienced significant damage as a result of the 2020 derecho. The 2020 derecho left hundreds of thousands of individuals without power, and four deaths were attributed to the storm. In Polk County, wind speeds of 80-90 miles per hour were recorded, while other parts of Iowa experienced wind speeds of more than 130 miles per hour. The impact of the 2020 derecho led to FEMA DR-4557, which remains the only Presidential Major Disaster Declaration for high winds exclusive of tornadic activity covering Polk County. Declarations pertaining to high winds which accompanied tornadic activity are described in the tornado hazard section. In total, the 2020 derecho caused approximately \$11.2 billion, making it the costliest thunderstorm disaster in U.S. history.<sup>49</sup>

<sup>49</sup> Kiel, Kyle. "August 2020 Derecho: A Look Back at the Costliest Thunderstorm Disaster in US History." <https://www.kwqc.com/2022/08/10/august-2020-derecho-look-back-costliest-thunderstorm-disaster-us-history/>.

Figure 113. August 2020 Derecho Wind Speeds with Polk County Outlined in Red



#### 3.3.22.5 PROBABILITY OF FUTURE OCCURRENCE

Thunderstorms are reasonably well-forecast, but derecho forecasting remains among the most challenging tasks facing operational meteorologists today. The difficulty of predicting these events is primarily due to two limitations: (1) the imprecise nature of the observational network (relative that necessary) to produce an accurate and detailed picture of the propensity for thunderstorms with strong surface winds, and (2) our incomplete understanding of the processes that lead to repetitive, linearly-organized storm development.<sup>50</sup>

Many meteorological factors may come together to yield an environment conducive to strong windstorms/derechos. The variation of these factors over space and time is important in fostering or hindering development of these systems. The current reality is that two nearly identical meteorological settings at a given location might yield vastly different outcomes depending upon how the atmosphere evolved to that point in time, as well as how conditions vary around that location. According to data from the National Oceanic and Atmospheric Administration, Polk County can expect a derecho

<sup>50</sup> Corfidi, Stephen, Jeffery Evans, and Robert Johns. "Facts About Derechos - Very Damaging Windstorms." spc.noaa.gov, January 11, 2022. <https://www.spc.noaa.gov/misc/AbtDerechos/derechofacts.htm>.

approximately once every two years. Therefore, damaging high winds, windstorms, and derechos are considered “likely” in Polk County.

3.3.22.6 VULNERABILITY AND IMPACTS

Windstorms are relatively large meteorological events which can impact the entire county, and all jurisdictions in Polk County are vulnerable to the hazard. The potential impacts of windstorms on specific community lifelines are described in the table below.

Table 124. Potential Impacts of Windstorms on Community Lifelines

| Lifelines                         | Impact Type                                                                         | Description                                                                                                                                                                                                                      |
|-----------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Safety & Security                 |    | Immediate threats to life and property necessitate rapid emergency response, including search and rescue operations, medical assistance, and maintaining public order to prevent looting or other crimes in affected areas.      |
| Food, Shelter, & Housing          |   | A significant windstorm can destroy large swaths of crops and lead to food insecurity in the planning area.                                                                                                                      |
| Health & Medical                  |  | Windstorms can cause injuries ranging from minor to severe, placing a sudden demand on healthcare facilities. Hospitals and clinics must be prepared for an influx of patients and possible damages to their own infrastructure. |
| Housing & Building Infrastructure |  | Windstorms can cause significant damage to homes, businesses, and public buildings, leading to displacement of residents and the need for temporary shelters and long-term rebuilding efforts.                                   |

| Lifelines          | Impact Type                                                                        | Description                                                                                                                                                                                                                                                                     |
|--------------------|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Utilities          |   | Windstorms can disrupt essential services by damaging power lines, water mains, and communication networks. Restoring these services is crucial for recovery and supporting other lifeline sectors.                                                                             |
| Transportation     |   | Damage to roads, bridges, and transportation infrastructure can hinder emergency response efforts and the movement of goods and people. Clearing debris and repairing infrastructure are critical post-tornado activities.                                                      |
| Economic Stability |  | The economic impacts of windstorms include the costs of emergency response, rebuilding, loss of crop yields, and the broader effects of property destruction and business interruptions. Insurance claims and financial assistance play significant roles in economic recovery. |

#### A) People

Due to windstorms having similar impacts as tornadoes, there is significant overlap of populations vulnerable to these events. People who are unable to access a sufficiently reinforced shelter in a timely manner are among the most vulnerable to windstorms. Individuals who may have difficulty accessing an appropriate shelter include those living in mobile homes, campgrounds, and other dwellings without secure foundations or basements. People in automobiles are also very vulnerable to windstorms as strong gusts can overturn vehicles, particularly high profile vehicles like semis and trucks.

Additionally, the elderly, very young, and physically and mentally handicapped may be more vulnerable to windstorms if their mobility limits the prospect of reaching shelter in a timely manner. People who's primary language is not English may also be more vulnerable if they are unable to understand watches, warnings, and other critical information about an impending windstorm. Lastly, it may be challenging for emergency services to reach individuals who reside in remote areas if windstorms produce debris which obstructs transportation routes.

#### B) Structures

Windspeeds produced by windstorm events are often comparable to tornadoes, and the resulting damage can be similar. Structures which utilize light-weight construction techniques are the

most likely to be damaged by windstorms. Mobile homes, barns, machine sheds, and grain silos are just a few examples of structures which can be particularly vulnerable to strong winds. Damaged structures can become sources of debris which can cause further damage to people and property, and structures may collapse if the damage is severe.

#### C) Systems

Windstorms can have detrimental effects on a variety of community systems. Communications and electricity are among the most vulnerable systems due to the volume of infrastructure exposed. It is common for this infrastructure to be above ground and exposed to direct damage from high wind. Indirect damage to communication and electricity infrastructure can occur when windstorms generate debris like tree branches which may fall on transmission lines.

Windstorms generally do not cause direct damage to transportation infrastructure. However, windstorms can produce conditions which make it unsafe to utilize transportation infrastructure, as cars, trucks, trains, and even airplanes can be thrown around and damaged by high speed winds. Debris created by windstorms can also obstruct roads and railways.

#### D) Natural, Historic, and Cultural Resources

Since windstorms/derechos do not have narrow tracks like tornadoes, the associated wind damage can be extensive and affect entire (and multiple) counties. The extent of windstorms/derechos can be highly concerning in areas like Polk County where agriculture is a significant piece of the community. High winds can quickly flatten hundreds of thousands of acres of cropland. Widespread destruction of cropland can have severe economic consequences and potentially jeopardize food security in the affected area. The impact of the 2020 derecho on agriculture was particularly severe due to it occurring mere weeks ahead of the harvest season. Agriculture officials in Iowa estimated that crop yields would likely be halved as a result of the disaster.<sup>51</sup>

#### E) Community Activities

Community activities may need to be relocated, postponed, or cancelled if the sites normally used to host these activities are damaged or destroyed by windstorms.

#### Existing Development

Mobile homes are among the most vulnerable structures due to their light weight and lack of anchoring to the ground; it is not uncommon for these structures to be severely damaged by windstorms. Larger structures are less likely to be physically damaged by the force of high winds, but airborne debris can shatter windows and puncture walls.

---

<sup>51</sup> Eller, Donnelle. "Iowa's Corn Yields Could Be Cut in Half Where Hurricane-Force Winds Flattened Fields." The Des Moines Register. Accessed February 21, 2024. <https://www.desmoinesregister.com/story/money/agriculture/2020/08/12/up-half-iowas-corn-yield-could-lost-derecho-damage/3357009001/>.

Future Development

Modern building codes help ensure that new development is largely able to withstand windstorms. However, extreme events such as the 2020 derecho can produce windspeeds which approach the limits of what wood-framed and sheet-metal structures can withstand. Thicker and stronger building materials – as well as additional design elements – are recommended to protect structures from windspeeds exceeding 100 miles per hour. To help inform new development which can better resist extreme wind speeds, FEMA produced the document “FEMA Building Science Resources to Assist with Reconstruction after an Extreme-Wind Event.”

Climate Change

The impacts of climate change on windstorms is an area of ongoing research. At present, there is conflicting evidence for whether global wind speeds are increasing, decreasing, or unchanged. However, researchers have found that climate change appears to be shifting the typical “season” of severe weather events like tornadoes and hurricanes, and it is plausible that wind storms may be affected in a similar way.<sup>52</sup> In such a scenario, the planning area should anticipate more windstorms occurring outside of the spring and summer months typically associated with severe weather in Iowa.

Hazard Risk Score

Table 125. Windstorm Probability and Health Impact Ratings

| Health Severity | Community Impact | Public Health System Impact | Healthcare System Impact | Total Health Hazard Score | Probability |
|-----------------|------------------|-----------------------------|--------------------------|---------------------------|-------------|
| 1               | 0                | 0                           | 1                        | 2                         | Likely      |

3.3.23 WINTER STORM

3.3.23.1 DESCRIPTION

A major winter storm can last for several days and be accompanied by high winds, freezing rain, sleet, heavy snowfall, and cold temperatures. The National Weather Service describes different types of winter storm events as follows:

- **Blizzard:** A winter storm which produces the following conditions for three (3) consecutive hours or longer: (1) sustained winds or frequent gusts 30 knots (35 mph) or greater, and (2) falling and/or blowing snow reducing visibility frequently to less than 1/4 mile.
- **Cold/wind chill:** Period of low temperatures or wind chill temperatures reaching or exceeding locally/regionally defined advisory (typical value is -18 °F or colder) conditions.
- **Extreme cold/wind chill:** A period of extremely low temperatures or wind chill temperatures reaching or exceeding locally/regionally defined warning criteria (typical value around -35° F or colder).

<sup>52</sup> Robinson, Walter A. “Climate Change and Extreme Weather: A Review Focusing on the Continental United States.” *Journal of the Air & Waste Management Association* 71, no. 10 (October 3, 2021): 1186–1209. <https://doi.org/10.1080/10962247.2021.1942319>.

- **Frost/Freeze:** A surface air temperature of 32 degrees Fahrenheit (°F) or lower, or the formation of ice crystals on the ground or other surfaces, for a period long enough to cause human or economic impact, during the locally defined growing season.
- **Heavy snow:** Snow accumulation meeting or exceeding locally/regionally defined 12 and/or 24-hour warning criteria. This could mean values such as 4, 6, or 8 inches or more in 12 hours or less; or 6, 8, or 10 inches in 24 hours or less.
- **Ice Storm:** Ice accretion meeting or exceeding locally/regionally defined warning criteria (typical value is 1/4 or 1/2 inch or more).
- **Sleet:** Sleet is simply frozen raindrops and occurs when the layer of freezing air along the surface is thicker. This causes the raindrops to freeze before reaching the ground. Sleet accumulations meeting or exceeding locally/regionally defined warning criteria (typical value is 1/2 inch or more).
- **Winter storm:** A winter weather event that has more than one significant hazard (i.e., heavy snow and blowing snow; snow and ice; snow and sleet; sleet and ice; or snow, sleet, and ice) and meets or exceeds locally/regionally defined 12 and/or 24-hour warning criteria for at least one of the precipitation elements.

#### 3.3.23.2 LOCATION

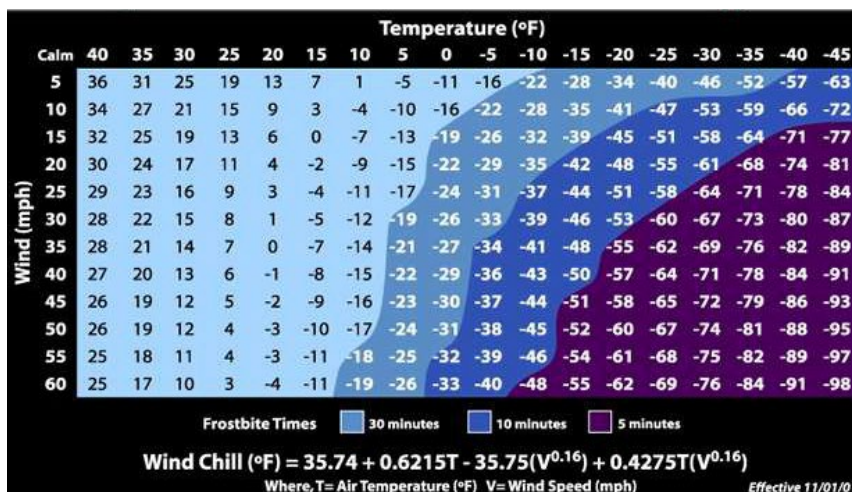
The entire planning area is susceptible to the effects of winter storm, as the entire state of Iowa can experience heavy snow, high winds, extreme cold temperatures, and freezing rain. Furthermore, many of these events can occur as part of the same system. The snow season in Polk County normally extends from late October through mid-April, but significant snowfall has been recorded as early as September 16 (1881) to as late as May 28 (1947).

#### 3.3.23.3 EXTENT

Severe winter storms include extreme cold, heavy snowfall, ice, and strong winds which can push the wind chill well below zero degrees Fahrenheit in the planning area. Wind can greatly amplify the impact of cold ambient air temperatures. Figure 114 below shows the relationship of wind speed to apparent temperature and typical time periods for the onset of frostbite. Under the right conditions, frostbite can occur in as little as 5 minutes.



Figure 114. Frostbite Chart



Source: National Weather Service: <https://www.weather.gov/safety/cold-wind-chill-chart>

The latest 30-year climate normals (1981-2010) developed by the National Weather Service show that during the winter months (December, January, and February) the average temperature in Polk County is approximately 22-26 °F. Generally, the southern half of the county is, on average, a few degrees warmer during the winter months than the northern half. The average temperature in Des Moines during the winter months is 25.3 °F. The coldest temperature recorded in Polk County occurred in February 1996 when the temperature in Ankeny dropped to -34 °F.<sup>53</sup>

<sup>53</sup> US Department of Commerce, NOAA. "Climate." weather.gov. NOAA's National Weather Service, March 29, 2024. <https://www.weather.gov/wrh/climate?wfo=dmx>.

Figure 115. Iowa Winter Average Temperature Normals (1981 - 2010)

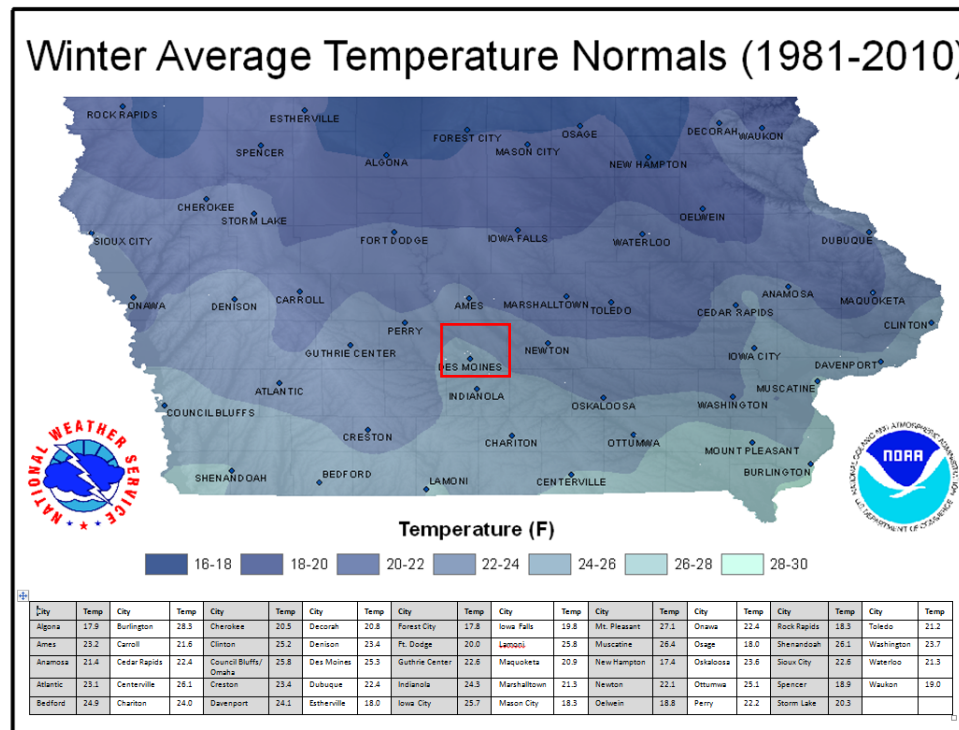
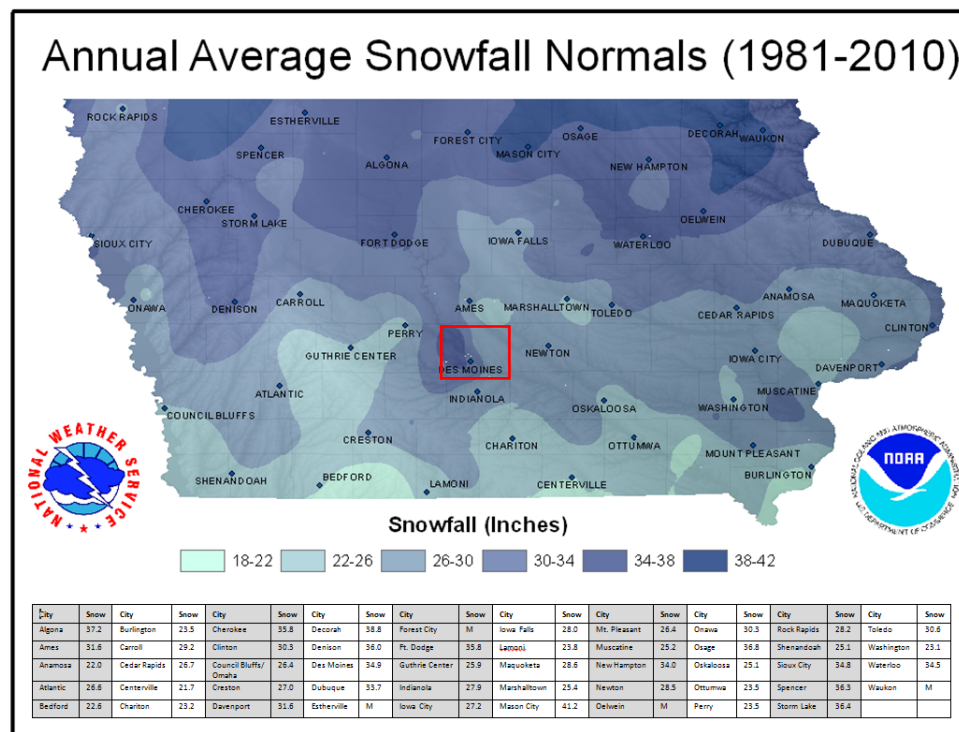


Figure 116. Iowa Annual Average Snowfall Normals (1981 - 2010)



According to the latest available 30-year climate normals (1981-2010) developed by the National Weather Service, Polk County typically receives 26-38 inches of snow; annual snowfall totals in the western part of Polk County tend to be towards the higher end of the range (34-38 inches), while the eastern portion usually experiences snowfall totals at the lower end (26-30 inches) of the spectrum. The annual average snowfall for Des Moines is 34.9 inches. The largest individual snowfall recorded in the Des Moines area came on New Year’s Day in 1942 when 19.8 inches of snow fell in Des Moines in a 24 hour period.

3.3.23.4 PAST OCCURRENCES

According to the latest National Weather Service 30-year estimates (1981-2010) for Des Moines, the winter high temperature normal is 33.6 °F, and the winter low temperature normal is 17 °F. and the annual average snowfall is 34.9 inches. The national Centers for Environmental Information identifies 104 instances of hazards associated with winter weather (defined in the “Description” section of this hazard profile) between January 1, 1980 and December 31, 2023. These events resulted in approximately \$14,727,798 worth of damage and 2 fatalities. Winter storms, which are events where multiple winter hazards are present, were the most frequent winter weather event to impact Polk County, and this is evidence that many winter hazards occur as part of the same system. Heavy snow is identified as the most common winter hazard to occur alone in the planning area.

Table 126. NCEI Winter Weather Hazards in Polk County 1980 - 2023

| Event Type             | Count | Total Property Damage | Total Crop Damage | Total Injuries | Total Deaths |
|------------------------|-------|-----------------------|-------------------|----------------|--------------|
| Winter storm           | 28    | \$829,900             | \$0               | 0              | 1            |
| Ice storm              | 11    | \$658,330             | \$0               | 0              | 0            |
| Heavy snow             | 26    | \$3,910,450           | \$2,600,000       | 0              | 0            |
| Frost/freeze           | 9     | \$0                   | \$4,000,000       | 0              | 0            |
| Cold/windchill         | 8     | \$0                   | \$294,118         | 0              | 0            |
| Extreme cold/windchill | 9     | \$0                   | \$0               | 0              | 1            |
| Blizzard               | 13    | \$2,435,000           | \$0               | 0              | 0            |
| TOTALS                 | 104   | \$7,833,680           | \$6,894,118       | 0              | 2            |

Historically, there have been two Presidential Disaster Declarations for Severe Winter Storm that included Polk County. The first declaration occurred in 1997, and the second declaration came 10

years later in 2007. Interestingly, both declarations occurred outside of the traditional winter season of December – February.

Table 127. FEMA Disaster Declarations Pertaining to Winter Weather in Polk County

| Disaster Number | Declaration Date | Description          |
|-----------------|------------------|----------------------|
| 1688            | 03/14/2007       | Severe winter storms |
| 1191            | 11/20/1997       | Severe snow storms   |

3.3.23.5 PROBABILITY OF FUTURE OCCURRENCE

With 104 instances of winter hazards impacting Polk County recorded over over the past 44 years (1980 – 2024), the avearge number of winter hazards per year is approximately 2.4. Future instances of winter hazards impacting Polk County should be expected, and at least once instance has been recorded in each year since 1996 with the exception of 2006. The probability of winter storms in Polk County is considered “highly likely” in a given year.

3.3.23.6 VULNERABILITY AND IMPACTS

Winter storms and severe winter weather can impact the planning area in a variety of ways. The specific impacts this hazard are described in the following table. All jurisdictions in Polk County are equally vulnerable to this hazard.

Table 128. Potential Impacts of Winter Storm on Community Lifelines

| Lifelines         | Impact Type                                                                         | Description                                                                                                                                                                                                                                                                    |
|-------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Safety & Security |  | The immediate threat to life due to extreme cold, icy conditions, and potential for accidents necessitates a robust emergency response, including rescue operations and law enforcement to manage traffic accidents and ensure public safety.                                  |
| Health & Medical  |  | Exposure to extreme cold can lead to hypothermia and frostbite, while slippery conditions increase the risk of falls and accidents. Healthcare facilities must be prepared for an influx of patients and potential challenges in maintaining operations during severe weather. |

| Lifelines                         | Impact Type                                                                       | Description                                                                                                                                                                                               |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Housing & Building Infrastructure |  | Heavy snowfall and ice can cause damage to roofs and structures. Ensuring that buildings are adequately insulated and heated is critical to prevent pipe freezing and to maintain safe living conditions. |
| Utilities                         |  | Winter storms can disrupt power, heating, and water services, as well as communication networks. Restoring these services is crucial for survival and comfort during extended cold periods.               |
| Transportation                    |  | Snow and ice can severely impact road, air, and rail travel, leading to delays, accidents, and the need for extensive snow and ice removal efforts.                                                       |

#### A) People

Extreme cold often accompanies severe winter storms and can lead to hypothermia and frostbite in people who are exposed to the weather without adequate clothing protection. When combined with high winds from winter storms, extreme cold becomes extreme wind chill, which is tremendously hazardous to health and safety. The National Institute on Aging estimates that more than 2.5 million Americans are especially vulnerable to hypothermia, with the isolated elderly being most at risk. About 10% of people over the age of 65 have some kind of temperature-regulating defect, and 3-4% of all hospital patients over 65 are hypothermic. Also at risk are those without shelter or who are stranded, or who live in a home that is poorly insulated or without heat. Emergency needs of remote or isolated residents for food or fuel, as well as for feed, water and shelter for livestock are unable to be met.

#### B) Structures

In general, structural impacts of winter weather hazards include damage to roofs and building frames, rather than building content. The weight of heavy snow and ice can cause damage to roofs and potentially result in structural collapse among buildings not adequately designed to withstand the added weight of snow and ice. Buildings with overhanging tree limbs are particularly vulnerable to damage during winter storms as tree limbs are prone to breaking off under the weight of snow and ice.

3-344

#### C) Systems

Winter storms can disrupt power, heating, and water services, as well as communication networks. Damage to these systems is typically caused by the weight of heavy snow and ice. High winds can also be damaging, especially if snow and ice already weigh down infrastructure such as power lines. Furthermore, tree branches can collapse under the weight of snow and ice, and this can damage utility lines and create obstacles on roads. Cold can cause fuel to congeal in storage tanks and supply lines, stopping electric generators. Cold temperatures can also overpower a building's heating system and cause water and sewer pipes to freeze and rupture.

Heavy snow and ice can bring a community to a standstill by inhibiting transportation. Ice can also become a problem on roadways if the air temperature is high enough so that precipitation falls as freezing rain rather than snow. Even small accumulations of ice can be extremely dangerous to motorists and pedestrians. About 70 percent of winter-related deaths occur in automobiles due to traffic accidents and about 25 percent are from people caught outside in a storm. Emergency services such as police, fire, and ambulance may be delayed or unable to respond due to road conditions. Bridges and overpasses are particularly dangerous because they freeze before other surfaces. Repair and snow removal costs can be significant.

#### D) Natural, Historic, and Cultural Resources

There are few vulnerabilities to natural resources from winter weather hazards; heavy snow and ice accumulation can potentially bring down large tree limbs, and freezing temperatures can potentially delay the start of the growing season. A cold snap can also be deadly for crops which have already been planted in the ground. According to the U.S. Department of Agriculture, temperatures at or below 24 °F can cause heavy damage to most plants. At these temperatures, the ground freezes solid, with the depth of the frozen ground dependent on the duration and severity of the freeze, soil moisture, and soil type.

#### E) Community Activities

Severe winter weather has the potential to immobilize the region causing cancellations of planned events or activities. This is typically short lived, although longer disruptions may occur if heavy snowfall damages structures and/or disrupts utilities which are necessary for community activities.

#### Existing Development

Winter weather can impact existing development in several ways. Heavy snowfall accumulation can damage roofs and utility lines, and transportation routes can be partially or completely obstructed. Extreme cold can also cause liquid pipelines to freeze and potentially rupture. Concrete can also be damaged when water turns to ice because ice occupies a larger volume of space than water. Any moisture present in small cracks and crevices will expand when frozen, and this expansion can cause concrete to chip/break. Over time, this process can cause noticeable damage to concrete infrastructure, and this freeze-thaw cycle is one of the main causes of potholes in roads.



#### Future Development

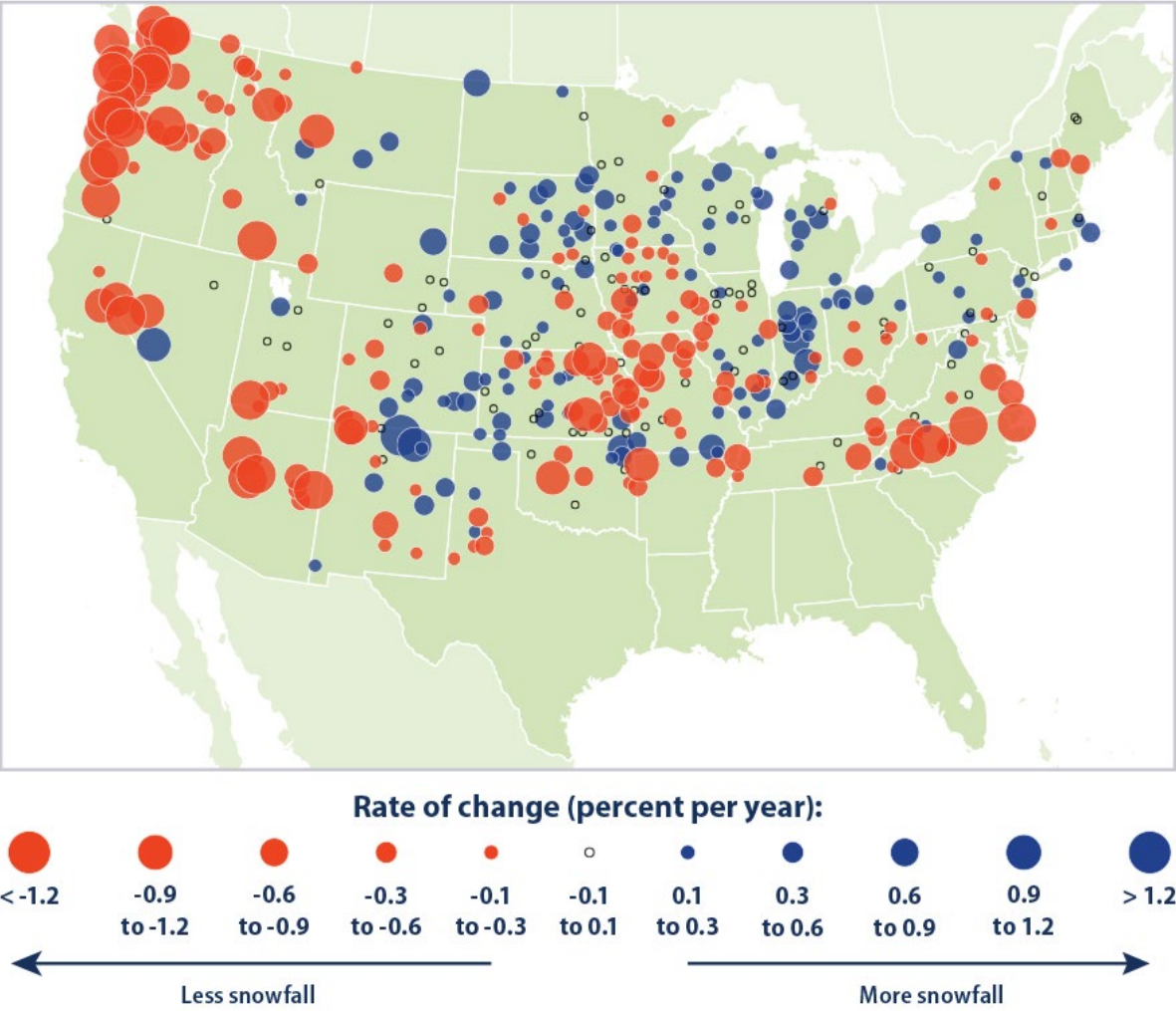
Severe winter weather will continue to be a hazard to development as large changes in building techniques and material properties are not anticipated. Future development could potentially increase vulnerability to this hazard by increasing demand on the utilities and increasing the exposure of infrastructure networks.

#### Climate Change

As is the case with many hazards profiled in this plan, the relationship between winter weather hazards and climate change is an area of ongoing research. With regard to winter temperatures, there is evidence that winter temperatures are gradually rising. This may indicate that future occurrences of extreme cold will become less frequent. Warmer winters may cause the annual snow “season” to be shorter, although this does not necessarily imply overall snowfall in the planning area will be reduced. Analysis of weather station data from 1930 to 2007 by the U.S. EPA found that shifts in snowfall totals appear to vary by region. Figure 117 shows the changes to snowfall totals recorded by more than 419 weather stations. Polk County is encouraged to monitor this field for any forthcoming research which may help inform future decisions pertaining to mitigation of severe winter weather.



Figure 117. Change in Total Snowfall in the Contiguous 48 States, 1930–2007



Source: U.S. Environmental Protection Agency: <https://www.epa.gov/climate-indicators/climate-change-indicators-snowfall>

Hazard Risk Score

Table 129. Winter Storm Probability and Health Impact Ratings

| Health Severity | Community Impact | Public Health System Impact | Healthcare System Impact | Total Health Hazard Score | Probability   |
|-----------------|------------------|-----------------------------|--------------------------|---------------------------|---------------|
| 2               | 4                | 2                           | 3                        | 11                        | Highly Likely |

3.4 VULNERABILITY ASSESSMENT SUMMARY

The table below provides a summary of the implications of recent trends on vulnerability in Polk County, as described in further detail in each of the hazard profiles. It uses the following symbols to describe how each trend (climate changes, population pattern changes, and changes in land use and development) have increased risk in each participating jurisdiction for each hazard:

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

 Increased Risk

 No change to Risk

 Decreased Risk

Table 130. Summary of Trend Implications for Vulnerability to Profiled Hazards

| Animal/Plant/Crop Disease                  |                                                                                     |                                                                                     |                                                                                       |
|--------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Jurisdiction                               | Changes in Climate                                                                  | Changes in Population Patterns                                                      | Changes in Land Use and Development                                                   |
| Polk County                                |    |    |    |
| Alleman                                    |    |    |    |
| Altoona                                    |    |    |    |
| Ankeny                                     |    |    |    |
| Ankeny Community School District           |    |    |    |
| Bondurant                                  |    |    |    |
| Bondurant-Farrar Community School District |   |   |   |
| Clive                                      |  |  |  |
| Delaware Township                          |  |  |  |
| Des Moines                                 |  |  |  |
| Des Moines Independent School District     |  |  |  |
| Des Moines Water Works                     |  |  |  |
| Elkhart                                    |  |  |  |
| Grimes                                     |  |  |  |
| Johnston                                   |  |  |  |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                                           |                           |                                       |                                            |
|-------------------------------------------|---------------------------|---------------------------------------|--------------------------------------------|
| Johnston Community School District        | ↑                         | ↔                                     | ↔                                          |
| Mitchellville                             | ↑                         | ↑                                     | ↔                                          |
| North Polk Community School District      | ↑                         | ↔                                     | ↔                                          |
| Pleasant Hill                             | ↑                         | ↑                                     | ↔                                          |
| Polk City                                 | ↑                         | ↑                                     | ↔                                          |
| Runnells                                  | ↑                         | ↓                                     | ↔                                          |
| Saylor Township                           | ↑                         | ↓                                     | ↔                                          |
| Southeast Polk Community School District  | ↑                         | ↔                                     | ↔                                          |
| Urbandale                                 | ↑                         | ↑                                     | ↔                                          |
| Urbandale Community School District       | ↑                         | ↔                                     | ↔                                          |
| West Des Moines                           | ↑                         | ↑                                     | ↔                                          |
| West Des Moines Community School District | ↑                         | ↔                                     | ↔                                          |
| Windsor Heights                           | ↑                         | ↑                                     | ↔                                          |
| <b>Climate Change</b>                     |                           |                                       |                                            |
| <b>Jurisdiction</b>                       | <b>Changes in Climate</b> | <b>Changes in Population Patterns</b> | <b>Changes in Land Use and Development</b> |
| Polk County                               | N/A                       | ↑                                     | ↑                                          |
| Alleman                                   | N/A                       | ↓                                     | ↔                                          |
| Altoona                                   | N/A                       | ↑                                     | ↑                                          |
| Ankeny                                    | N/A                       | ↑                                     | ↑                                          |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                                            |     |                                                                                     |                                                                                       |
|--------------------------------------------|-----|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Ankeny Community School District           | N/A |    |    |
| Bondurant                                  | N/A |    |    |
| Bondurant-Farrar Community School District | N/A |    |    |
| Clive                                      | N/A |    |    |
| Delaware Township                          | N/A |    |    |
| Des Moines                                 | N/A |    |    |
| Des Moines Independent School District     | N/A |    |    |
| Des Moines Water Works                     | N/A |    |    |
| Elkhart                                    | N/A |    |    |
| Grimes                                     | N/A |  |  |
| Johnston                                   | N/A |  |  |
| Johnston Community School District         | N/A |  |  |
| Mitchellville                              | N/A |  |  |
| North Polk Community School District       | N/A |  |  |
| Pleasant Hill                              | N/A |  |  |
| Polk City                                  | N/A |  |  |
| Runnells                                   | N/A |  |  |
| Saylor Township                            | N/A |  |  |
| Southeast Polk Community School District   | N/A |  |  |
| Urbandale                                  | N/A |  |  |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                                            |                           |                                       |                                            |
|--------------------------------------------|---------------------------|---------------------------------------|--------------------------------------------|
| Urbandale Community School District        | N/A                       |                                       |                                            |
| West Des Moines                            | N/A                       |                                       |                                            |
| West Des Moines Community School District  | N/A                       |                                       |                                            |
| Windsor Heights                            | N/A                       |                                       |                                            |
| <b>Cyberattack</b>                         |                           |                                       |                                            |
| <b>Jurisdiction</b>                        | <b>Changes in Climate</b> | <b>Changes in Population Patterns</b> | <b>Changes in Land Use and Development</b> |
| Polk County                                |                           |                                       |                                            |
| Alleman                                    |                           |                                       |                                            |
| Altoona                                    |                           |                                       |                                            |
| Ankeny                                     |                           |                                       |                                            |
| Ankeny Community School District           |                           |                                       |                                            |
| Bondurant                                  |                           |                                       |                                            |
| Bondurant-Farrar Community School District |                           |                                       |                                            |
| Clive                                      |                           |                                       |                                            |
| Delaware Township                          |                           |                                       |                                            |
| Des Moines                                 |                           |                                       |                                            |
| Des Moines Independent School District     |                           |                                       |                                            |
| Des Moines Water Works                     |                           |                                       |                                            |
| Elkhart                                    |                           |                                       |                                            |
| Grimes                                     |                           |                                       |                                            |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                                           |                           |                                       |                                            |
|-------------------------------------------|---------------------------|---------------------------------------|--------------------------------------------|
| Johnston                                  |                           |                                       |                                            |
| Johnston Community School District        |                           |                                       |                                            |
| Mitchellville                             |                           |                                       |                                            |
| North Polk Community School District      |                           |                                       |                                            |
| Pleasant Hill                             |                           |                                       |                                            |
| Polk City                                 |                           |                                       |                                            |
| Runnells                                  |                           |                                       |                                            |
| Saylor Township                           |                           |                                       |                                            |
| Southeast Polk Community School District  |                           |                                       |                                            |
| Urbandale                                 |                           |                                       |                                            |
| Urbandale Community School District       |                           |                                       |                                            |
| West Des Moines                           |                           |                                       |                                            |
| West Des Moines Community School District |                           |                                       |                                            |
| Windsor Heights                           |                           |                                       |                                            |
| <b>Dam Failure</b>                        |                           |                                       |                                            |
| <b>Jurisdiction</b>                       | <b>Changes in Climate</b> | <b>Changes in Population Patterns</b> | <b>Changes in Land Use and Development</b> |
| Polk County                               |                           |                                       |                                            |
| Alleman                                   |                           |                                       |                                            |
| Altoona                                   |                           |                                       |                                            |
| Ankeny                                    |                           |                                       |                                            |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                                            |   |   |   |
|--------------------------------------------|---|---|---|
| Ankeny Community School District           | ↔ | ↔ | ↔ |
| Bondurant                                  | ↔ | ↔ | ↔ |
| Bondurant-Farrar Community School District | ↔ | ↔ | ↔ |
| Clive                                      | ↔ | ↑ | ↑ |
| Delaware Township                          | ↔ | ↔ | ↔ |
| Des Moines                                 | ↔ | ↑ | ↑ |
| Des Moines Independent School District     | ↔ | ↔ | ↔ |
| Des Moines Water Works                     | ↔ | ↔ | ↔ |
| Elkhart                                    | ↔ | ↔ | ↔ |
| Grimes                                     | ↔ | ↑ | ↑ |
| Johnston                                   | ↔ | ↑ | ↑ |
| Johnston Community School District         | ↔ | ↔ | ↔ |
| Mitchellville                              | ↔ | ↔ | ↔ |
| North Polk Community School District       | ↔ | ↔ | ↔ |
| Pleasant Hill                              | ↔ | ↔ | ↔ |
| Polk City                                  | ↔ | ↑ | ↑ |
| Runnells                                   | ↔ | ↓ | ↔ |
| Saylor Township                            | ↔ | ↔ | ↔ |
| Southeast Polk Community School District   | ↔ | ↔ | ↔ |
| Urbandale                                  | ↔ | ↑ | ↑ |



### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                                            |                           |                                       |                                            |
|--------------------------------------------|---------------------------|---------------------------------------|--------------------------------------------|
| Urbandale Community School District        | ↔                         | ↔                                     | ↔                                          |
| West Des Moines                            | ↔                         | ↑                                     | ↑                                          |
| West Des Moines Community School District  | ↔                         | ↔                                     | ↔                                          |
| Windsor Heights                            | ↔                         | ↑                                     | ↑                                          |
| <b>Drought</b>                             |                           |                                       |                                            |
| <b>Jurisdiction</b>                        | <b>Changes in Climate</b> | <b>Changes in Population Patterns</b> | <b>Changes in Land Use and Development</b> |
| Polk County                                | ↑                         | ↑                                     | ↔                                          |
| Alleman                                    | ↑                         | ↓                                     | ↔                                          |
| Altoona                                    | ↑                         | ↑                                     | ↔                                          |
| Ankeny                                     | ↑                         | ↑                                     | ↔                                          |
| Ankeny Community School District           | ↑                         | ↔                                     | ↔                                          |
| Bondurant                                  | ↑                         | ↑                                     | ↔                                          |
| Bondurant-Farrar Community School District | ↑                         | ↔                                     | ↔                                          |
| Clive                                      | ↑                         | ↑                                     | ↔                                          |
| Delaware Township                          | ↑                         | ↔                                     | ↔                                          |
| Des Moines                                 | ↑                         | ↑                                     | ↔                                          |
| Des Moines Independent School District     | ↑                         | ↔                                     | ↔                                          |
| Des Moines Water Works                     | ↑                         | ↔                                     | ↔                                          |
| Elkhart                                    | ↑                         | ↑                                     | ↔                                          |
| Grimes                                     | ↑                         | ↑                                     | ↔                                          |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                                           |                           |                                       |                                            |
|-------------------------------------------|---------------------------|---------------------------------------|--------------------------------------------|
| Johnston                                  | ↑                         | ↑                                     | ↔                                          |
| Johnston Community School District        | ↑                         | ↔                                     | ↔                                          |
| Mitchellville                             | ↑                         | ↑                                     | ↔                                          |
| North Polk Community School District      | ↑                         | ↔                                     | ↔                                          |
| Pleasant Hill                             | ↑                         | ↑                                     | ↔                                          |
| Polk City                                 | ↑                         | ↑                                     | ↔                                          |
| Runnells                                  | ↑                         | ↓                                     | ↔                                          |
| Saylor Township                           | ↑                         | ↓                                     | ↔                                          |
| Southeast Polk Community School District  | ↑                         | ↔                                     | ↔                                          |
| Urbandale                                 | ↑                         | ↑                                     | ↔                                          |
| Urbandale Community School District       | ↑                         | ↔                                     | ↔                                          |
| West Des Moines                           | ↑                         | ↑                                     | ↔                                          |
| West Des Moines Community School District | ↑                         | ↔                                     | ↔                                          |
| Windsor Heights                           | ↑                         | ↑                                     | ↔                                          |
| <b>Earthquake</b>                         |                           |                                       |                                            |
| <b>Jurisdiction</b>                       | <b>Changes in Climate</b> | <b>Changes in Population Patterns</b> | <b>Changes in Land Use and Development</b> |
| Polk County                               | ↔                         | ↑                                     | ↑                                          |
| Alleman                                   | ↔                         | ↓                                     | ↔                                          |
| Altoona                                   | ↔                         | ↑                                     | ↑                                          |
| Ankeny                                    | ↔                         | ↑                                     | ↑                                          |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                                            |   |   |   |
|--------------------------------------------|---|---|---|
| Ankeny Community School District           | ↔ | ↔ | ↔ |
| Bondurant                                  | ↔ | ↑ | ↑ |
| Bondurant-Farrar Community School District | ↔ | ↔ | ↔ |
| Clive                                      | ↔ | ↑ | ↑ |
| Delaware Township                          | ↔ | ↔ | ↔ |
| Des Moines                                 | ↔ | ↑ | ↑ |
| Des Moines Independent School District     | ↔ | ↔ | ↔ |
| Des Moines Water Works                     | ↔ | ↔ | ↔ |
| Elkhart                                    | ↔ | ↑ | ↑ |
| Grimes                                     | ↔ | ↑ | ↑ |
| Johnston                                   | ↔ | ↑ | ↑ |
| Johnston Community School District         | ↔ | ↔ | ↔ |
| Mitchellville                              | ↔ | ↑ | ↑ |
| North Polk Community School District       | ↔ | ↔ | ↔ |
| Pleasant Hill                              | ↔ | ↑ | ↑ |
| Polk City                                  | ↔ | ↑ | ↑ |
| Runnells                                   | ↔ | ↓ | ↔ |
| Saylor Township                            | ↔ | ↓ | ↔ |
| Southeast Polk Community School District   | ↔ | ↔ | ↔ |
| Urbandale                                  | ↔ | ↑ | ↑ |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                                            |                           |                                       |                                            |
|--------------------------------------------|---------------------------|---------------------------------------|--------------------------------------------|
| Urbandale Community School District        | ↔                         | ↔                                     | ↔                                          |
| West Des Moines                            | ↔                         | ↑                                     | ↑                                          |
| West Des Moines Community School District  | ↔                         | ↔                                     | ↔                                          |
| Windsor Heights                            | ↔                         | ↑                                     | ↑                                          |
| <b>Expansive Soils</b>                     |                           |                                       |                                            |
| <b>Jurisdiction</b>                        | <b>Changes in Climate</b> | <b>Changes in Population Patterns</b> | <b>Changes in Land Use and Development</b> |
| Polk County                                | ↔                         | ↑                                     | ↑                                          |
| Alleman                                    | ↔                         | ↓                                     | ↔                                          |
| Altoona                                    | ↔                         | ↑                                     | ↑                                          |
| Ankeny                                     | ↔                         | ↑                                     | ↑                                          |
| Ankeny Community School District           | ↔                         | ↔                                     | ↔                                          |
| Bondurant                                  | ↔                         | ↑                                     | ↑                                          |
| Bondurant-Farrar Community School District | ↔                         | ↔                                     | ↔                                          |
| Clive                                      | ↔                         | ↑                                     | ↑                                          |
| Delaware Township                          | ↔                         | ↔                                     | ↔                                          |
| Des Moines                                 | ↔                         | ↑                                     | ↑                                          |
| Des Moines Independent School District     | ↔                         | ↔                                     | ↔                                          |
| Des Moines Water Works                     | ↔                         | ↔                                     | ↔                                          |
| Elkhart                                    | ↔                         | ↑                                     | ↑                                          |
| Grimes                                     | ↔                         | ↑                                     | ↑                                          |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                                           |                           |                                       |                                            |
|-------------------------------------------|---------------------------|---------------------------------------|--------------------------------------------|
| Johnston                                  |                           |                                       |                                            |
| Johnston Community School District        |                           |                                       |                                            |
| Mitchellville                             |                           |                                       |                                            |
| North Polk Community School District      |                           |                                       |                                            |
| Pleasant Hill                             |                           |                                       |                                            |
| Polk City                                 |                           |                                       |                                            |
| Runnells                                  |                           |                                       |                                            |
| Saylor Township                           |                           |                                       |                                            |
| Southeast Polk Community School District  |                           |                                       |                                            |
| Urbandale                                 |                           |                                       |                                            |
| Urbandale Community School District       |                           |                                       |                                            |
| West Des Moines                           |                           |                                       |                                            |
| West Des Moines Community School District |                           |                                       |                                            |
| Windsor Heights                           |                           |                                       |                                            |
| <b>Extreme Temperatures</b>               |                           |                                       |                                            |
| <b>Jurisdiction</b>                       | <b>Changes in Climate</b> | <b>Changes in Population Patterns</b> | <b>Changes in Land Use and Development</b> |
| Polk County                               |                           |                                       |                                            |
| Alleman                                   |                           |                                       |                                            |
| Altoona                                   |                           |                                       |                                            |
| Ankeny                                    |                           |                                       |                                            |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                                            |   |   |   |
|--------------------------------------------|---|---|---|
| Ankeny Community School District           | ↑ | ↔ | ↔ |
| Bondurant                                  | ↑ | ↑ | ↔ |
| Bondurant-Farrar Community School District | ↑ | ↔ | ↔ |
| Clive                                      | ↑ | ↑ | ↔ |
| Delaware Township                          | ↑ | ↔ | ↔ |
| Des Moines                                 | ↑ | ↑ | ↔ |
| Des Moines Independent School District     | ↑ | ↔ | ↔ |
| Des Moines Water Works                     | ↑ | ↔ | ↔ |
| Elkhart                                    | ↑ | ↑ | ↔ |
| Grimes                                     | ↑ | ↑ | ↔ |
| Johnston                                   | ↑ | ↑ | ↔ |
| Johnston Community School District         | ↑ | ↔ | ↔ |
| Mitchellville                              | ↑ | ↑ | ↔ |
| North Polk Community School District       | ↑ | ↔ | ↔ |
| Pleasant Hill                              | ↑ | ↑ | ↔ |
| Polk City                                  | ↑ | ↑ | ↔ |
| Runnells                                   | ↑ | ↓ | ↔ |
| Saylor Township                            | ↑ | ↓ | ↔ |
| Southeast Polk Community School District   | ↑ | ↔ | ↔ |
| Urbandale                                  | ↑ | ↑ | ↔ |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                                            |                                                                                     |                                                                                     |                                                                                       |
|--------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Urbandale Community School District        |    |    |    |
| West Des Moines                            |    |    |    |
| West Des Moines Community School District  |    |    |    |
| Windsor Heights                            |    |    |    |
| <b>Flash Flooding</b>                      |                                                                                     |                                                                                     |                                                                                       |
| <b>Jurisdiction</b>                        | <b>Changes in Climate</b>                                                           | <b>Changes in Population Patterns</b>                                               | <b>Changes in Land Use and Development</b>                                            |
| Polk County                                |    |    |    |
| Alleman                                    |    |    |    |
| Altoona                                    |    |    |    |
| Ankeny                                     |  |  |  |
| Ankeny Community School District           |  |  |  |
| Bondurant                                  |  |  |  |
| Bondurant-Farrar Community School District |  |  |  |
| Clive                                      |  |  |  |
| Delaware Township                          |  |  |  |
| Des Moines                                 |  |  |  |
| Des Moines Independent School District     |  |  |  |
| Des Moines Water Works                     |  |  |  |
| Elkhart                                    |  |  |  |
| Grimes                                     |  |  |  |



### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                                           |                           |                                       |                                            |
|-------------------------------------------|---------------------------|---------------------------------------|--------------------------------------------|
| Johnston                                  | ↑                         | ↑                                     | ↑                                          |
| Johnston Community School District        | ↑                         | ↔                                     | ↔                                          |
| Mitchellville                             | ↑                         | ↑                                     | ↑                                          |
| North Polk Community School District      | ↑                         | ↔                                     | ↔                                          |
| Pleasant Hill                             | ↑                         | ↑                                     | ↑                                          |
| Polk City                                 | ↑                         | ↑                                     | ↑                                          |
| Runnells                                  | ↑                         | ↓                                     | ↔                                          |
| Saylor Township                           | ↑                         | ↓                                     | ↔                                          |
| Southeast Polk Community School District  | ↑                         | ↔                                     | ↔                                          |
| Urbandale                                 | ↑                         | ↑                                     | ↑                                          |
| Urbandale Community School District       | ↑                         | ↔                                     | ↔                                          |
| West Des Moines                           | ↑                         | ↑                                     | ↑                                          |
| West Des Moines Community School District | ↑                         | ↔                                     | ↔                                          |
| Windsor Heights                           | ↑                         | ↑                                     | ↑                                          |
| <b>Grass or Wildland Fire</b>             |                           |                                       |                                            |
| <b>Jurisdiction</b>                       | <b>Changes in Climate</b> | <b>Changes in Population Patterns</b> | <b>Changes in Land Use and Development</b> |
| Polk County                               | ↑                         | ↑                                     | ↑                                          |
| Alleman                                   | ↑                         | ↓                                     | ↑                                          |
| Altoona                                   | ↑                         | ↑                                     | ↔                                          |
| Ankeny                                    | ↑                         | ↑                                     | ↑                                          |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                                            |   |   |   |
|--------------------------------------------|---|---|---|
| Ankeny Community School District           | ↑ | ↔ | ↔ |
| Bondurant                                  | ↑ | ↑ | ↑ |
| Bondurant-Farrar Community School District | ↑ | ↔ | ↔ |
| Clive                                      | ↑ | ↑ | ↑ |
| Delaware Township                          | ↑ | ↔ | ↔ |
| Des Moines                                 | ↑ | ↑ | ↑ |
| Des Moines Independent School District     | ↑ | ↔ | ↔ |
| Des Moines Water Works                     | ↑ | ↔ | ↔ |
| Elkhart                                    | ↑ | ↑ | ↑ |
| Grimes                                     | ↑ | ↑ | ↑ |
| Johnston                                   | ↑ | ↑ | ↑ |
| Johnston Community School District         | ↑ | ↔ | ↔ |
| Mitchellville                              | ↑ | ↑ | ↑ |
| North Polk Community School District       | ↑ | ↔ | ↔ |
| Pleasant Hill                              | ↑ | ↑ | ↑ |
| Polk City                                  | ↑ | ↑ | ↑ |
| Runnells                                   | ↑ | ↓ | ↔ |
| Saylor Township                            | ↑ | ↓ | ↔ |
| Southeast Polk Community School District   | ↑ | ↔ | ↔ |
| Urbandale                                  | ↑ | ↑ | ↑ |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                                            |                                                                                     |                                                                                     |                                                                                       |
|--------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Urbandale Community School District        |    |    |    |
| West Des Moines                            |    |    |    |
| West Des Moines Community School District  |    |    |    |
| Windsor Heights                            |    |    |    |
| <b>Hazardous Materials Incident</b>        |                                                                                     |                                                                                     |                                                                                       |
| <b>Jurisdiction</b>                        | <b>Changes in Climate</b>                                                           | <b>Changes in Population Patterns</b>                                               | <b>Changes in Land Use and Development</b>                                            |
| Polk County                                |    |    |    |
| Alleman                                    |    |    |    |
| Altoona                                    |    |    |    |
| Ankeny                                     |   |   |   |
| Ankeny Community School District           |  |  |  |
| Bondurant                                  |  |  |  |
| Bondurant-Farrar Community School District |  |  |  |
| Clive                                      |  |  |  |
| Delaware Township                          |  |  |  |
| Des Moines                                 |  |  |  |
| Des Moines Independent School District     |  |  |  |
| Des Moines Water Works                     |  |  |  |
| Elkhart                                    |  |  |  |
| Grimes                                     |  |  |  |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                                           |                           |                                       |                                            |
|-------------------------------------------|---------------------------|---------------------------------------|--------------------------------------------|
| Johnston                                  |                           |                                       |                                            |
| Johnston Community School District        |                           |                                       |                                            |
| Mitchellville                             |                           |                                       |                                            |
| North Polk Community School District      |                           |                                       |                                            |
| Pleasant Hill                             |                           |                                       |                                            |
| Polk City                                 |                           |                                       |                                            |
| Runnells                                  |                           |                                       |                                            |
| Saylor Township                           |                           |                                       |                                            |
| Southeast Polk Community School District  |                           |                                       |                                            |
| Urbandale                                 |                           |                                       |                                            |
| Urbandale Community School District       |                           |                                       |                                            |
| West Des Moines                           |                           |                                       |                                            |
| West Des Moines Community School District |                           |                                       |                                            |
| Windsor Heights                           |                           |                                       |                                            |
| <b>Human Disease</b>                      |                           |                                       |                                            |
| <b>Jurisdiction</b>                       | <b>Changes in Climate</b> | <b>Changes in Population Patterns</b> | <b>Changes in Land Use and Development</b> |
| Polk County                               |                           |                                       |                                            |
| Alleman                                   |                           |                                       |                                            |
| Altoona                                   |                           |                                       |                                            |
| Ankeny                                    |                           |                                       |                                            |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                                            |   |   |   |
|--------------------------------------------|---|---|---|
| Ankeny Community School District           | ↔ | ↔ | ↔ |
| Bondurant                                  | ↔ | ↑ | ↔ |
| Bondurant-Farrar Community School District | ↔ | ↔ | ↔ |
| Clive                                      | ↔ | ↑ | ↔ |
| Delaware Township                          | ↔ | ↔ | ↔ |
| Des Moines                                 | ↔ | ↑ | ↔ |
| Des Moines Independent School District     | ↔ | ↔ | ↔ |
| Des Moines Water Works                     | ↔ | ↔ | ↔ |
| Elkhart                                    | ↔ | ↑ | ↔ |
| Grimes                                     | ↔ | ↑ | ↔ |
| Johnston                                   | ↔ | ↑ | ↔ |
| Johnston Community School District         | ↔ | ↔ | ↔ |
| Mitchellville                              | ↔ | ↑ | ↔ |
| North Polk Community School District       | ↔ | ↔ | ↔ |
| Pleasant Hill                              | ↔ | ↑ | ↔ |
| Polk City                                  | ↔ | ↑ | ↔ |
| Runnells                                   | ↔ | ↓ | ↔ |
| Saylor Township                            | ↔ | ↓ | ↔ |
| Southeast Polk Community School District   | ↔ | ↔ | ↔ |
| Urbandale                                  | ↔ | ↑ | ↔ |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                                            |                           |                                       |                                            |
|--------------------------------------------|---------------------------|---------------------------------------|--------------------------------------------|
| Urbandale Community School District        | ↔                         | ↔                                     | ↔                                          |
| West Des Moines                            | ↔                         | ↑                                     | ↔                                          |
| West Des Moines Community School District  | ↔                         | ↔                                     | ↔                                          |
| Windsor Heights                            | ↔                         | ↑                                     | ↔                                          |
| <b>Infrastructure Failure</b>              |                           |                                       |                                            |
| <b>Jurisdiction</b>                        | <b>Changes in Climate</b> | <b>Changes in Population Patterns</b> | <b>Changes in Land Use and Development</b> |
| Polk County                                | ↔                         | ↑                                     | ↑                                          |
| Alleman                                    | ↔                         | ↓                                     | ↔                                          |
| Altoona                                    | ↔                         | ↑                                     | ↑                                          |
| Ankeny                                     | ↔                         | ↑                                     | ↑                                          |
| Ankeny Community School District           | ↔                         | ↔                                     | ↔                                          |
| Bondurant                                  | ↔                         | ↑                                     | ↑                                          |
| Bondurant-Farrar Community School District | ↔                         | ↔                                     | ↔                                          |
| Clive                                      | ↔                         | ↑                                     | ↑                                          |
| Delaware Township                          | ↔                         | ↔                                     | ↔                                          |
| Des Moines                                 | ↔                         | ↑                                     | ↑                                          |
| Des Moines Independent School District     | ↔                         | ↔                                     | ↔                                          |
| Des Moines Water Works                     | ↔                         | ↔                                     | ↔                                          |
| Elkhart                                    | ↔                         | ↑                                     | ↑                                          |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                                           |                           |                                       |                                            |
|-------------------------------------------|---------------------------|---------------------------------------|--------------------------------------------|
| Grimes                                    | ↔                         | ↑                                     | ↑                                          |
| Johnston                                  | ↔                         | ↑                                     | ↑                                          |
| Johnston Community School District        | ↔                         | ↔                                     | ↔                                          |
| Mitchellville                             | ↔                         | ↑                                     | ↑                                          |
| North Polk Community School District      | ↔                         | ↔                                     | ↔                                          |
| Pleasant Hill                             | ↔                         | ↑                                     | ↑                                          |
| Polk City                                 | ↔                         | ↑                                     | ↑                                          |
| Runnells                                  | ↔                         | ↓                                     | ↔                                          |
| Saylor Township                           | ↔                         | ↓                                     | ↔                                          |
| Southeast Polk Community School District  | ↔                         | ↔                                     | ↔                                          |
| Urbandale                                 | ↔                         | ↑                                     | ↑                                          |
| Urbandale Community School District       | ↔                         | ↔                                     | ↔                                          |
| West Des Moines                           | ↔                         | ↑                                     | ↑                                          |
| West Des Moines Community School District | ↔                         | ↔                                     | ↔                                          |
| Windsor Heights                           | ↔                         | ↑                                     | ↑                                          |
| <b>Levee Failure</b>                      |                           |                                       |                                            |
| <b>Jurisdiction</b>                       | <b>Changes in Climate</b> | <b>Changes in Population Patterns</b> | <b>Changes in Land Use and Development</b> |
| Polk County                               | ↔                         | ↑                                     | ↑                                          |
| Alleman                                   | ↔                         | ↔                                     | ↔                                          |



### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                                            |                                                                                     |                                                                                     |                                                                                       |
|--------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Altoona                                    |    |    |    |
| Ankeny                                     |    |    |    |
| Ankeny Community School District           |    |    |    |
| Bondurant                                  |    |    |    |
| Bondurant-Farrar Community School District |    |    |    |
| Clive                                      |    |    |    |
| Delaware Township                          |    |    |    |
| Des Moines                                 |    |    |    |
| Des Moines Independent School District     |   |   |   |
| Des Moines Water Works                     |  |  |  |
| Elkhart                                    |  |  |  |
| Grimes                                     |  |  |  |
| Johnston                                   |  |  |  |
| Johnston Community School District         |  |  |  |
| Mitchellville                              |  |  |  |
| North Polk Community School District       |  |  |  |
| Pleasant Hill                              |  |  |  |
| Polk City                                  |  |  |  |
| Runnells                                   |  |  |  |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                                            |                           |                                       |                                            |
|--------------------------------------------|---------------------------|---------------------------------------|--------------------------------------------|
| Saylor Township                            | ↔                         | ↔                                     | ↔                                          |
| Southeast Polk Community School District   | ↔                         | ↔                                     | ↔                                          |
| Urbandale                                  | ↔                         | ↔                                     | ↔                                          |
| Urbandale Community School District        | ↔                         | ↔                                     | ↔                                          |
| West Des Moines                            | ↔                         | ↑                                     | ↑                                          |
| West Des Moines Community School District  | ↔                         | ↔                                     | ↔                                          |
| Windsor Heights                            | ↔                         | ↔                                     | ↔                                          |
| <b>River Flooding</b>                      |                           |                                       |                                            |
| <b>Jurisdiction</b>                        | <b>Changes in Climate</b> | <b>Changes in Population Patterns</b> | <b>Changes in Land Use and Development</b> |
| Polk County                                | ↑                         | ↑                                     | ↑                                          |
| Alleman                                    | ↑                         | ↓                                     | ↔                                          |
| Altoona                                    | ↑                         | ↑                                     | ↑                                          |
| Ankeny                                     | ↑                         | ↑                                     | ↑                                          |
| Ankeny Community School District           | ↑                         | ↔                                     | ↔                                          |
| Bondurant                                  | ↑                         | ↑                                     | ↑                                          |
| Bondurant-Farrar Community School District | ↑                         | ↔                                     | ↔                                          |
| Clive                                      | ↑                         | ↑                                     | ↑                                          |
| Delaware Township                          | ↑                         | ↔                                     | ↔                                          |
| Des Moines                                 | ↑                         | ↑                                     | ↑                                          |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                                           |                                                                                     |                                                                                     |                                                                                       |
|-------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Des Moines Independent School District    |    |    |    |
| Des Moines Water Works                    |    |    |    |
| Elkhart                                   |    |    |    |
| Grimes                                    |    |    |    |
| Johnston                                  |    |    |    |
| Johnston Community School District        |    |    |    |
| Mitchellville                             |    |    |    |
| North Polk Community School District      |    |    |    |
| Pleasant Hill                             |    |    |    |
| Polk City                                 |   |   |   |
| Runnells                                  |  |  |  |
| Saylor Township                           |  |  |  |
| Southeast Polk Community School District  |  |  |  |
| Urbandale                                 |  |  |  |
| Urbandale Community School District       |  |  |  |
| West Des Moines                           |  |  |  |
| West Des Moines Community School District |  |  |  |
| Windsor Heights                           |  |  |  |
| Sinkholes/Landslides                      |                                                                                     |                                                                                     |                                                                                       |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

| Jurisdiction                               | Changes in Climate | Changes in Population Patterns | Changes in Land Use and Development |
|--------------------------------------------|--------------------|--------------------------------|-------------------------------------|
| Polk County                                | ↔                  | ↑                              | ↑                                   |
| Alleman                                    | ↔                  | ↓                              | ↔                                   |
| Altoona                                    | ↔                  | ↑                              | ↑                                   |
| Ankeny                                     | ↔                  | ↑                              | ↑                                   |
| Ankeny Community School District           | ↔                  | ↔                              | ↔                                   |
| Bondurant                                  | ↔                  | ↑                              | ↑                                   |
| Bondurant-Farrar Community School District | ↔                  | ↔                              | ↔                                   |
| Clive                                      | ↔                  | ↑                              | ↑                                   |
| Delaware Township                          | ↔                  | ↔                              | ↔                                   |
| Des Moines                                 | ↔                  | ↑                              | ↑                                   |
| Des Moines Independent School District     | ↔                  | ↔                              | ↔                                   |
| Des Moines Water Works                     | ↔                  | ↔                              | ↔                                   |
| Elkhart                                    | ↔                  | ↑                              | ↑                                   |
| Grimes                                     | ↔                  | ↑                              | ↑                                   |
| Johnston                                   | ↔                  | ↑                              | ↑                                   |
| Johnston Community School District         | ↔                  | ↔                              | ↔                                   |
| Mitchellville                              | ↔                  | ↑                              | ↑                                   |
| North Polk Community School District       | ↔                  | ↔                              | ↔                                   |
| Pleasant Hill                              | ↔                  | ↑                              | ↑                                   |
| Polk City                                  | ↔                  | ↑                              | ↑                                   |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                                            |                           |                                       |                                            |
|--------------------------------------------|---------------------------|---------------------------------------|--------------------------------------------|
| Runnells                                   | ↔                         | ↓                                     | ↔                                          |
| Saylor Township                            | ↔                         | ↓                                     | ↔                                          |
| Southeast Polk Community School District   | ↔                         | ↔                                     | ↔                                          |
| Urbandale                                  | ↔                         | ↑                                     | ↑                                          |
| Urbandale Community School District        | ↔                         | ↔                                     | ↔                                          |
| West Des Moines                            | ↔                         | ↑                                     | ↑                                          |
| West Des Moines Community School District  | ↔                         | ↔                                     | ↔                                          |
| Windsor Heights                            | ↔                         | ↑                                     | ↑                                          |
| <b>Structural Fire</b>                     |                           |                                       |                                            |
| <b>Jurisdiction</b>                        | <b>Changes in Climate</b> | <b>Changes in Population Patterns</b> | <b>Changes in Land Use and Development</b> |
| Polk County                                | ↔                         | ↑                                     | ↑                                          |
| Alleman                                    | ↔                         | ↓                                     | ↔                                          |
| Altoona                                    | ↔                         | ↑                                     | ↑                                          |
| Ankeny                                     | ↔                         | ↑                                     | ↑                                          |
| Ankeny Community School District           | ↔                         | ↔                                     | ↔                                          |
| Bondurant                                  | ↔                         | ↑                                     | ↑                                          |
| Bondurant-Farrar Community School District | ↔                         | ↔                                     | ↔                                          |
| Clive                                      | ↔                         | ↑                                     | ↑                                          |
| Delaware Township                          | ↔                         | ↔                                     | ↔                                          |
| Des Moines                                 | ↔                         | ↑                                     | ↑                                          |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                                           |   |   |   |
|-------------------------------------------|---|---|---|
| Des Moines Independent School District    | ↔ | ↔ | ↔ |
| Des Moines Water Works                    | ↔ | ↔ | ↔ |
| Elkhart                                   | ↔ | ↑ | ↑ |
| Grimes                                    | ↔ | ↑ | ↑ |
| Johnston                                  | ↔ | ↑ | ↑ |
| Johnston Community School District        | ↔ | ↔ | ↔ |
| Mitchellville                             | ↔ | ↑ | ↑ |
| North Polk Community School District      | ↔ | ↔ | ↔ |
| Pleasant Hill                             | ↔ | ↑ | ↑ |
| Polk City                                 | ↔ | ↑ | ↑ |
| Runnells                                  | ↔ | ↓ | ↔ |
| Saylor Township                           | ↔ | ↓ | ↔ |
| Southeast Polk Community School District  | ↔ | ↔ | ↔ |
| Urbandale                                 | ↔ | ↑ | ↑ |
| Urbandale Community School District       | ↔ | ↔ | ↔ |
| West Des Moines                           | ↔ | ↑ | ↑ |
| West Des Moines Community School District | ↔ | ↔ | ↔ |
| Windsor Heights                           | ↔ | ↑ | ↑ |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

| Thunderstorm with Lightning and Hail       |                    |                                |                                     |
|--------------------------------------------|--------------------|--------------------------------|-------------------------------------|
| Jurisdiction                               | Changes in Climate | Changes in Population Patterns | Changes in Land Use and Development |
| Polk County                                | ↑                  | ↑                              | ↑                                   |
| Alleman                                    | ↑                  | ↓                              | ↔                                   |
| Altoona                                    | ↑                  | ↑                              | ↑                                   |
| Ankeny                                     | ↑                  | ↑                              | ↑                                   |
| Ankeny Community School District           | ↑                  | ↔                              | ↔                                   |
| Bondurant                                  | ↑                  | ↑                              | ↑                                   |
| Bondurant-Farrar Community School District | ↑                  | ↔                              | ↔                                   |
| Clive                                      | ↑                  | ↑                              | ↑                                   |
| Delaware Township                          | ↑                  | ↔                              | ↔                                   |
| Des Moines                                 | ↑                  | ↑                              | ↑                                   |
| Des Moines Independent School District     | ↑                  | ↔                              | ↔                                   |
| Des Moines Water Works                     | ↑                  | ↔                              | ↔                                   |
| Elkhart                                    | ↑                  | ↑                              | ↑                                   |
| Grimes                                     | ↑                  | ↑                              | ↑                                   |
| Johnston                                   | ↑                  | ↑                              | ↑                                   |
| Johnston Community School District         | ↑                  | ↔                              | ↔                                   |
| Mitchellville                              | ↑                  | ↑                              | ↑                                   |
| North Polk Community School District       | ↑                  | ↔                              | ↔                                   |
| Pleasant Hill                              | ↑                  | ↑                              | ↑                                   |



### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                                            |                                                                                     |                                                                                     |                                                                                       |
|--------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Polk City                                  |    |    |    |
| Runnells                                   |    |    |    |
| Saylor Township                            |    |    |    |
| Southeast Polk Community School District   |    |    |    |
| Urbandale                                  |    |    |    |
| Urbandale Community School District        |    |    |    |
| West Des Moines                            |    |    |    |
| West Des Moines Community School District  |    |    |    |
| Windsor Heights                            |   |   |   |
| <b>Tornado</b>                             |                                                                                     |                                                                                     |                                                                                       |
| <b>Jurisdiction</b>                        | <b>Changes in Climate</b>                                                           | <b>Changes in Population Patterns</b>                                               | <b>Changes in Land Use and Development</b>                                            |
| Polk County                                |  |  |  |
| Alleman                                    |  |  |  |
| Altoona                                    |  |  |  |
| Ankeny                                     |  |  |  |
| Ankeny Community School District           |  |  |  |
| Bondurant                                  |  |  |  |
| Bondurant-Farrar Community School District |  |  |  |
| Clive                                      |  |  |  |
| Delaware Township                          |  |  |  |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                                           |   |   |   |
|-------------------------------------------|---|---|---|
| Des Moines                                | ↔ | ↑ | ↑ |
| Des Moines Independent School District    | ↔ | ↔ | ↔ |
| Des Moines Water Works                    | ↔ | ↔ | ↔ |
| Elkhart                                   | ↔ | ↑ | ↑ |
| Grimes                                    | ↔ | ↑ | ↑ |
| Johnston                                  | ↔ | ↑ | ↑ |
| Johnston Community School District        | ↔ | ↔ | ↔ |
| Mitchellville                             | ↔ | ↑ | ↑ |
| North Polk Community School District      | ↔ | ↔ | ↔ |
| Pleasant Hill                             | ↔ | ↑ | ↑ |
| Polk City                                 | ↔ | ↑ | ↑ |
| Runnells                                  | ↔ | ↓ | ↔ |
| Saylor Township                           | ↔ | ↓ | ↔ |
| Southeast Polk Community School District  | ↔ | ↔ | ↔ |
| Urbandale                                 | ↔ | ↑ | ↑ |
| Urbandale Community School District       | ↔ | ↔ | ↔ |
| West Des Moines                           | ↔ | ↑ | ↑ |
| West Des Moines Community School District | ↔ | ↔ | ↔ |
| Windsor Heights                           | ↔ | ↑ | ↑ |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

| Transportation Incident                    |                    |                                |                                     |
|--------------------------------------------|--------------------|--------------------------------|-------------------------------------|
| Jurisdiction                               | Changes in Climate | Changes in Population Patterns | Changes in Land Use and Development |
| Polk County                                | ↔                  | ↑                              | ↑                                   |
| Alleman                                    | ↔                  | ↑                              | ↔                                   |
| Altoona                                    | ↔                  | ↑                              | ↑                                   |
| Ankeny                                     | ↔                  | ↑                              | ↑                                   |
| Ankeny Community School District           | ↔                  | ↔                              | ↔                                   |
| Bondurant                                  | ↔                  | ↑                              | ↑                                   |
| Bondurant-Farrar Community School District | ↔                  | ↔                              | ↔                                   |
| Clive                                      | ↔                  | ↑                              | ↑                                   |
| Delaware Township                          | ↔                  | ↔                              | ↔                                   |
| Des Moines                                 | ↔                  | ↑                              | ↑                                   |
| Des Moines Independent School District     | ↔                  | ↔                              | ↔                                   |
| Des Moines Water Works                     | ↔                  | ↔                              | ↔                                   |
| Elkhart                                    | ↔                  | ↑                              | ↑                                   |
| Grimes                                     | ↔                  | ↑                              | ↑                                   |
| Johnston                                   | ↔                  | ↑                              | ↑                                   |
| Johnston Community School District         | ↔                  | ↔                              | ↔                                   |
| Mitchellville                              | ↔                  | ↑                              | ↑                                   |
| North Polk Community School District       | ↔                  | ↔                              | ↔                                   |
| Pleasant Hill                              | ↔                  | ↑                              | ↑                                   |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                                            |                           |                                       |                                            |
|--------------------------------------------|---------------------------|---------------------------------------|--------------------------------------------|
| Polk City                                  | ↔                         | ↑                                     | ↑                                          |
| Runnells                                   | ↔                         | ↓                                     | ↑                                          |
| Saylor Township                            | ↔                         | ↓                                     | ↑                                          |
| Southeast Polk Community School District   | ↔                         | ↔                                     | ↔                                          |
| Urbandale                                  | ↔                         | ↑                                     | ↑                                          |
| Urbandale Community School District        | ↔                         | ↔                                     | ↔                                          |
| West Des Moines                            | ↔                         | ↑                                     | ↑                                          |
| West Des Moines Community School District  | ↔                         | ↔                                     | ↔                                          |
| Windsor Heights                            | ↔                         | ↑                                     | ↑                                          |
| <b>Windstorm</b>                           |                           |                                       |                                            |
| <b>Jurisdiction</b>                        | <b>Changes in Climate</b> | <b>Changes in Population Patterns</b> | <b>Changes in Land Use and Development</b> |
| Polk County                                | ↔                         | ↑                                     | ↑                                          |
| Alleman                                    | ↔                         | ↓                                     | ↔                                          |
| Altoona                                    | ↔                         | ↑                                     | ↑                                          |
| Ankeny                                     | ↔                         | ↑                                     | ↑                                          |
| Ankeny Community School District           | ↔                         | ↔                                     | ↔                                          |
| Bondurant                                  | ↔                         | ↑                                     | ↑                                          |
| Bondurant-Farrar Community School District | ↔                         | ↔                                     | ↔                                          |
| Clive                                      | ↔                         | ↑                                     | ↑                                          |
| Delaware Township                          | ↔                         | ↔                                     | ↔                                          |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                                           |   |   |   |
|-------------------------------------------|---|---|---|
| Des Moines                                | ↔ | ↑ | ↑ |
| Des Moines Independent School District    | ↔ | ↔ | ↔ |
| Des Moines Water Works                    | ↔ | ↔ | ↔ |
| Elkhart                                   | ↔ | ↑ | ↑ |
| Grimes                                    | ↔ | ↑ | ↑ |
| Johnston                                  | ↔ | ↑ | ↑ |
| Johnston Community School District        | ↔ | ↔ | ↔ |
| Mitchellville                             | ↔ | ↑ | ↑ |
| North Polk Community School District      | ↔ | ↔ | ↔ |
| Pleasant Hill                             | ↔ | ↑ | ↑ |
| Polk City                                 | ↔ | ↑ | ↑ |
| Runnells                                  | ↔ | ↓ | ↔ |
| Saylor Township                           | ↔ | ↓ | ↔ |
| Southeast Polk Community School District  | ↔ | ↔ | ↔ |
| Urbandale                                 | ↔ | ↑ | ↑ |
| Urbandale Community School District       | ↔ | ↔ | ↔ |
| West Des Moines                           | ↔ | ↑ | ↑ |
| West Des Moines Community School District | ↔ | ↔ | ↔ |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                                            |                                                                                     |                                                                                     |                                                                                       |
|--------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Windsor Heights                            |    |    |    |
| <b>Winter Storm</b>                        |                                                                                     |                                                                                     |                                                                                       |
| <b>Jurisdiction</b>                        | <b>Changes in Climate</b>                                                           | <b>Changes in Population Patterns</b>                                               | <b>Changes in Land Use and Development</b>                                            |
| Polk County                                |    |    |    |
| Alleman                                    |    |    |    |
| Altoona                                    |    |    |    |
| Ankeny                                     |    |    |    |
| Ankeny Community School District           |    |    |    |
| Bondurant                                  |    |    |    |
| Bondurant-Farrar Community School District |  |  |  |
| Clive                                      |  |  |  |
| Delaware Township                          |  |  |  |
| Des Moines                                 |  |  |  |
| Des Moines Independent School District     |  |  |  |
| Des Moines Water Works                     |  |  |  |
| Elkhart                                    |  |  |  |
| Grimes                                     |  |  |  |
| Johnston                                   |  |  |  |
| Johnston Community School District         |  |  |  |
| Mitchellville                              |  |  |  |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

|                                           |                                                                                   |                                                                                   |                                                                                     |
|-------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| North Polk Community School District      |  |  |  |
| Pleasant Hill                             |  |  |  |
| Polk City                                 |  |  |  |
| Runnells                                  |  |  |  |
| Saylor Township                           |  |  |  |
| Southeast Polk Community School District  |  |  |  |
| Urbandale                                 |  |  |  |
| Urbandale Community School District       |  |  |  |
| West Des Moines                           |  |  |  |
| West Des Moines Community School District |  |  |  |
| Windsor Heights                           |  |  |  |



### 3.5 CONSEQUENCE ANALYSIS SUMMARY

This section considers and articulates the impact of each hazard profiled in the Polk County, Iowa Hazard Mitigation Plan. This consequence analysis applies equally to all municipalities and other jurisdictions that participate in this plan.

