MIDWEST CITY COUNCIL

AGENDA FOR

NOVEMBER 12, 2019

The 6:00 PM meetings will be shown live on Channel 20 and streamed live on the City of Midwest City - Government YouTube page.

The recorded video will be available on YouTube and the City's website within 48 hours: Bit.ly/youtubemwc.

The meeting minutes and video can be found on the City's website in the Agenda Center: https://midwestcityok.org/AgendaCenter.

To make a special assistance request, call 739-1213 or email bbundy@midwestcityok.org no less than 24 hours prior to the start of a meeting. If special assistance is needed during a meeting, call 739-1388.

The Council will go directly into the City meetings down in the Council Chambers of City Hall at 6:00 PM. However, they will informally gather at or after 5:00 PM in the second floor conference room for dinner, but no City Council business will be discussed or acted upon and the room will be open to the public. Meals will only be provided to the City Council and staff.

CITY OF MIDWEST CITY COUNCIL AGENDA

City Hall - Midwest City Council Chambers, 100 N. Midwest Boulevard

November 12, 2019 – 6:00 PM

A. CALL TO ORDER.

B. OPENING BUSINESS.

- Invocation by Assistant City Manager Vaughn Sullivan
- Pledge of Allegiance by Carl Albert Jr. ROTC Cadets Lair and West Barkema
- Community-related announcements and comments

C. CONSENT AGENDA. These items are placed on the Consent Agenda so the Council, by unanimous consent, can approve routine agenda items by one motion. If any item proposed does not meet with the approval of all Council, or members of the audience wish to discuss an item, it will be removed and heard in a regular order.

1. Discussion and consideration of approving the minutes of the October 22, 2019 meeting. (City Clerk - S. Hancock)

2. Discussion and consideration of 1) approving and entering into the 2020 Safe Oklahoma Grant Program Contract with the Oklahoma Attorney General's Office to establish the terms and conditions under which the City will receive a law enforcement grant in the amount of $45,000; and 2) authorizing the mayor and/or city manager to execute such documents and enter into such agreements as are necessary or appropriate to carry out the objectives of the grant. (Police - B. Clabes)

3. Discussion and consideration of approving and entering into a contract in an amount not to exceed $10,000 for fiscal year 2019/2020 with Jay D. Collins to establish the terms and condition under which he shall serve as the Volunteer Income Tax Assistance Center Coordinator. (Neighborhood Services - M. Stroh)

4. Discussion and consideration of awarding the bid to MagneGrip, DBA Clean Air Concepts, and entering into a contract for purchase and installation of five (5) new Fire Station Exhaust Removal Systems in an amount not to exceed $224,122.00. (Fire – B. Norton)

5. Discussion and consideration of approving a resolution between the City of Midwest City and Oklahoma County for the purpose of adopting a partnership for a Hazard Mitigation Plan where the City of Midwest City will accept the Plan developed by the County as outlined in Section 9 of the Oklahoma County Hazard Mitigation Plan 2019 Update. (Emergency Management - M. Bower)

6. Discussion and consideration of declaring a 2005 GMC truck, equipment #050205, as surplus and authorizing disposal by sealed bid, public auction or other means as necessary. (Community Development - B. Harless)

7. Discussion and consideration of declaring one (1) 2001 Chevrolet S10 Pickup as surplus and authorizing disposal by public auction, sealed bid, destruction, or other means if necessary. (City Clerk - S. Hancock)

D. DISCUSSION ITEMS.

1. Discussion and consideration of approving an ordinance amending the Midwest City Municipal Code, Chapter 21, Human Rights, by amending Article II Fair Housing, Division I Generally; by repealing and reserving Section 21-16, Fair Housing; by amending Section 21-17, Complaints; by repealing and reserving Sections 21-18, Investigation of Complaints, 21-19, Hearings, 21-20, Filing of Charges; by amending Division 2 Discriminatory Practices, Title; by amending Section 21-32, Prohibited Acts; by amending Section 21-33, Exemptions; by repealing and reserving Section 21-34, Violations; and providing for repealer and severability. (Grants Management - T. Craft)