**Table 131 – EMAP Consequence Analysis**

| Hazard                                 | Impacts on:                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                          |
|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                        | The Public                                                                                                                                                                                                                                                             | Responders                                                                                                                                                                                                                                                                                                                       | Continuity of Government                                                                                                                                                                                                                                                                                                                       | Property, Facilities, and Infrastructure                                                                                                                                                                                                                                                                                       | Environment                                                                                                                                                                                                                                                        | Economic Condition of the Jurisdiction                                                                                                                                                                                                                                  | Public Confidence in the Jurisdiction's Governance                                                                                                                                                                                       |
| <b>Animal, Plant, and Crop Disease</b> | The greatest potential consequence for the public of animal, plant, or crop disease is the food supply chain disruption that would occur if a crop or herd were infected with disease.                                                                                 | Impacts of animal, plant, and crop disease on responders are minimal.                                                                                                                                                                                                                                                            | Animal, Plant, and Crop diseases are not expected to impact continuity of government.                                                                                                                                                                                                                                                          | Animal, Plant, and Crop diseases are not expected to impact property, facilities, and infrastructure.                                                                                                                                                                                                                          | Animal, Plant, and Crop diseases can spread from domesticated to wild animals and plants, causing widespread damage. Animal and plant diseases have the potential to wipe out entire populations of animals and plants under the right circumstances.              | The greatest potential consequence for the economy of animal, plant, or crop disease is agricultural loss, which can be significant. Destroying unhealthy plants and animals can cause significant financial strain for agricultural interests.                         | Public confidence in governance would be minimally impacted by an outbreak of animal, plant, or crop disease that is short term in nature. However, significant or longer-term food supply impacts may erode public trust in government. |
| <b>Climate Change</b>                  | While climate change does not pose a <i>direct</i> threat to the public, it threatens to increase the severity of drought, extreme temperature, flooding, flash flooding, grass or wildland fire, river flooding, thunderstorm, tornado, windstorm, and winter storms. | While climate change does not pose a <i>direct</i> threat to responders, it threatens to increase the severity of drought, extreme temperature, flooding, flash flooding, grass or wildland fire, river flooding, thunderstorm, tornado, windstorm, and winter storms. See relevant sections of this table for more information. | While climate change does not pose a <i>direct</i> threat to continuity of government, it threatens to increase the severity of drought, extreme temperature, flooding, flash flooding, grass or wildland fire, river flooding, thunderstorm, tornado, windstorm, and winter storms. See relevant sections of this table for more information. | While climate change does not pose a <i>direct</i> threat to property, it threatens to increase the severity of drought, extreme temperature, flooding, flash flooding, grass or wildland fire, river flooding, thunderstorm, tornado, windstorm, and winter storms. See relevant sections of this table for more information. | Climate change is expected to negatively impact a wide variety of species of animals and plants, through reduction of suitable ecosystems to sustain them, changes to seasons that their life cycles depend on, and impacts to other species in their food chains. | While climate change does not pose a <i>direct</i> threat to the economy, it threatens to increase the severity of drought, extreme temperature, flooding, flash flooding, grass or wildland fire, river flooding, thunderstorm, tornado, windstorm, and winter storms. | Public trust in government could be negatively impacted by climate change if members of the public believe that any impacts could have been avoided if the government had taken different action(s) to prevent them.                     |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

| Hazard              | Impacts on:                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                             |                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     | The Public                                                                                                                                                                                                                                                             | Responders                                                                                                                                                                                                                                              | Continuity of Government                                                                                                                                                                                                                                                                | Property, Facilities, and Infrastructure                                                                                                                                                                                    | Environment                                                                                                                                                                                                 | Economic Condition of the Jurisdiction                                                                                                                                                                                                                          | Public Confidence in the Jurisdiction's Governance                                                                                                                                                                             |
|                     | See relevant sections of this table for more information.                                                                                                                                                                                                              |                                                                                                                                                                                                                                                         | table for more information.                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                             |                                                                                                                                                                                                             | See relevant sections of this table for more information.                                                                                                                                                                                                       |                                                                                                                                                                                                                                |
| <b>Cyber Attack</b> | The public faces significant consequences from cyber-attacks, which often target personal consumer information. Those impacts range from inconvenience to identity theft and direct financial loss.                                                                    | Impacts of cyber-attack on responders are minimal, unless that cyber-attack targeted a piece of infrastructure (see "infrastructure failure") or a critical facility like a fire or police station.                                                     | Cyber-attacks can significantly impede continuity of government when targeting government systems. Many American municipalities have been functionally shut down for days by hostile actors committing cyber-attacks.                                                                   | Impacts of cyber-attack on property and infrastructure are minimal, unless that directly targeting a piece of infrastructure (see "infrastructure failure").                                                                | Cyber-attacks are not expected to have an impact on the environment.                                                                                                                                        | Most cyber-attacks target individual people or companies, and do not have an impact on the economy. However, an attack targeting a piece of infrastructure could lead to infrastructure failure with wide economic consequences (see "infrastructure failure"). | Cyber-attacks (if directed at government infrastructure or services) could negatively impact public confidence in government if they believe that additional action should have been taken to prevent or respond to the event. |
| <b>Dam Failure</b>  | More than 40% of the population of Polk County lives in the inundation zones of the twelve high-hazard dams in Polk County, and a dam failure has the potential to cause widespread injury and fatality among this population, even though such a failure is unlikely. | Dam failure's primary impact is flooding, which can wash out roads and bridges and cause hazardous conditions for first responders. Those located directly in inundation zones are also vulnerably to physical injury or death in the event of failure. | Failure of a high hazard dam could damage government facilities, including some fire stations, EOCs, and police stations. It would also lead to likely long-term power outages in the affected area, both of which would impact the ability to continue delivering government services. | Significant and widespread damage to property, facilities, and infrastructure would occur in the event of a high hazard dam failure. The primary consequence would be due to flooding; see "flooding" for more information. | Potential environmental impacts of dam failure include damage to trees and vegetation, the loss of lake ecosystems and habitats, and the release of hazardous materials into the environment and waterways. | Large-scale dam failure would cause significant economic impacts. Property damage would occur at many residences that are not covered by flood insurance, due to their location outside of the mapped SFHA. See "flooding" for more information.                | If a high hazard dam were to fail, erosion of public trust would be expected, as the public is likely to blame the government for failing to maintain infrastructure and prevent the hazard from occurring.                    |
| <b>Drought</b>      | Consequences of drought on the public are typically indirect. Members of the public involved in                                                                                                                                                                        | Responders generally will not be directly impacted by drought. Possible reductions of water for firefighting purposes in                                                                                                                                | The county is unlikely to experience issues continuing operations and delivering services during drought.                                                                                                                                                                               | Persistent drought can directly impact the water and wastewater, energy, and agriculture sectors, which could                                                                                                               | Environmental consequences of drought are significant, as it reduces the                                                                                                                                    | Drought has moderate potential to impact the economy in Polk County, given its agricultural interests,                                                                                                                                                          | Public confidence in government will likely not be impacted by a drought event.                                                                                                                                                |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

| Hazard             | Impacts on:                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                           |                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                   |                                                                                                                                                                                                                                                              |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | The Public                                                                                                                                                                                                                                                                         | Responders                                                                                                                                                                                                                                                                                                                       | Continuity of Government                                                                                                                                                                                                                                  | Property, Facilities, and Infrastructure                                                                                                                                              | Environment                                                                                                                                                                                                                                                                                                                                                                  | Economic Condition of the Jurisdiction                                                                                                                                            | Public Confidence in the Jurisdiction's Governance                                                                                                                                                                                                           |
|                    | farming will be the most directly impacted by drought. If farms do not produce crops, the food supply is impacted. If water restrictions are implemented by government, residential lawns and gardens will be impacted in addition to agricultural interests.                      | extreme instances when supplemental water sources are not available could create operational stress and risk for firefighters.                                                                                                                                                                                                   |                                                                                                                                                                                                                                                           | cause cascading impacts to other sectors.                                                                                                                                             | availability of water, reduces crop yields, & impacts ecosystems. Drought can also impact the spread of crop and animal diseases and pests.                                                                                                                                                                                                                                  | particularly in extreme cases if major restrictions on water were to be placed on individuals and businesses.                                                                     | Droughts are common in Iowa.                                                                                                                                                                                                                                 |
| <b>Earthquakes</b> | Consequences to the public from a significant earthquake are numerous. Life safety would be at significant risk from building collapse. Homes and businesses could be destroyed, roadways and bridges could fail, and power, water, and sewer services may take months to restore. | Responders would face unique consequences from an earthquake event. Earthquakes can damage bridges and roadways, cause land to liquefy, spark fires, and damage hazardous material tanks. This could affect the availability of communications, power, water, or sewer, and responders may not be able to access impacted areas. | A major earthquake could directly impact or damage EOCs and other critical facilities, which could necessitate moving operations to alternate locations. Extended power outages and other utility disruptions would also impact continuity of operations. | Earthquakes have the potential to cause catastrophic consequence for property, facilities, and infrastructure, up to and including widespread structural collapses and road closures. | Environmental consequences from earthquakes are numerous. The ground motion and soil type may cause the ground to liquefy, causing underground storage tanks to surface or fail. Hazardous materials spills are common during earthquakes. In high magnitude earthquakes, trees will fall, underground pipes will break, and fires may spark, all impacting the environment. | The economy would be severely impacted by a major earthquake. Impacts to infrastructure would create significant challenges for companies doing business in and near Polk County. | Public confidence in government may suffer in the event of an earthquake. It may take several days or weeks to access the hardest hit areas. Debris may block roadways for weeks. Families may have to turn to public shelters if their homes are destroyed. |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

| Hazard                     | Impacts on:                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                     |                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                        |                                                                                             |                                                                                                                                                                 |                                                                                                |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
|                            | The Public                                                                                                                                                                                                                                                                                                                                                                  | Responders                                                                                                                                                                                                                          | Continuity of Government                                                                                                                                         | Property, Facilities, and Infrastructure                                                                                                                                                                                                                                                                                                               | Environment                                                                                 | Economic Condition of the Jurisdiction                                                                                                                          | Public Confidence in the Jurisdiction's Governance                                             |
| <b>Expansive Soils</b>     | Expansive soils are not expected to directly negatively impact people, except for those who own homes that experience gradual damage.                                                                                                                                                                                                                                       | Expansive soils are not expected to directly impact responders.                                                                                                                                                                     | Polk County does not expect expansive soils to cause issues maintaining continuity of government.                                                                | Expansive soils can cause gradual damage to buildings and infrastructure, including eroded, cracked, or lifted, foundations, ruptured underground service lines, and increased settling of structures.                                                                                                                                                 | Environmental consequences of expansive soils are minimal.                                  | The impact of expansive soils tends to be limited to individual residences, structures, or pieces of infrastructure, and is not expected to affect the economy. | Expansive soils are not expected to affect public confidence in the jurisdiction's governance. |
| <b>Extreme Temperature</b> | Extreme temperatures can create risks to human health and safety, and cause heat exhaustion, heat stroke, frostbite, and other injuries. Extreme temperature events can be particularly risky for the elderly, outdoor laborers, and residents without air conditioning or heat. Impacts of extreme temperatures can create stress on social service and medical providers. | Extreme temperatures can cause increased risk to responders based on physical exertion, protective gear, and the need for increased hydration. In extreme temperature conditions, caution should be exercised for first responders. | Extreme temperatures are unlikely to cause issues impacting continuing operations and delivering services unless they lead to extended electric utility outages. | Extreme temperatures place intense strain on the electrical grid and may cause or contribute to outages or blackouts, which can have cascading effects on all areas of critical infrastructure. Extreme cold can cause pipes to crack and break, resulting in water system leakages, water utility outages, and lack of fire suppression capabilities. | Extreme temperature events are not expected to have significant impacts on the environment. | Extreme temperatures early in the year can cause major damages to crops, impacting the local agricultural industry.                                             | Public confidence in government will likely not be impacted by an extreme temperature event.   |
| <b>Flash Flooding</b>      | The public may face extreme consequences from flash floods. Floods have the potential to                                                                                                                                                                                                                                                                                    | Debris removal and emergency response costs from flash flooding can be significant. Responders may face extreme                                                                                                                     | Many access roads may be impacted by flooding, and in an extreme event, EOCs and other critical facilities may become                                            | Flash flooding can cause widespread, significant damage to properties, facilities, and infrastructure. Property                                                                                                                                                                                                                                        | Environmental consequences of flash flooding are significant. Flash flooding can cause      | Flash flooding can have significant economic impacts, particularly in densely populated flash-flood-                                                            | Education and awareness are key components to maintaining public confidence in                 |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

| Hazard                        | Impacts on:                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                              |                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                           |                                                                                        |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
|                               | The Public                                                                                                                                                                                                                                                                                                                                                                                | Responders                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Continuity of Government                                                                                                                                                                                                     | Property, Facilities, and Infrastructure                                                                                                                                                                                    | Environment                                                                                                                                                                                                                                                                            | Economic Condition of the Jurisdiction                                                                                                                                                                                                                    | Public Confidence in the Jurisdiction's Governance                                     |
|                               | injure and kill people, especially those who drive through flooded roadways. Floods can destroy residences and businesses, and interrupt water, power, and sewer services necessary to return to a normal way of life. Whether residents have flood insurance or receive assistance or not, the recovery process from a flood may be costly and take weeks, months, or years to complete. | difficulties when responding to a flash flood event. Flash floods can destroy homes, businesses, and critical infrastructure such as EOCs, fire stations, and hospitals. Floods can wash out bridges and roadways, as well as destroy government buildings critical for response and recovery operations. Responders may have to perform swift water rescues to individuals trapped in flooded areas. Responders should be aware of their risks at all times. | inaccessible, even when not physically located in the SFHA. This may require municipal or county operations to move to alternate EOCs or function from secondary locations to maintain operations.                           | in the floodplain or other low-lying areas may be severely impacted or destroyed. Critical infrastructure like utilities, roadways, bridges, and Police, Fire, or EMS stations may be damaged or destroyed by floodwaters.  | sediments to enter the waterways, clogging water management systems & waterways downstream. Flash floods can bring hazardous materials or pollution into waterways via runoff. Riparian ecosystems are negatively impacted with the introduction of sediments, pollutants & nutrients. | prone areas. The additional impact of flash flooding on transportation, agriculture, business continuity, and government services is substantial. Federal grants can aid in recovery efforts and alleviate the overall economic impact of flash flooding. | governance during a flash flood, especially when managing extended recovery timelines. |
| <b>Grass or Wildland Fire</b> | The public will feel the direct consequences of a wildfire if their home or place of employment is in the wildfire impact area. Homes and businesses may be destroyed in a fire, utility service could be interrupted, and access to roadways may be limited. The public may also be impacted by air                                                                                      | Responders will be directly impacted by a wildfire. Wildfires may change directions quickly as the wind and environmental elements change. Wildfires are often difficult to control and may take numerous resources to do so. Inhalation of fumes may pose a health risk to firefighters.                                                                                                                                                                     | The county does not anticipate any issues maintaining operations and the delivery of services during a wildfire. In an event that directly impacts an EOC, temporarily operating from an alternate location may be required. | Property, facilities, and infrastructure in the wildfire zone will be significantly impacted. Homes and businesses may be destroyed in a fire, utility service could be interrupted, and access to roadways may be limited. | Although wildfires are a natural process, the environment may be negatively impacted. Not only are trees impacted by these fires, so are the native species of plants and animals. The smoke and ash from the fires can pollute waterways and our air.                                 | If a large fire does occur and cannot be controlled quickly, there could be a significant economic effect due to widespread property damage and impacts to businesses and their operations.                                                               | Public confidence in government will likely not be impacted by a wildfire event.       |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

| Hazard                     | Impacts on:                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                             |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                            | The Public                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Responders                                                                                                                                                                                                                                                                                                                                                         | Continuity of Government                                                                                                                                                                        | Property, Facilities, and Infrastructure                                                                                                                                                                                                                                                                                                           | Environment                                                                                                                                                                                                                                                                                                                                                  | Economic Condition of the Jurisdiction                                                                                                                                                                                            | Public Confidence in the Jurisdiction's Governance                                                                                                                                                                                                                                                                          |
|                            | pollution from the wildfires.                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                             |
| <b>Hazardous Materials</b> | The public could be immediately impacted by the consequences of a hazardous materials release, or spill. Hazmat releases can occur via many sources and in many locations including fixed facilities, roadway, and rail. The public may be impacted on roadways, at school, in homes, through the food supply, or in public venues (large stadiums, athletic events, movie theaters, etc.). The consequences of hazardous materials may be illness, injury, or death. | Responders face the immediate consequences of hazmat incidents. They must determine the type of material released or spilled and the appropriate response and cleanup of the material. A variety of responders are specially trained to deal with these incidences and they are provided protective gear to reduce their vulnerability to the hazardous materials. | Government facilities may be directly impacted by a hazmat release, spill, or terrorist act, impacting the ability to provide continued government services.                                    | Property, facilities, and infrastructure will be significantly impacted by a hazmat incident. Especially in the event of an explosion, homes, businesses, industries, and infrastructure may be damaged or destroyed. In addition, most mobile hazmat releases are caused by traffic accidents, which can destroy vehicles, roadways, and signage. | The environment is likely to experience significant consequences from a hazmat incident. Sensitive ecosystems could be destroyed or significantly disturbed. Hazardous materials can be quickly spread through water, air, or the food supply. Once hazardous materials are in environmental systems, it may take days, weeks, months, or years to clean up. | Depending on the size of the incident, the economy could experience enormous consequences. Hazmat spills on highways or releases at chemical facilities impact the economy if an industry or transportation routes are shut down. | Public confidence in governance may be impacted by a hazmat incident. In small, localized events, impacts on public confidence are unlikely. These events happen on a regular basis. In a major chemical release, radiological release, or terrorist incident, the public may be inclined to lose confidence in governance. |
| <b>Human Disease</b>       | Consequences to the public from a pandemic are vast. The public may experience temporary illness, long-term illness, or even death. Hospitals and doctor offices                                                                                                                                                                                                                                                                                                      | Responders may also feel the consequences of pandemics. They may be exposed to the risk and become ill. Responders may have to wear protective gear and receive vaccinations to mitigate their risk.                                                                                                                                                               | As demonstrated by COVID-19, a pandemic has the potential to impact the government operations. To prevent the spread of infectious disease, government agencies may move to virtual operations. | It is unlikely that the consequences of a pandemic would physically impact property, facilities, or infrastructure; however, a pandemic would impact personnel, potentially impacting                                                                                                                                                              | Consequences to the environment from a pandemic are unlikely. Unless the event is terrorism or hazmat related, there will be no direct impact. See hazmat for more information.                                                                                                                                                                              | The economic condition may be significantly impacted by a pandemic. If a significant percentage of the population becomes ill, they will not be able to go to work or spend money.                                                | Public confidence in governance may be minimally impacted by a public health emergency that is short term in nature. However, as demonstrated by the COVID-19 pandemic,                                                                                                                                                     |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

| Hazard                        | Impacts on:                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                              |                                                                                                                                                       |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                              |                                                                                                                                                                |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                               | The Public                                                                                                                                                                                                                                                                          | Responders                                                                                                                                                                                                                                                                                   | Continuity of Government                                                                                                                              | Property, Facilities, and Infrastructure                                                                                                                                                                                                             | Environment                                                                                                                                                                                                                          | Economic Condition of the Jurisdiction                                                                                                                                                                                                                                       | Public Confidence in the Jurisdiction's Governance                                                                                                             |
|                               | may become crowded, patients may experience long lines, and pharmaceuticals may be limited. The COVID-19 pandemic demonstrated the potential magnitude of the impact on the public in a significant way.                                                                            |                                                                                                                                                                                                                                                                                              |                                                                                                                                                       | the ability to properly service and maintain property, facilities, and infrastructure.                                                                                                                                                               |                                                                                                                                                                                                                                      | Outbreak-related movement restrictions also have the potential to significantly impact the economy. With vaccinations and early detection of pandemics and other public health issues, the impacts can be partially mitigated.                                               | long-term public health impacts and the inability of government to immediately eliminate them may erode public trust in government significantly.              |
| <b>Infrastructure Failure</b> | Infrastructure failure can have a wide variety of negative impacts on the public. Road and bridge failures can significantly lengthen commutes. Failure of utility or wastewater infrastructure can create public health hazards, especially during periods of extreme temperature. | Infrastructure failure creates challenges for responders. In road and bridge failures, responders will need to both manage traffic concerns and injuries, as well as navigate around inaccessible areas. Public health impacts of sanitary system failure could increase responder workload. | Infrastructure failure is not expected to impact continuity of government, except in the case of a wide-spread failure of telecommunications systems. | Infrastructure failure, fundamentally, has a negative impact on infrastructure. Additionally, power system failures can lead to the damage to other structures and infrastructure from the prolonged absence of climate control and other functions. | Infrastructure failure can lead to the release of debris into the environment, as well as the release of chemicals, hazardous materials, natural gas, or anything else traveling through that infrastructure at the time of failure. | Infrastructure failure has significant economic consequences. Rebuilding failed infrastructure is often prohibitively expensive, costs that may ultimately be borne by taxpayers. The economic impact of the loss of roads and bridges for shipping can also be significant. | Infrastructure failure that results from deferred or insufficient maintenance could severely erode public confidence in government.                            |
| <b>Levee Failure</b>          | Because the consequences of levee failure largely mirror that of flooding, the impacts to the public are largely the same as for river flooding; see "river flooding."                                                                                                              | The sudden release of water can pose immediate threats to life and property, necessitating urgent evacuation and rescue operations.                                                                                                                                                          | Levee failure could result in flooding impacts to critical facilities, which could impact continuity of government; see "river flooding."             | Levee failures can disrupt essential services such as electricity, water supply, and communication networks, both directly through physical damage and indirectly due to access issues. The                                                          | A levee failure can lead to environmental disasters, impacting water quality, wildlife habitats, and local ecosystems. Remediation and ecological restoration efforts may be                                                         | The economic impacts include the immediate costs of emergency response and infrastructure repairs, as well as longer-term effects on local economies due to business interruptions                                                                                           | If a levee were to fail, erosion of public trust would be expected, as the public is likely to blame the government for failing to maintain infrastructure and |



### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

| Hazard                        | Impacts on:                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                 |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                               | The Public                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Responders                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Continuity of Government                                                                                                                                                                                                                                                                                                       | Property, Facilities, and Infrastructure                                                                                                                                                                                                                                                                                             | Environment                                                                                                                                                                                                                                                                                                                                                                    | Economic Condition of the Jurisdiction                                                                                                                                                                                                                                                                                                                 | Public Confidence in the Jurisdiction's Governance                                                                                                              |
|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                | associated flooding can also damage residences and other facilities.                                                                                                                                                                                                                                                                 | required in the aftermath.                                                                                                                                                                                                                                                                                                                                                     | and loss of property. See "river flooding" for more information.                                                                                                                                                                                                                                                                                       | prevent the hazard from occurring.                                                                                                                              |
| <b>River Flooding</b>         | The public may face extreme consequences from flooding. Floods have the potential to injure and kill people, especially those who drive through flooded roadways. Floods can destroy residences and businesses, and interrupt water, power, and sewer services necessary to return to a normal way of life. Whether residents have flood insurance or receive assistance, the recovery process from a flood may be costly and take weeks, months, or years to complete. | Debris removal and emergency response costs from flooding can be significant. Responders may face extreme difficulties when responding to a flood event. Floods can destroy homes, businesses, and critical infrastructure such as EOCs, fire stations, and hospitals. Floods can wash out bridges and roadways, as well as destroy government buildings critical for response and recovery operations. Responders may have to perform swift water rescues to individuals trapped in flooded areas. Responders should be aware of their risks at all times. | Many access roads may be impacted by flooding, and in an extreme flood event, EOCs and other critical facilities may become inaccessible, even when not physically located in the SFHA. This may require municipal or county operations to move to alternate EOCs or function from secondary locations to maintain operations. | Flooding can cause widespread, significant damage to properties, facilities, and infrastructure. Property in the floodplain or other low-lying areas may be severely impacted or destroyed. Critical infrastructure like utilities, roadways, bridges, and Police, Fire, or EMS stations may be damaged or destroyed by floodwaters. | Environmental consequences of flooding are significant. Flooding may erode riverbeds, causing sediments to enter the waterways, clogging water management systems & waterways downstream. Floods can bring hazardous materials or pollution into waterways via runoff. Riparian ecosystems are negatively impacted with the introduction of sediments, pollutants & nutrients. | Flooding can have significant economic impacts, particularly in densely populated flood-prone areas and along rivers. The additional impact of flooding on transportation, agriculture, business continuity, and government services is substantial. Federal grants can aid in recovery efforts and alleviate the overall economic impact of flooding. | Education and awareness are key components to maintaining public confidence in governance during a flood, especially when managing extended recovery timelines. |
| <b>Sinkholes / Landslides</b> | Residents of Polk County are not likely to experience any impacts of sinkholes or landslides. There are no known reports of injuries from sinkholes and                                                                                                                                                                                                                                                                                                                 | Past occurrences of sinkholes and landslides have caused damage to infrastructure and roads, which can impact responders' ability to perform their duties.                                                                                                                                                                                                                                                                                                                                                                                                  | Polk County does not expect sinkholes or landslides to cause issues maintaining continuity of government.                                                                                                                                                                                                                      | The biggest impact of sinkholes and landslides in Polk County is minor, infrequent damage to infrastructure and roads.                                                                                                                                                                                                               | Environmental consequences of sinkholes and landslides are minimal. However, sinkholes can in some cases lead to water quality problems,                                                                                                                                                                                                                                       | Sinkholes can cause structural damage, but the impact area tends to be limited to individual residences, structures, or pieces of infrastructure. The biggest economic                                                                                                                                                                                 | Sinkholes and landslides are not expected to affect public confidence in the jurisdiction's governance.                                                         |

| Hazard          | Impacts on:                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                 |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                            |                                                                                  |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
|                 | The Public                                                                                                                                                                                                                       | Responders                                                                                                                                                                                                                                                        | Continuity of Government                                                                                                                                                                                                                                        | Property, Facilities, and Infrastructure                                                                                            | Environment                                                                                                                                                                                                                                                                                                                                                                                           | Economic Condition of the Jurisdiction                                                                                                                                                     | Public Confidence in the Jurisdiction's Governance                               |
|                 | related hazards in Polk County<br>However, sinkholes and landslides can damage roadways, inconveniencing residents.                                                                                                              |                                                                                                                                                                                                                                                                   | DRAFT                                                                                                                                                                                                                                                           |                                                                                                                                     | when surface waters are able to leak into groundwater.                                                                                                                                                                                                                                                                                                                                                | consequences would be in the event of a sinkhole that created significant, extended transportation disruption, which could impact business interests.                                      |                                                                                  |
| Structural Fire | Structural fires are common, and in extreme events, urban fire and explosions can cause serious injury and fatalities. There were 25 fire-related fatalities and 136 fire-related injuries in Polk County between 2019 and 2022. | Responders face significant consequences from structural fires, being tasked with dealing with and ending these dangerous incidents. Firefighters are at risk of injury and fatality during response due to smoke inhalation, poisoning, and structural collapse. | Structural fire (unless extremely widespread) is unlikely to impact continuity of government. However, if directly impacting an EOC, fire station, or other critical facility, it could impact the delivery of services and the safety of government employees. | Structural fire damage ranges from minor smoke or water damage to the destruction of residential, commercial, or public properties. | Structural fire at facilities with natural gas or hazardous material lines could have significant environmental impacts, due to the release of natural gas into the air, and potential damage to other subterranean infrastructure. Smoke from fires can be unsafe for animals. Fire can lead to contamination of water runoff systems, and the spread of cinders can (in rare cases) cause wildfire. | The economic impact of structural fires is low. The damage from most structural fires is limited to individual residences, where that damage tends to be covered by homeowners' insurance. | Public confidence in governance is not likely to be impacted by structural fire. |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

| Hazard                                      | Impacts on:                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                    |                                                                                               |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
|                                             | The Public                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Responders                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Continuity of Government                                                                                                                                                                                                             | Property, Facilities, and Infrastructure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Environment                                                                                                                                                                                                                                                                                                                                              | Economic Condition of the Jurisdiction                                                                                                                                                                                                                                                             | Public Confidence in the Jurisdiction's Governance                                            |
| <b>Thunderstorm with Lightning and Hail</b> | The public may face localized consequences from a severe thunderstorm. Thunderstorms, lightning, and hail have the potential to injure and/or kill people, damage residences and businesses, and interrupt power service. Lightning may strike homes and businesses, potentially sparking a fire or damaging electrical systems. Hail can also cause damage to the roofs of homes and businesses. Recovery from a severe thunderstorm event may take several weeks. | Responders may face some difficulties when responding to a thunderstorm event. Trees may be down, blocking critical roadways and access points. Power lines may also be down in roadways or on private property. Localized flooding may require swift water rescues. Lightning may spark building and house fires, requiring immediate response. Responders should exercise caution when driving or operating in significant winds and may be unable to respond during significant hail. Restoration of utilities may be delayed as some equipment cannot operate in heavy winds. | Thunderstorm, lightning, and hail are unlikely to cause issues maintaining operations and the delivery of services, unless downed trees directly impact critical facilities, or those facilities do not have access to backup power. | Consequences to property, facilities, and infrastructure from thunderstorms are minimal. Downed trees and power lines are typical consequences from thunderstorms. Roofs and windows of homes and businesses may be damaged. Power service to residences and critical facilities may be impacted in the short term.<br><br>Lightning has the potential to damage property, facilities, and infrastructure. Lightning can spark fires and destroy electrical systems.<br><br>Hail has the potential to damage property, facilities, and infrastructure. Large hail can puncture roof tops, windshields, vehicles, windows, and other outdoor structures. | Severe thunderstorms in Polk County have historically had few consequences to the environment. In some cases, these storms can down trees and vegetation, cause hail damage, and cause localized flooding. Please see "Flooding". No major consequences to the environment are expected, except in extreme events where lightning could spark wildfires. | Consequences to the economic condition of the county (which experiences many thunderstorms and severe storms each year) will be minimal. While the annual cumulative costs of minor property and infrastructure damage might be significant, the impacts of individual events are usually minimal. | Public confidence in government is not expected to be impacted by severe thunderstorm events. |
| <b>Tornado</b>                              | All of Polk County is at risk from tornadoes, and the public could face                                                                                                                                                                                                                                                                                                                                                                                             | Responders will face significant difficulties responding to a tornado. Search & rescue                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | The county does not anticipate any issues maintaining operations and the delivery of                                                                                                                                                 | All property in Polk County is at risk from tornadoes. The consequences to                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Because of the vast range of wind speeds associated with tornadoes,                                                                                                                                                                                                                                                                                      | The impacts of most tornadoes are typically limited to the properties directly in                                                                                                                                                                                                                  | Public confidence in government will not likely be impacted by a tornado event                |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

| Hazard                         | Impacts on:                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                         |                                                                                 |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
|                                | The Public                                                                                                                                                                                                                                                                                                                                             | Responders                                                                                                                                                                                                                                                                                                                                                                 | Continuity of Government                                                                                                                                                                                     | Property, Facilities, and Infrastructure                                                                                                                                                                                                                                                                                                                                                                      | Environment                                                                                                                                                                                                                                                                                                                                                              | Economic Condition of the Jurisdiction                                                                                                                                                                                                                  | Public Confidence in the Jurisdiction's Governance                              |
|                                | serious consequences. Tornadoes can be deadly. Common consequences of tornadoes to the public are damage to homes and businesses, interruption of utility services, and devastation to the local economy.                                                                                                                                              | operations may be required. Communication systems may be destroyed. Road signs and landmarks may be missing when trying to navigate to survivors in need. Power lines, debris, and trees may block roadways and access points. Responders should exercise extreme caution.                                                                                                 | services in the event of a tornado. If the EOC is directly affected by a tornado, it may be necessary to move to an Alternate EOC or function from another location to maintain operations during the event. | individual properties, facilities, and infrastructure from a tornado may be catastrophic.                                                                                                                                                                                                                                                                                                                     | consequences to the environment vary greatly. Even an EF0 (65-85mph) can uproot trees and vegetation. In stronger tornadoes, debris may be tossed miles away from the source, potentially entering our waterways. Hazardous materials may escape if vehicles are damaged, or storage tanks are compromised.                                                              | their paths. However, a large outbreak of tornadoes could damage enough properties as to cause localized economic impacts.                                                                                                                              | unless errors are made in the processes of forecasting and issuing warnings.    |
| <b>Transportation Incident</b> | The people most vulnerable to transportation incidents are those involved in the accident. The energy imparted on the occupants of the vehicle(s) in an accident can cause serious injury and death. Particularly violent events may also produce projectiles which can harm anyone in the immediate vicinity. When transportation accidents result in | Responders can be significantly impacted by transportation accidents. Immediate response is essential for ensuring public safety, managing traffic, securing the crash site, and preventing secondary incidents. Emergency services, including police, fire, and rescue teams, are tasked with managing the impacts of transportation incidents, which can be challenging. | Transportation incidents are not expected to impact continuity of government.                                                                                                                                | Significant crashes, especially those involving large vehicles or trains, can cause damage to nearby buildings and infrastructure. Crashes can disrupt utility services, particularly if infrastructure like power lines, water pipes, or communication towers are damaged. Transportation crashes directly impact the transport network. Roads may be closed, rail services disrupted, and air or sea travel | The primary impact of transportation accidents on natural resources is contamination. It is not uncommon for transportation accidents to result in minor fuel spills, but these can often be remedied in a relatively quick manner. However, larger spills like those which can result from transportation accidents involving bulk shipments can be much more difficult | Transportation incidents are expected to have minor impacts on the economy. These include direct costs associated with emergency response, medical care, and infrastructure repair, as well as indirect costs like traffic delays and loss of business. | Transportation incidents are not expected to impact public trust in governance. |

### 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

| Hazard              | Impacts on:                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     | The Public                                                                                                                                                     | Responders                                                                                                                                                                                                                                                                                                                           | Continuity of Government                                                                                                       | Property, Facilities, and Infrastructure                                                                                                                                                                                                                                                                                                                                      | Environment                                                                                                                                                                      | Economic Condition of the Jurisdiction                                                                                                                                                                                                                                                                                                           | Public Confidence in the Jurisdiction's Governance                                                                                                                                             |
|                     | fires and/or the release of hazardous materials, the wider public may suffer from exposure, and evacuations could be necessary.                                |                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                | affected. This disrupts the movement of people and goods and can have wider economic implications.                                                                                                                                                                                                                                                                            | and time consuming to contain. A significant release of hazardous materials can kill wildlife, livestock, and pets, cause widespread crop failure, and destroy nature preserves. |                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                |
| <b>Windstorm</b>    | Windstorms can cause significant damage to homes, leading to displacement of residents and the need for temporary shelters and long-term rebuilding efforts.   | Windstorms can directly impact responders by making it unsafe to travel to perform their regular duties. Immediate threats to life and property necessitate rapid emergency response, including search and rescue operations, medical assistance, and maintaining public order to prevent looting or other crimes in affected areas. | Windstorms can cause widespread power outages which, if extended in nature, could temporarily impact continuity of government. | In extreme wind events, wind has the potential to damage personal property, trees, and residences. Certain types of structures (including manufactured homes and structures without gable roofs) are more susceptible to wind damage. Because people with lower incomes are more likely to reside in this type of structure, they be more susceptible to this type of damage. | Windstorms can destroy trees and other plants, reducing the available habitat for some animals.                                                                                  | High winds can quickly flatten hundreds of thousands of acres of cropland. Widespread destruction of cropland can have severe economic consequences and potentially jeopardize food security in the affected area. The 2020 derecho, for example, occurred ahead of the harvest season, and led to the loss of approximately 50% of crop yields. | Windstorm is not expected to impact the public's confidence in government.                                                                                                                     |
| <b>Winter Storm</b> | Winter storms have the potential to impact the public by damaging infrastructure and private property and interrupting the delivery of utility services. Power | Debris removal and emergency response costs from winter storms can be significant. Debris in roadways poses the greatest hurdle for response operations following a winter storm. Responders face many                                                                                                                               | Critical operations are expected to continue during winter storm events without issue.                                         | Winter storms (particularly ice storms, or snowstorms followed by heating and cooling cycles that lead to the presence of ice) can cause extensive damage to infrastructure. Collapsed roofs, downed                                                                                                                                                                          | Consequences to the environment from winter storms include downed trees/branches, localized flooding from snow melt, and below freezing temperatures.                            | The economic condition of the county may be impacted by a widespread winter storm causing structural damage and service/ business interruptions.                                                                                                                                                                                                 | Public confidence in government will likely not be impacted by a winter storm, unless there are significant errors in forecasts or delays in protective action decision-making (e.g., closures |

| Hazard | Impacts on:                                                                                                                                   |                                                                                                                                                                                                    |                          |                                                                                                                            |             |                                                                                                           |                                                                                          |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------|-------------|-----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
|        | The Public                                                                                                                                    | Responders                                                                                                                                                                                         | Continuity of Government | Property, Facilities, and Infrastructure                                                                                   | Environment | Economic Condition of the Jurisdiction                                                                    | Public Confidence in the Jurisdiction's Governance                                       |
|        | outages are common during winter weather, which affect public health and safety, as do the hazardous driving conditions winter storms create. | consequences from winter weather, including navigating dangerous roadways and working in freezing conditions. Ice and snow may bring down trees and power lines, causing widespread power outages. |                          | power lines, vegetative debris in roadways, and damage to water and wastewater facilities may take weeks or months to fix. |             | Community members choosing to stay home in large numbers will spend less money purchasing food and goods. | and releases) that result in increased danger or harm. Winter weather is common in Iowa. |

# Chapter 4:

## Mitigation Strategy





### 4. MITIGATION STRATEGY

---

**44 CFR Requirement §201.6(c)(3): The plan shall include a mitigation strategy that provides the jurisdiction’s blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.**

---

This section presents the mitigation strategy updated by the Hazard Mitigation Planning Committee (HMPC) based on the risk assessment. The mitigation strategy was developed through a collaborative group process and consists of updated general goal statements to guide the jurisdictions in efforts to lessen disaster impacts as well as specific mitigation actions that can be put in place to directly reduce vulnerability to hazards and losses. The following definitions are based upon those found in FEMA publication 386-3, Developing a Mitigation Plan (April 2003):

- **Goals** are general guidelines that explain what you want to achieve. Goals are defined before considering how to accomplish them so that they are not dependent on the means of achievement. They are usually long-term, broad, policy-type statements.
- **Objectives** are overarching themes from the goals that provide direction for the development of mitigation actions.
- **Mitigation Actions** are specific actions that help achieve goals.

#### 4.1. GOALS AND OBJECTIVES

---

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

---

As part of this update, the HMPC reviewed the goals from the 2018 Polk County Hazard Mitigation Plan to determine if they were still valid. The group discussed these goals during both the HIRA meeting on February 20, 2024 and the Strategy Meeting on March 19, 2024.

After a lively discussion, the planning committee determined that the 2018 goals needed to be revised to more clearly differentiate between them and reflect the priorities of the participating communities. The four goals in this update still share the same *intentions* as the previous four goals (with goals related to public information, increasing capacity, conducting physical mitigation, and coordinating with other agencies), but now more clearly state their targeted outcomes. The communities’ new goals are:

## 4: MITIGATION STRATEGY

1. Increase public awareness of disaster risk and empower the public to collectively and individually participate in hazard mitigation.
2. Increase municipal and county government capability to plan for and implement hazard mitigation projects, programs, and activities.
3. Engage and coordinate with public, nonprofit, and other non-governmental partners to expand the scope of hazard mitigation and encourage these entities to participate in risk reduction activities.
4. Conduct cost-effective hazard mitigation projects to reduce the vulnerability of critical facilities, infrastructure, and other assets.

In addition to goals for this plan, Polk County has incorporated overarching objectives, which identify methods for implementing the stated goals that are further realized in the proposed mitigation actions, which are discussed in the next section. The objectives are:

1. Prevention
2. Property Protection
3. Natural Resources Protection and Nature-Based Solutions
4. Emergency Services
5. Public Information
6. Data Analysis, Modeling, and Forecasting

Through prevention, the County seeks to ensure that tools such as land use planning, zoning, stormwater, building codes, subdivision ordinances, and natural resource/open space protection reduce the loss from future hazards. Furthermore, jurisdictions should determine whether NFIP and other floodplain management programs are sufficient for full mitigation of flood risk, and look towards their regional watershed management plans to ensure that decision-making processes are taking previous planning efforts into account.

Property protection is an ongoing task within Des Moines and other Polk County communities. Significant flood events have shown great opportunity to acquire repetitive loss properties, areas that are in need of stormwater management retrofitting, and the promotion of flood insurance participation beyond those properties in special flood hazard areas. This objective encompasses a wide variety of physical work to mitigate the effects of hazards, including property retrofits, strengthening dams, and infrastructure hardening.

Natural resource protection in an urbanized county like Polk is crucial, and development trends and national best practices suggest that nature-based solutions should be more aggressively pursued. Historically, wetlands across Central Iowa naturally provide protection from flooding, but as development has increased, much of these wetlands have been drained to make way for growing cities. Protecting natural resources must be a critical piece of development in Polk County. Jurisdictions should look towards their watershed management plans and authorities to ensure that natural resources are protected and helping to mitigate hazards from the beginning.

## 4: MITIGATION STRATEGY

Emergency services across the County respond to incidents related to hazards in this plan on a daily basis. In terms of mitigation however, alert systems, data sharing, partnerships with state and federal organizations are all on the rise, and coordinated partnerships to ensure information is shared and utilized properly should continue to develop in order to protect from loss. The planning team understands that while FEMA may not consider work and costs related to emergency services to be part of hazard mitigation, they nonetheless form a critical avenue for reducing risk related to disasters in the community.

Empowering the public to take informed action with consistent and targeted public information can have significant impacts on the community's safety. The planning team aspires to foster a community where residents understand their risk, are aware of forthcoming threats, and understand best practices for staying safe. Increased utilization of social media provides additional and broader avenues for public information, and the planning team will work together to continue to strengthen public education procedures and coordination to ensure the public is wholly aware of hazards before, during, and after disaster events.

### 4.2. MITIGATION ACTION UPDATE PROCESS

---

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

---

During the Hazard Identification and Risk Assessment (HIRA) meeting, the second meeting of the HMPC, results of the risk assessment update were provided to the HMPC members for review. The concluded with an introduction to mitigation actions to prompt discussions within and among the jurisdictions about any new mitigation actions as well as on-going actions from the existing plans. Following this meeting, each jurisdiction was provided with a Strategy Worksheet, which asked for updates on the status of actions from the previous plan and information about new actions the communities' wished to add to the strategy.

The focus of the Strategy Meeting, the third meeting of the HMPC, was to update the mitigation goals and objectives and discuss the participants' progress towards reviewing and updating their own community action plans. Topics of discussion in this meeting included:

- Risks or issues identified by the communities for which a mitigation solution was not readily apparent
- Opportunities for multi-jurisdictional projects and coordination
- Alignment of potential grants with expected FEMA grant opportunities, including how funding in those programs is prioritized

## 4: MITIGATION STRATEGY

In development of each jurisdiction's final mitigation strategy for submission to the plan, the jurisdictions were encouraged to review the details of the risk assessment to address vulnerabilities specific to their jurisdiction. The mitigation strategy update included a thorough review and status update of the existing actions. The table below provides a summary of the number of actions that each jurisdiction identified in the previous plan. Please note that the Des Moines Water Works and the public school districts were not included as officially participating jurisdictions in the previous plan. As a result, there are no previous actions for the school districts.

**Table 127: Summary of Number of Actions in Previous Plan**

| Jurisdiction                     | Actions in Previous Plan |
|----------------------------------|--------------------------|
| Polk County                      | 8                        |
| City of Alleman                  | 2                        |
| City of Altoona                  | 18                       |
| City of Ankeny                   | 16                       |
| City of Bondurant                | 7                        |
| City of Clive                    | 21                       |
| City of Des Moines               | 22                       |
| City of Elkhart                  | 5                        |
| City of Grimes                   | 6                        |
| City of Johnston                 | 8                        |
| City of Mitchellville            | 6                        |
| City of Pleasant Hill            | 16                       |
| City of Polk City                | 10                       |
| City of Runnells                 | 4                        |
| City of Urbandale                | 28                       |
| Delaware Township                | 2                        |
| City of West Des Moines          | 25                       |
| City of Windsor Heights          | 5                        |
| Des Moines Water Works           | 4                        |
| Ankeny Schools                   | 5                        |
| Bondurant-Farrar School District | 2                        |
| Dallas Center-Grimes Schools     | 1                        |
| Des Moines Independent Schools   | 8                        |
| Johnston School District         | 2                        |
| North Polk Schools               | 1                        |
| Southeast Polk Schools           | 5                        |
| Urbandale Schools                | 12                       |

#### 4: MITIGATION STRATEGY

|                         |            |
|-------------------------|------------|
| West Des Moines Schools | 4          |
| <b>Total</b>            | <b>253</b> |

Of the 253 actions in the previous plan, 49 have been completed, 15 were deleted or combined with other actions, and 189 were continued in the plan update. The jurisdictions were encouraged to be comprehensive and include all appropriate actions to work toward becoming more disaster resistant. However, they were encouraged to maintain a realistic approach and were reminded that the hazard mitigation plan is a “living document”. As capabilities, vulnerabilities, or the nature of hazards that threaten each jurisdiction change, the mitigation actions can and should be updated to reflect those changes, including addition or deletion of actions, as appropriate. In updating the strategy, participants also considered the potential cost of each project in relation to the anticipated future cost savings. This type of discussion allowed the committee as a whole to understand the broad priorities and discussion of the types of projects most beneficial to all jurisdictions within Polk County.

## 4: MITIGATION STRATEGY

### 4.3. STATUS OF 2018 PLAN ACTIONS

The table below provides an update on the status of the 253 actions included in the 2018 Polk County Hazard Mitigation Plan.

**Table 128 – Status of 2018 Plan Actions**

| Status of 2018 Plan Actions |                                                                                                                                                                                                                                        |                                          |                                                                                                   |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|---------------------------------------------------------------------------------------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                                                                              | Action Status<br>(Continuing or Deleted) | Notes and Status Updates                                                                          |
| Polk County 1               | Continue to comply with the NFIP by enforcing floodplain management ordinance, including regulating/ monitoring new construction and substantial improvements in the SFHA; and participating in floodplain identification and mapping. | Continuing                               | Ongoing action                                                                                    |
| Polk County 2               | Construction of Storm Water Detention Basins, Buffer Strips, and Channel Improvements to Fourmile Creek though the Fourmile Creek Watershed Authority                                                                                  | Continuing                               | No progress                                                                                       |
| Polk County 3               | Construction of Storm Water Detention Basins, buffer Strips, and Channel Improvements to Mud, Camp, and Spring Creek watersheds though the Watershed Authority                                                                         | Continuing                               | No progress                                                                                       |
| Polk County 4               | Construction of Storm Water Detention Basins, buffer Strips, and Channel Improvements to the Walnut Creek watershed though the Watershed Authority                                                                                     | Continuing                               | No progress                                                                                       |
| Polk County 5               | Construction of Storm Water Detention Basins, buffer Strips, and Channel Improvements to the Beaver Creek watershed though the Watershed Authority                                                                                     | Continuing                               | No progress                                                                                       |
| Polk County 6               | Reconstruction of a Skunk River Crossing to assure emergency responders can cross the Skunk River during times of extreme flooding. In 2010, only one crossing in Polk County was open in a 30-mile section of the river.              | Continuing                               | No progress                                                                                       |
| Polk County 7               | Construct severe weather safe rooms for three Polk County Public Works Maintenance Facilities                                                                                                                                          | Continuing                               | Two of three completed; adjusting wording of action in new plan to reflect one remaining facility |
| Polk County 8               | Update siren software to polygon based system                                                                                                                                                                                          | Continuing                               | No progress                                                                                       |

## 4: MITIGATION STRATEGY

### Status of 2018 Plan Actions

| Action ID  | Mitigation Project / Activity Description                                                                                                                                                                                              | Action Status (Continuing or Deleted) | Notes and Status Updates                                                      |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------|
| Alleman 1  | Construct retention pond at Northeast 134                                                                                                                                                                                              | Deleted                               | Project complete; residents maintain this new dry pond for stormwater runoff. |
| Alleman 2  | Consider participation in the NFIP                                                                                                                                                                                                     | Continuing                            | In progress; Clerk is working on related documents                            |
| Altoona 1  | Continue to comply with the NFIP by enforcing floodplain management ordinance, including regulating/ monitoring new construction and substantial improvements in the SFHA; and participating in floodplain identification and mapping. | Continuing                            | No progress                                                                   |
| Altoona 2  | Stormwater detention basin improvement - Tuscany Pond; removed sediment from pond to regain capacity and construct new outfall.                                                                                                        | Continuing                            | No progress                                                                   |
| Altoona 3  | Secondary storm sewer installation                                                                                                                                                                                                     | Continuing                            | No progress                                                                   |
| Altoona 4  | Storm sewer installation 4th St SW from Lion's Park to 5th Ave NW                                                                                                                                                                      | Continuing                            | No progress                                                                   |
| Altoona 5  | Adventureland Park Drainage Improvements - detention pond modifications, culvert improvements, stream bank stabilization                                                                                                               | Continuing                            | No progress                                                                   |
| Altoona 6  | Traffic signal fiber                                                                                                                                                                                                                   | Deleted                               | Project Complete                                                              |
| Altoona 7  | Community Center Security Cameras                                                                                                                                                                                                      | Deleted                               | Project Complete                                                              |
| Altoona 8  | 4 Safe rooms for multiple park sites                                                                                                                                                                                                   | Continuing                            | No progress                                                                   |
| Altoona 9  | Replace 5 severe weather sirens                                                                                                                                                                                                        | Continuing                            | No progress                                                                   |
| Altoona 10 | Addition of 4 new severe weather sirens                                                                                                                                                                                                | Continuing                            | No progress                                                                   |
| Altoona 11 | Construction of new Fire Station #26                                                                                                                                                                                                   | Continuing                            | No progress                                                                   |
| Altoona 12 | Addition of new Firefighting Engine                                                                                                                                                                                                    | Deleted                               | Project in progress at time of plan update and to be completed soon           |
| Altoona 13 | Sanitary sewer lining 5th Ave SW to 8th Ave SE, south of the railroad tracks                                                                                                                                                           | Continuing                            | No progress                                                                   |



## 4: MITIGATION STRATEGY

### Status of 2018 Plan Actions

| Action ID  | Mitigation Project / Activity Description                                                                                                                                                                                              | Action Status (Continuing or Deleted) | Notes and Status Updates                                        |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-----------------------------------------------------------------|
| Altoona 14 | Remove sump pump and footing tiles from sanitary sewers                                                                                                                                                                                | Continuing                            | No progress                                                     |
| Altoona 15 | New water storage facility to replace existing 50,000 gallon tower                                                                                                                                                                     | Deleted                               | Project Complete                                                |
| Altoona 16 | New water treatment plant                                                                                                                                                                                                              | Continuing                            | No progress                                                     |
| Altoona 17 | New well                                                                                                                                                                                                                               | Continuing                            | No progress                                                     |
| Altoona 18 | Sanitary sewer lining all existing clay sewer mains                                                                                                                                                                                    | Continuing                            | No progress                                                     |
| Ankeny 1   | Construct safe room(s) at Mel Ray Mobile Home Park                                                                                                                                                                                     | Continuing                            | No progress                                                     |
| Ankeny 2   | Construct safe room(s) at Autumn Ridge Mobile Home Park                                                                                                                                                                                | Continuing                            | No progress                                                     |
| Ankeny 3   | Tradition Park Detention Basin Flood Improvements                                                                                                                                                                                      | Deleted                               | Project Complete                                                |
| Ankeny 4   | Westwinds Channel Fortification                                                                                                                                                                                                        | Deleted                               | Project Complete                                                |
| Ankeny 5   | Northcreek Channel Flood Prevention Measures                                                                                                                                                                                           | Deleted                               | Project Complete                                                |
| Ankeny 6   | Sawgrass Park Dam Improvements                                                                                                                                                                                                         | Continuing                            | No progress                                                     |
| Ankeny 7   | Saylor Creek Tributary Channel Improvements                                                                                                                                                                                            | Continuing                            | No progress                                                     |
| Ankeny 8   | Storm sewer/channel improvements Four Mile Creek bank stabilization                                                                                                                                                                    | Continuing                            | No progress; project included in City SW Master Plan, 2040 Plan |
| Ankeny 9   | Reconstruct storm water detention - Packard Pond improvements                                                                                                                                                                          | Deleted                               | No progress; removing from 2024 project list.                   |
| Ankeny 10  | Continue to comply with the NFIP by enforcing floodplain management ordinance, including regulating/ monitoring new construction and substantial improvements in the SFHA; and participating in floodplain identification and mapping. | Continuing                            | Project is Ongoing                                              |
| Ankeny 11  | Reconstruct storm water detention - Wildflower Public Pond improvements                                                                                                                                                                | Deleted                               | Project Complete                                                |
| Ankeny 12  | Storm sewer/channel improvements<br>- SE Creekview Drive Improvements                                                                                                                                                                  | Deleted                               | Project Complete                                                |
| Ankeny 13  | NW Elm Lane Sanitary Sewer Replacement                                                                                                                                                                                                 | Deleted                               | Project Complete                                                |

## 4: MITIGATION STRATEGY

### Status of 2018 Plan Actions

| Action ID   | Mitigation Project / Activity Description                                                                                                                                                                                              | Action Status<br>(Continuing or Deleted) | Notes and Status Updates                                                                      |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------------------------------------------------------------------|
| Ankeny 14   | Briarwood Sanitary Sewer Upsizing / Replacement                                                                                                                                                                                        | Continuing                               | Community is studying the scope and needs of the project                                      |
| Ankeny 15   | Central City Areas - Sewer Upsizing and Replacements                                                                                                                                                                                   | Continuing                               | Project is Ongoing                                                                            |
| Ankeny 16   | Construct safe room(s) at On With Life Care Facility                                                                                                                                                                                   | Continuing                               | No progress                                                                                   |
| Bondurant 1 | Update tornado warning system                                                                                                                                                                                                          | Continuing                               | No progress                                                                                   |
| Bondurant 2 | Generator at Public Safety Building                                                                                                                                                                                                    | Continuing                               | No progress                                                                                   |
| Bondurant 3 | NW 2nd St. Culvert Expansion                                                                                                                                                                                                           | Continuing                               | No progress                                                                                   |
| Bondurant 4 | 15th St. SW Bridge Replacement                                                                                                                                                                                                         | Continuing                               | No progress                                                                                   |
| Bondurant 5 | Mud Creek Channel Restoration                                                                                                                                                                                                          | Continuing                               | No progress                                                                                   |
| Bondurant 6 | Mud Creek Regional Detention Facility/Grant St. South Relocation                                                                                                                                                                       | Continuing                               | No progress                                                                                   |
| Bondurant 7 | Continue to comply with the NFIP by enforcing floodplain management ordinance, including regulating/ monitoring new construction and substantial improvements in the SFHA; and participating in floodplain identification and mapping. | Continuing                               | No progress                                                                                   |
| Clive 1     | Radio Upgrade                                                                                                                                                                                                                          | Continuing                               | Converting to a County-Wide action, reflecting the need for interoperability of these systems |
| Clive 2     | Install/Replace backup generators                                                                                                                                                                                                      | Continuing                               | No Progress                                                                                   |
| Clive 3     | Website Enhancement                                                                                                                                                                                                                    | Continuing                               | Rewording action to reflect broader communications needs                                      |
| Clive 4     | Streambank Stabilization Projects                                                                                                                                                                                                      | Continuing                               | Work ongoing; rephrasing action in plan to specify more types of projects                     |
| Clive 5     | Reconstruct Greenbelt Trail bridges                                                                                                                                                                                                    | Continuing                               | No Progress                                                                                   |
| Clive 6     | Reconstruct NW 86th Street bridge                                                                                                                                                                                                      | Continuing                               | No Progress                                                                                   |

## 4: MITIGATION STRATEGY

### Status of 2018 Plan Actions

| Action ID    | Mitigation Project / Activity Description                                                                                                                                                                                  | Action Status (Continuing or Deleted) | Notes and Status Updates                                                                               |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------|
| Clive 7      | Reconstruct railroad bridge (7800 block University Blvd)                                                                                                                                                                   | Continuing                            | No Progress                                                                                            |
| Clive 8      | Little Walnut Creek floodplain acquisitions                                                                                                                                                                                | Deleted                               | Project Completed                                                                                      |
| Clive 9      | Walnut Creek floodplain acquisitions                                                                                                                                                                                       | Continuing                            | Ongoing; about 30 acres remaining                                                                      |
| Clive 10     | North Walnut Creek floodplain acquisitions                                                                                                                                                                                 | Continuing                            | Ongoing; about 8 acres remaining                                                                       |
| Clive 11     | University Blvd Neighborhood Flood Mitigation Planning and Implementation                                                                                                                                                  | Continuing                            | Planning completed; implementation (including buyouts, floodproofing, and adaptive land reuse) ongoing |
| Clive 12     | Indian Hills Neighborhood Flood Mitigation Planning and Implementation                                                                                                                                                     | Continuing                            | No Progress                                                                                            |
| Clive 13     | Buffalo Road Secondary Water Source                                                                                                                                                                                        | Deleted                               | Project Completed                                                                                      |
| Clive 14     | Relocation of Porter Shelter                                                                                                                                                                                               | Continuing                            | No Progress                                                                                            |
| Clive 15     | Swanson Blvd Flapgates                                                                                                                                                                                                     | Continuing                            | No Progress                                                                                            |
| Clive 16     | University Blvd Flood Mitigation Improvements (Minor)                                                                                                                                                                      | Continuing                            | No Progress                                                                                            |
| Clive 17     | Regional Stormwater Management Facilities (modifications)                                                                                                                                                                  | Continuing                            | No Progress                                                                                            |
| Clive 18     | Regional Stormwater Facilities (outside of Clive)                                                                                                                                                                          | Continuing                            | No Progress; rewording action in 2024 plan                                                             |
| Clive 19     | Regional Stormwater Facilities (within Clive)                                                                                                                                                                              | Continuing                            | No Progress; rewording action in 2024 plan                                                             |
| Clive 20     | Repetitive Loss Buyout Program                                                                                                                                                                                             | Deleted                               | Action removed from list to remove redundancy from multiple acquisition-related actions                |
| Clive 21     | Flood Alert Early Warning System Enhancements                                                                                                                                                                              | Continuing                            | Converting to a County-Wide action                                                                     |
| Des Moines 1 | Pursue remedial flood mitigation actions associated with the Southeast Des Moines (SEDM) Levee, US 65                                                                                                                      | Continuing                            | Ongoing action                                                                                         |
| Des Moines 2 | Comply with the NFIP by enforcing floodplain management ordinance, including regulating/ monitoring new construction and substantial improvements in the SFHA; and participating in floodplain identification and mapping. | Continuing                            | Ongoing action                                                                                         |

## 4: MITIGATION STRATEGY

### Status of 2018 Plan Actions

| Action ID     | Mitigation Project / Activity Description                                                                                                                                                                                                                  | Action Status (Continuing or Deleted) | Notes and Status Updates                                                         |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|----------------------------------------------------------------------------------|
| Des Moines 3  | Construct safe room(s) at Des Moines Municipal Housing Agency's multi-family units                                                                                                                                                                         | Continuing                            | Ongoing action; actively seeking grant opportunities                             |
| Des Moines 4  | Harden single family home scattered site Public Housing units                                                                                                                                                                                              | Deleted                               | The city is opting to sell these homes instead.                                  |
| Des Moines 5  | Treatment and removal of ash trees in response to onset of Emerald Ash Borer (EAB)                                                                                                                                                                         | Continuing                            | Ongoing action                                                                   |
| Des Moines 6  | Des Moines River Flood Mitigation Improvements - Flood protection system improvements (levees, floodwalls, pump stations, etc.) to maintain FEMA accreditation despite increased flows identified in 2011 Des Moines River Regulated Flow Frequency Study. | Continuing                            | Ongoing action                                                                   |
| Des Moines 7  | Hamilton Drainage Area Stormwater Improvements - Storm sewer conveyance improvements to increase storm sewer capacity and/or construct detention/G.I. to reduce identified flood risk concerns.                                                            | Continuing                            | Ongoing action                                                                   |
| Des Moines 8  | Leetown Creekway Stormwater Improvements - Increased storm sewer capacity between University Avenue and Dean Avenue and channel improvements from south of Dean Avenue to confluence with Fourmile Creek.                                                  | Deleted                               | Project Completed                                                                |
| Des Moines 9  | Closes Creek Stormwater Improvements - Increase storm sewer capacity and/or construct detention/G.I. to reduce identified flood risk concerns                                                                                                              | Continuing                            | Ongoing action                                                                   |
| Des Moines 10 | Crawford Creek Stormwater Improvements - Increased storm sewer capacity and/or construct detention/G.I. to reduce identified flood risk concerns                                                                                                           | Continuing                            | Ongoing action                                                                   |
| Des Moines 11 | Sanitary Sewer Separation Projects - Install storm sewer to eliminate CSO's that discharge sanitary water to the river                                                                                                                                     | Continuing                            | Ongoing action                                                                   |
| Des Moines 12 | City-wide Small Watershed Flood Mitigation Projects - Identify and construct projects that increase storm sewer capacity and/or construct detention/G.I. to reduce flood risk concerns                                                                     | Continuing                            | Ongoing action; city-wide stormwater master plan program used to select projects |
| Des Moines 13 | Storm Water Pump Station Rehabilitation - Updates to pump stations to provide resiliency                                                                                                                                                                   | Continuing                            | Ongoing action                                                                   |

## 4: MITIGATION STRATEGY

| Status of 2018 Plan Actions |                                                                                                                                                                                        |                                       |                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                              | Action Status (Continuing or Deleted) | Notes and Status Updates                                                                                                                                                                                                                                                                                                                                                |
| Des Moines 14               | Voluntary acquisition and demolition of all single and two-family residential structures in the floodplain and repetitive loss properties. Estimated 220 structures would be acquired. | Continuing                            | Ongoing action; voluntary acquisition based on funding and interest from property owners; will take decades to complete.                                                                                                                                                                                                                                                |
| Des Moines 15               | Revise Floodplain Development regulations to increase freeboard height, implement compensatory fill, and limit enclosures in the floodplain.                                           | Deleted                               | Action Completed                                                                                                                                                                                                                                                                                                                                                        |
| Des Moines 16               | Construct safe room in new fire station(s)                                                                                                                                             | Continuing                            | Ongoing action; targeting new Station 4 construction in FY25/26                                                                                                                                                                                                                                                                                                         |
| Des Moines 17               | Generator for new fire station(s)                                                                                                                                                      | Continuing                            | Ongoing action; targeting new Station 4 construction in FY25/26                                                                                                                                                                                                                                                                                                         |
| Des Moines 18               | Construct safe room in new City Hall Annex                                                                                                                                             | Continuing                            | Modifying action to account for city choosing to relocate instead of building an annex                                                                                                                                                                                                                                                                                  |
| Des Moines 19               | Generator and 72-hour fuel storage for new City Hall Annex                                                                                                                             | Continuing                            | Modifying action to account for city choosing to relocate instead of building an annex                                                                                                                                                                                                                                                                                  |
| Des Moines 20               | Building inventory for Fire Dept. community risk assessment / analysis                                                                                                                 | Continuing                            | Included in 2023 CRA; continue through accreditation process (FY25)                                                                                                                                                                                                                                                                                                     |
| Des Moines 21               | Regional NextGen 911 data improvements                                                                                                                                                 | Deleted                               | City of Des Moines re-engineered the Regional GIS data editing workflow currently in use by Regional GIS Partners. New NG911 Data Quality checks and data load processes for submitting data to State of Iowa have been implemented. City of Des Moines will spend approximately \$45,000 for GIS consulting to support the latest NG911 data maintenance improvements. |
| Des Moines 22               | Damage assessment data collection tools and standard operating procedures during and after emergency events                                                                            | Continuing                            | City utilizes IHSEMD's damage assessment data collection tool and follows their workflow for reporting and capturing information                                                                                                                                                                                                                                        |
| Elkhart 1                   | Construct safe room at Elkhart Memorial Park                                                                                                                                           | Continuing                            | No progress                                                                                                                                                                                                                                                                                                                                                             |
| Elkhart 2                   | Construct safe room in NEW fire station                                                                                                                                                | Continuing                            | No progress                                                                                                                                                                                                                                                                                                                                                             |

## 4: MITIGATION STRATEGY

### Status of 2018 Plan Actions

| Action ID  | Mitigation Project / Activity Description                                                                                                                                                                                              | Action Status (Continuing or Deleted) | Notes and Status Updates                                               |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------------------------------------------------------------------------|
| Elkhart 3  | Generator for new fire station                                                                                                                                                                                                         | Continuing                            | No progress                                                            |
| Elkhart 4  | Generator at city water plant                                                                                                                                                                                                          | Continuing                            | No progress                                                            |
| Elkhart 5  | Construct safe room at Elkhart Community Center                                                                                                                                                                                        | Continuing                            | No progress                                                            |
| Grimes 1   | Construct safe room at existing facilities                                                                                                                                                                                             | Deleted                               | Removing from list                                                     |
| Grimes 2   | Generators at City Hall                                                                                                                                                                                                                | Continuing                            | New City Hall building is currently being planned                      |
| Grimes 3   | Generator at fire station                                                                                                                                                                                                              | Continuing                            | New fire station is currently being planned                            |
| Grimes 4   | Warning siren northeast and southwest areas of city                                                                                                                                                                                    | Deleted                               | Complete; 3 new sirens were installed in 2021                          |
| Grimes 5   | Continue to comply with the NFIP by enforcing floodplain management ordinance, including regulating/ monitoring new construction and substantial improvements in the SFHA; and participating in floodplain identification and mapping. | Continuing                            | Ongoing                                                                |
| Grimes 6   | Update existing warning sirens to be compatible with single siren activation                                                                                                                                                           | Deleted                               | Obsolete; 3 new sirens were installed in 2021                          |
| Johnston 1 | Update outdoor warning system                                                                                                                                                                                                          | Deleted                               | Project Completed                                                      |
| Johnston 2 | Construct Detention Basin Northglenn Neighborhood West of Merle Hay Road                                                                                                                                                               | Continuing                            | No Progress                                                            |
| Johnston 3 | Extend 72" Storm Sewer Pipe under Johnston Drive                                                                                                                                                                                       | Continuing                            | No Progress                                                            |
| Johnston 4 | Construct flood control structure on Johnston Drive                                                                                                                                                                                    | Continuing                            | No Progress                                                            |
| Johnston 5 | Multi-purpose Safe Room at Lew Clarkson Park                                                                                                                                                                                           | Continuing                            | Recently-constructed concession stand did not meet safe room standards |
| Johnston 6 | Continue to work with Iowa DOT to eliminate flooding at Northwest Beaver Drive (water impounded since the 2008 flood may be affecting the water table and may be polluted)                                                             | Continuing                            | Ongoing                                                                |
| Johnston 7 | Conduct flood impact study on Merle Hay and Beaver Creek area                                                                                                                                                                          | Continuing                            | DNR has determined that FEMA mapping is incorrect in this area         |

## 4: MITIGATION STRATEGY

| Status of 2018 Plan Actions |                                                                                                                                                                                                                                        |                                       |                                                                                                                |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|----------------------------------------------------------------------------------------------------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                                                                              | Action Status (Continuing or Deleted) | Notes and Status Updates                                                                                       |
| Johnston 8                  | Continue to comply with the NFIP by enforcing floodplain management ordinance, including regulating/ monitoring new construction and substantial improvements in the SFHA; and participating in floodplain identification and mapping. | Continuing                            | Ongoing                                                                                                        |
| Mitchellville 1             | Improve ditch and culvert drainage in northwest part of town                                                                                                                                                                           | Deleted                               | Project Completed                                                                                              |
| Mitchellville 2             | Backup power generator for police/fire station                                                                                                                                                                                         | Continuing                            | No Progress                                                                                                    |
| Mitchellville 3             | New roof for police/fire station                                                                                                                                                                                                       | Continuing                            | No Progress                                                                                                    |
| Mitchellville 4             | Re-wiring the electrical system for police/fire station                                                                                                                                                                                | Continuing                            | No Progress                                                                                                    |
| Mitchellville 5             | New siren on east edge of town                                                                                                                                                                                                         | Continuing                            | No Progress                                                                                                    |
| Mitchellville 6             | Continue to comply with the NFIP by enforcing floodplain management ordinance, including regulating/ monitoring new construction and substantial improvements in the SFHA; and participating in floodplain identification and mapping. | Continuing                            | Ongoing                                                                                                        |
| Pleasant Hill 1             | Generators for lift stations: 6400 Southeast 6th Street; Northeast 80th Street; Vandalia Road; Harbor Lake Drive, and Southeast 60th Street                                                                                            | Continuing                            | Completed for all locations except SE 60 <sup>th</sup> street; revising wording of action in new plan          |
| Pleasant Hill 2             | Flood mitigation planning elevation of southeast connector so water passes underneath – current road is in flood zone                                                                                                                  | Continuing                            | In progress; road construction funded through INFRA and likely will be constructed during this planning cycle. |
| Pleasant Hill 3             | Creation of storm water utility (with taxing and bonding authority) Explore increase to utilities fees to complete storm water utilities.                                                                                              | Continuing                            | Ongoing; updating wording of action in new plan                                                                |
| Pleasant Hill 4             | Relocation of and construction of new fire station                                                                                                                                                                                     | Deleted                               | Project Completed                                                                                              |
| Pleasant Hill 5             | Relocation of gas pumps for city vehicles which are in flood zone                                                                                                                                                                      | Continuing                            | Ongoing; updating wording of action in new plan                                                                |
| Pleasant Hill 6             | Safe room incorporation into new city facilities / construction                                                                                                                                                                        | Continuing                            | No Progress                                                                                                    |
| Pleasant Hill 7             | Regional detention facility at northeast 80th Street                                                                                                                                                                                   | Continuing                            | Ongoing; updating wording of action in new plan                                                                |
| Pleasant Hill 8             | Enhance combined development of Des Moines Area Regional GIS Partnership                                                                                                                                                               | Continuing                            | No Progress                                                                                                    |
| Pleasant Hill 9             | Construction of new culvert at Little Four Mile Creek Drive 4400 block                                                                                                                                                                 | Continuing                            | Ongoing; updating wording of action in new plan                                                                |



## 4: MITIGATION STRATEGY

### Status of 2018 Plan Actions

| Action ID        | Mitigation Project / Activity Description                                                                                                                                                                                              | Action Status (Continuing or Deleted) | Notes and Status Updates                                                       |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|--------------------------------------------------------------------------------|
| Pleasant Hill 10 | Pursue remedial flood mitigation actions associated with the South East Des Moines (SEDM) Levee, US 65                                                                                                                                 | Continuing                            | No Progress                                                                    |
| Pleasant Hill 11 | Continue to comply with the NFIP by enforcing floodplain management ordinance, including regulating/ monitoring new construction and substantial improvements in the SFHA; and participating in floodplain identification and mapping. | Continuing                            | Ongoing                                                                        |
| Pleasant Hill 12 | Flood way buyout program                                                                                                                                                                                                               | Continuing                            | No Progress                                                                    |
| Pleasant Hill 13 | Construction of Storm Water Detention Basins, Buffer Strips, and Channel Improvements to Fourmile Creek though the Fourmile Creek Watershed Authority                                                                                  | Continuing                            | No Progress                                                                    |
| Pleasant Hill 14 | Construction of Storm Water Detention Basins, buffer Strips, and Channel Improvements to Four Mile Creek watersheds though the Watershed Authority                                                                                     | Continuing                            | Ongoing; updating wording of action in new plan                                |
| Pleasant Hill 15 | Management of Stream Buffers - along creek beds / river beds                                                                                                                                                                           | Continuing                            | Ongoing                                                                        |
| Pleasant Hill 16 | Construction of new box culvert at Parkridge Ave across from the Cemetery                                                                                                                                                              | Deleted                               | Project Complete                                                               |
| Polk City 1      | Safe Room for: police department/fire department/ community center/city hall/ visitors at area lakes                                                                                                                                   | Continuing                            | No Progress                                                                    |
| Polk City 2      | Safe room for sports complex                                                                                                                                                                                                           | Continuing                            | No Progress                                                                    |
| Polk City 3      | Advocate for structural enhancements to Mile Long Bridge to bring to current DOT standards                                                                                                                                             | Continuing                            | No Progress                                                                    |
| Polk City 4      | Raise levee elevation for sewer treatment facility on East Broadway Street                                                                                                                                                             | Deleted                               | No longer needed; new lift station was built higher and lagoons no longer used |
| Polk City 5      | Advocate for expanding pumping capacity for sewer treatment facility pumping to Saylorville Reservoir                                                                                                                                  | Deleted                               | Project Completed by Army Corps of Engineers in 2023                           |
| Polk City 6      | Raise wellheads and associated electrical for Polk City Well Field on North 3rd Street and East Northside Drive                                                                                                                        | Deleted                               | Ownership of wells being transferred from the City to Central Iowa Water Works |
| Polk City 7      | Storm sirens at Hugg Drive and Westside Drive                                                                                                                                                                                          | Continuing                            | No Progress                                                                    |

## 4: MITIGATION STRATEGY

### Status of 2018 Plan Actions

| Action ID    | Mitigation Project / Activity Description                                                                                                                                                                                              | Action Status (Continuing or Deleted) | Notes and Status Updates                             |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------------------------------------------------------|
| Polk City 8  | Lining of public sewers to mitigate infiltration of the main pump.                                                                                                                                                                     | Continuing                            | No Progress                                          |
| Polk City 9  | Culvert at N 3rd -Bedshed Drive to mitigate water running over the road flooding buildings                                                                                                                                             | Continuing                            | No Progress                                          |
| Polk City 10 | Join the National Flood Insurance Program                                                                                                                                                                                              | Continuing                            | No Progress                                          |
| Runnells 1   | Backup power generator for community center at 108 Brown Street                                                                                                                                                                        | Continuing                            | Project Ongoing                                      |
| Runnells 2   | Document electronic backup for city critical documents                                                                                                                                                                                 | Continuing                            | Community actively seeking funding                   |
| Runnells 3   | Development of new lagoon at sewer station to mitigate overflow in high rains                                                                                                                                                          | Continuing                            | In progress; expecting completion June 2025          |
| Runnells 4   | Continue to comply with the NFIP by enforcing floodplain management ordinance, including regulating/ monitoring new construction and substantial improvements in the SFHA; and participating in floodplain identification and mapping. | Continuing                            | Ongoing                                              |
| Urbandale 1  | Oxbow Construction                                                                                                                                                                                                                     | Deleted                               | Project Completed                                    |
| Urbandale 2  | Flood way buyout program                                                                                                                                                                                                               | Continuing                            | 1 voluntary buyout 2021, program available as needed |
| Urbandale 3  | Buyout Property Redesign Program                                                                                                                                                                                                       | Continuing                            | 1 voluntary buyout 2021, program available as needed |
| Urbandale 4  | Police Station Expansion and Fleet Storage                                                                                                                                                                                             | Continuing                            | In planning stage, funding allocated                 |
| Urbandale 5  | Police Station – Douglas Entrance                                                                                                                                                                                                      | Deleted                               | Project Completed                                    |
| Urbandale 6  | Fire: Rescue Truck Replacement                                                                                                                                                                                                         | Continuing                            | Scheduled for delivery Summer 2024                   |
| Urbandale 7  | Fire: Truck Replacement                                                                                                                                                                                                                | Continuing                            | Scheduled for delivery Fall 2024                     |
| Urbandale 8  | Fire: Truck                                                                                                                                                                                                                            | Deleted                               | Project Completed                                    |
| Urbandale 9  | Fire: Tender                                                                                                                                                                                                                           | Continuing                            | Pending future annexation                            |
| Urbandale 10 | Looped Fiber Connection Between City Facilities                                                                                                                                                                                        | Continuing                            | Scheduled for completion by July 2024                |
| Urbandale 11 | Phone and Network Upgrade                                                                                                                                                                                                              | Deleted                               | Project Completed                                    |
| Urbandale 12 | Drainage Improvements-Variou Locations                                                                                                                                                                                                 | Continuing                            | Annual program in place                              |
| Urbandale 13 | Intake Rebuilding                                                                                                                                                                                                                      | Continuing                            | Annual program in place                              |

## 4: MITIGATION STRATEGY

| Status of 2018 Plan Actions |                                                                                                                                   |                                       |                                            |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|--------------------------------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                         | Action Status (Continuing or Deleted) | Notes and Status Updates                   |
| Urbandale 14                | Aurora Avenue Railroad Crossing                                                                                                   | Deleted                               | Project Completed                          |
| Urbandale 15                | Hickman Road at 128 <sup>th</sup> Street                                                                                          | Continuing                            | DOT project, nearing completion            |
| Urbandale 16                | Interchange Modifications and Collector Distributor Connections- Interstate 35/80 and Highway 141 / NW Urbandale Drive / Meredith | Deleted                               | Project Completed                          |
| Urbandale 17                | 100th Street Interchange at I-35/80                                                                                               | Deleted                               | Project Completed                          |
| Urbandale 18                | 72 <sup>nd</sup> Street Replacement with Storm Sewer                                                                              | Deleted                               | Project Completed                          |
| Urbandale 19                | 104 <sup>th</sup> Street with Storm Sewer                                                                                         | Deleted                               | Project Completed                          |
| Urbandale 20                | Battery Backup Signalization                                                                                                      | Deleted                               | Project Completed                          |
| Urbandale 21                | Water Main Projects                                                                                                               | Continuing                            | Annual program in place                    |
| Urbandale 22                | Warning siren at Alice's Road                                                                                                     | Deleted                               | Project Completed                          |
| Urbandale 23                | Traffic Signal Battery Back up                                                                                                    | Continuing                            | 52 out of 58 signals have battery backups. |
| Urbandale 24                | Storm Sewer inflow elimination program                                                                                            | Deleted                               |                                            |
| Urbandale 25                | Storm water grant programs                                                                                                        | Continuing                            | Annual program in place                    |
| Urbandale 26                | Storm shelters in Public Parks                                                                                                    | <i>Deleted</i>                        |                                            |
| Urbandale 27                | Creek Bank Stabilization                                                                                                          | Continuing                            | Annual program in place                    |
| Urbandale 28                | Community Scholarship for swimming lessons                                                                                        | Continuing                            | Annual program in place                    |
| Delaware Township 1         | Standby Generator Installation                                                                                                    | Continuing                            | No Progress                                |
| Delaware Township 2         | Township Plow Purchase                                                                                                            | Deleted                               | Project Completed                          |
| West Des Moines 1           | Elevation of I-35 Bridge over Raccoon River and Highway 28 Bridge over Raccoon River to mitigate washout                          | Continuing                            | No Progress                                |
| West Des Moines 2           | Pursue remedial flood mitigation actions associated with the Southeast Des Moines (SEDM) Levee, US 65                             | Continuing                            | No Progress                                |

## 4: MITIGATION STRATEGY

### Status of 2018 Plan Actions

| Action ID          | Mitigation Project / Activity Description                                                                                                                                                                                                                                                                                                                                      | Action Status (Continuing or Deleted) | Notes and Status Updates                                                                                                                                                                                                                                                                        |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| West Des Moines 3  | Lining of public sewers in the Valley Junction Area to mitigate infiltration at the Main Pump-2 Phases                                                                                                                                                                                                                                                                         | Continuing                            | No Progress                                                                                                                                                                                                                                                                                     |
| West Des Moines 4  | Lining of public sewers in the Fairmeadows Creek Area to mitigate infiltration of the main pump                                                                                                                                                                                                                                                                                | Continuing                            | No Progress                                                                                                                                                                                                                                                                                     |
| West Des Moines 5  | Incorporate and adopt recommended ASCE Flood Resistant Design and Construction Guidelines into City Building Code and Floodplain Management section of City Code (Title 9, Ch. 12)                                                                                                                                                                                             | Deleted                               | ASCE Flood Resistant Design and Construction Standards have been incorporated in the Building Code and have been adopted by the City. Standards related to Flood Design Class can be incorporated into the Floodplain Management chapter of City code when the next FEMA/FIRM updates occur. (L |
| West Des Moines 6  | Design MidAmerican Energy RecPlex to function as an essential facility (evacuation center) during emergency response. Classify as a Flood Design - Class 4. Ensure connection to roadway, loading dock and primary structure are built at ASCE Design Flood Elevation guidelines. Harden building elements to provide storm shelter for building and recreational field users. | Deleted                               | Construction on the facility complete – actions were not implemented.                                                                                                                                                                                                                           |
| West Des Moines 7  | Map and buffer Tier II facilities within City and adjacent to City perimeter. Develop emergency response and subsequent evacuation routes for HAZMAT incidents based on these mappings.                                                                                                                                                                                        | Continuing                            | No Progress                                                                                                                                                                                                                                                                                     |
| West Des Moines 8  | Implement recommended storm water improvements from the Westown-PCP drainage study.                                                                                                                                                                                                                                                                                            | Continuing                            | No Progress                                                                                                                                                                                                                                                                                     |
| West Des Moines 9  | Installation of ice protection structures at regional radio communications infrastructure sites.                                                                                                                                                                                                                                                                               | Continuing                            | No Progress                                                                                                                                                                                                                                                                                     |
| West Des Moines 10 | Incorporate and adopt recommended ASCE Flood Resistant Design and Construction Guidelines into City Building Code and Floodplain Management section of City Code                                                                                                                                                                                                               | Deleted                               | Removing duplicative action from list                                                                                                                                                                                                                                                           |
| West Des Moines 11 | Develop evacuation routes for hazard incidents, flooding incidents, and serve weather incidents.                                                                                                                                                                                                                                                                               | Continuing                            | No Progress                                                                                                                                                                                                                                                                                     |

## 4: MITIGATION STRATEGY

| Status of 2018 Plan Actions |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                       |                          |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|--------------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                                                                                                                                                                                                                                                                                                 | Action Status (Continuing or Deleted) | Notes and Status Updates |
| West Des Moines 12          | Map Tier II facilities within City and adjacent to City perimeter.                                                                                                                                                                                                                                                                                                                                                                                        | Continuing                            | No Progress              |
| West Des Moines 13          | In conjunction with redevelopment, identify and implement storm water drainage improvement recommendations within the Blue Creek drainage basin.                                                                                                                                                                                                                                                                                                          | Continuing                            | No Progress              |
| West Des Moines 14          | Enhance current floodplain management efforts by updating the Floodplain Management Ordinance, which includes new Flood Insurance Rate Maps, associated ordinance language approved by IDNR/FEMA, and increased requirements for City facilities including public services, emergency services, and similar structures that are critical to maintaining City functions in an emergency to be elevated a minimum of one (1) foot above the 500-year flood. | Continuing                            | No Progress              |
| West Des Moines 15          | SE Basins Stormwater Improvements (Valley Junction Area) approximate boundary: 19th St. & Woodland Ave. to Grand Ave. & Railroad Avenue to Lincoln St. & HWY 28 to Hwy 28 & Prospect Ave.                                                                                                                                                                                                                                                                 | Continuing                            | No Progress              |
| West Des Moines 16          | NE Basins Stormwater Improvements (Valley Junction Area) approximate boundary: Hwy. 28 & N. of Ashworth Rd. to Hoak Dr. & IA Interstate RR to Office Park Road & 15th St. to Ashworth Rd. & 11th St. to Ashworth Rd. & 9th St. to Grand Ave. & 9th St. to Grand Ave. & 8th St. to 5th St. & Prospect Ave. to 5th St. & Vine St. to Hwy 28 & Vine St. to Hwy 28 & Lincoln St. to Walnut Creek Levee (Des Moines) to Hwy. 28 & N. of Ashworth Rd.           | Continuing                            | No Progress              |
| West Des Moines 17          | Raccoon River - Bank Stabilization                                                                                                                                                                                                                                                                                                                                                                                                                        | Continuing                            | No Progress              |
| West Des Moines 18          | Grand Avenue Stormwater Pump Station Near Raccoon River Dr.                                                                                                                                                                                                                                                                                                                                                                                               | Continuing                            | No Progress              |
| West Des Moines 19          | Blue Creek Basins Stormwater Improvements ( 5 Basins)                                                                                                                                                                                                                                                                                                                                                                                                     | Continuing                            | No Progress              |
| West Des Moines 20          | Iowa Interstate Railroad Bridge near Raccoon River Park Entrance and Raccoon River Park Soccer Complex Culvert                                                                                                                                                                                                                                                                                                                                            | Continuing                            | No Progress              |

## 4: MITIGATION STRATEGY

### Status of 2018 Plan Actions

| Action ID                | Mitigation Project / Activity Description                                                                                                                                                                                              | Action Status (Continuing or Deleted) | Notes and Status Updates                                                                                                    |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| West Des Moines 21       | Fairmeadows Creek - 27th & Vine Culvert                                                                                                                                                                                                | Continuing                            | No Progress                                                                                                                 |
| West Des Moines 22       | Walnut Creek Watershed Management Authority Misc. Projects                                                                                                                                                                             | Continuing                            | No Progress                                                                                                                 |
| West Des Moines 23       | 62nd & Railroad Ave Sanitary Sewer Gate Structure Replacement                                                                                                                                                                          | Continuing                            | No Progress                                                                                                                 |
| West Des Moines 24       | 8th Street Reconstruction - I-235 to Clegg Road                                                                                                                                                                                        | Continuing                            | No Progress                                                                                                                 |
| West Des Moines 25       | S. 88th Street Railroad Crossing improvements- Near Raccoon River Drive                                                                                                                                                                | Continuing                            | No Progress                                                                                                                 |
| Windsor Heights 1        | Install residential check valves at Washington Avenue and 70th Street                                                                                                                                                                  | Continuing                            | No Progress                                                                                                                 |
| Windsor Heights 2        | Replace storm sewer intakes                                                                                                                                                                                                            | Continuing                            | No Progress                                                                                                                 |
| Windsor Heights 3        | Identify potential future shelter sites                                                                                                                                                                                                | Continuing                            | No Progress                                                                                                                 |
| Windsor Heights 4        | Continue to comply with the NFIP by enforcing floodplain management ordinance, including regulating/ monitoring new construction and substantial improvements in the SFHA; and participating in floodplain identification and mapping. | Continuing                            | No Progress                                                                                                                 |
| Windsor Heights 5        | Walnut Creek bank stabilization                                                                                                                                                                                                        | Continuing                            | No Progress                                                                                                                 |
| Des Moines Water Works 1 | Upgrade Interior Drainage Pumping System inside the levee protected area at Fleur Drive Water Treatment Plant.                                                                                                                         | Deleted                               | Project Completed                                                                                                           |
| Des Moines Water Works 2 | Relocate grounds maintenance facility to the dry side of the levee system to reduce repetitive loss potential.                                                                                                                         | Deleted                               | Project ongoing (building new grounds maintenance facility on the dry side of the levee) and expected to be completed soon. |
| Des Moines Water Works 3 | Evaluate and repair flood gates located at the Fleur Drive Water Treatment Plant.                                                                                                                                                      | Continuing                            | A study is being completed in 2024.                                                                                         |
| Des Moines Water Works 4 | Evaluation of ring levee protecting Fleur Drive Water Treatment Plant.                                                                                                                                                                 | Continuing                            | A study is being completed in 2024.                                                                                         |

## 4: MITIGATION STRATEGY

| Status of 2018 Plan Actions    |                                                                                                                                                                                                                                                                                                                                                          |                                       |                                                                                                                                                                                                                        |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Action ID                      | Mitigation Project / Activity Description                                                                                                                                                                                                                                                                                                                | Action Status (Continuing or Deleted) | Notes and Status Updates                                                                                                                                                                                               |
| Ankeny Schools 1               | Multi-purpose Safe Rooms District Wide                                                                                                                                                                                                                                                                                                                   | Continuing                            | One storm shelter added to each high school with completion of new additions (capacity of 400 at both locations). The newest elementary school (opening fall 2024) will have safe room capacity for the entire school. |
| Ankeny Schools 2               | Emergency HVAC Shut-Off                                                                                                                                                                                                                                                                                                                                  | Continuing                            | No updates                                                                                                                                                                                                             |
| Ankeny Schools 3               | Safety Film/Glass                                                                                                                                                                                                                                                                                                                                        | Continuing                            | Every school entrance will have safety film applied to the glass by the end of March 2024. We would like to continue with all exterior windows, especially those on the 1st floor.                                     |
| Ankeny Schools 4               | Back-up Facility Generators                                                                                                                                                                                                                                                                                                                              | Continuing                            | No updates                                                                                                                                                                                                             |
| Bondurant-Farrar Schools 1     | Safety Glass                                                                                                                                                                                                                                                                                                                                             | Deleted                               | The district has secured funding through a school safety grant program                                                                                                                                                 |
| Bondurant-Farrar Schools 2     | Storm Safe Room at Anderson Elementary                                                                                                                                                                                                                                                                                                                   | Continuing                            | This is still the only building that does not have a hardened space for student safety in high wind or storm events. District would like to make this happen in the future.                                            |
| Dallas Center-Grimes Schools 1 | Construction of safe rooms in existing or new school buildings                                                                                                                                                                                                                                                                                           | Deleted                               | Removing action, as the district is not participating in the 2024 update of the plan                                                                                                                                   |
| Des Moines Schools 1           | DAS and repeaters- (Distributed antenna system) As Des Moines Public Schools becomes more energy efficient, cellular and radio communications are blocked within our buildings. In order to combat this, we need to add DAS antennas and repeaters. This improves communication capabilities for not only DMPS staff, but also all emergency responders. | Continuing                            | In-progress. Radios purchased with LTE coverage and currently looking at a system that will leverage IP based building radios which would tie into the Statewide ISICS radio system.                                   |
| Des Moines Schools 2           | Virtual, remote server farm service for disaster recovery due to flood, tornado, windstorm. Our servers are in a building that is in a flood plain. Our back-up system is downtown which also has the potential to flood. In order to recover from a disaster we need the ability to transfer all systems to a remote 3rd party.                         | Continuing                            | No Updates                                                                                                                                                                                                             |



## 4: MITIGATION STRATEGY

| Status of 2018 Plan Actions |                                                                                                                            |                                       |                                                                                                                                                     |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                  | Action Status (Continuing or Deleted) | Notes and Status Updates                                                                                                                            |
| Des Moines Schools 3        | Backup Generation at all of our schools and administrative offices                                                         | Continuing                            | No Updates                                                                                                                                          |
| Des Moines Schools 4        | Construct new safe rooms at various elementary schools                                                                     | Continuing                            | No Updates                                                                                                                                          |
| Des Moines Schools 5        | Construct a multipurpose room as a safe room-Jefferson Elementary                                                          | Deleted                               | Project Completed                                                                                                                                   |
| Des Moines Schools 6        | Construct a multipurpose room as a safe room-Lovejoy Elementary                                                            | Deleted                               | Project Completed                                                                                                                                   |
| Des Moines Schools 7        | Construct a multipurpose room as a safe room-Studebaker Elementary                                                         | Deleted                               | Project Completed                                                                                                                                   |
| Des Moines Schools 8        | Construct a multipurpose room as a safe room-Wright Elementary                                                             | Deleted                               | Project Completed                                                                                                                                   |
| Johnston Schools 1          | Sprinkle facility at 6510 NW 62nd when repurposing the building                                                            | Continuing                            | No updates                                                                                                                                          |
| Johnston Schools 2          | Replace and upgrade of emergency communication radio system                                                                | Continuing                            | No updates                                                                                                                                          |
| North Polk Schools 1        | Conduct needs analysis and feasibility study for safe rooms at Central Elementary and North Polk Junior/Senior High School | Continuing                            | Vulnerability assessment completed; working on projects to implement safe room construction. Rewording action in new plan to reflect status change. |
| Southeast Polk Schools 1    | Contraction of Multi-purpose Safe Rooms District Wide                                                                      | Continuing                            | Rewording in updated plan                                                                                                                           |
| Southeast Polk Schools 2    | Double-entry systems in each school; bullet-resistant glass                                                                | Deleted                               | Project Completed                                                                                                                                   |
| Southeast Polk Schools 3    | Internal and outward-facing electronic communications for emergency/disaster mitigation                                    | Continuing                            | In progress, via school safety grant plan implementation                                                                                            |
| Southeast Polk Schools 4    | Emergency Radios--Cabinet Members (6)                                                                                      | Continuing                            | Expanding action via school safety grant process to include all schools; work in progress                                                           |

## 4: MITIGATION STRATEGY

| Status of 2018 Plan Actions |                                                                                                       |                                       |                                                                                                                                                                                                                                                   |
|-----------------------------|-------------------------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Action ID                   | Mitigation Project / Activity Description                                                             | Action Status (Continuing or Deleted) | Notes and Status Updates                                                                                                                                                                                                                          |
| Southeast Polk Schools 5    | Replace antiquated district surveillance cameras and install new systems in buildings without cameras | Continuing                            | Expanding action via school safety grant process to include all schools; work in progress                                                                                                                                                         |
| Urbandale Schools 1         | NOAA Weather Radios at District Buildings                                                             | Deleted                               | All schools except Olmsted, MetroWest and UHS currently have a weather radio                                                                                                                                                                      |
| Urbandale Schools 2         | Move Generator from Middle School to Jensen Elementary                                                | Deleted                               | Project no longer feasible                                                                                                                                                                                                                        |
| Urbandale Schools 3         | Implement Emergency Operations Plan                                                                   | Continuing                            | Ongoing                                                                                                                                                                                                                                           |
| Urbandale Schools 4         | Safe Room at New Elementary School                                                                    | Deleted                               | Completed at both new buildings. MetroWest's new location also has a safety room.                                                                                                                                                                 |
| Urbandale Schools 5         | "Safety Center" Electronic Safety Plan APP                                                            | Deleted                               | Project no longer feasible                                                                                                                                                                                                                        |
| Urbandale Schools 6         | Ballistic film and Glazing                                                                            | Continuing                            | Currently on the front of new elementary buildings. Preparing to add to Karen Acres. Also preparing to add to other locations at Olmsted. Valerius is pending.                                                                                    |
| Urbandale Schools 7         | Digital Radios for District EOP Staff                                                                 | Deleted                               | All administrators and other identified individuals have an updated working radio. There is a 911 channel as well as building specific channels. District level administrators have a universal radio that allows communication to all buildings. |
| Urbandale Schools 8         | Internal Locking Capabilities at District Buildings                                                   | Continuing                            | In progress                                                                                                                                                                                                                                       |
| Urbandale Schools 9         | Sally Port at Karen Acres                                                                             | Deleted                               | Project Completed                                                                                                                                                                                                                                 |
| Urbandale Schools 10        | Sally Port at MS                                                                                      | Deleted                               | Project Completed                                                                                                                                                                                                                                 |
| Urbandale Schools 11        | Sally Port at HS                                                                                      | Deleted                               | Project Completed                                                                                                                                                                                                                                 |

## 4: MITIGATION STRATEGY

| Status of 2018 Plan Actions |                                                                                                                                    |                                       |                                                                                                                                                                        |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                          | Action Status (Continuing or Deleted) | Notes and Status Updates                                                                                                                                               |
| Urbandale Schools 12        | Sally Port at Webster Elementary                                                                                                   | Deleted                               | Project Completed                                                                                                                                                      |
| West Des Moines Schools 1   | Installation of FEMA compliant safe rooms/areas in nine elementary school buildings.                                               | Continuing                            | In progress; six of nine have been installed. Rewording action to reflect progress.                                                                                    |
| West Des Moines Schools 2   | Installation of FEMA compliant safe rooms/areas in two Jr. High buildings and one Freshman High School.                            | Continuing                            | In progress; the freshman high school building project is complete, as is one of the two Jr. High School buildings; Rewording action to reflect progress.              |
| West Des Moines Schools 3   | Installation of generator(s) to serve the FEMA compliant safe rooms/areas in nine elementary buildings.                            | Continuing                            | Generators have been installed in the same six of the nine elementary schools that have had FEMA compliant safe rooms installed. Rewording action to reflect progress. |
| West Des Moines Schools 4   | Installation of generator (s) to serve the FEMA compliant safe rooms/areas in two Jr. High buildings and one Freshman High School. | Continuing                            | Generators have been installed in one of the Jr. High buildings and the Freshman High School. Rewording action to reflect progress.                                    |

## 4: MITIGATION STRATEGY

### 4.4. 2024 MITIGATION ACTION LIST

The table below provides a list of the mitigation actions that communities participating in this plan update hope to work towards over the next five years, including both continuing actions identified in the previous plan and new mitigation actions proposed during the update process. In addition to the 189 actions continued from the previous plan, 70 new actions were identified, for a combined total of 259 actions in this updated strategy. The participants are not committing to undertaking every action suggested in this list, but rather proposing an extensive list of *potential* actions that they may wish to pursue, depending in the availability of funding. The potential benefits and costs of each action was weighed when deciding whether or not to include it in the plan. However, a detailed and quantitative benefit-cost analysis will be performed prior to implementation of actions when additional detailed project cost information has been developed.

This plan update also includes county-wide actions (which are separate from unincorporated Polk County's actions), which apply to every participating jurisdiction. Some of these actions are included in this section because they are multi-jurisdictional, and some actions are listed as county-wide because the planning team identified a gap in the existing strategy (for example, hazards for which multiple communities had not yet identified specific actions, or actions that are of significant importance across the entire planning area). All planning committee members representing participating communities agree to be responsible for the implementation of these actions.

Note that Saylor Township's representatives determined that these county-wide actions sufficiently met their needs, and they did not wish to add any additional jurisdiction-specific actions to this plan.

While the table below analyzes a comprehensive range of mitigation actions, spanning many types of solutions, the "Project Type" column assigns each action to one of four general categories:

- Local Plans and Regulations
- Structure and Infrastructure Projects
- Natural Systems Protection
- Education and Awareness Programs

As mentioned above, and discussed in section 4.7, the process of determining which mitigation projects participating communities will ultimately apply funding for and pursue is more nuanced than the process of developing this action plan. However, for the purposes of assigning a general, high-level priority to each action in the table below, the following rubric was used:

## 4: MITIGATION STRATEGY

- **High Priority (High):**
  - Saves lives, and either reduces property damage or reduces the need for response actions
- **Medium Priority (Medium):**
  - Saves lives, but does not reduce property damage or the need for response actions, **OR**
  - Does not save lives, but reduces property damage *and* reduces the need for response actions
- **Low Priority (Low):** Achieves only *one* of the following
  - Reduce property damage
  - Reduce the need for response actions

Similarly, the “Expected Timeframe for Completion” estimate column is based on the following rubric:

- **Short Term:** Feasible to accomplish within the next two years
- **Medium-Term:** Feasible to accomplish within the next six years
- **Long-Term:** Expected to take longer than six years to complete

## 4: MITIGATION STRATEGY

Table 129: 2024 Mitigation Action Plan

| 2024 Mitigation Action Plan |                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                               |                                    |                                                           |                                                                                           |                                    |                                       |                                   |        |                  |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|-----------------------------------------------------------|-------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                            | Hazards Addressed                                                                                                                                                                                                                                                                                                                                                             | Impacts Existing or New Structures | Responsible Agency or Entity                              | Potential Funding Sources                                                                 | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| County-Wide 1               | Expand and improve municipal and county capacity to implement mitigation activities, particularly those items identified as unavailable in Chapter 2 | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ landslides, structural fire, thunderstorm with lightning and hail, tornado, transportation incident, windstorm, winter storm | Both                               | All HMPC representatives from participating jurisdictions | City Budgets (general funds, Capital Improvement Funds) FEMA HMA Grants, EMPG Funding     | Long-Term                          | Local Plans and Regulations           | New                               | 2, 3   | High             |
| County-Wide 2               | Explore the possibility of conducting county-wide cyber security training, joint exercises, or vulnerability assessments                             | Cyberattacks, Infrastructure Failure                                                                                                                                                                                                                                                                                                                                          | Existing                           | Polk County Emergency Management                          | City Budgets (general funds, Capital Improvement Funds), DHS and FEMA preparedness grants | Medium- Term                       | Education and Awareness Programs      | New                               | 2, 3   | Low              |
| County-Wide 3               | Upgrade radio systems, fiber redundancy components, and CAD-to-CAD arrangements to increase interoperability                                         | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ landslides, structural fire, thunderstorm with lightning and hail, tornado,                                                  | Both                               | All HMPC representatives from participating jurisdictions | City Budgets (general funds, Capital Improvement Funds), DHS and FEMA preparedness grants | Medium- Term                       | Structure and Infrastructure Projects | New                               | 2, 3   | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                 |                                                                                                                                                                                                                                                  |                                    |                                                           |                                                                                           |                                    |                                                                    |                                   |            |                  |
|-----------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|-----------------------------------------------------------|-------------------------------------------------------------------------------------------|------------------------------------|--------------------------------------------------------------------|-----------------------------------|------------|------------------|
| Action ID                   | Mitigation Project / Activity Description                       | Hazards Addressed                                                                                                                                                                                                                                | Impacts Existing or New Structures | Responsible Agency or Entity                              | Potential Funding Sources                                                                 | Expected Time Frame for Completion | Project Type                                                       | Action Status (New or Continuing) | Goal #     | Priority (H/M/L) |
|                             |                                                                 | transportation incident, windstorm, winter storm                                                                                                                                                                                                 |                                    |                                                           |                                                                                           |                                    |                                                                    |                                   |            |                  |
| County-Wide 4               | Improve and enhance flood alert early warning systems           | River Flooding; Flash Flooding                                                                                                                                                                                                                   | Both                               | All HMPC representatives from participating jurisdictions | City Budgets (general funds, Capital Improvement Funds), DHS and FEMA preparedness grants | Medium- Term                       | Structure and Infrastructure Projects                              | New                               | 1, 2, 3    | Medium           |
| County-Wide 5               | Water System Load Demand Management Planning and Implementation | Drought                                                                                                                                                                                                                                          | Both                               | All HMPC representatives from participating jurisdictions | City Budgets (general funds, Capital Improvement Funds), FEMA HMA Grants, City Budgets    | Medium-Term                        | Local Plans and Regulations, Structure and Infrastructure Projects | New                               | 2, 4       | Medium           |
| County-Wide 6               | Overhead Electric System Management Planning and Implementation | Infrastructure Failure                                                                                                                                                                                                                           | Both                               | All HMPC representatives from participating jurisdictions | City Budgets (general funds, Capital Improvement Funds), FEMA HMA Grants, City Budgets    | Medium-Term                        | Local Plans and Regulations, Structure and Infrastructure Projects | New                               | 2, 3, 4, 3 | Medium           |
| County-Wide 7               | Conduct annual regional preparedness exercise                   | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ | Both                               | All HMPC representatives from participating jurisdictions | City Budgets (general funds, Capital Improvement Funds)                                   | Long-Term                          | Local Plans and Regulations                                        | New                               | 2, 3       | Medium           |



## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                |                                                                                                                              |                                    |                                                           |                                                                                 |                                    |                             |                                   |        |                  |
|-----------------------------|----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|------------------------------------|-----------------------------------------------------------|---------------------------------------------------------------------------------|------------------------------------|-----------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                      | Hazards Addressed                                                                                                            | Impacts Existing or New Structures | Responsible Agency or Entity                              | Potential Funding Sources                                                       | Expected Time Frame for Completion | Project Type                | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
|                             |                                                                                                                | landslides, structural fire, thunderstorm with lightning and hail, tornado, transportation incident, windstorm, winter storm |                                    |                                                           |                                                                                 |                                    |                             |                                   |        |                  |
| County-Wide 8               | Partner with Iowa DNR to further assess dam-related risk, and to expand dam safety planning measures           | Dam Failure                                                                                                                  | Existing                           | All HMPC representatives from participating jurisdictions | City Budgets (general funds, Capital Improvement Funds), FEMA Dam Safety Grants | Long-Term                          | Local Plans and Regulations | New                               | 2      | Medium           |
| County-Wide 9               | Maintain StormReady Community Designation                                                                      | Flash Flooding, Thunderstorm with Lightning/Hail, Tornado, Windstorm                                                         | Both                               | All HMPC representatives from participating jurisdictions | City Budgets (general funds, Capital Improvement Funds)                         | Long-Term                          | Local Plans and Regulations | New                               | 2      | Medium           |
| County-Wide 10              | Educate the public about the presence of flooding hazards                                                      | Flash Flooding; River Flooding                                                                                               | Both                               | All HMPC representatives from participating jurisdictions | City Budgets (general funds, Capital Improvement Funds)                         | Long-Term                          | Local Plans and Regulations | New                               | 2      | Medium           |
| County-Wide 11              | Establish flood hazard disclosure processes, modeled after disclosure required by Iowa Admin Code r. 193E-14.1 | Flash Flooding; River Flooding                                                                                               | Both                               | All HMPC representatives from participating jurisdictions | City Budgets (general funds, Capital Improvement Funds)                         | Long-Term                          | Local Plans and Regulations | New                               | 2      | Medium           |
| County-Wide 12              | Conduct watershed-based water quality management plans                                                         | Flash Flooding; River Flooding                                                                                               | Both                               | All HMPC representatives from participating jurisdictions | City Budgets (general funds, Capital Improvement Funds)                         | Long-Term                          | Local Plans and Regulations | New                               | 2      | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                               |                                    |                                                           |                                                                                           |                                    |                                  |                                   |        |                  |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|-----------------------------------------------------------|-------------------------------------------------------------------------------------------|------------------------------------|----------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                 | Hazards Addressed                                                                                                                                                                                                                                                                                                                                                             | Impacts Existing or New Structures | Responsible Agency or Entity                              | Potential Funding Sources                                                                 | Expected Time Frame for Completion | Project Type                     | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| County-Wide 13              | Provide staff training on hazard mitigation, floodplain management, substantial damage/substantial improvement processes, and damage assessment                           | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ landslides, structural fire, thunderstorm with lightning and hail, tornado, transportation incident, windstorm, winter storm | Both                               | All HMPC representatives from participating jurisdictions | City Budgets (general funds, Capital Improvement Funds)                                   | Long-Term                          | Local Plans and Regulations      | New                               | 2, 3   | Medium           |
| County-Wide 25              | Coordinate with Iowa State University Extension to educate the public about the risks associated with animal, plant, and crop diseases                                    | Animal/ Plant/ Crop Disease                                                                                                                                                                                                                                                                                                                                                   | N/A                                | All HMPC representatives from participating jurisdictions | City Budgets (general funds, Capital Improvement Funds), County Funds; federal ag. grants | Medium-Term                        | Education and Awareness Programs | New                               | 1, 3   | Low              |
| County-Wide 26              | Coordinate with federal agencies and other partners to gather additional data about the expected impacts of climate change on the residents and industries of Polk County | Climate Change                                                                                                                                                                                                                                                                                                                                                                | N/A                                | All HMPC representatives from participating jurisdictions | City Budgets (general funds, Capital Improvement Funds), County Funds                     | Medium-Term                        | Local Plans and Regulations      | New                               | 1, 3   | Low              |
| County-Wide 27              | Conduct a public education and outreach campaign to increase awareness of earthquake risks and best practices for safety                                                  | Earthquake                                                                                                                                                                                                                                                                                                                                                                    | N/A                                | All HMPC representatives from participating jurisdictions | City Budgets (general funds, Capital Improvement Funds), FEMA HMA Grants                  | Medium-Term                        | Education and Awareness Programs | New                               | 1      | Low              |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                         |                        |                                    |                                                           |                                                                          |                                    |                                  |                                   |         |                  |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|------------------------|------------------------------------|-----------------------------------------------------------|--------------------------------------------------------------------------|------------------------------------|----------------------------------|-----------------------------------|---------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                               | Hazards Addressed      | Impacts Existing or New Structures | Responsible Agency or Entity                              | Potential Funding Sources                                                | Expected Time Frame for Completion | Project Type                     | Action Status (New or Continuing) | Goal #  | Priority (H/M/L) |
| County-Wide 28              | Conduct a public education and outreach campaign to increase awareness of the presence of expansive soils for homebuyers                | Expansive Soils        | N/A                                | All HMPC representatives from participating jurisdictions | City Budgets (general funds, Capital Improvement Funds); FEMA HMA Grants | Medium-Term                        | Education and Awareness Programs | New                               | 1       | Low              |
| County-Wide 29              | Conduct a public education and outreach campaign to increase awareness of extreme temperature risks and best practices for safety       | Extreme Temperature    | N/A                                | All HMPC representatives from participating jurisdictions | City Budgets (general funds, Capital Improvement Funds); FEMA HMA Grants | Medium-Term                        | Education and Awareness Programs | New                               | 1       | Low              |
| County-Wide 30              | Conduct a public education and outreach campaign to encourage hazardous fuels reduction and increase awareness of wildfire risks        | Grass or Wildland Fire | N/A                                | All HMPC representatives from participating jurisdictions | City Budgets (general funds, Capital Improvement Funds); FEMA HMA Grants | Medium-Term                        | Education and Awareness Programs | New                               | 1       | Low              |
| County-Wide 31              | Continue to coordinate with Tier II Facility owners and LEPC to reduce hazardous material release or spill risk                         | Hazardous Materials    | N/A                                | All HMPC representatives from participating jurisdictions | City Budgets (general funds, Capital Improvement Funds); FEMA HMA Grants | Medium-Term                        | Education and Awareness Programs | New                               | 1, 2, 3 | Medium           |
| County-Wide 32              | Conduct a public education and outreach campaign to encourage vaccinations, personal hygiene, and other disease risk reduction measures | Human Disease          | N/A                                | All HMPC representatives from participating jurisdictions | City Budgets (general funds, Capital Improvement Funds)                  | Medium-Term                        | Education and Awareness Programs | New                               | 1       | Low              |
| County-Wide 33              | Conduct additional modeling to further understand the risks associated with Levee Failure in Polk County                                | Levee Failure          | Both                               | All HMPC representatives from participating jurisdictions | City Budgets (general funds, Capital Improvement Funds)                  | Medium-Term                        | Local Plans and Regulations      | New                               | 2, 3    | Low              |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                               |                                    |                                                           |                                                                          |                                    |                                  |                                   |        |                  |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|-----------------------------------------------------------|--------------------------------------------------------------------------|------------------------------------|----------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                           | Hazards Addressed                                                                                                                                                                                                                                                                                                                                                             | Impacts Existing or New Structures | Responsible Agency or Entity                              | Potential Funding Sources                                                | Expected Time Frame for Completion | Project Type                     | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| County-Wide 34              | Conduct additional modeling to further understand the risks associated with Sinkholes and Landslides in Polk County                                                                 | Sinkholes/ Landslide                                                                                                                                                                                                                                                                                                                                                          | Both                               | All HMPC representatives from participating jurisdictions | City Budgets (general funds, Capital Improvement Funds)                  | Medium-Term                        | Local Plans and Regulations      | New                               | 2, 3   | Low              |
| County-Wide 35              | Conduct a public education and outreach campaign to teach residents about how to prevent (and stay safe in the event of) structural fires                                           | Structural Fire                                                                                                                                                                                                                                                                                                                                                               | N/A                                | All HMPC representatives from participating jurisdictions | City Budgets (general funds, Capital Improvement Funds); FEMA HMA Grants | Medium-Term                        | Education and Awareness Programs | New                               | 1      | Low              |
| County-Wide 36              | Conduct studies to identify areas of highest traffic-related risk.                                                                                                                  | Transportation Incident                                                                                                                                                                                                                                                                                                                                                       | N/A                                | All HMPC representatives from participating jurisdictions | City Budgets (general funds, Capital Improvement Funds)                  | Long-Term                          | Local Plans and Regulations      | New                               | 2, 3   | Low              |
| County-Wide 37              | Conduct a public education and outreach campaign to encourage residents to prepare for the impacts of winter storm (including reducing exposure risk and safe use of generators)    | Winter Storm                                                                                                                                                                                                                                                                                                                                                                  | N/A                                | All HMPC representatives from participating jurisdictions | City Budgets (general funds, Capital Improvement Funds); FEMA HMA Grants | Medium-Term                        | Education and Awareness Programs | New                               | 1      | Low              |
| County-Wide 38              | Host lunch-and-learn or similar events for elected and newly-elected public officials to educate them about the hazard mitigation plan and how they can support its implementation. | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ landslides, structural fire, thunderstorm with lightning and hail, tornado, transportation incident, windstorm, winter storm | N/A                                | All HMPC representatives from participating jurisdictions | City Budgets (general funds, Capital Improvement Funds)                  | Long-Term                          | Education and Awareness Programs | New                               | 1, 2   | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                                                                                        |                                |                                    |                                                           |                                                                          |                                    |                                                                   |                                   |         |                  |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------------------|-----------------------------------------------------------|--------------------------------------------------------------------------|------------------------------------|-------------------------------------------------------------------|-----------------------------------|---------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                                                                              | Hazards Addressed              | Impacts Existing or New Structures | Responsible Agency or Entity                              | Potential Funding Sources                                                | Expected Time Frame for Completion | Project Type                                                      | Action Status (New or Continuing) | Goal #  | Priority (H/M/L) |
| County-Wide 39              | Explore opportunities to "Regionalize" public education and flood insurance coverage components of CRS participation                                                                                                                   | Flash Flooding, River Flooding | Both                               | All HMPC representatives from participating jurisdictions | City Budgets (general funds, Capital Improvement Funds), FEMA HMA Grants | Medium-Term                        | Local Plans and Regulations                                       | New                               | 1, 2, 3 | Medium           |
| Polk County 1               | Continue to comply with the NFIP by enforcing floodplain management ordinance, including regulating/ monitoring new construction and substantial improvements in the SFHA; and participating in floodplain identification and mapping. | River Flooding                 | Both                               | Polk County Emergency Management                          | County General Operating Budget                                          | Long-Term                          | Local Plans and Regulations                                       | Continuing                        | 2       | Medium           |
| Polk County 2               | Construction of Storm Water Detention Basins, Buffer Strips, and Channel Improvements to Fourmile Creek though the Fourmile Creek Watershed Authority                                                                                  | Flash Flooding, River Flooding | Both                               | Polk County Emergency Management                          | FEMA HMA Grants                                                          | Long-Term                          | Structure and Infrastructure Projects, Natural Systems Protection | Continuing                        | 4       | Medium           |
| Polk County 3               | Construction of Storm Water Detention Basins, buffer Strips, and Channel Improvements to Mud, Camp, and Spring Creek watersheds though the Watershed Authority                                                                         | Flash Flooding, River Flooding | Both                               | Polk County Emergency Management                          | FEMA HMA Grants                                                          | Long-Term                          | Structure and Infrastructure Projects, Natural Systems Protection | Continuing                        | 4       | Medium           |
| Polk County 4               | Construction of Storm Water Detention Basins, buffer Strips, and Channel Improvements to the Walnut Creek watershed though the Watershed Authority                                                                                     | Flash Flooding, River Flooding | Both                               | Polk County Emergency Management                          | FEMA HMA Grants                                                          | Long-Term                          | Structure and Infrastructure Projects, Natural Systems Protection | Continuing                        | 4       | Medium           |
| Polk County 5               | Construction of Storm Water Detention Basins, buffer Strips, and Channel Improvements to the Beaver Creek watershed though the Watershed Authority                                                                                     | Flash Flooding, River Flooding | Both                               | Polk County Emergency Management                          | FEMA HMA Grants                                                          | Long-Term                          | Structure and Infrastructure Projects, Natural Systems Protection | Continuing                        | 4       | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                                                                           |                                                                                      |                                    |                                                                       |                                                    |                                    |                                             |                                   |        |                  |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------|------------------------------------|---------------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                                                                 | Hazards Addressed                                                                    | Impacts Existing or New Structures | Responsible Agency or Entity                                          | Potential Funding Sources                          | Expected Time Frame for Completion | Project Type                                | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Polk County 6               | Reconstruction of a Skunk River Crossing to assure emergency responders can cross the Skunk River during times of extreme flooding. In 2010, only one crossing in Polk County was open in a 30-mile section of the river. | River Flooding/<br>Infrastructure Failure/<br>Transportation Incident                | Both                               | Polk County<br>Emergency<br>Management                                | FEMA HMA<br>Grants                                 | Long-Term                          | Structure and<br>Infrastructure<br>Projects | Continuing                        | 4      | High             |
| Polk County 7               | Construct severe weather safe rooms for Polk County Public Works Maintenance Facility                                                                                                                                     | Thunderstorm with<br>Lightning/Hail, Tornado                                         | Existing                           | Polk County<br>Emergency<br>Management                                | FEMA HMA<br>Grants                                 | Medium- Term                       | Structure and<br>Infrastructure<br>Projects | Continuing                        | 4      | High             |
| Polk County 8               | Update siren software to polygon based system                                                                                                                                                                             | Tornado                                                                              | Existing                           | Polk County<br>Emergency<br>Management                                | FEMA EMPG<br>Grants                                | Medium- Term                       | Structure and<br>Infrastructure<br>Projects | Continuing                        | 1, 4   | High             |
| Polk County 9               | Encourage additional Polk County communities to participate in the Community Rating System (CRS) program                                                                                                                  | Flash Flooding, River<br>Flooding                                                    | Both                               | Polk County<br>Emergency<br>Management                                | HMA Grants<br>(BRIC, HMGP<br>5% initiative)        | Long-Term                          | Local Plans and<br>Regulations              | New                               | 2      | Medium           |
| Polk County 10              | Replace existing water distribution lines to eliminate possible contamination sources.                                                                                                                                    | Flash Flooding,<br>Hazardous Materials,<br>Infrastructure Failure,<br>River Flooding | Existing                           | Polk County<br>Emergency<br>Management                                | CDBG, Other<br>Federal<br>Infrastructure<br>Grants | Long-Term                          | Structure and<br>Infrastructure<br>Projects | New                               | 4      | Low              |
| Polk County 11              | Address deficiencies to reduce risk associated with the Red Rock Dam – Avon Station Remedial Works                                                                                                                        | Dam Failure                                                                          | Existing                           | All HMPC<br>representatives<br>from<br>participating<br>jurisdictions | FEMA HMA or<br>HHPD Grants                         | Long-Term                          | Structure and<br>Infrastructure<br>Projects | New                               | 4      | High             |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                                                                                        |                                        |                                    |                                                           |                           |                                    |                                       |                                   |        |                  |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|------------------------------------|-----------------------------------------------------------|---------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                                                                              | Hazards Addressed                      | Impacts Existing or New Structures | Responsible Agency or Entity                              | Potential Funding Sources | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Polk County 12              | Address deficiencies to reduce risk associated with the Red Rock – Carlisle Remedial Dam                                                                                                                                               | Dam Failure                            | Existing                           | All HMPC representatives from participating jurisdictions | FEMA HMA or HHPD Grants   | Long-Term                          | Structure and Infrastructure Projects | New                               | 4      | High             |
| Alleman 1                   | Consider participation in the NFIP                                                                                                                                                                                                     | River Flooding, Flash Flooding         | Both                               | City Clerk                                                | General Operating Budget  | Medium-Term                        | Local Plans and Regulations           | Continuing                        | 2      | Low              |
| Altoona 1                   | Continue to comply with the NFIP by enforcing floodplain management ordinance, including regulating/ monitoring new construction and substantial improvements in the SFHA; and participating in floodplain identification and mapping. | River Flooding, Flash Flooding         | Both                               | Fire Chief                                                | General Operating Budget  | Medium-Term                        | Local Plans and Regulations           | Continuing                        | 2      | Low              |
| Altoona 2                   | Stormwater detention basin improvement - Tuscany Pond; removed sediment from pond to regain capacity and construct new outfall.                                                                                                        | Flash Flooding, Infrastructure Failure | Existing                           | Fire Chief                                                | FEMA HMA Grants           | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | High             |
| Altoona 3                   | Secondary storm sewer installation                                                                                                                                                                                                     | Flash flooding, Infrastructure Failure | New                                | Fire Chief                                                | FEMA HMA Grants           | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| Altoona 4                   | Storm sewer installation 4th St SW from Lion's Park to 5th Ave NW                                                                                                                                                                      | Flash flooding, Infrastructure Failure | New                                | Fire Chief                                                | FEMA HMA Grants           | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |



## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                          |                                        |                                    |                              |                                           |                                    |                                       |                                   |        |                  |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------|----------------------------------------|------------------------------------|------------------------------|-------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                | Hazards Addressed                      | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                 | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Altoona 5                   | Adventureland Park Drainage Improvements - detention pond modifications, culvert improvements, stream bank stabilization | Flash flooding, Infrastructure Failure | Both                               | Fire Chief                   | FEMA HMA Grants                           | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| Altoona 6                   | 4 Safe rooms for multiple park sites                                                                                     | Tornado                                | New                                | Fire Chief                   | FEMA HMA Grants                           | Short-Term                         | Structure and Infrastructure Projects | Continuing                        | 4      | High             |
| Altoona 7                   | Replace 5 severe weather sirens                                                                                          | Tornado, Thunderstorm                  | Both                               | Fire Chief                   | FEMA HMA Grants                           | Short-Term                         | Structure and Infrastructure Projects | Continuing                        | 1, 4   | High             |
| Altoona 8                   | Addition of 4 new severe weather sirens                                                                                  | Tornado, Thunderstorm                  | Both                               | Fire Chief                   | FEMA HMA Grants                           | Short-Term                         | Structure and Infrastructure Projects | Continuing                        | 1, 4   | High             |
| Altoona 9                   | Construction of new Fire Station #26                                                                                     | Structural Fire                        | New                                | Fire Chief                   | Bonds; general Operating Budget           | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 2      | Low              |
| Altoona 10                  | Sanitary sewer lining 5th Ave SW to 8th Ave SE, south of the railroad tracks                                             | Infrastructure failure, Flash flooding | Existing                           | Fire Chief                   | General Operating Budget; Stormwater Fees | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Low              |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                       |                                        |                                    |                              |                                           |                                    |                                       |                                   |        |                  |
|-----------------------------|-----------------------------------------------------------------------|----------------------------------------|------------------------------------|------------------------------|-------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                             | Hazards Addressed                      | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                 | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Altoona 11                  | Remove sump pump and footing tiles from sanitary sewers               | Infrastructure failure, Flash flooding | Existing                           | Fire Chief                   | General Operating Budget; Stormwater Fees | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Low              |
| Altoona 12                  | New water treatment plant                                             | Infrastructure failure                 | New                                | Fire Chief                   | Bond; General Operating Budget            | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 2      | Low              |
| Altoona 13                  | New well                                                              | Infrastructure failure                 | New                                | Fire Chief                   | General Operating Budget; Stormwater Fees | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 2      | Low              |
| Altoona 14                  | Sanitary sewer lining all existing clay sewer mains                   | Infrastructure failure, Flash flooding | Existing                           | Fire Chief                   | General Operating Budget; Stormwater Fees | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Low              |
| Altoona 15                  | Dedicated safe rooms/tornado shelter for Sam Wise Park and Lions Park | Tornado                                | New                                | Fire Chief                   | FEMA HMA Grants                           | Short-Term                         | Structure and Infrastructure Projects | New                               | 4      | High             |
| Ankeny 1                    | Construct safe room(s) at Mel Ray Mobile Home Park                    | Tornado                                | New                                | Fire Chief                   | FEMA HMA Grants                           | Short-Term                         | Structure and Infrastructure Projects | Continuing                        | 4      | High             |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                                                                                       |                   |                                    |                              |                           |                                    |                                       |                                   |        |                  |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------------------------|------------------------------|---------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                                                                             | Hazards Addressed | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Ankeny 2                    | Construct safe room(s) at Autumn Ridge Mobile Home Park                                                                                                                                                                               | Tornado           | New                                | Fire Chief                   | FEMA HMA Grants           | Short-Term                         | Structure and Infrastructure Projects | Continuing                        | 4      | High             |
| Ankeny 3                    | Sawgrass Park Dam Improvements                                                                                                                                                                                                        | Flash Flooding    | Existing                           | Fire Chief                   | FEMA HMA Grants           | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| Ankeny 4                    | Saylor Creek Tributary Channel Improvements                                                                                                                                                                                           | Flash Flooding,   | Existing                           | Fire Chief                   | FEMA HMA Grants           | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| Ankeny 5                    | Storm sewer/channel improvements<br>Four Mile Creek bank stabilization                                                                                                                                                                | Flash Flooding    | Existing                           | Fire Chief                   | FEMA HMA Grants           | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| Ankeny 6                    | Continue to comply with the NFIP by enforcing floodplain management ordinance, including regulating/monitoring new construction and substantial improvements in the SFHA; and participating in floodplain identification and mapping. | River Flooding    | Existing                           | Fire Chief                   | FEMA HMA Grants           | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 1, 2   | Low              |
| Ankeny 7                    | Briarwood Sanitary Sewer Upsizing / Replacement                                                                                                                                                                                       | Flash Flooding    | New                                | Fire Chief                   | FEMA HMA Grants           | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                               |                   |                                    |                              |                           |                                    |                                       |                                   |        |                  |
|-----------------------------|---------------------------------------------------------------|-------------------|------------------------------------|------------------------------|---------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                     | Hazards Addressed | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Ankeny 8                    | Central City Areas - Sewer Upsizing and Replacements          | Flash Flooding    | New                                | Fire Chief                   | FEMA HMA Grants           | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| Ankeny 9                    | Construct safe room(s) at On With Life Care Facility          | Tornado           | New                                | Fire Chief                   | FEMA HMA Grants           | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | High             |
| Ankeny 10                   | Storm Sewer Improvements – Westlawn Area                      | Flash Flooding    | Existing                           | Fire Chief                   | FEMA HMA Grants           | Medium-Term                        | Structure and Infrastructure Projects | New                               | 4      | Medium           |
| Ankeny 11                   | Diamond Hills Greenbelt Corridor Stabilization & Improvements | Flash Flooding    | Existing                           | Fire Chief                   | FEMA HMA Grants           | Medium-Term                        | Structure and Infrastructure Projects | New                               | 4      | Medium           |
| Ankeny 12                   | Northview Middle School Potential Detention Area              | Flash Flooding    | New                                | Fire Chief                   | FEMA HMA Grants           | Medium-Term                        | Structure and Infrastructure Projects | New                               | 4      | Medium           |
| Ankeny 13                   | Potential NW 36th Detention Area                              | Flash Flooding    | New                                | Fire Chief                   | FEMA HMA Grants           | Medium-Term                        | Structure and Infrastructure Projects | New                               | 4      | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                               |                                |                                    |                              |                           |                                    |                                       |                                   |        |                  |
|-----------------------------|---------------------------------------------------------------|--------------------------------|------------------------------------|------------------------------|---------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                     | Hazards Addressed              | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Ankeny 14                   | Potential NE 18th Detention Area                              | Flash Flooding                 | New                                | Fire Chief                   | FEMA HMA Grants           | Medium-Term                        | Structure and Infrastructure Projects | New                               | 4      | Medium           |
| Ankeny 15                   | Rock Creek Stabilization between NW Somerset Ct & NW 13th St. | Flash Flooding, River Flooding | New                                | Fire Chief                   | FEMA HMA Grants           | Medium-Term                        | Structure and Infrastructure Projects | New                               | 4      | Medium           |
| Ankeny 16                   | Autumn Ridge Estates Drainage Improvements                    | Flash Flooding                 | Existing                           | Fire Chief                   | FEMA HMA Grants           | Medium-Term                        | Structure and Infrastructure Projects | New                               | 4      | Medium           |
| Ankeny 17                   | Terrace/NW 9th St. & N. Ankeny Blvd Storm Sewer Improvements  | Flash Flooding                 | Existing                           | Fire Chief                   | FEMA HMA Grants           | Medium-Term                        | Structure and Infrastructure Projects | New                               | 4      | Medium           |
| Ankeny 18                   | SE Cortina Dr. Storm Sewer Improvements                       | Flash Flooding                 | Existing                           | Fire Chief                   | FEMA HMA Grants           | Medium-Term                        | Structure and Infrastructure Projects | New                               | 4      | Medium           |
| Bondurant 1                 | Update tornado warning system                                 | Tornado                        | Both                               | Emergency Services           | FEMA HMA Grants           | Short-Term                         | Hazard Mitigation Plan                | Continuing                        | 1      | High             |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                                                                                        |                                  |                                    |                              |                                                    |                                    |                               |                                   |        |                  |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|------------------------------------|------------------------------|----------------------------------------------------|------------------------------------|-------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                                                                              | Hazards Addressed                | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                          | Expected Time Frame for Completion | Project Type                  | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Bondurant 2                 | Generator at Public Safety Building                                                                                                                                                                                                    | Windstorms/Rolling Power Outages | Existing                           | Emergency Services           | FEMA HMA Grants                                    | Short-Term                         | Hazard Mitigation Plan        | Continuing                        | 1      | Medium           |
| Bondurant 3                 | NW 2nd St. Culvert Expansion                                                                                                                                                                                                           | Flooding                         | Existing/New                       | Emergency Services           | FEMA HMA Grants                                    | Medium-Term                        | Hazard Mitigation Plan        | Continuing                        | 1      | Medium           |
| Bondurant 4                 | 15th St. SW Bridge Replacement                                                                                                                                                                                                         | Flooding                         | Existing/New                       | Emergency Services           | Federal Infrastructure Grants, FEMA HMA Grants     | Long-Term                          | Hazard Mitigation Plan        | Continuing                        | 1      | Medium           |
| Bondurant 5                 | Mud Creek Channel Restoration                                                                                                                                                                                                          | Flooding                         | Existing                           | Emergency Services           | FEMA HMA Grants                                    | Medium-Term                        | Hazard Mitigation Plan        | Continuing                        | 1      | Medium           |
| Bondurant 6                 | Mud Creek Regional Detention Facility/Grant St. South Relocation                                                                                                                                                                       | Flooding/ Regional Water Quality | New Structure                      | Emergency Services           | FEMA HMA Grants                                    | Medium-Term                        | Hazard Mitigation Plan        | Continuing                        | 1      | Medium           |
| Bondurant 7                 | Continue to comply with the NFIP by enforcing floodplain management ordinance, including regulating/ monitoring new construction and substantial improvements in the SFHA; and participating in floodplain identification and mapping. | River Flooding                   | Existing and New                   | Emergency Services           | General Operating Budget; Stormwater Utility Funds | Long-Term                          | NFIP floodplain \mgt. program | Continuing                        | 1      | High             |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                               |                                    |                              |                                     |                                    |                                                            |                                   |        |                  |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------------------|-------------------------------------|------------------------------------|------------------------------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                               | Hazards Addressed                                                                                                                                                                                                                                                                                                                                                             | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources           | Expected Time Frame for Completion | Project Type                                               | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Clive 1                     | Install/Replace backup generators                                                                                                                                                       | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ landslides, structural fire, thunderstorm with lightning and hail, tornado, transportation incident, windstorm, winter storm | Both                               | City Managers Office (CMO)   | FEMA HMA Grants, General Fund       | Short-Term                         | Structure and Infrastructure Projects                      | Continuing                        | 4      | High             |
| Clive 2                     | Enhance communications (including website, social media, print media, etc) used to articulat risk and provide warning, including capacity for communicating with vulnerable populations | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ landslides, structural fire, thunderstorm with lightning and hail, tornado, transportation incident, windstorm, winter storm | Both                               | City Managers Office (CMO)   | FEMA HMA Grants, General Fund       | Medium-Term                        | Education and Awareness Programs [Public Information]      | Continuing                        | 1, 2   | High             |
| Clive 3                     | Walnut Creek Watershed Streambank/ Buffers/ Wetlands/ Stormwater/ Flood Control Improvements                                                                                            | River Flooding                                                                                                                                                                                                                                                                                                                                                                | Existing                           | Community Development        | FEMA HMA Grants, Stormwater Utility | Medium-Term                        | Structure and Infrastructure Projects [Structural Project] | Continuing                        | 4      | Medium           |



## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                           |                   |                                    |                              |                                                   |                                    |                                                                                          |                                   |        |                  |
|-----------------------------|---------------------------------------------------------------------------|-------------------|------------------------------------|------------------------------|---------------------------------------------------|------------------------------------|------------------------------------------------------------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                 | Hazards Addressed | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                         | Expected Time Frame for Completion | Project Type                                                                             | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Clive 4                     | Reconstruct Greenbelt Trail bridges                                       | River Flooding    | Existing                           | Leisure Services             | FEMA HMA Grants, Debt Service                     | Medium-Term                        | Structure and Infrastructure Projects [Structural Project]                               | Continuing                        | 4      | Medium           |
| Clive 5                     | Reconstruct NW 86th Street bridge                                         | River Flooding    | Existing                           | Public Works                 | FEMA HMA Grants, STP, Debt Service                | Long-Term                          | Structure and Infrastructure Projects [Structural Project]                               | Continuing                        | 4      | Low              |
| Clive 6                     | Reconstruct railroad bridge (7800 block University Blvd)                  | River Flooding    | Existing                           | Public Works                 | FEMA HMA Grants, STP, Debt Service                | Long-Term                          | Structure and Infrastructure Projects [Structural Project]                               | Continuing                        | 4      | Low              |
| Clive 7                     | Walnut Creek floodplain acquisitions                                      | River Flooding    | Existing                           | Community Development        | FEMA HMA Grants, REAP, Debt Service               | Long-Term                          | Structure and Infrastructure Projects [Natural Resource Protection]                      | Continuing                        | 4      | High             |
| Clive 8                     | North Walnut Creek floodplain acquisitions                                | River Flooding    | Existing                           | Community Development        | FEMA HMA Grants, REAP, Debt Service               | Long-Term                          | Structure and Infrastructure Projects [Natural Resource Protection]                      | Continuing                        | 4      | High             |
| Clive 9                     | University Blvd Neighborhood Flood Mitigation Planning and Implementation | River Flooding    | Existing                           | Community Development        | FEMA HMA Grants, Stormwater Utility, Debt Service | Long-Term                          | Structure and Infrastructure Projects; Local Plans and Regulations [Property Protection] | Continuing                        | 2, 4   | High             |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                                                               |                   |                                    |                              |                                          |                                    |                                                                                          |                                   |        |                  |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------------------------|------------------------------|------------------------------------------|------------------------------------|------------------------------------------------------------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                                                     | Hazards Addressed | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                | Expected Time Frame for Completion | Project Type                                                                             | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Clive 10                    | Indian Hills Neighborhood Flood Mitigation Planning and Implementation                                                                                                                                        | River Flooding    | Existing                           | Community Development        | FEMA HMA Grants, Stormwater Utility      | Long-Term                          | Structure and Infrastructure Projects; Local Plans and Regulations [Property Protection] | Continuing                        | 2, 4   | High             |
| Clive 11                    | Relocation of Porter Park Shelter                                                                                                                                                                             | River Flooding    | Both                               | Leisure Services             | FEMA HMA Grants, REAP, SWU, Debt Service | Medium-Term                        | Structure and Infrastructure Projects [Preventive]                                       | Continuing                        | 4      | High             |
| Clive 12                    | Swanson Blvd Flapgates                                                                                                                                                                                        | River Flooding    | Existing                           | Public Works                 | FEMA HMA Grants, SWU                     | Medium-Term                        | Structure and Infrastructure Projects [Structural Project]                               | Continuing                        | 4      | High             |
| Clive 13                    | Regional Stormwater Management Facilities (modifications)                                                                                                                                                     | River Flooding    | Existing                           | Public Works                 | FEMA HMA Grants, SWU, DS                 | Medium-Term                        | Structure and Infrastructure Projects [Structural Project]                               | Continuing                        | 4      | Medium           |
| Clive 14                    | Construction of Stormwater Detention Basins, Flood Control Facilities, Buffer Strips, and Channel Improvements in Walnut Creek and North Raccoon Watersheds through the partnerships with Watershed Authority | River Flooding    | New                                | Community Development        | FEMA HMA Grants, SWU, DS                 | Medium-Term                        | Structure and Infrastructure Projects                                                    | Continuing                        | 4      | Medium           |
| Clive 15                    | North Raccoon River Watershed Streambank/ Buffers/ Wetlands/ Stormwater/ Flood Control Improvements                                                                                                           | River Flooding    | New                                | Community Development        | FEMA HMA Grants, SWU, DS                 | Medium-Term                        | Structure and Infrastructure Projects                                                    | New                               | 4      | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                      |                                                                                                                                                                                                                                                                                                                                                                               |                                    |                              |                                                         |                                    |                                                                                       |                                   |        |                  |
|-----------------------------|----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------------------|---------------------------------------------------------|------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                            | Hazards Addressed                                                                                                                                                                                                                                                                                                                                                             | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                               | Expected Time Frame for Completion | Project Type                                                                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Clive 16                    | Update Flood Response and Recovery Plan                              | River Flooding, Flash Flooding                                                                                                                                                                                                                                                                                                                                                | Both                               | Fire                         | FEMA Preparedness Grants, EMPG, General Fund            | Medium-Term                        | Local Plans and Regulations [Emergency Services]                                      | New                               | 2      | Medium           |
| Clive 17                    | Floodplain Vegetation Management Planning and Implementation         | River Flooding, Grass or Wildland Fire                                                                                                                                                                                                                                                                                                                                        | Both                               | Leisure Services             | FEMA HMA Grants, REAP, SWU, DS                          | Medium-Term                        | Local Plans and Regulations, Natural Systems Protection [Natural Resource Protection] | New                               | 2, 4   | Medium           |
| Clive 18                    | Update City Technology Plan to reduce vulnerability to cyber threats | Cyberattacks                                                                                                                                                                                                                                                                                                                                                                  | Both                               | CMO                          | General Operating Budget; Federal Cyber Security Grants | Long-Term                          | Local Plans and Regulations                                                           | New                               | 2      | Low              |
| Clive 19                    | Update and enforce building codes                                    | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ landslides, structural fire, thunderstorm with lightning and hail, tornado, transportation incident, windstorm, winter storm | Both                               | Community Development        | FEMA HMA Grants, General Fund                           | Long-Term                          | Local Plans and Regulations                                                           | New                               | 2      | Medium           |
| Clive 20                    | Update floodplain development regulations                            | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash                                                                                                                                                                                                                                        | Both                               | Community Development        | FEMA HMA Grants, SWU, General Fund                      | Long-Term                          | Local Plans and Regulations [Preventive]                                              | New                               | 2      | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                             |                                                                                                                                                                                                                                                                                                                                                                               |                                    |                              |                                                  |                                    |                                                                      |                                   |        |                  |
|-----------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------------------|--------------------------------------------------|------------------------------------|----------------------------------------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                   | Hazards Addressed                                                                                                                                                                                                                                                                                                                                                             | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                        | Expected Time Frame for Completion | Project Type                                                         | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
|                             |                                                                                             | flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ landslides, structural fire, thunderstorm with lightning and hail, tornado, transportation incident, windstorm, winter storm                                                                                                                                        |                                    |                              |                                                  |                                    |                                                                      |                                   |        |                  |
| Clive 21                    | Building Energy Efficiency planning and implementation (ie: renewal systems for redundancy) | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ landslides, structural fire, thunderstorm with lightning and hail, tornado, transportation incident, windstorm, winter storm | Both                               | CMO                          | FEMA HMA Grants, Federal Resiliency Grants, DS   | Medium-Term                        | Local Plans and Regulations, Structure and Infrastructure Projects   | New                               | 2, 4   | Medium           |
| Clive 22                    | Backflow Prevention (sewer drains)                                                          | Flash Flooding                                                                                                                                                                                                                                                                                                                                                                | Both                               | Public Works                 | FEMA HMA Grants, Sanitary Sewer Utility, DS      | Medium-Term                        | Structure and Infrastructure Projects [Property Protection]          | New                               | 4      | Medium           |
| Clive 23                    | Forestry Management Plan and implementation                                                 | River Flooding, Extreme Temperature, Grass or Wildland Fire                                                                                                                                                                                                                                                                                                                   | Both                               | Leisure Services             | FEMA HMA Grants, REAP, Federal Resiliency Grants | Medium-Term                        | Local Plans and Regulations, Natural Systems Protection [Preventive] | New                               | 2, 4   | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                |                          |                                    |                              |                           |                                    |                                                                                          |                                   |        |                  |
|-----------------------------|--------------------------------------------------------------------------------|--------------------------|------------------------------------|------------------------------|---------------------------|------------------------------------|------------------------------------------------------------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                      | Hazards Addressed        | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources | Expected Time Frame for Completion | Project Type                                                                             | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Clive 24                    | Sub-watershed stormwater/flooding planning and implementation                  | Flash Flooding           | Both                               | Public Works                 | FEMA HMA Grants, SWU, DS  | Medium-Term                        | Local Plans and Regulations, Structure and Infrastructure Projects [Property Protection] | New                               | 2, 4   | Medium           |
| Clive 25                    | Relocate University Boulevard Pump Station from 100-year floodplain            | Flooding                 | Existing                           | Public Works                 | FEMA HMA Grants, SWU, DS  | Long-Term                          | Structure and Infrastructure Projects [Preventive]                                       | New                               | 4      | Medium           |
| Clive 26                    | Mitigate flooding threat to public works facilities in the 100-year floodplain | Flooding                 | Existing                           | Public Works                 | FEMA HMA Grants, SWU, DS  | Long-Term                          | Structure and Infrastructure Projects [Preventive]                                       | New                               | 4      | Medium           |
| Clive 27                    | Mitigate flooding threat to Aquatics Center                                    | Flooding                 | Existing                           | Leisure Services             | FEMA HMA Grants, SWU, DS  | Long-Term                          | Structure and Infrastructure Projects [Preventive]                                       | New                               | 4      | Medium           |
| Clive 28                    | Stormwater detention basin maintenance planning and implementation             | Flash Flooding           | Both                               | Public Works                 | SWU, DS                   | Medium-Term                        | Local Plans and Regulations, Structure and Infrastructure Projects [Property Protection] | New                               | 2, 4   | Medium           |
| Clive 29                    | Obtain CRS Class 4 Status                                                      | Flooding, Flash Flooding | Both                               | Community Development        | General Operating Budget  | Medium-Term                        | Local Plans and Regulations [Public Information]                                         | New                               | 2      | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                               |                                    |                              |                                                   |                                    |                                                           |                                   |        |                  |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------------------|---------------------------------------------------|------------------------------------|-----------------------------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                     | Hazards Addressed                                                                                                                                                                                                                                                                                                                                                             | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                         | Expected Time Frame for Completion | Project Type                                              | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Clive 30                    | Drainage System (natural/human made) Maintenance planning and implementation                                                                                                  | Flooding, Flash Flooding                                                                                                                                                                                                                                                                                                                                                      | Both                               | Public Works                 | General Operating Budget; Stormwater Utility Fees | Medium-Term                        | Local Plans and Regulations                               | New                               | 2      | Low              |
| Clive 31                    | Natural Floodplain Function planning and implementation                                                                                                                       | Flooding, Flash Flooding                                                                                                                                                                                                                                                                                                                                                      | Both                               | Community Development        | General Operating Budget                          | Long-Term                          | Local Plans and Regulations [Natural Resource Protection] | New                               | 2      | Low              |
| Clive 32                    | Flood Insurance Coverage planning and implementation                                                                                                                          | Flooding, Flash Flooding                                                                                                                                                                                                                                                                                                                                                      | Both                               | Community Development        | General Operating Budget                          | Long-Term                          | Local Plans and Regulations [Preventive]                  | New                               | 2      | Low              |
| Clive 33                    | Maintain BCEGS 3/4 Rating                                                                                                                                                     | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ landslides, structural fire, thunderstorm with lightning and hail, tornado, transportation incident, windstorm, winter storm | Both                               | Community Development        | General Operating Budget                          | Long-Term                          | Local Plans and Regulations                               | New                               | 2      | Low              |
| Clive 34                    | Partner with the State of Iowa (IDNR Dam Safety division) and Country Club Homeowners Association to ensure monitoring of the physical and structural components of the Clive | Dam Failure                                                                                                                                                                                                                                                                                                                                                                   | Existing                           | Community Development        | General Operating Budget; Stormwater Utility Fees | Long-Term                          | Education and Outreach                                    | New                               | 4      | Low              |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                                                                            |                           |                                    |                              |                                               |                                    |                                       |                                   |        |                  |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|------------------------------------|------------------------------|-----------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                                                                  | Hazards Addressed         | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                     | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
|                             | Lake Dam to reduce risks associated with dam failure.                                                                                                                                                                      |                           |                                    |                              |                                               |                                    |                                       |                                   |        |                  |
| Des Moines 1                | Pursue remedial flood mitigation actions associated with the Southeast Des Moines (SEDM) Levee, US 65                                                                                                                      | River Flooding            | Existing                           | Engineering Department       | Capital Improvements Program; FEMA HMA Grants | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | High             |
| Des Moines 2                | Comply with the NFIP by enforcing floodplain management ordinance, including regulating/ monitoring new construction and substantial improvements in the SFHA; and participating in floodplain identification and mapping. | River Flooding            | Both                               | Engineering Department       | Operating Budget                              | Long-Term                          | Local Plans and Regulations           | Continuing                        | 2      | High             |
| Des Moines 3                | Construct safe room(s) at Des Moines Municipal Housing Agency's multi-family units                                                                                                                                         | Windstorms                | Existing and New                   | Engineering Department       | Capital Improvements Program; FEMA HMA Grants | Long-Term                          | Structure and Infrastructure Projects | Continuing                        | 4      | High             |
| Des Moines 4                | Treatment and removal of ash trees in response to onset of Emerald Ash Borer (EAB)                                                                                                                                         | Animal/Crop/Plant Disease | Existing                           | Engineering Department       | Capital Improvements Program                  | Medium-Term                        | Natural Systems Protection            | Continuing                        | 4      | Medium           |
| Des Moines 5                | Des Moines River Flood Mitigation Improvements - Flood protection system improvements (levees, floodwalls, pump stations, etc.) to maintain FEMA accreditation despite increased flows identified in 2011 Des              | River Flooding            | Existing                           | Engineering Department       | Capital Improvements Program; FEMA HMA Grants | Long-Term                          | Structure and Infrastructure Projects | Continuing                        | 4      | High             |



## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                                                 |                   |                                    |                              |                                                                                  |                                    |                                       |                                   |        |                  |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------------------------|------------------------------|----------------------------------------------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                                       | Hazards Addressed | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                                                        | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
|                             | Moines River Regulated Flow Frequency Study.                                                                                                                                                    |                   |                                    |                              |                                                                                  |                                    |                                       |                                   |        |                  |
| Des Moines 6                | Hamilton Drainage Area Stormwater Improvements - Storm sewer conveyance improvements to increase storm sewer capacity and/or construct detention/G.I. to reduce identified flood risk concerns. | Flash Flooding    | Existing                           | Engineering Department       | Capital Improvements Program; FEMA HMA Grants                                    | Long-Term                          | Structure and Infrastructure Projects | Continuing                        | 4      | High             |
| Des Moines 7                | Closes Creek Stormwater Improvements - Increase storm sewer capacity and/or construct detention/G.I. to reduce identified flood risk concerns                                                   | Flash Flooding    | Existing                           | Engineering Department       | Capital Improvements Program; FEMA HMA Grants                                    | Long-Term                          | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| Des Moines 8                | Crawford Creek Stormwater Improvements - Increased storm sewer capacity and/or construct detention/G.I. to reduce identified flood risk concerns                                                | Flash Flooding    | Existing                           | Engineering Department       | Capital Improvements Program; FEMA HMA Grants                                    | Long-Term                          | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| Des Moines 9                | Sanitary Sewer Separation Projects - Install storm sewer to eliminate CSO's that discharge sanitary water to the river                                                                          | Public Health     | Existing                           | Engineering Department       | Capital Improvements Program; FEMA HMA Grants                                    | Long-Term                          | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| Des Moines 10               | City-wide Small Watershed Flood Mitigation Projects - Identify and construct projects that increase storm sewer capacity and/or construct detention/G.I. to reduce flood risk concerns          | Flash Flooding    | Existing                           | Engineering Department       | Capital Improvements Program; FEMA HMA Grants; Local Options Sales & Service Tax | Long-Term                          | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                                        |                                     |                                    |                              |                                                                                 |                                    |                                       |                                   |        |                  |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|------------------------------------|------------------------------|---------------------------------------------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                              | Hazards Addressed                   | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                                                       | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Des Moines 11               | Storm Water Pump Station Rehabilitation - Updates to pump stations to provide resiliency                                                                                               | Public Safety                       | Existing                           | Engineering Department       | Capital Improvements Program; FEMA HMA Grants                                   | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| Des Moines 12               | Voluntary acquisition and demolition of all single and two-family residential structures in the floodplain and repetitive loss properties. Estimated 220 structures would be acquired. | River/Creek Flooding                | Existing                           | Engineering Department       | Capital Improvements Program; FEMA HMA Grants; Local Option Sales & Service Tax | Long-Term                          | Structure and Infrastructure Projects | Continuing                        | 1      | High             |
| Des Moines 13               | Construct safe room in new fire station(s)                                                                                                                                             | Windstorms / Tornado                | New                                | Engineering Department       | Capital Improvements Program; FEMA HMA Grants                                   | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | High             |
| Des Moines 14               | Generator for new fire station(s)                                                                                                                                                      | Windstorms / Tornado / Winter Storm | New                                | Engineering Department       | Capital Improvements Program; FEMA HMA Grants                                   | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| Des Moines 15               | Construct safe room or storm shelter for new city administration building                                                                                                              | Windstorms / Tornado                | New                                | Engineering Department       | Capital Improvements Program; FEMA HMA Grants                                   | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | High             |
| Des Moines 16               | Generator and 72-hour fuel storage for new city administration building                                                                                                                | Windstorms / Tornado / Winter Storm | New                                | Engineering Department       | Capital Improvements Program; FEMA HMA Grants                                   | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                                                                                                                                    |                                                   |                                    |                              |                                                |                                    |                                       |                                   |        |                  |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|------------------------------------|------------------------------|------------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                                                                                                                          | Hazards Addressed                                 | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                      | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Des Moines 17               | Building inventory for Fire Dept. community risk assessment / analysis                                                                                                                                                                                                             | Public Safety, Fire / Hazmat                      | Existing and New                   | Engineering Department       | Capital Improvements Program                   | Short-Term                         | Local Plans and Regulations           | Continuing                        | 2      | Medium           |
| Des Moines 18               | Damage assessment data collection tools and standard operating procedures during and after emergency events                                                                                                                                                                        | Public Safety / Flooding / Tornado / Winter Storm | Existing                           | Engineering Department       | Capital Improvements Program; Operating Budget | Long-Term                          | Local Plans and Regulations           | Continuing                        | 2      | Low              |
| Des Moines 19               | Address physical and structural deficiencies to reduce risk associated with the Easter Lake Stormwater Retention Basin and maintain its satisfactory condition.                                                                                                                    | Dam Failure                                       | Existing                           | Engineering Department       | FEMA HMA or HHPD Grants                        | Long-Term                          | Structure and Infrastructure Projects | New                               | 4      | High             |
| Des Moines 20               | Address physical and structural deficiencies to reduce risk associated with the Fort Des Moines Park Dam and raise its structural condition from fair to satisfactory.                                                                                                             | Dam Failure                                       | Existing                           | Engineering Department       | FEMA HMA or HHPD Grants                        | Long-Term                          | Structure and Infrastructure Projects | New                               | 4      | High             |
| Des Moines 21               | Address physical and structural deficiencies to reduce risk associated with the Twenty-Sixth Street Stormwater Detention Basin and maintain its satisfactory condition.                                                                                                            | Dam Failure                                       | Existing                           | Engineering Department       | FEMA HMA or HHPD Grants                        | Long-Term                          | Structure and Infrastructure Projects | New                               | 4      | High             |
| Des Moines 22               | Conduct a public education and outreach campaign to increase awareness of the risks of dam failure within the inundation zones of Easter Lake Stormwater Retention Basin, Fort Des Moines Park Dam, Red Rock Dam – Avon Station, Red Rock Dam – Carlisle Remedial Dam, Saylorville | Dam Failure                                       | Existing                           | Engineering Department       | FEMA HMA or HHPD Grants                        | Long-Term                          | Education and Awareness               | New                               | 4      | High             |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                          |                   |                                    |                              |                                 |                                    |                                       |                                   |        |                  |
|-----------------------------|----------------------------------------------------------|-------------------|------------------------------------|------------------------------|---------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                | Hazards Addressed | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources       | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
|                             | Dam, and Twenty-Sixth Street Stormwater Detention Basin. |                   |                                    |                              |                                 |                                    |                                       |                                   |        |                  |
| Elkhart 1                   | Construct safe room at Elkhart Memorial Park             | Windstorms        | New                                | Fire Department              | BRIC; HMGP; Community donations | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | High             |
| Elkhart 2                   | Construct safe room in NEW fire station                  | Windstorms        | New                                | Fire Department              | BRIC; HMGP; Community donations | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | High             |
| Elkhart 3                   | Generator for new fire station                           | Windstorms        | New                                | Fire Department              | HMGP 5%; Community donations    | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| Elkhart 4                   | Generator at city water plant                            | Windstorms        | Existing                           | Fire Department              | HMGP 5%; Community donations    | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| Elkhart 5                   | Construct safe room at Elkhart Community Center          | Windstorms        | Existing                           | Fire Department              | BRIC; HMGP; Community donations | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | High             |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                                                                                       |                                |                                    |                              |                                                                 |                                    |                                       |                                   |        |                  |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------------------|------------------------------|-----------------------------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                                                                             | Hazards Addressed              | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                                       | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Grimes 1                    | Generators at City Hall                                                                                                                                                                                                               | Windstorms                     | Existing                           | Fire Chief                   | FEMA HMA Grants                                                 | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| Grimes 2                    | Generator at fire station                                                                                                                                                                                                             | Windstorms                     | Existing                           | Fire Chief                   | FEMA HMA Grants                                                 | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | High             |
| Grimes 3                    | Continue to comply with the NFIP by enforcing floodplain management ordinance, including regulating/monitoring new construction and substantial improvements in the SFHA; and participating in floodplain identification and mapping. | River Flooding                 | Existing and New                   | Fire Chief                   | General Fund; Stormwater Enterprise Fund                        | Long-Term                          | Local Plans and Regulations           | Continuing                        | 2      | Low              |
| Grimes 4                    | Install four additional outdoor warning sirens to cover newly annexed areas and key outdoor spaces                                                                                                                                    | Tornado                        | New                                | Fire Chief                   | FEMA HMA Grants                                                 | Medium-Term                        | Structure and Infrastructure Projects | New                               | 4      | High             |
| Grimes 5                    | Conduct a public education and outreach campaign to increase awareness of the risks of dam failure within the inundation zones of Saylorville Dam.                                                                                    | Dam Failure                    | Existing                           | Fire Chief                   | FEMA HMA Grants                                                 | Medium-Term                        | Education and Outreach                | New                               | 4      | Medium           |
| Grimes 6                    | Identify and acquire flood-prone properties and to convert them to green space in perpetuity, eliminating risk of future structural damage.                                                                                           | River Flooding, Flash Flooding | New                                | Fire Chief                   | Stormwater Enterprise Fund; Capital Improvements Projects Fund; | Medium-Term                        | Structure and Infrastructure Projects | New                               | 2, 4   | High             |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                            |                                |                                    |                              |                                                                 |                                    |                                       |                                   |        |                  |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------------------|------------------------------|-----------------------------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                  | Hazards Addressed              | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                                       | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
|                             |                                                                                                                                                                            |                                |                                    |                              | FEMA HMA Grants                                                 |                                    |                                       |                                   |        |                  |
| Johnston 1                  | Construct Detention Basin Northglenn Neighborhood West of Merle Hay Road                                                                                                   | River Flooding, Flash Flooding | New                                | Fire Chief                   | Storm Water Funds; Capital Improvements Budget; FEMA HMA Grants | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| Johnston 2                  | Extend 72" Storm Sewer Pipe under Johnston Drive                                                                                                                           | River Flooding, Flash Flooding | New                                | Fire Chief                   | Storm Water Funds; Capital Improvements Budget; FEMA HMA Grants | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| Johnston 3                  | Construct flood control structure on Johnston Drive                                                                                                                        | River Flooding, Flash Flooding | New                                | Fire Chief                   | Storm Water Funds; Capital Improvements Budget; FEMA HMA Grants | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| Johnston 4                  | Multi-purpose Safe Room at Lew Clarkson Park                                                                                                                               | Tornado                        | New                                | Fire Chief                   | Capital Improvements Budget; FEMA HMA Grants                    | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | High             |
| Johnston 5                  | Continue to work with Iowa DOT to eliminate flooding at Northwest Beaver Drive (water impounded since the 2008 flood may be affecting the water table and may be polluted) | River Flooding, Flash Flooding | Both                               | Fire Chief                   | Storm Water Funds; Capital Improvements Budget; FEMA HMA Grants | Long-Term                          | Structure and Infrastructure Projects | Continuing                        | 4      | High             |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                                                                                                                                    |                                           |                                    |                              |                                                  |                                    |                                       |                                   |        |                  |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|------------------------------------|------------------------------|--------------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                                                                                                                          | Hazards Addressed                         | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                        | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Johnston 6                  | Conduct flood impact study on Merle Hay and Beaver Creek area                                                                                                                                                                                                                      | River Flooding, Flash Flooding            | Both                               | Fire Chief                   | Storm Water Fund; FEMA HMA Grants                | Medium-Term                        | Local Plans and Regulations           | Continuing                        | 2      | Medium           |
| Johnston 7                  | Continue to comply with the NFIP by enforcing floodplain management ordinance, including regulating/monitoring new construction and substantial improvements in the SFHA; and participating in floodplain identification and mapping.                                              | River Flooding, Flash Flooding            | Both                               | Fire Chief                   | Storm Water Funds; City General Budget           | Long-Term                          | Local Plans and Regulations           | Continuing                        | 2      | Medium           |
| Johnston 8                  | Install New Warning Sirens to cover newly annexed property to north and west of Johnston                                                                                                                                                                                           | Tornado, Thunderstorm with Lightning/Hail | New                                | Fire Chief                   | City Capital Improvement Budget; FEMA HMA Grants | Medium-Term                        | Structure and Infrastructure Projects | New                               | 4      | High             |
| Johnston 9                  | Install radio repeater to communicate with all warning sirens and newly acquired monitoring system to ensure consistent communication with remote sirens that do not have good line of site transmission back to Public Works                                                      | Tornado, Thunderstorm with Lightning/Hail | New                                | Fire Chief                   | City Capital Improvement Budget; FEMA HMA Grants | Medium-Term                        | Structure and Infrastructure Projects | New                               | 2, 4   | High             |
| Johnston 10                 | With the support of Polk County Emergency Management, develop and maintain consistent communication with the U.S. Army Corps of Engineers regarding the current condition of Saylorville Dam and any actions taken to reduce deficiencies and risks associated with the structure. | Dam Failure                               | Existing                           | Fire Chief                   | City General Fund; FEMA HMA Grants               | Medium-Term                        | Structure and Infrastructure Projects | New                               | 4      | Medium           |



## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                               |                                    |                              |                                            |                                    |                                       |                                   |        |                  |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------------------|--------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                         | Hazards Addressed                                                                                                                                                                                                                                                                                                                                                             | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                  | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Johnston 11                 | Conduct a public education and outreach campaign to increase awareness of the risks of dam failure within the inundation zone of Saylorville Dam. | Dam Failure                                                                                                                                                                                                                                                                                                                                                                   | Existing                           | Fire Chief                   | City General Fund; FEMA HMA Grants         | Medium-Term                        | Education and Outreach                | New                               | 4      | Medium           |
| Mitchellville 1             | Backup power generator for police/fire station                                                                                                    | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ landslides, structural fire, thunderstorm with lightning and hail, tornado, transportation incident, windstorm, winter storm | Existing                           | Police, Fire                 | General Operating Budget; FEMA HMA Grants  | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | High             |
| Mitchellville 2             | Reinforce police/fire station roof                                                                                                                | Windstorms                                                                                                                                                                                                                                                                                                                                                                    | Existing                           | Police, Fire                 | General Operating Budget; FEMA HMA Grants  | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | High             |
| Mitchellville 3             | Re-wiring the electrical system for police/fire station                                                                                           | Windstorms                                                                                                                                                                                                                                                                                                                                                                    | Existing                           | Police, Fire                 | General Operating Budget; FEMA HMA Grants  | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Low              |
| Mitchellville 4             | New siren on east edge of town                                                                                                                    | Windstorms                                                                                                                                                                                                                                                                                                                                                                    | New                                | Police, Fire                 | Capital Improvement Funds; FEMA HMA Grants | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | High             |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                               |                                    |                              |                                                       |                                    |                                       |                                   |        |                  |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------------------|-------------------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                                                                                  | Hazards Addressed                                                                                                                                                                                                                                                                                                                                                             | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                             | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Mitchellville 5             | Continue to comply with the NFIP by enforcing floodplain management ordinance, including regulating/ monitoring new construction and substantial improvements in the SFHA; and participating in floodplain identification and mapping.     | River Flooding                                                                                                                                                                                                                                                                                                                                                                | Both                               | Police, Fire                 | General Operating Budget                              | Long-Term                          | Local Plans and Regulations           | Continuing                        | 2, 4   | Medium           |
| Mitchellville 6             | Invest in response capabilities, including construction of a new public safety facility, replacing aging ambulances and police cars, updating City EOP, converting fire service from paid on-call to a mixed department, and adding staff. | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ landslides, structural fire, thunderstorm with lightning and hail, tornado, transportation incident, windstorm, winter storm | Both                               | Police, Fire                 | Capital Improvement Funds, LOSST Funds; Bond Issuance | Long-Term                          | Structure and Infrastructure Projects | New                               | 2      | Low              |
| Mitchellville 7             | City-Wide Storm Shelter                                                                                                                                                                                                                    | Tornado                                                                                                                                                                                                                                                                                                                                                                       | New                                | Police, Fire                 | Capital Improvement Funds; FEMA HMA Grants            | Long-Term                          | Structure and Infrastructure Projects | New                               | 4      | High             |
| Pleasant Hill 1             | Generator for lift station at Southeast 60th Street                                                                                                                                                                                        | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ landslides, structural fire,                                                                                                 | Existing                           | Community Development        | Capital Improvement Fund; Sewer Fund; FEMA HMA Grants | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                            |                                                                                                 |                                    |                              |                                                                       |                                    |                                       |                                   |        |                  |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------|------------------------------|-----------------------------------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                  | Hazards Addressed                                                                               | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                                             | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
|                             |                                                                                                                                            | thunderstorm with lightning and hail, tornado, transportation incident, windstorm, winter storm |                                    |                              |                                                                       |                                    |                                       |                                   |        |                  |
| Pleasant Hill 2             | Flood mitigation planning elevation of southeast connector so water passes underneath – current road is in flood zone                      | River Flooding                                                                                  | Existing and New                   | Community Development        | Capital Improvement Fund; FEMA HMA Grants                             | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| Pleasant Hill 3             | Creation of storm water utility (with taxing and bonding authority); Explore increase to utilities fees to complete storm water utilities. | Flash Flooding                                                                                  | N/A                                | Community Development        | Stormwater Utility Fees                                               | Long-Term                          | Local Plans and Regulations           | Continuing                        | 2      | Medium           |
| Pleasant Hill 4             | Relocation of Public Works and Parks facilities (including gas pumps for city vehicles) which are in flood zones                           | River Flooding                                                                                  | Existing                           | Community Development        | Capital Improvement Fund; TIF; FEMA HMA Grants                        | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| Pleasant Hill 5             | Safe room incorporation into new city facilities / construction                                                                            | Windstorm, Tornado                                                                              | New                                | Community Development        | Capital Improvement Fund; FEMA HMA Grants                             | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | High             |
| Pleasant Hill 6             | Regional detention facilities throughout the community                                                                                     | Flash Flooding                                                                                  | New                                | Community Development        | General Obligation Fund; Stormwater Utility Fees; Capital Improvement | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                               |                                    |                              |                                                   |                                    |                                       |                                   |        |                  |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------------------|---------------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                  | Hazards Addressed                                                                                                                                                                                                                                                                                                                                                             | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                         | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
|                             |                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                               |                                    |                              | Fund; FEMA HMA Grants                             |                                    |                                       |                                   |        |                  |
| Pleasant Hill 7             | Enhance combined development of Des Moines Area Regional GIS Partnership                                                                                                   | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ landslides, structural fire, thunderstorm with lightning and hail, tornado, transportation incident, windstorm, winter storm | N/A                                | Community Development        | General Obligation Fund                           | Medium-Term                        | Local Plans and Regulations           | Continuing                        | 3      | Low              |
| Pleasant Hill 8             | Construction of new culvert at Little Four Mile Creek Drive 4400 block                                                                                                     | Flash Flooding, Flooding                                                                                                                                                                                                                                                                                                                                                      | New                                | Community Development        | Capital Improvement Fund; Stormwater Utility Fees | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| Pleasant Hill 9             | Pursue remedial flood mitigation actions associated with the South East Des Moines (SEDM) Levee, US 65                                                                     | River Flooding                                                                                                                                                                                                                                                                                                                                                                | Existing                           | Community Development        | Capital Improvement Fund; FEMA HMA Grants         | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | High             |
| Pleasant Hill 10            | Continue to comply with the NFIP by enforcing floodplain management ordinance, including regulating/ monitoring new construction and substantial improvements in the SFHA; | River Flooding                                                                                                                                                                                                                                                                                                                                                                | Existing and New                   | Community Development        | General Obligation Fund                           | Long-Term                          | Local Plans and Regulations           | Continuing                        | 2, 4   | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                        |                                |                                    |                              |                                                                    |                                    |                                       |                                   |        |                  |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------------------|------------------------------|--------------------------------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                              | Hazards Addressed              | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                                          | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
|                             | and participating in floodplain identification and mapping.                                                                                            |                                |                                    |                              |                                                                    |                                    |                                       |                                   |        |                  |
| Pleasant Hill 11            | Flood way buyout program                                                                                                                               | River Flooding                 | New                                | Community Development        | General Obligation Fund; Stormwater Utility Fees; FEMA HMA Grants  | Long-Term                          | Structure and Infrastructure Projects | Continuing                        | 4      | High             |
| Pleasant Hill 12            | Construction of Storm Water Detention Basins, Buffer Strips, and Channel Improvements to Fourmile Creek through the Fourmile Creek Watershed Authority | River Flooding, Flash Flooding | Both                               | Community Development        | Capital Improvement Fund; Stormwater Utility Fees; FEMA HMA Grants | Long-Term                          | Structure and Infrastructure Projects | Continuing                        | 3, 4   | Medium           |
| Pleasant Hill 13            | Construction of Storm Water Detention Basins, buffer Strips, and Channel Improvements to Spring Creek watersheds through the Watershed Authority       | River Flooding, Flash Flooding | Both                               | Community Development        | Capital Improvement Fund; Stormwater Utility Fees; FEMA HMA Grants | Long-Term                          | Structure and Infrastructure Projects | Continuing                        | 3, 4   | Medium           |
| Pleasant Hill 14            | Management of Stream Buffers - along creek beds / river beds                                                                                           | River Flooding                 | Existing                           | Community Development        | General Obligation Fund; Stormwater Utility Fees                   | Long-Term                          | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                               |                                    |                              |                                                                      |                                    |                                       |                                   |        |                  |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------------------|----------------------------------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                                                                                                                                                                                   | Hazards Addressed                                                                                                                                                                                                                                                                                                                                                             | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                                            | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Pleasant Hill 15            | Modify existing Public Works and Parks Facilities to become more flood resistant and accessible during high water events                                                                                                                                                                                                                    | River Flooding, Flash Flooding                                                                                                                                                                                                                                                                                                                                                | Both                               | Community Development        | General Obligation Fund; FEMA HMA Grants                             | Long-Term                          | Structure and Infrastructure Projects | New                               | 4      | Medium           |
| Pleasant Hill 16            | Create a redundant communication network including construction of communication tower, fiber ring, multiple service providers and other available technology advances for traffic signals and municipal buildings to ensure emergency and critical communication is always accessible. Consider satellite phones for emergency operations. | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ landslides, structural fire, thunderstorm with lightning and hail, tornado, transportation incident, windstorm, winter storm | Both                               | Community Development        | General Obligation Fund; Federal comms and preparedness grants, EMPG | Long-Term                          | Structure and Infrastructure Projects | New                               | 2      | Medium           |
| Pleasant Hill 17            | Add solar, electric vehicle, geothermal and other energy efficient programs where appropriate to City buildings to add redundancy. Provide grounding and surge protectors where appropriate.                                                                                                                                                | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ landslides, structural fire, thunderstorm with lightning and hail, tornado, transportation incident, windstorm, winter storm | Both                               | Community Development        | General Obligation Fund                                              | Long-Term                          | Structure and Infrastructure Projects | New                               | 4      | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                               |                                    |                              |                                                                                        |                                    |                                       |                                   |        |                  |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------------------|----------------------------------------------------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                                                                                                                    | Hazards Addressed                                                                                                                                                                                                                                                                                                                                                             | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                                                              | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Pleasant Hill 18            | Equip public safety professionals with gear appropriate for hazard response and rescue efforts such as water rescue suits, PFDs, thermal cameras, and other necessary equipment.                                                                                             | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ landslides, structural fire, thunderstorm with lightning and hail, tornado, transportation incident, windstorm, winter storm | N/A                                | Community Development        | General Obligation Fund; Equipment Replacement Fund; Federal preparedness grants, EMPG | Medium-Term                        | Local Plans and Regulations           | New                               | 2      | Medium           |
| Pleasant Hill 19            | Create a cyber-security plan or conduct vulnerability analysis and implement recommendations to ensure safe data protection including software upgrades, policy adoption, data backup, education and training, and other relevant steps to maintain control of City network. | Cyberattack                                                                                                                                                                                                                                                                                                                                                                   | N/A                                | Community Development        | General Obligation Fund; Federal cyber security grants, EMPG                           | Medium-Term                        | Local Plans and Regulations           | New                               | 2      | Low              |
| Pleasant Hill 20            | Develop a robust pedestrian network to accommodate and separate users, especially in critical areas such as the bridge over Fourmile Creek (add sidewalk/trail), grade separated crossings where appropriate, advanced flashers for at grade crossings                       | Infrastructure Failure                                                                                                                                                                                                                                                                                                                                                        | New                                | Community Development        | Capital Improvement Fund                                                               | Medium-Term                        | Structure and Infrastructure Projects | New                               | 4      | Medium           |
| Polk City 1                 | Safe Room for: police department/fire department/ community center/city hall/ visitors at area lakes                                                                                                                                                                         | Tornado                                                                                                                                                                                                                                                                                                                                                                       | Existing                           | Fire, Planning               | City General Operating Budget; FEMA HMA Grants                                         | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | High             |



## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                            |                   |                                    |                              |                                                              |                                    |                                       |                                   |        |                  |
|-----------------------------|--------------------------------------------------------------------------------------------|-------------------|------------------------------------|------------------------------|--------------------------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                  | Hazards Addressed | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                                    | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Polk City 2                 | Safe room for sports complex                                                               | Tornado           | New                                | Fire, Planning               | City General Operating Budget; FEMA HMA Grants               | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | High             |
| Polk City 3                 | Advocate for structural enhancements to Mile Long Bridge to bring to current DOT standards | River Flooding    | Existing                           | Fire, Planning               | City General Operating Budget; Federal Infrastructure Grants | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | High             |
| Polk City 4                 | Storm sirens at Hugg Drive and Westside Drive                                              | Tornado           | New                                | Fire, Planning               | City General Operating Budget; FEMA HMA Grants               | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | High             |
| Polk City 5                 | Lining of public sewers to mitigate infiltration of the main pump.                         | Flash Flooding    | Existing                           | Fire, Planning               | City General Operating Budget; FEMA HMA Grants               | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| Polk City 6                 | Culvert at N 3rd -Bedshed Drive to mitigate water running over the road flooding buildings | Flash Flooding    | Existing                           | Fire, Planning               | City General Operating Budget; FEMA HMA Grants               | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| Polk City 7                 | Join the National Flood Insurance Program                                                  | River Flooding    | Both                               | Fire, Planning               | City General Operating Budget;                               | Long-Term                          | Local Plans and Regulations           | Continuing                        | 2      | High             |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                                                                                        |                   |                                    |                                                           |                                       |                                    |                                       |                                   |        |                  |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------------------------|-----------------------------------------------------------|---------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                                                                              | Hazards Addressed | Impacts Existing or New Structures | Responsible Agency or Entity                              | Potential Funding Sources             | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Polk City 8                 | Conduct tabletop exercise with Emergency Management and U.S. Army Corps of Engineers to assess readiness for dam failure and identify gaps in preparedness (Big Creek Diversion Dam).                                                  | Dam Failure       | Existing                           | All HMPC representatives from participating jurisdictions | FEMA HMA or HHPD Grants               | Long-Term                          | Structure and Infrastructure Projects | New                               | 4      | High             |
| Runnells 1                  | Backup power generator for community center at 108 Brown Street                                                                                                                                                                        | Tornado           | New                                | Fire Department                                           | G-L Community Center; FEMA HMA Grants | Short-Term                         | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| Runnells 2                  | Document electronic backup for city critical documents                                                                                                                                                                                 | Tornado           | N/A                                | Fire Department                                           | G-L City Hall                         | Medium-Term                        | Local Plans and Regulations           | Continuing                        | 2      | Medium           |
| Runnells 3                  | Development of new lagoon at sewer station to mitigate overflow in high rains                                                                                                                                                          | Flash Flooding    | New                                | Fire Department                                           | Sewer Proprietary; FEMA HMA Grants    | Short-Term                         | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| Runnells 4                  | Continue to comply with the NFIP by enforcing floodplain management ordinance, including regulating/ monitoring new construction and substantial improvements in the SFHA; and participating in floodplain identification and mapping. | River Flooding    | Existing and New                   | Fire Department                                           | G-L Ground Maintenance                | Long-Term                          | Local Plans and Regulations           | Continuing                        | 2      | High             |
| Runnells 5                  | Conduct a public education and outreach campaign to increase awareness of the risks of dam failure within the inundation zones of Red Rock Dam - Avon Station Remedial                                                                 | Dam Failure       | Existing                           | Fire Department                                           | FEMA HMA Grants                       | Medium-Term                        | Education and Outreach                | New                               | 4      | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                               |                        |                                    |                              |                           |                                    |                |                                   |        |                  |
|-----------------------------|-------------------------------------------------------------------------------|------------------------|------------------------------------|------------------------------|---------------------------|------------------------------------|----------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                     | Hazards Addressed      | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources | Expected Time Frame for Completion | Project Type   | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
|                             | Works, Red Rock Dam - Carlisle Remedial Dam, and Saylorville Dam,             |                        |                                    |                              |                           |                                    |                |                                   |        |                  |
| Urbandale 1                 | Hickman Rd interchange (in conjunction with the DOT I-80/35 widening project) | Infrastructure Failure | Both                               | DOT, Engineering             | CIP                       | Medium (2028)                      | Infrastructure | New                               | High   | High             |
| Urbandale 2                 | Meredith Drive widening/extension, 156th 170th – 184th St.                    | Infrastructure Failure | Both                               | Engineering                  | CIP                       | Medium (2028)                      | Infrastructure | New                               | Low    | Low              |
| Urbandale 3                 | NW 54th St widening                                                           | Infrastructure Failure | Both                               | Urbandale, Johnston          | CIP                       | Short (2026)                       | Infrastructure | New                               | Low    | Low              |
| Urbandale 4                 | 170th St. (Alices Rd) widening north of Meredith                              | Infrastructure Failure | New                                | Engineering                  | CIP                       | Medium (2028)                      | Infrastructure | New                               | Low    | Low              |
| Urbandale 5                 | Merle Hay Reinvestment District Stormwater Improvements Project               | Flash Flooding         | Existing                           | Engineering                  | CIP                       | Short (2025)                       | Infrastructure | New                               | Medium | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                              |                   |                                    |                              |                           |                                    |                |                                   |        |                  |
|-----------------------------|--------------------------------------------------------------|-------------------|------------------------------------|------------------------------|---------------------------|------------------------------------|----------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                    | Hazards Addressed | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources | Expected Time Frame for Completion | Project Type   | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Urbandale 6                 | Oliver Smith Drive Storm Sewer Improvements                  | Flash Flooding    | Existing                           | Engineering                  | CIP                       | Medium (2028)                      | Infrastructure | New                               | Medium | Medium           |
| Urbandale 7                 | Roseland Drive Storm Sewer Improvements                      | Flash Flooding    | Existing                           | Engineering                  | CIP                       | Medium (2028)                      | Infrastructure | New                               | Medium | Medium           |
| Urbandale 8                 | Storm Sewer Extension to the Merle Hay Reinvestment District | Flash Flooding    | Existing                           | Engineering                  | CIP                       | Medium (2028)                      | Infrastructure | New                               | Medium | Medium           |
| Urbandale 9                 | 66th Street Storm Sewer Improvements                         | Flash Flooding    | Existing                           | Engineering                  | CIP                       | Medium (2028)                      | Infrastructure | New                               | Medium | Medium           |
| Urbandale 10                | Expansion of the Waaterford Rd. Public Work site             | Flash Flooding    | Both                               | Public Works                 | CIP                       | Medium (2028)                      | Structure      | New                               | Low    | Low              |
| Urbandale 11                | Replace Fire Station 41                                      | Structure Fire    | Both                               | Fire                         | CIP                       | Medium (2028)                      | Structure      | New                               | High   | High             |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                                           |                        |                                    |                              |                                                                                            |                                    |                                       |                                   |        |                  |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|------------------------------------|------------------------------|--------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                                 | Hazards Addressed      | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                                                                  | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Urbandale 12                | Hickman Rd interchange (in conjunction with the DOT I-80/35 widening project)                                                                                                             | Infrastructure Failure | Both                               | DOT, Engineering             | CIP                                                                                        | Medium (2028)                      | Infrastructure                        | New                               | High   | High             |
| Urbandale 13                | Address physical and structural deficiencies to reduce risk associated with the Parkview Dam and maintain its satisfactory condition.                                                     | Dam Failure            | Existing                           | Public Works                 | CIP                                                                                        | Medium (2028)                      | Infrastructure                        | New                               | 4      | High             |
| Urbandale 14                | Conduct a public education and outreach campaign to increase awareness of the risks of dam failure within the inundation zones of Clive Lake Dam, Parkview Lake Dam, and Saylorville Dam. | Dam Failure            | Existing                           | Public Works                 | CIP                                                                                        | Medium (2028)                      | Education and Outreach                | New                               | 4      | High             |
| West Des Moines 1           | Elevation of I-35 Bridge over Raccoon River and Highway 28 Bridge over Raccoon River to mitigate washout                                                                                  | River Flooding         | Existing                           | Fire and EMS                 | City General Operating Budget; Capital Improvement Funds; Stormwater Fees; FEMA HMA Grants | Long-Term                          | Structure and Infrastructure Projects | Continuing                        | 4      | High             |
| West Des Moines 2           | Pursue remedial flood mitigation actions associated with the Southeast Des Moines (SEDM) Levee, US 65                                                                                     | River Flooding         | Existing                           | Fire and EMS                 | City General Operating Budget; Capital Improvement Funds; Stormwater Fees; FEMA HMA Grants | Long-Term                          | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                                         |                                          |                                    |                              |                                                                                            |                                    |                                       |                                   |        |                  |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|------------------------------------|------------------------------|--------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                               | Hazards Addressed                        | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                                                                  | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| West Des Moines 3           | Lining of public sewers in the Valley Junction Area to mitigate infiltration at the Main Pump-2 Phases                                                                                  | Flash Flooding                           | Existing                           | Fire and EMS                 | City General Operating Budget; Capital Improvement Funds; Stormwater Fees; FEMA HMA Grants | Long-Term                          | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| West Des Moines 4           | Lining of public sewers in the Fairmeadows Creek Area to mitigate infiltration of the main pump                                                                                         | Flash Flooding                           | Existing                           | Fire and EMS                 | City General Operating Budget; Capital Improvement Funds; Stormwater Fees; FEMA HMA Grants | Long-Term                          | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| West Des Moines 5           | Map and buffer Tier II facilities within City and adjacent to City perimeter. Develop emergency response and subsequent evacuation routes for HAZMAT incidents based on these mappings. | HAZMAT Incident, Transportation Incident | Existing                           | Fire and EMS                 | City General Operating Budget; Capital Improvement Funds; Stormwater Fees; FEMA HMA Grants | Medium-Term                        | Local Plans and Regulations           | Continuing                        | 2, 3   | High             |
| West Des Moines 6           | Implement recommended storm water improvements from the Westown-PCP drainage study.                                                                                                     | Flash Flooding                           | Existing and New                   | Fire and EMS                 | City General Operating Budget; Capital Improvement Funds; Stormwater Fees; FEMA HMA Grants | Long-Term                          | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                  |                                          |                                    |                              |                                                                                                                |                                    |                                                                    |                                   |        |                  |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|------------------------------------|------------------------------|----------------------------------------------------------------------------------------------------------------|------------------------------------|--------------------------------------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                        | Hazards Addressed                        | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                                                                                      | Expected Time Frame for Completion | Project Type                                                       | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| West Des Moines 7           | Installation of ice protection structures at regional radio communications infrastructure sites.                                                 | Winter storms, Windstorms                | New                                | Fire and EMS                 | City General Operating Budget; Capital Improvement Funds; Economic Development Funds; FEMA Preparedness Grants | Medium-Term                        | Structure and Infrastructure Projects                              | Continuing                        | 4      | Medium           |
| West Des Moines 8           | Develop evacuation routes for hazard incidents, flooding incidents, and serve weather incidents.                                                 | HAZMAT Incident, Transportation Incident | Existing                           | Fire and EMS                 | City General Operating Budget; Capital Improvement Funds; Economic Development Funds; FEMA preparedness Grants | Medium-Term                        | Local Plans and Regulations                                        | Continuing                        | 1, 2   | High             |
| West Des Moines 9           | Map Tier II facilities within City and adjacent to City perimeter.                                                                               | HAZMAT Incident, Transportation Incident | Existing                           | Fire and EMS                 | City General Operating Budget; Capital Improvement Funds; Economic Development Funds; FEMA preparedness Grants | Medium-Term                        | Local Plans and Regulations                                        | Continuing                        | 2, 3   | Medium           |
| West Des Moines 10          | In conjunction with redevelopment, identify and implement storm water drainage improvement recommendations within the Blue Creek drainage basin. | Flash Flooding                           | Both                               | Fire and EMS                 | City General Operating Budget; Capital Improvement Funds FEMA HMA Grants                                       | Long-Term                          | Local Plans and Regulations, Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |



## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                         |                                    |                              |                                                                                            |                                    |                                       |                                   |         |                  |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|------------------------------------|------------------------------|--------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|---------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                                                                                                                                                                                                                                                                                                 | Hazards Addressed                       | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                                                                  | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal #  | Priority (H/M/L) |
| West Des Moines 11          | Enhance current floodplain management efforts by updating the Floodplain Management Ordinance, which includes new Flood Insurance Rate Maps, associated ordinance language approved by IDNR/FEMA, and increased requirements for City facilities including public services, emergency services, and similar structures that are critical to maintaining City functions in an emergency to be elevated a minimum of one (1) foot above the 500-year flood. | Flash Flooding                          | Both                               | Fire and EMS                 | City General Operating Budget; Capital Improvement Funds; Stormwater Fees; FEMA HMA Grants | Long-Term                          | Local Plans and Regulations           | Continuing                        | 1, 2, 4 | Medium           |
| West Des Moines 12          | SE Basins Stormwater Improvements (Valley Junction Area) approximate boundary: 19th St. & Woodland Ave. to Grand Ave. & Railroad Avenue to Lincoln St. & HWY 28 to Hwy 28 & Prospect Ave.                                                                                                                                                                                                                                                                 | Flash Flooding, Transportation Incident | Both                               | Fire and EMS                 | City General Operating Budget; Capital Improvement Funds; Stormwater fees; FEMA HMA Grants | Long-Term                          | Structure and Infrastructure Projects | Continuing                        | 4       | Medium           |
| West Des Moines 13          | NE Basins Stormwater Improvements (Valley Junction Area) approximate boundary: Hwy. 28 & N. of Ashworth Rd. to Hoak Dr. & IA Interstate RR to Office Park Road & 15th St. to Ashworth Rd. & 11th St. to Ashworth Rd. & 9th St. to Grand Ave. & 9th St. to Grand Ave. & 8th St. to 5th St. & Prospect Ave. to 5th St. & Vine St. to Hwy 28 & Vine St. to Hwy 28 & Lincoln St. to Walnut Creek Levee (Des Moines) to Hwy. 28 & N. of Ashworth Rd.           | Flash Flooding, Transportation Incident | Both                               | Fire and EMS                 | City General Operating Budget; Capital Improvement Funds; Stormwater fees; FEMA HMA Grants | Long-Term                          | Structure and Infrastructure Projects | Continuing                        | 4       | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                |                                         |                                    |                              |                                                                                            |                                    |                                       |                                   |        |                  |
|-----------------------------|----------------------------------------------------------------------------------------------------------------|-----------------------------------------|------------------------------------|------------------------------|--------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                      | Hazards Addressed                       | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                                                                  | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| West Des Moines 14          | Raccoon River - Bank Stabilization                                                                             | River Flooding, Transportation Incident | Existing                           | Fire and EMS                 | City General Operating Budget; Capital Improvement Funds; Stormwater fees; FEMA HMA Grants | Long-Term                          | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| West Des Moines 15          | Grand Avenue Stormwater Pump Station Near Raccoon River Dr.                                                    | River Flooding, Transportation Incident | New                                | Fire and EMS                 | City General Operating Budget; Capital Improvement Funds; Stormwater Fees; FEMA HMA Grants | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| West Des Moines 16          | Blue Creek Basins Stormwater Improvements ( 5 Basins)                                                          | Flash Flooding                          | Both                               | Fire and EMS                 | City General Operating Budget; Capital Improvement Funds; Stormwater fees; FEMA HMA Grants | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| West Des Moines 17          | Iowa Interstate Railroad Bridge near Raccoon River Park Entrance and Raccoon River Park Soccer Complex Culvert | Flash Flooding, Transportation Incident | Existing                           | Fire and EMS                 | City General Operating Budget; Capital Improvement Funds; Stormwater fees; FEMA HMA Grants | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                               |                         |                                    |                              |                                                                                                                        |                                    |                                       |                                   |        |                  |
|-----------------------------|---------------------------------------------------------------|-------------------------|------------------------------------|------------------------------|------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                     | Hazards Addressed       | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                                                                                              | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| West Des Moines 18          | Fairmeadows Creek - 27th & Vine Culvert                       | Flash Flooding          | Existing                           | Fire and EMS                 | City General Operating Budget; Capital Improvement Funds; Stormwater fees; FEMA HMA Grants                             | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| West Des Moines 19          | Walnut Creek Watershed Management Authority Misc. Projects    | Flash Flooding          | Existing                           | Fire and EMS                 | City General Operating Budget; Capital Improvement Funds; Stormwater fees; FEMA HMA Grants                             | Long-Term                          | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| West Des Moines 20          | 62nd & Railroad Ave Sanitary Sewer Gate Structure Replacement | Infrastructure Failure  | Existing                           | Fire and EMS                 | City General Operating Budget; Capital Improvement Funds; Stormwater fees; Economic Development Funds; FEMA HMA Grants | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| West Des Moines 21          | 8th Street Reconstruction - I-235 to Clegg Road               | Transportation Incident | Existing                           | Fire and EMS                 | City General Operating Budget; Capital Improvement Funds; Stormwater fees; Economic Development                        | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                               |                                    |                              |                                                                                                       |                                    |                                       |                                   |        |                  |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------------------|-------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                                                                                                                                | Hazards Addressed                                                                                                                                                                                                                                                                                                                                                             | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                                                                             | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
|                             |                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                               |                                    |                              | Funds; FEMA HMA Grants                                                                                |                                    |                                       |                                   |        |                  |
| West Des Moines 22          | S. 88th Street Railroad Crossing improvements- Near Raccoon River Drive                                                                                                                                                                                                                  | Transportation Incident                                                                                                                                                                                                                                                                                                                                                       | Existing                           | Fire and EMS                 | City General Operating Budget; Capital Improvement Funds; Economic Development Funds; FEMA HMA Grants | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| West Des Moines 23          | Evaluate and consider participation or adoption of programs, standards, and policies to achieve compliance by alternate means and methods or phased improvements to bring older developed areas within the jurisdiction into compliance with building, fire, and flood hazard standards. | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ landslides, structural fire, thunderstorm with lightning and hail, tornado, transportation incident, windstorm, winter storm | Both                               | Fire and EMS                 | City General Operating Budget; Capital Improvement Funds; Economic Development Funds; FEMA HMA Grants | Long-Term                          | Local Plans and Regulations           | New                               | 2      | Medium           |
| West Des Moines 24          | Address physical and structural deficiencies to reduce risks associated with West Lake Office Park Dam and Glen Oaks Country Club Dam as well as maintaining the satisfactory condition of these dams.                                                                                   | Dam Failure                                                                                                                                                                                                                                                                                                                                                                   | Existing                           | Fire and EMS                 | City General Operating Budget; Capital Improvement Funds; Stormwater fees; Economic Development       | Long-Term                          | Structure and Infrastructure Projects | New                               | 4      | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                                                                               |                   |                                    |                              |                                                                                                                        |                                    |                                       |                                   |        |                  |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------------------------|------------------------------|------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                                                                     | Hazards Addressed | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                                                                                              | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
|                             |                                                                                                                                                                                                                               |                   |                                    |                              | Funds; FEMA HMA Grants                                                                                                 |                                    |                                       |                                   |        |                  |
| West Des Moines 25          | Conduct a public education and outreach campaign to increase awareness of the risks of dam failure within the inundation zones of Clive Lake Dam, Glen Oaks Country Club Dam, Saylorville Dam, and West Lake Office Park Dam. | Dam Failure       | Existing                           | Fire and EMS                 | City General Operating Budget; Capital Improvement Funds; Stormwater fees; Economic Development Funds; FEMA HMA Grants | Long-Term                          | Education and Outreach                | New                               | 4      | Medium           |
| Windsor Heights 1           | Install residential check valves at Washington Avenue and 70th Street                                                                                                                                                         | Flash Flooding    | Existing                           | City Administrator's Office  | General Operating Budget; FEMA HMA Grants                                                                              | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| Windsor Heights 2           | Replace storm sewer intakes                                                                                                                                                                                                   | Flash Flooding    | Existing                           | City Administrator's Office  | Stormwater Fund                                                                                                        | Long-Term                          | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| Windsor Heights 3           | Identify potential future shelter sites                                                                                                                                                                                       | Windstorms        | Existing & New                     | City Administrator's Office  | General Operating Budget; FEMA Preparedness Grants                                                                     | Short-term                         | Local Plans and Regulations           | Continuing                        | 4      | High             |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                                                                                                                                                                                                                                 |                                |                                    |                              |                                           |                                    |                                       |                                   |        |                  |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------------------|------------------------------|-------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                                                                                                                                                                                                                       | Hazards Addressed              | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                 | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Windsor Heights 4           | Continue to comply with the NFIP by enforcing floodplain management ordinance, including regulating/ monitoring new construction and substantial improvements in the SFHA; and participating in floodplain identification and mapping.                                                                                                                                          | River Flooding                 | Existing & New                     | City Administrator's Office  | General Operating Budget                  | Long-term                          | Local Plans and Regulations           | Continuing                        | 1      | High             |
| Windsor Heights 5           | Walnut Creek bank stabilization                                                                                                                                                                                                                                                                                                                                                 | River Flooding                 | Existing                           | City Administrator's Office  | Stormwater Funds; FEMA HMA Grants         | Long-term                          | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| Windsor Heights 6           | Construct a non-accredited levee along the east bank of Walnut Creek between southwest of Wal-Mart and I-235 or Construct an accredited levee along the east bank of Walnut Creek between east of Wal-Mart / west of the Colby Park neighborhood and I-235. or Construct an accredited levee along the east bank of Walnut Creek between the Colby Park neighborhood and I-235. | River Flooding                 | New                                | City Administrator's Office  | FEMA HMA Grants                           | Long-term                          | Structure and Infrastructure Projects | New                               | 4      | High             |
| Windsor Heights 7           | Channel Modification. Construct channel improvements from I-235 to 63rd Street.                                                                                                                                                                                                                                                                                                 | Flash Flooding; River Flooding | New                                | City Administrator's Office  | FEMA HMA Grants                           | Long-Term                          | Structure and Infrastructure Projects | New                               | 4      | Medium           |
| Windsor Heights 8           | Construct one or more flood risk reduction dams or detention cells                                                                                                                                                                                                                                                                                                              | Flash Flooding; River Flooding | New                                | City Administrator's Office  | General Operating Budget; FEMA HMA Grants | Long-Term                          | Structure and Infrastructure Projects | New                               | 4      | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                               |                                    |                              |                                           |                                    |                                       |                                   |        |                  |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------------------|-------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                        | Hazards Addressed                                                                                                                                                                                                                                                                                                                                                             | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                 | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Windsor Heights 9           | Upstream dam in upper Walnut Creek Watershed                                                                                                     | River Flooding                                                                                                                                                                                                                                                                                                                                                                | New                                | City Administrator's Office  | FEMA HMA Grants                           | Long-Term                          | Structure and Infrastructure Projects | New                               | 4      | Medium           |
| Windsor Heights 10          | Install a concrete barrier along selected properties beside North Walnut Creek.                                                                  | River Flooding                                                                                                                                                                                                                                                                                                                                                                | New                                | City Administrator's Office  | FEMA HMA Grants                           | Long-Term                          | Structure and Infrastructure Projects | New                               | 4      | Medium           |
| Windsor Heights 11          | Acquisition of shared resource emergency vehicles                                                                                                | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ landslides, structural fire, thunderstorm with lightning and hail, tornado, transportation incident, windstorm, winter storm | N/A                                | City Administrator's Office  | General Operating Budget; FEMA HMA Grants | Medium-Term                        | Local Plans and Regulations           | New                               | 2      | Medium           |
| Windsor Heights 12          | Relocate Public Works and Community Center out of flood plain.                                                                                   | River Flooding                                                                                                                                                                                                                                                                                                                                                                | Existing                           | City Administrator's Office  | FEMA HMA Grants                           | Long-Term                          | Structure and Infrastructure Projects | New                               | 4      | High             |
| Windsor Heights 13          | Conduct a public education and outreach campaign to increase awareness of the risks of dam failure within the inundation zone of Clive Lake Dam. | Dam Failure                                                                                                                                                                                                                                                                                                                                                                   | Existing                           | City Administrator's Office  | General Operating Budget; FEMA HMA Grants | Medium-Term                        | Education and Outreach                | New                               | 4      | Medium           |



## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                               |                                    |                              |                                            |                                    |                                       |                                   |        |                  |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------------------|--------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                         | Hazards Addressed                                                                                                                                                                                                                                                                                                                                                             | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                  | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Delaware Township 1         | Standby Generator Installation                                                                                    | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ landslides, structural fire, thunderstorm with lightning and hail, tornado, transportation incident, windstorm, winter storm | New                                | Fire                         | HMGP 5%; Community donations               | Long-Term                          | Structure and Infrastructure Projects | Continuing                        | 2, 4   | High             |
| Delaware Township 2         | Replace Fire Engine                                                                                               | Structural Fire                                                                                                                                                                                                                                                                                                                                                               | New                                | Fire                         | Preparedness Grants; Community donations   | Medium-Term                        | Local Plans and Regulations           | New                               | 2      | Medium           |
| Des Moines Water Works 1    | Evaluate and repair flood gates located at the Fleur Drive Water Treatment Plant.                                 | River Flooding                                                                                                                                                                                                                                                                                                                                                                | Existing                           | DMWW                         | DMWW Capital Improvement Funds; HMA Grants | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 2, 4   | High             |
| Des Moines Water Works 2    | Evaluation of ring levee protecting Fleur Drive Water Treatment Plant.                                            | River Flooding                                                                                                                                                                                                                                                                                                                                                                | Existing                           | DMWW                         | DMWW Capital Improvement Funds; HMA Grants | Medium-Term                        | Local Plans and Regulations           | Continuing                        | 2, 4   | High             |
| Des Moines Water Works 3    | Add flood protection to the East Low Lift and East High Lift facilities at the Fleur Drive Water Treatment Plant. | River Flooding                                                                                                                                                                                                                                                                                                                                                                | Existing                           | DMWW                         | DMWW Capital Improvement Funds; HMA Grants | Medium-Term                        | Structure and Infrastructure Projects | New                               | 4      | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                |                     |                                    |                              |                                                                                                                                   |                                    |                                       |                                   |        |                  |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------------------------|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                      | Hazards Addressed   | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                                                                                                         | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Des Moines Water Works 4    | Evaluate and mitigate flood hazards at the Maffitt Water Treatment Plant, including but not limited to: wells, riprap, levees, pump station, and river intake. | River Flooding      | Existing                           | DMWW                         | DMWW Capital Improvement Funds; HMA Grants                                                                                        | Medium-Term                        | Structure and Infrastructure Projects | New                               | 4      | Medium           |
| Des Moines Water Works 5    | Improve resiliency to cyanotoxins in source water at all three water treatment plants.                                                                         | River Flooding      | Existing                           | DMWW                         | DMWW Capital Improvement Funds; HMA Grants                                                                                        | Medium-Term                        | Structure and Infrastructure Projects | New                               | 4      | Medium           |
| Ankeny Schools 1            | Multi-purpose Safe Rooms District Wide                                                                                                                         | Tornado             | Both                               | Ankeny Schools               | Physical Plant & Equipment Levy; Secure an Advanced Vision for Education; School Bonds; General Operating Budget; FEMA HMA Grants | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | High             |
| Ankeny Schools 2            | Emergency HVAC Shut-Off                                                                                                                                        | Hazardous Materials | Both                               | Ankeny Schools               | Physical Plant & Equipment Levy; Secure an Advanced Vision for Education; School Bonds; General Operating Budget; FEMA HMA Grants | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                               |                                    |                              |                                                                                                                                            |                                    |                                       |                                   |        |                  |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                        | Hazards Addressed                                                                                                                                                                                                                                                                                                                                                             | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                                                                                                                  | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Ankeny Schools 3            | Safety Film/Glass                                                                                                                                                | Intruder                                                                                                                                                                                                                                                                                                                                                                      | New                                | Ankeny Schools               | Physical Plant & Equipment Levy; Secure an Advanced Vision for Education; School Bonds; General Operating Budget; FEMA HMA Grants          | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | High             |
| Ankeny Schools 4            | Back-up Facility Generators                                                                                                                                      | Tornado                                                                                                                                                                                                                                                                                                                                                                       | Existing                           | Ankeny Schools               | Physical Plant & Equipment Levy; Secure an Advanced Vision for Education; School Bonds; General Operating Budget; FEMA HMA Grants          | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| Ankeny Schools 5            | Bi-Directional Amplifiers (BDA) capable of both P25 and Mototrbo to enhance interoperable communications between responders and school officials in an emergency | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ landslides, structural fire, thunderstorm with lightning and hail, tornado, transportation incident, windstorm, winter storm | Both                               | Ankeny Schools               | Physical Plant & Equipment Levy; Secure an Advanced Vision for Education; School Bonds; General Operating Budget; FEMA Preparedness Grants | Medium-Term                        | Local Plans and Regulations           | New                               | 2      | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                                                                                                                                                                                                          |                        |                                    |                                  |                                                                                           |                                    |                                       |                                   |        |                  |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|------------------------------------|----------------------------------|-------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                                                                                                                                                                                                | Hazards Addressed      | Impacts Existing or New Structures | Responsible Agency or Entity     | Potential Funding Sources                                                                 | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Bondurant-Farrar Schools 1  | Storm Safe Room at Anderson Elementary                                                                                                                                                                                                                                                                                                                   | Tornado                | Existing                           | Bondurant-Farrar School District | Physical Plant & Equipment Levy; Secure an Advanced Vision for Education; FEMA HMA Grants | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | High             |
| Des Moines Schools 1        | DAS and repeaters- (Distributed antenna system) As Des Moines Public Schools becomes more energy efficient, cellular and radio communications are blocked within our buildings. In order to combat this, we need to add DAS antennas and repeaters. This improves communication capabilities for not only DMPS staff, but also all emergency responders. | Infrastructure Failure | Existing                           | Des Moines Schools               | Capital expenses; FEMA preparedness Grants                                                | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 2, 4   | Medium           |
| Des Moines Schools 2        | Virtual, remote server farm service for disaster recovery due to flood, tornado, windstorm. Our servers are in a building that is in a flood plain. Our back-up system is downtown which also has the potential to flood. In order to recover from a disaster we need the ability to transfer all systems to a remote 3rd party.                         | Infrastructure Failure | Existing                           | Des Moines Schools               | Capital expenses; FEMA preparedness Grants                                                | Long-Term                          | Structure and Infrastructure Projects | Continuing                        | 2, 4   | Medium           |
| Des Moines Schools 3        | Backup Generation at all of our schools and administrative offices                                                                                                                                                                                                                                                                                       | Infrastructure Failure | Existing                           | Des Moines Schools               | PPEL; FEMA HMA Grants                                                                     | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                               |                                    |                              |                                                                                                         |                                    |                                       |                                   |        |                  |
|-----------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------------------|---------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                           | Hazards Addressed                                                                                                                                                                                                                                                                                                                                                             | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                                                                               | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Des Moines Schools 4        | Construct new safe rooms at various elementary schools                              | Tornado                                                                                                                                                                                                                                                                                                                                                                       | Existing                           | Des Moines Schools           | Capital expenses; FEMA HMA Grants                                                                       | Long-Term                          | Structure and Infrastructure Projects | Continuing                        | 4      | High             |
| Johnston Schools 1          | Sprinklers in facility at 6510 NW 62nd when repurposing the building                | Fire                                                                                                                                                                                                                                                                                                                                                                          | Existing                           | Johnston Schools             | Capital Improvements Fund; FEMA HMA Grants                                                              | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| Johnston Schools 2          | Replace and upgrade of emergency communication radio system                         | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ landslides, structural fire, thunderstorm with lightning and hail, tornado, transportation incident, windstorm, winter storm | Existing                           | Johnston Schools             | Capital Improvements Fund; FEMA preparedness Grants                                                     | Medium-Term                        | Local Plans and Regulations           | Continuing                        | 2      | Medium           |
| North Polk Schools 1        | Construct safe rooms at Central Elementary and North Polk Junior/Senior High School | Tornado                                                                                                                                                                                                                                                                                                                                                                       | Existing                           | North Polk Schools           | Physical Plant and Equipment Levy; Secure an Advanced Vision for Education; bond sales; FEMA HMA Grants | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | High             |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                               |                                    |                              |                                                                                                         |                                    |                                       |                                   |        |                  |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------------------|---------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                      | Hazards Addressed                                                                                                                                                                                                                                                                                                                                                             | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                                                                               | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| North Polk Schools 2        | Research, scope, and conduct structural and non-structural retrofits to reduce the vulnerability of school district facilities to all hazards. | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ landslides, structural fire, thunderstorm with lightning and hail, tornado, transportation incident, windstorm, winter storm | Existing                           | North Polk Schools           | Physical Plant and Equipment Levy; Secure an Advanced Vision for Education; bond sales; FEMA HMA Grants | Medium-Term                        | Structure and Infrastructure Projects | New                               | 4      | High             |
| Southeast Polk Schools 1    | Construction of Multi-purpose Safe Rooms District Wide                                                                                         | Tornado, Windstorm                                                                                                                                                                                                                                                                                                                                                            | Both                               | Southeast Polk Schools       | Public referendum; FEMA HMA Grants                                                                      | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | High             |
| Southeast Polk Schools 2    | Internal and outward-facing electronic communications for emergency/disaster mitigation                                                        | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ landslides, structural fire, thunderstorm with lightning and hail, tornado, transportation incident, windstorm, winter storm | Both                               | Southeast Polk Schools       | Iowa School Safety Grant; FEMA preparedness Grants                                                      | Medium-Term                        | Local Plans and Regulations           | Continuing                        | 2      | Medium           |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                         |                                                                                                                                                                                                                                                                                                                                                                               |                                    |                              |                                                                            |                                    |                             |                                   |        |                  |
|-----------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------------------|----------------------------------------------------------------------------|------------------------------------|-----------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                               | Hazards Addressed                                                                                                                                                                                                                                                                                                                                                             | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                                                  | Expected Time Frame for Completion | Project Type                | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| Southeast Polk Schools 3    | Emergency Radios in all schools                                                         | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ landslides, structural fire, thunderstorm with lightning and hail, tornado, transportation incident, windstorm, winter storm | New                                | Southeast Polk Schools       | Iowa School Safety Grant; FEMA preparedness Grants                         | Medium-Term                        | Local Plans and Regulations | Continuing                        | 2      | Medium           |
| Southeast Polk Schools 4    | Replace antiquated district surveillance cameras and install new systems in all schools | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ landslides, structural fire, thunderstorm with lightning and hail, tornado, transportation incident, windstorm, winter storm | New                                | Southeast Polk Schools       | Iowa School Safety Grant; FEMA preparedness Grants                         | Medium-Term                        | Local Plans and Regulations | Continuing                        | 2      | Medium           |
| Urbandale Schools 1         | Implement Emergency Operations Plan                                                     | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ landslides, structural fire,                                                                                                 | Existing                           | Urbandale Schools            | Physical Plant and Equipment Levy; Secure an Advanced Vision for Education | Long-Term                          | Local Plans and Regulations | Continuing                        | 2      | Medium           |



## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                               |                                    |                              |                                                                                                                    |                                    |                                       |                                   |         |                  |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------------------|--------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|---------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                                                                                                         | Hazards Addressed                                                                                                                                                                                                                                                                                                                                                             | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                                                                                          | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal #  | Priority (H/M/L) |
|                             |                                                                                                                                                                                                                                                                   | thunderstorm with lightning and hail, tornado, transportation incident, windstorm, winter storm                                                                                                                                                                                                                                                                               |                                    |                              |                                                                                                                    |                                    |                                       |                                   |         |                  |
| Urbandale Schools 2         | Ballistic film and Glazing                                                                                                                                                                                                                                        | Tornado, Active Shooter (Not Profiled)                                                                                                                                                                                                                                                                                                                                        | Both                               | Urbandale Schools            | Physical Plant and Equipment Levy; Secure an Advanced Vision for Education; HMA grants; school preparedness grants | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4       | High             |
| Urbandale Schools 3         | Internal Locking Capabilities at District Buildings                                                                                                                                                                                                               | Active Shooter (Not Profiled)                                                                                                                                                                                                                                                                                                                                                 | Existing                           | Urbandale Schools            | Physical Plant and Equipment Levy; Secure an Advanced Vision for Education; school preparedness grants             | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4       | High             |
| Urbandale Schools 4         | Opening access to internal/external cameras in school buildings to the Urbandale Police Department. This provides them immediate access in an emergency situation so they can have eyes on everywhere. Training will continue as they identify appropriate staff. | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ landslides, structural fire, thunderstorm with lightning and hail, tornado, transportation incident, windstorm, winter storm | Both                               | Urbandale Schools            | Physical Plant and Equipment Levy; Secure an Advanced Vision for Education; school preparedness grants             | Medium-Term                        | Structure and Infrastructure Projects | New                               | 2, 3, 4 | High             |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                               |                                    |                              |                                                                                                        |                                    |                                       |                                   |         |                  |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------------------|--------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|---------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                                                                                                                     | Hazards Addressed                                                                                                                                                                                                                                                                                                                                                             | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                                                                              | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal #  | Priority (H/M/L) |
| Urbandale Schools 5         | Allow the Urbandale Police Department to use empty facilities and occupied facilities after hours to train. This provides them with a familiarity of the buildings should they need to come into a situation. | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ landslides, structural fire, thunderstorm with lightning and hail, tornado, transportation incident, windstorm, winter storm | Both                               | Urbandale Schools            | Physical Plant and Equipment Levy; Secure an Advanced Vision for Education; school preparedness grants | Medium-Term                        | Local Plans and Regulations           | New                               | 2, 3, 4 | High             |
| Urbandale Schools 6         | Increase the number of internal/external cameras in school buildings to ensure all areas are captured.                                                                                                        | Animal/plant/crop disease, climate change, cyberattack, dam failure, drought, earthquake, expansive soils, extreme temperatures, flash flooding, grass or wildland fire, hazardous materials incident, levee failure, river flooding, sinkholes/ landslides, structural fire, thunderstorm with lightning and hail, tornado, transportation incident, windstorm, winter storm | Both                               | Urbandale Schools            | Physical Plant and Equipment Levy; Secure an Advanced Vision for Education; school preparedness grants | Medium-Term                        | Structure and Infrastructure Projects | New                               | 2, 3, 4 | High             |
| West Des Moines Schools 1   | Installation of FEMA compliant safe rooms/areas in three elementary school buildings.                                                                                                                         | Tornado                                                                                                                                                                                                                                                                                                                                                                       | Existing                           | West Des Moines Schools      | Capital Improvement Funds; FEMA HMA Grants                                                             | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4       | High             |

## 4: MITIGATION STRATEGY

| 2024 Mitigation Action Plan |                                                                                                          |                   |                                    |                              |                                            |                                    |                                       |                                   |        |                  |
|-----------------------------|----------------------------------------------------------------------------------------------------------|-------------------|------------------------------------|------------------------------|--------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------|------------------|
| Action ID                   | Mitigation Project / Activity Description                                                                | Hazards Addressed | Impacts Existing or New Structures | Responsible Agency or Entity | Potential Funding Sources                  | Expected Time Frame for Completion | Project Type                          | Action Status (New or Continuing) | Goal # | Priority (H/M/L) |
| West Des Moines Schools 2   | Installation of FEMA compliant safe room/area in a Jr. High building.                                    | Tornado           | Existing                           | West Des Moines Schools      | Capital Improvement Funds; FEMA HMA Grants | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | High             |
| West Des Moines Schools 3   | Installation of generator(s) to serve the FEMA compliant safe rooms/areas in three elementary buildings. | Tornado           | Existing                           | West Des Moines Schools      | Capital Improvement Funds; FEMA HMA Grants | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |
| West Des Moines Schools 4   | Installation of generator (s) to serve the FEMA compliant safe room/area in a Jr. High building          | Tornado           | Existing                           | West Des Moines Schools      | Capital Improvement Funds; FEMA HMA Grants | Medium-Term                        | Structure and Infrastructure Projects | Continuing                        | 4      | Medium           |

### 4.5. PRIORITIZATION OF MITIGATION ACTIONS

As noted above, the mitigation actions included in the 2024 Polk County Hazard Mitigation Plan do not represent a commitment by participating communities to take on every listed action. Rather, this is a list of *potential* actions that they may wish to pursue, depending in the availability of funding. When determining how to use available hazard mitigation funding, or identifying (during annual plan reviews) which actions to pursue in the coming year, the HMPC will consider the following factors when identifying priority actions:

- The benefit-cost ratio (BCR) of proposed projects
  - BCR is a measure of the return on investment the community can expect to receive, and one of the most important factors in determining whether or not to implement an action
  - Communities may opt to conduct a full benefit-cost analysis, or may consider the relative costs and benefits qualitatively, depending on the availability of detailed project cost information.
- Degree to which the project impacts or protects life safety
- Degree to which the project reduces the need for response actions
- Size of the population who would benefit from the action
- Benefit to the county's economy overall
- Useful life of project, taking into consideration the expected impacts of climate change
- Benefits to underserved communities
- Other non-monetary benefits not specified here

### 4.6. CITY OF CLIVE ACTION DEVELOPMENT PROCESS

The City of Clive planning team reviewed a range of flood mitigation activities that could prevent or reduce the severity of community impacts. Although some concepts were newly discussed, a majority of the potential list of actions included ideas that have been previously evaluated in the City's Comprehensive Plan, Walnut Creek Watershed Master Plan, Greenbelt Master Plan, Water Resources Master Plan and/or University Boulevard Neighborhood Flood Mitigation Plan processes. A summary of the activities explored have been categorized into the following types:

**Preventive Actions:** Those actions that have the potential to keep flooding impacts from getting worse. The most beneficial tool that has been leveraged in the community is associated with the acquisition of floodplain property for incorporation in the City's Greenbelt Park. Beyond preventing people/buildings from developing in the floodplain in the first place, a number of other regulatory program have been previously discussed as a means of helping to reduce the need for on-going emergency operations during flood events. As the community is generally built-out, the political and social costs associated with imposing higher regulatory standards is challenging. Continued advanced planning solidifying the "why" will be important if these items are able to be moved forward.

- Continue to Acquire Undeveloped Floodplain/Floodway Property
- Enhance Flood Disclosure Notification (State Code)
- Enhance Dam Safety Program
- Develop Formal Debris Management Program
- Expand Stormwater Detention Basin Maintenance Program
- Expand Storm Sewer Network Modeling (pluvial flooding impacts)
- Update Floodplain Development Regulations (future conditions)
- Update Building Codes (future conditions)
- Consider "no net impact" floodplain development
- Develop Flood Mitigation Plan for Indian Hills/Swanson Blvd Neighborhood
- Increase Stormwater Management Requirements (greenfield)
- Increase Stormwater Management Requirements (redevelopment)
- Formalize Substantial Improvement Program
- Complete Flood Study for Remaining A Zone Area Prior to Development

**Property Protection:** Currently there are approximately 350 private properties located in the Walnut Creek floodplain. Of those, approximately 250 buildings have legitimate exposure to the current 100-year flood event based on the previously completed damage assessment modeling. Many of the buildings most at-risk are associated with Pre-FIRM construction standards and are repetitively

## 4: MITIGATION STRATEGY

damaged during marginal flood events (less than 50-year flood events). In the event of a 100-year flood, the a significant number of the Pre-FIRM buildings will be substantially damaged. With that understanding of the current condition, let alone the anticipated future conditions, the continuation of the University Boulevard Flood Buyout Program is the primary implementation activity in this category. Although the funding needs are significant, the positive BCR and the availability of Federal funds suggests the opportunity to achieve long-term success (21 acquisitions completed since 2019 - 31 additional at-risk properties remain).

The high priority has been given to the University Boulevard neighborhood area, however, the future flood conditions due suggest that additional advanced flood mitigation planning for the Indian Hills neighborhood would be prudent. To date, this neighborhood (approximately 200 single family homes) fears flood insurance costs more than it does actual flooding as the repetitive flood events in the community have not significantly impacted this neighborhood. During a 100-year flood event, there is significant potential for building and life safety impacts as many of the homes have basements (previous FEMA approval for structural basement foundations) designed to the 1980 flood standards. In addition to the advanced planning to better understand the potential risks, it is expected that the quality/condition of the existing buildings will support retrofitting (in lieu of buyout acquisition) which will require new staff skill sets and additional public education.

- Continue Flood Buyout Program (University Boulevard)
- Acquire Building Elevation Data/Update Damage Assessment Model
- Private Property Flood Mitigation Technical Assistance (University Blvd)
- Enhance Flood Insurance Marketing
- Expand Staff Training (Floodproofing)
- Consider Cumulative Substantial Improvement

**Natural Resource Protection:** Integral to the community character is its long standing commitment to incorporation of the City's natural resources into the design of its neighborhoods. Since the mid-1970's, the City has been active in the acquisition of Walnut Creek floodplain property and development of a linear "Greenbelt Park" trail along Walnut Creek. The City currently owns nearly 50% of the floodplain property and has plans to continue with acquisitions both from a conservation perspective as well as floodplain management. With nearly 500 acres of floodplain land, the City has also more recently turned its attention of maximizing the utility of the floodplain beyond its primary park function. Projects and activities around vegetation management, streambank stabilization and oxbow/wetland construction are all part of the suite of multi-beneficial natural floodplain activities that have been evaluated.

- Continue Implementation of Greenbelt Vegetation Management Plan
- Develop Broader Forestry Master Plan (plant diversity of native trees)

## 4: MITIGATION STRATEGY

- Continue to Incorporate Natural Channel Design into Greenbelt Improvements
- Reconnect Incised Walnut Creek with Floodplain (Channel Improvements)
- Continue to Install Ox-bow and Wetlands in Floodplain
- Continue to Disconnect Storm Sewer System from Stream Channel
- Enhance Solid Waste Management (prevention prior to stream cleanup)
- Maximize Sponginess of Floodplain

**Emergency Services:** Although the creation of a resilient Walnut Creek floodplain is the long-term overarching goal of the community, having the day-to-day capability of addressing the community needs associated with flooding will continue to be necessary well into the future. The flashy characteristics of the flooding events along Walnut Creek result in the need for as much “warning time” as possible. Additionally, the frequency of the flooding events requires that emergency operations and response plans are unambiguous and continually improved. As the community continues to suffer from repetitive flood events, formalizing damage assessment and reconstruction processes is a growing need. Actions that enhance the City’s existing capabilities to respond to and recover from the growing risks of Walnut Creek flooding are of paramount importance.

- Enhance Walnut Creek Early Warning System (Updated 28-E)
- Enhance Flood Prediction Modeling/Capabilities (IFC and NWS)
- Expand Annual Flood Preparedness Simulations to Dam Failure/Regional Response Events
- Formalize Substantial Damage Program

**Structural Projects:** A number of structural flood control activities have been previously evaluated for the University Boulevard neighborhood area, however, none of the efforts have addressed all of the community needs for the long term. Depending on the ultimate disposition of the buyout program, some structural solutions may be necessary and cost-benefitted, however, those are not currently the priority for the University Boulevard neighborhood.

Although the SilverJackets studies paint a clear picture that the City of Clive is not going to be able to meaningfully address the source of flooding within its boundary (or solely within its financial capacity), there may be opportunities to reduce the frequency/severity of the future flood conditions through upstream watershed improvements. Continuing to partner with the communities in the Walnut Creek Watershed Management Authority to further explore the regional benefits of headwater improvements has been determined to be a worthwhile long-term use of the City’s resources.

- University Boulevard Levy/Floodwall



## 4: MITIGATION STRATEGY

- Reconstruction of Railroad Bridge
- Reconstruction of NW 86<sup>th</sup> Street Bridge
- Reconstruction of Greenbelt Trail Bridges
- Walnut Creek Stream Channel Improvements
- Regional Walnut Creek Detention Basins/Reservoirs

**Public Information:** As stated above, the City of Clive is well aware that it can not “solve” the flooding impacts in the community. Private property owners will need to be continually engaged from both the prevention as well as the preparation lenses. Property owners must have access to all of the actional information that will allow them to make informed decisions about their property and their financial investments. With the current and growing flood risks and the nature of transitional property ownership, continual public education will be necessary to ensure that residents are able to protect themselves when flood events do occur.

- Creation of Formal Program for Public Information Committee/Plan (CRS 330)
- Enhanced Floodplain Mapping/Property Information Service
- Regionalize Public Education/Outreach (countywide approach)

Based on a discussion of the merits/benefits of the various actions and preliminary evaluation of the relative capital, social and political costs, the City of Clive planning team narrowed the list of possible actions down to those that were perceived to be viable for implementation within the next 10-years.

The 2024 Mitigation Action List identifies a range of cost effective actions that the City of Clive and County believe are capable of addressing both current and future risks. The list includes clarity around who is responsible for implementation, the expected time frame for completion, and how it will be funded.

Although the 2024 Mitigation Action List is generally not “prioritized”, the City of Clive projects have been prioritized by the City’s planning committee and validated during the June community engagement (1 is highest priority, 31 is lowest priority).

1. Update Flood Response and Recovery Plan
2. University Blvd Neighborhood Flood Mitigation Planning and Implementation
3. Walnut Creek Floodplain Acquisitions
4. North Walnut Creek Floodplain Acquisitions
5. Floodplain Vegetation Management Planning and Implementation
6. Update City Technology Plan (Cyber Security)

## 4: MITIGATION STRATEGY

7. Relocate University Blvd Water Pump Station (critical facility)
8. Indian Hills Neighborhood Flood Mitigation Planning and Implementation
9. Update Floodplain Development Regulations
10. Enhance Communications (public education and warning)
11. Walnut Creek Watershed Streambank/Buffers/Wetlands/SW/Flood Control Improvements
12. Sub-watershed Stormwater/Flooding Planning and Implementation
13. Mitigate Flooding Threat to Public Works Facility (critical facility)
14. Relocate Porter Shelter
15. Flood Insurance Coverage Planning and Implementation
16. Natural Floodplain Function Planning and Implementation
17. Obtain CRS Class 4 Status
18. Mitigate Flooding Threat to Aquatic Center
19. Stormwater Detention Basin Maintenance Planning and Implementation
20. Reconstruct Greenbelt Trail Bridges
21. Update Building Codes
22. Drainage System Maintenance Planning and Implementation
23. Regional Stormwater Management Facilities (modifications)
24. North Raccoon River Watershed Streambank/Buffers/Wetlands/SW/Flood Control Improvements
25. Building Energy Efficiency Planning and Implementation (public response facilities)
26. Install/Replace Backup Generators
27. Forestry Management Planning and Implementation
28. Backflow Prevention Planning and Implementation (sewer drains)
29. Swanson Boulevard Flapgates
30. Reconstruct NW 86<sup>th</sup> Street Bridge
31. Reconstruct Railroad Bridge (7800 Block of University Boulevard)

# Chapter 5:

## Plan Maintenance Process



# CHAPTER 5: PLAN MAINTENANCE PROCESS

This chapter provides an overview of the overall strategy for plan maintenance and outlines the method and schedule for monitoring, updating and evaluating the plan. The chapter also discusses incorporating the plan into existing planning mechanisms and how to address continued public involvement.

## 5.1. MONITORING, EVALUATING, AND UPDATING THE PLAN

With adoption of this plan, the HMPC will be tasked with plan monitoring, evaluation and maintenance. The participating jurisdictions and agencies, led by the Polk County Emergency Management Director, agree to:

- Meet annually, and after a disaster event, to monitor and evaluate the implementation of the plan and its mitigation actions, including documenting any progress made towards each action every year;
- Act as a forum for hazard mitigation issues;
- Disseminate hazard mitigation ideas and activities to all participants;
- Pursue the implementation of high priority, low- or no-cost recommended actions;
- Maintain vigilant monitoring of multi-objective, cost-share, and other funding opportunities to help the community implement the plan's recommended actions for which no current funding exists;
- Monitor and assist in implementation and update of this plan;
- Keep the concept of mitigation in the forefront of community decision making by identifying plan recommendations when other community goals, plans, and activities overlap, influence, or directly affect community vulnerability to disasters;
- Report on progress made towards implementation of specific mitigation actions;
- Report on plan progress and recommended changes to the Polk County Board of Supervisors and governing bodies of participating jurisdictions; and
- Inform and solicit input from the public.

The HMPC agrees to meet annually and after a state or federally declared hazard event as appropriate to monitor progress and update the mitigation strategy. To this effect, plan maintenance should monitor implementation, review progress and recommend revisions to the plan during an annual review of the plan and documented through an evaluation report. The annual evaluation report will be submitted to the local governing bodies, released to the media and made available to the public. The

Polk County Emergency Management Director will be responsible for initiating the plan reviews and will invite members of the HMPC to the meeting.

The HMPC is an advisory body and can only make recommendations to county, city, town, or district elected officials. Its primary duty is to see the plan successfully carried out and to report to the community governing boards and the public on the status of plan implementation and mitigation opportunities. Other duties include reviewing and promoting mitigation proposals, hearing stakeholder concerns about hazard mitigation, passing concerns on to appropriate entities, and posting relevant information in areas accessible to the public.

### 5.1.1 PLAN EVALUATION

The annual evaluation of the plan's progress will also include an evaluation of its effectiveness, which will 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).

In order to best evaluate any changes in vulnerability as a result of plan implementation, 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 on an annual basis to the jurisdictional HMPC member on action status and providing input on whether the action as implemented 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.

Interim changes can 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 as "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. Interim formal updates of the publicly-posted plan document may take place via written changes and submissions, as the Polk County HMPC deems appropriate and necessary, and as approved by the Polk County Emergency Management Commission and the governing boards of the other participating jurisdictions. However, individual participating communities can make changes to their own mitigation action lists between formal updates without the need for approval of the Emergency Management Commission.

### 5.1.2 PLAN UPDATE

In coordination with the other participating jurisdictions, a five-year written update of the plan will be submitted to the Iowa Homeland Security and Emergency Management Division and FEMA Region VII per Requirement §201.6(c)(4)(i) of the Disaster Mitigation Act of 2000, unless disaster or other circumstances (e.g., changing regulations) require a change to this schedule. The HMPC will follow the same process for the 2029 plan update as was used for the 2024 plan. The next plan update will:

- Be supported by the HMPC;
- 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.

### 5.2. INCORPORATION INTO EXISTING PLANNING MECHANISMS

Where possible, plan participants will use existing plans and/or programs to implement hazard mitigation actions. Based on the capability assessments of the participating jurisdictions, communities in Polk County will continue to plan and implement programs to reduce losses to life and property from hazards. Representatives of jurisdictions involved in the development of this plan will work to integrate the ideas, information, and strategies of the plan into other planning mechanisms relevant to their respective communities. This plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing actions, where possible, through the following plans:

- General or master plans of participating jurisdictions;
- Ordinances of participating jurisdictions;
- Polk County Emergency Operations Plan;
- Capital improvement plans and budgets;
- Other community plans within the County, such as water conservation plans, stormwater management plans, and parks and recreation plans;
- School Plans; and
- Other plans and policies outlined in the capability assessment sections for each jurisdiction in Chapter 2 of this plan.



Polk County communities have already demonstrated a willingness to incorporate mitigation actions set forth in hazard mitigation plans. Following the approval of the 2018 Polk County Hazard Mitigation Plan, the mitigation actions set forth in that plan were considered in the creation and implementation of various planning mechanisms including:

- Windsor Heights Flood Reduction and Resiliency Plan (2019)
- Fourmile Creek Water Management Authority Master Plan (drafted 2010, updated 2017, currently being implemented)
- City of Des Moines Climate Action and Adaptation Plan (2023)
- City of Grimes Comprehensive Plan (2018 Update)
- City of Urbandale Comprehensive Plan (2023)

Every participating jurisdiction will be responsible for integrating the findings and actions of the mitigation plan, as appropriate, into all relevant local plans. The HMPC is also responsible for monitoring this integration and incorporating the appropriate information into the five-year update of the multi-jurisdictional hazard mitigation plan, which will be reviewed and discussed in the annual status review meeting.

Additionally, after the annual review of the Hazard Mitigation Plan, the Polk County Emergency Management Director will provide the updated Mitigation Strategy with current status of each mitigation action to the County Commission as well as all Mayors, City Clerks, and School District Superintendents requesting that the mitigation strategy be incorporated, where appropriate in other planning mechanisms.

### 5.3. CONTINUED PUBLIC INVOLVEMENT

The update process provides an opportunity to publicize success stories from the plan's implementation and seek additional public comment. Information about the annual reviews will be posted in the Des Moines Register, and on the County website following each annual review of the mitigation plan. When the HMPC reconvenes for the update, it will coordinate with all stakeholders participating in the planning process, including those who joined the HMPC after the initial effort, to update and revise the plan. Public notice will be posted and public participation will be invited, at a minimum, through available website postings and press releases to local media outlets, primarily newspapers.





## 2018 Progress

| Action ID   | Mitigation Project/Activity Description                                                                                                                                                                                   | Action Status<br>(Continuing or Deleted) | Notes and Status Updates                                                                                                                        |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Bondurant 1 | Update tornado warning systems                                                                                                                                                                                            | Continuing                               | Ongoing                                                                                                                                         |
| Bondurant 2 | Generator at Public Safety Building (101 Grant St S)                                                                                                                                                                      | Completed                                | This facility will become a Community Center and be available for heating/cooling with the construction of the new Emergency Services Facility. |
| Bondurant 3 | NW 2nd St. Culvert Expansion                                                                                                                                                                                              | Completed                                | Completed                                                                                                                                       |
| Bondurant 4 | 15th St. SW Bridge Replacement                                                                                                                                                                                            | Deleted                                  | The bridge has been removed.                                                                                                                    |
| Bondurant 5 | Mud Creek Channel Restoration                                                                                                                                                                                             | Deleted                                  | The creek channel south of 2nd Street NW has been restored (straightened).                                                                      |
| Bondurant 6 | Mud Creek Regional Detention Facility/Grant St. South Relocation                                                                                                                                                          | Continuing                               | This project is in design.                                                                                                                      |
| Bondurant 7 | Continue to comply with the NFIP by enforcing floodplain management ordinance, including regulating/monitoring new construction and substantial improvements; and participating in floodplain identification and mapping. | Continuing                               | Ongoing                                                                                                                                         |

| Action ID           | Mitigation Project/Activity Description                                                                                                                                                                                   | Hazards Addressed                                               | Impacts Existing or New Structures | Responsible Agency or Entity    | Potential Funding Sources                             | Expected Time Frame for Completion | Project Type                       | Action Status (New or Continuing) | Goal # | Priority (H, M, L) |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------|---------------------------------|-------------------------------------------------------|------------------------------------|------------------------------------|-----------------------------------|--------|--------------------|
| <b>Bondurant 1</b>  | Update tornado warning systems                                                                                                                                                                                            | Tornado/Windstorm                                               | Both                               | Emergency Services              | FEMA/HMA Grants                                       | Short-Term                         | Hazard Mitigation                  | Continuing                        | 1      | High               |
| <b>Bondurant 2</b>  | Generator at Public Safety Building (Civic Campus)                                                                                                                                                                        | Windstorms/Rolling Power Outages                                | New                                | Emergency Services              | FEMA/HMA Grants                                       | Short-Term                         | Hazard Mitigation                  | Continuing                        | 4      | Medium             |
| <b>Bondurant 3</b>  | Generator at Bondurant Municipal Water Works Building                                                                                                                                                                     | Windstorms/Rolling Power Outages                                | New                                | Public Works                    | FEMA/HMA Grants                                       | Medium-Term                        | Hazard Mitigation                  | New                               | 4      | Medium             |
| <b>Bondurant 4</b>  | Harden Facility at Bondurant Municipal Water Works Building                                                                                                                                                               | Windstorms/Rolling Power Outages                                | New                                | Public Works                    | FEMA/HMA Grants                                       | Medium-Term                        | Hazard Mitigation                  | New                               | 4      | Medium             |
| <b>Bondurant 5</b>  | Upper Mud Creek Regional Detention                                                                                                                                                                                        | Flooding/Regional Water Quality/Flash Flooding                  | New                                | Public Works                    | FEMA/HMA Grants                                       | Long-Term                          | Hazard Mitigation                  | New                               | 4      | Medium             |
| <b>Bondurant 6</b>  | Mud Creek Regional Detention Facility/Grant St. South Relocation                                                                                                                                                          | Flooding/Regional Water Quality                                 | New                                | Emergency Services/Public Works | FEMA/HMA Grants                                       | Medium-term                        | Hazard Mitigation                  | Continuing                        | 4      | Medium             |
| <b>Bondurant 7</b>  | Continue to comply with the NFIP by enforcing floodplain management ordinance, including regulating/monitoring new construction and substantial improvements; and participating in floodplain identification and mapping. | River Flooding                                                  | Existing and New                   | Emergency Services              | General Operating Budget; Stormwater Utility Funds    | Long-Term                          | NFIP floodplain Management Program | Continuing                        | 2      | High               |
| <b>Bondurant 8</b>  | Treatment and removal of ash trees in response to onset of Emerald Ash Borer (EAB)                                                                                                                                        | Animal/Crop/Plan Disease                                        | Existing                           | Public Works                    | Tree Fund/Grants                                      | Medium-Term                        | Natural Systems Protection         | Continuing                        | 2      | High               |
| <b>Bondurant 9</b>  | Upgrade Emergency Power for Bondurant Recreational Sports Complex Storm Shelter                                                                                                                                           | Tornado/Windstorm                                               | Existing                           | Public Works                    | FEMA/HMA Grants                                       | Medium-Term                        | Hazard Mitigation                  | New                               | 4      | High               |
| <b>Bondurant 10</b> | Construct 10th Street Extension to facilitate alternate route for Emergency Vehicles                                                                                                                                      | All                                                             | New                                | Emergency Services/Public Works | FEMA/HMA Grants/Road Use Tax/TIF/Any applicable grant | Long-Term                          | Hazard Mitigation                  | New                               | 4      | High               |
| <b>Bondurant 11</b> | Construct 16th Street from HWY 65 to Franklin/64th Street to facilitate alternate route for Emergency Vehicles                                                                                                            | All                                                             | New                                | Emergency Services/Public Works | FEMA/HMA Grants/Road Use Tax/TIF/Any applicable grant | Long-Term                          | Hazard Mitigation                  | New                               | 4      | High               |
| <b>Bondurant 12</b> | Relocate Public Works to sturdier and secure structure to protect essential equipment from severe storm events                                                                                                            | Tornado/Windstorm/Winter storm/Thunderstorm with lightning/hail | New                                | Public Works                    | FEMA/HMA Grants/Road Use Tax/TIF/Any applicable grant | Long-Term                          | Hazard Mitigation                  | New                               | 4      | High               |
| <b>Bondurant 13</b> | Cleanup of Environmental Hazard Adjacent to Mud Creek                                                                                                                                                                     | Water quality/Flooding                                          | New                                | City Administrator's Office     | FEMA/HMA Grants/TIF/Any applicable grant              | Long-Term                          | Hazard Mitigation                  | New                               | 4      | Low                |
| <b>Bondurant 14</b> | Mud Creek Channel Restoration (North of 2nd Street NW)                                                                                                                                                                    | Flooding/Regional Water Quality/Flash Flooding                  | New                                | Public Works                    | FEMA/HMA Grants                                       | Medium-Term                        | Hazard Mitigation                  | New                               | 4      | Medium             |

**High Priority (High):** o Saves lives, and either reduces property damage or reduces the need for response actions

**Medium Priority (Medium):** o Saves lives, but does not reduce property damage or the need for response actions, **OR**  
o Does not save lives, but reduces property damage *and* reduces the need for response actions

Ⓜ **Low Priority (Low):** Achieves only *one* of the following

- o Reduce property damage
- o Reduce the need for response actions



**BUSINESS OF THE CITY COUNCIL  
BONDURANT, IOWA  
AGENDA STATEMENT**

Item No. 7.a.  
For Meeting of 2/18/2025  
**Ordinance**

**TITLE:** - (Second Reading) Discussion of Cemetery Plot Prices and possible consideration of one or more readings of Ordinance Amending Chapter 115 - Cemetery to Remove Plot Prices and Establish a Fee Schedule

**CONTACT PERSON:**

Jene Jess, Finance Director  
Katie Klus, Communication & Events Coordinator

**BRIEF HISTORY & ANALYSIS: Summary and Detail:**

The City's current pricing structure for cemetery plots is \$1,400 for a two-plot arrangement for residents and \$2,800 for a two-plot arrangement for non-residents. This pricing is insufficient to establish a perpetual care fund capable of sustaining the ongoing estimated maintenance and mowing costs of the cemetery. Fully funding the perpetual care fund is important and is even more critical in the wake of state legislative actions that have affected the City's general fund by nearly 15%. Previously, the City has funded the difference between the investment in maintenance and the interest produced by the perpetual fund (which is the revenue that is supposed to underwrite the maintenance activities) with General Fund dollars. However, given recent legislation that limits general fund collections, the City cannot continue to rely on current property tax payments to maintain the private property of the deceased. Even with the recommended price adjustments, the maintenance will still need to be supported by the General Fund for several years until all of the plots are sold; however, if no change is made, the burden to care for the private plots will always remain with the taxpayers.

Financial analysis estimates that an annual interest income of \$20,000 is needed to cover these recurring expenses. To generate this estimated annual income, the perpetual care fund must maintain an estimated principal of \$666,667, based on a 3% APR. To achieve this goal, total revenue from plot sales needs to reach approximately \$700,000, ensuring adequate funding over time.

With 478 plots available, the recommended pricing per plot is calculated as follows:

- **Estimated Principal Needed:** \$700,000
- **Number of Plots:** 478
- **Recommended Price Per Plot for Residents:** \$1,464.44

- **Recommended Price Per Plot for Non-Residents: \$2,928.88**

Staff recommend adjusting the pricing for single plots as follows:

1. Resident single plots at \$1,464.44
2. Non-resident single plots at \$2,928.88

Additionally, staff recommend implementing an annual price increase for both resident and non-resident plots based on the Midwest Consumer Price Index (CPI), as outlined in the Iowa League of Cities Special Budget Report. This adjustment will ensure the fund's purchasing power is maintained and will secure resources for perpetual maintenance.

By adopting this pricing structure and CPI-based adjustment, the City will position the cemetery's perpetual care fund to generate sufficient interest income to cover mowing and maintenance costs. This approach aligns with the City's commitment to long-term financial sustainability and service planning while reflecting the value of these essential services.

**Recommendation:** Approve the proposed pricing adjustment for cemetery plots to \$1,464.44 per single plot for residents and \$2,928.88 per single plot for non-residents, with an annual increase tied to the Midwest CPI, as indicated in the Iowa League of Cities Special Budget Report.

**Ordinance:** The attached ordinance amends Chapter 115 of the City Code to enhance the flexibility and transparency of cemetery fee management. The ordinance removes specific cemetery plot prices from the code and authorizes the City Council to establish and update fees through a flexible fee schedule. This change allows adjustments to reflect operational costs, market trends, and community needs while ensuring the fee schedule is publicly accessible at City Hall and on the city's website. The schedule would be able to be reviewed and updated annually or as necessary to maintain alignment with the city's requirements. Several other metro communities use this approach to cemetery management, and from discussions, have found this to be very beneficial and efficient to the annual financial operation of the cemetery.

There is a resolution later on this agenda that establishes the fee schedule.

---

The **first reading was approved on February 3**, and this is now the **second reading** for further consideration and approval.

**FUNDING SOURCE:** This is a revenue source to support ongoing operations of the cemetery.

**STAFF RECOMMENDATION:** Approve ordinance on a roll call vote.

**APPROVED FOR SUBMITTAL:**

**ATTACHMENTS:**

1. ORDINANCE NO. 250203-203



CITY OF BONDURANT  
ORDINANCE NO. 250203-203

ORDINANCE AMENDING THE CITY CODE OF THE CITY OF BONDURANT, IOWA,  
BY AMENDING CHAPTER 115 – CEMETERY TO REMOVE PLOT PRICES AND  
ESTABLISH A FEE SCHEDULE

**BE IT ENACTED** by the City Council of the City of Bondurant, Polk County, Iowa:

Section 1. **PURPOSE.** The purpose of this ordinance is to amend Chapter 115: Cemetery of the City Code to remove specific cemetery plot prices from the ordinance and instead authorize the City Council to establish and update plot prices and other cemetery-related fees by resolution. This change will allow for greater flexibility and efficiency in managing fees to reflect operational costs, market conditions, and community needs.

Section 2. **FINDINGS.** The City Council of the City of Bondurant hereby makes the following findings:

1. Operational Flexibility: The removal of specific plot prices from the ordinance and the establishment of a fee schedule by resolution will provide the City with the flexibility to adapt cemetery-related fees to reflect actual operational costs, market trends, and community needs.
2. Efficiency in Updates: Authorizing fees to be adjusted via resolution rather than ordinance amendments ensures that updates can be made efficiently, minimizing administrative burdens and allowing for timely responses to changing circumstances.
3. Transparency and Accessibility: The ordinance ensures that the current fee schedule will be made publicly available at City Hall and on the City's official website, promoting transparency and ease of access for residents.

Section 3. **HEREBY AMENDED.** Chapter 115 of the Bondurant City Code is amended to read as follows:

1. 115.12 PLOT PRICES. ~~The purchase price for interment rights in a plot at the Bondurant Perpetual Cemetery (two spaces per plot) is \$1,400 if purchased by and for a resident of the City of Bondurant, Iowa, Polk County and \$2,800 if purchased by and for a non-resident of the City of Bondurant, Iowa, Polk County.~~ The prices for cemetery plots and any related fees shall be established by a fee schedule adopted by resolution of the City Council. The fee schedule shall be reviewed annually and amended as necessary by resolution. A copy of the current fee schedule shall be made available to the public at City Hall and on the City's official website.

Section 4. **REPEALER.** All ordinances or parts of ordinances in conflict with the provisions of this ordinance are hereby repealed.

Section 5. **SEVERABILITY.** If any section, provisions, sentence, clause, phrase or part of this ordinance shall be adjudicated, invalid or unconstitutional, such adjudication shall not affect the validity of the ordinance as a whole or any provision, section, subsection, sentence clause, phrase or part thereof not adjudged invalid or unconstitutional.

Section 6. **EFFECTIVE DATE.** This ordinance shall be in full force and effect following its passage, adoption, and publication as required by law.

**PASSED AND APPROVED** by the City Council this 3rd day of February 2025.

CITY OF BONDURANT, POLK COUNTY, IOWA

---

DOUG ELROD, MAYOR

ATTEST:

---

SHELBY HAGAN, CITY CLERK

(SEAL)

FIRST CONSIDERATION: February 3, 2025

SECOND CONSIDERATION:

THIRD CONSIDERATION:

### **CLERK'S CERTIFICATE**

I, Shelby Hagan, hereby certify that the foregoing Ordinance No. 240203-203, was published as required by law on the XX day of February 2025.

---

Shelby Hagan  
City Clerk



**BUSINESS OF THE CITY COUNCIL  
BONDURANT, IOWA  
AGENDA STATEMENT**

Item No. 7.b.  
For Meeting of 2/18/2025  
**Resolution**

**TITLE:** - Resolution Adopting a Cemetery Fee Schedule (Tabled from February 3, 2025 City Council Meeting)

**CONTACT PERSON:**

Jene Jess, Finance Director  
Katie Klus, Communication & Events Coordinator  
Marketa Oliver, ICMA-CM, SPHR, City Administrator

**BRIEF HISTORY & ANALYSIS:** As discussed earlier on this agenda, the City's current pricing structure for cemetery plots is \$1,400 for a two-plot arrangement for residents and \$2,800 for a two-plot arrangement for non-residents. This pricing is insufficient to establish a perpetual care fund capable of sustaining the ongoing estimated maintenance and mowing costs of the cemetery. Fully funding the perpetual care fund is important and is even more critical in the wake of state legislative actions that have affected the City's general fund by nearly 15%. Previously, the City has funded the difference between the investment in maintenance and the interest produced by the perpetual fund (which is the revenue that is supposed to underwrite the maintenance activities) with General Fund dollars. However, given recent legislation that limits general fund collections, the City cannot continue to rely on current property tax payments to maintain the private property of the deceased. Even with the recommended price adjustments, the maintenance will still need to be supported by the General Fund for several years until all of the plots are sold; however, if no change is made, the burden to care for the private plots will always remain with the taxpayers.

Financial analysis estimates that an annual interest income of \$20,000 is needed to cover these recurring expenses. To generate this estimated annual income, the perpetual care fund must maintain an estimated principal of \$666,667, based on a 3% APR. To achieve this goal, total revenue from plot sales needs to reach approximately \$700,000, ensuring adequate funding over time.

With 478 plots available, the recommended pricing per plot is calculated as follows:

- **Estimated Principal Needed:** \$700,000
- **Number of Plots:** 478
- **Recommended Price Per Plot for Residents:** \$1,464.44

- **Recommended Price Per Plot for Non-Residents: \$2,928.88**

Staff recommend adjusting the pricing for single plots as follows:

1. Resident single plots at \$1,464.44
2. Non-resident single plots at \$2,928.88

Additionally, staff recommend implementing an annual price increase for both resident and non-resident plots based on the Midwest Consumer Price Index (CPI), as outlined in the Iowa League of Cities Special Budget Report. This adjustment will ensure the fund's purchasing power is maintained and will secure resources for perpetual maintenance.

By adopting this pricing structure and CPI-based adjustment, the City will position the cemetery's perpetual care fund to generate sufficient interest income to cover mowing and maintenance costs. This approach aligns with the City's commitment to long-term financial sustainability and service planning while reflecting the value of these essential services.

The attached resolution adjusts cemetery plots to \$1,464.44 per single plot for residents and \$2,928.88 per single plot for non-residents, with an annual increase tied to the Midwest CPI, as indicated in the Iowa League of Cities Special Budget Report. The resolution would go into effect April 1, 2025, giving time to create awareness about the price adjustment.

---

This item was **tabled** at the **February 3, 2025** meeting because the **City Council only passed the first reading** of the corresponding ordinance. As the ordinance must go through additional readings before final adoption, this resolution is being brought back for further consideration.

**FUNDING SOURCE:** This is a revenue source that will support the perpetual care cemetery.

**STAFF RECOMMENDATION:** Approve resolution on a roll call vote after the third and final reading of Ordinance No. 250203-203.

**APPROVED FOR SUBMITTAL:**

**ATTACHMENTS:**

1. RESOLUTION NO. 250203-39

CITY OF BONDURANT  
RESOLUTION NO. 250203-39

RESOLUTION ADOPTING A CEMETERY FEE SCHEDULE

**WHEREAS** the City of Bondurant recognizes the importance of maintaining adequate funding for the perpetual care of the cemetery to ensure proper maintenance, mowing, and long-term sustainability; AND

**WHEREAS** the current pricing structure for cemetery plots is insufficient to establish a perpetual care fund capable of sustaining ongoing maintenance costs; AND

**WHEREAS** financial analysis has determined that an annual interest income of \$20,000 is necessary to cover recurring expenses, requiring the perpetual care fund to maintain an estimated principal of \$700,000; AND

**WHEREAS** based on the availability of 478 plots, the following pricing adjustments have been calculated to meet the perpetual care fund requirements:

- Resident Single Plots: \$1,464.44
- Non-Resident Single Plots: \$2,928.88

**WHEREAS** an annual pricing adjustment tied to the Midwest Consumer Price Index (CPI), as outlined in the Iowa League of Cities Special Budget Report, is recommended to ensure the perpetual care fund maintains purchasing power and meets future financial needs;

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Bondurant, Iowa, that:

1. Adoption of Fee Schedule

The cemetery fee schedule is hereby adopted as follows:

- Resident single plots: \$1,464.44
- Non-resident single plots: \$2,928.88

2. Annual CPI Adjustment

Plot prices shall be adjusted annually based on the Midwest Consumer Price Index (CPI) to ensure the fund maintains adequate purchasing power for perpetual care needs.

3. Transparency and Availability

The adopted fee schedule shall be made publicly available at Bondurant City Hall and on the City's official website.

4. Effective Date

This resolution shall take effect as of April 1, 2025.

Passed and adopted this 3<sup>rd</sup> day of February 2025,

---

Doug Elrod, Mayor

ATTEST: I, Shelby Hagan, City Clerk of Bondurant, hereby certify that at a meeting of the City Council held on the above date, among other proceedings the above was adopted.

IN WITNESS WHEREOF, I have hereunto set my hand the day and year above written.

---

Shelby Hagan, City Clerk

| Council Action | Ayes | Nays | Abstain | Absent |
|----------------|------|------|---------|--------|
| Cox            |      |      |         |        |
| Driscoll       |      |      |         |        |
| McKenzie       |      |      |         |        |
| Peffer         |      |      |         |        |
| Sillanpaa      |      |      |         |        |