2. Discussion and consideration of passing and approving a resolution and proclamation authorizing the calling and holding of a primary election on February 11, 2020, if necessary, and a general election, if necessary, on April 7, 2020 in wards 2, 4, and 6 of the City of Midwest City, County of Oklahoma, State of Oklahoma, for the purpose of electing Ward 2, 4, and 6 councilmembers; enumerating the qualifications for those offices; and establishing the filing period. (City Clerk - S. Hancock)

3. Discussion and consideration of entering into and approving an Agreement for Professional Services with R.L. Shears in the amount of $241,411.00 to design the expansion of the Mid-America Park. This is a General Bond Obligation project. (Community Development - B. Bundy)

4. Public hearing with discussion and consideration of a resolution declaring the structure located at 1205 Loftin Drive, a dilapidated building as defined in Title 11-22-112(C) 1. Oklahoma State Statutes and setting dates to demolish and remove the structure from the site. (Neighborhood Services - M. Stroh)

5. Discussion and Consideration approving Amendment No. 1 to the construction management contract with CMS Willowbrook, Inc. for the Reed Conference Center 2019 Renovations for additional meeting room space in an amount not to exceed $797,916.35.

E. NEW BUSINESS/PUBLIC DISCUSSION. The purpose of the "Public Discussion Section" of the Agenda is for members of the public to speak to the City Council on any Subject not scheduled on the Regular Agenda. The Council shall make no decision or take any action, except to direct the City Manager to take action, or to schedule the matter for discussion at a later date. Pursuant to the Oklahoma Open Meeting Act, the Council will not engage in any discussion on the matter until that matter has been placed on an agenda for discussion. THOSE ADDRESSING THE COUNCIL ARE REQUESTED TO STATE THEIR NAME AND ADDRESS PRIOR TO SPEAKING TO THE COUNCIL.

F. FURTHER INFORMATION.

1. Minutes of the October 15, 2019 Park Land Review Committee Meeting. (Community Development - K. Gilles)

G. ADJOURNMENT.

MIDWEST CITY

Where the Spirit Flies High

CONSENT AGENDA

Notice for the Midwest City Council meetings was filed for the calendar year with the City Clerk of Midwest City. Public notice of this agenda was accessible at least 24 hours before this meeting at City Hall and on the Midwest City website (www.midwestcityokorg).

Midwest City Council Minutes

October 22, 2019 – 6:00 PM

This meeting was held in the Midwest City Council Chambers at City Hall, 100 N. Midwest Boulevard, Midwest City, County of Oklahoma, State of Oklahoma. Mayor Matt Dukes called the meeting to order at 6:01 PM with the following members present: Councilmembers Pat Byrne, Españiola Bowen, Sean Reed, and Christine Allen with City Clerk Sara Hancock, City Attorney Heather Poole, and City Manager Tim Lyon. Absent: Susan Eads and Jeff Moore.

OPENING BUSINESS. The invocation was given by Glenn Goldschlager, followed by the Pledge of Allegiance led by Midwest City High School Jr. ROTC Cadets Tailor Lewis and Cory Heinrich. Council and Staff made community-related announcements. Mayoral proclamations including Domestic Violence Awareness Month and Extra Mile Day on November 1, 2019. John Reininger, the Midwest City Americans With Disabilities Act Committee, addressed the Council.

CONSENT AGENDA. Reed made a motion to approve the consent agenda, as submitted, seconded by Allen. Voting aye: Byrne, Reed, Bowen, Allen, and Mayor Dukes. Nay: none. Absent: Eads and Moore. Motion carried.

1. Discussion and consideration of approving the minutes of the September 24, 2019 meeting.

2. Discussion and consideration of approving the minutes of the October 8, 2019 meeting.

3. Discussion and consideration of accepting the City Manager's Report for the month of September 2019.

4. Discussion and consideration of supplemental budget adjustments to the following funds for FY 2019-2020, increase: Risk Fund, expenses/Risk Insurance (29) $485,000. Worker's Comp Fund, expenses/Risk Insurance (29) $1,477,000. Grants Fund, revenue/Intergovernmental (62) $45,000; revenue/Transfers In (62) $3,443; expenses/Police (62) $48,443. Police Impound Fees Fund, expenses/Transfers Out (62) $3,443.

5. Discussion and consideration of accepting the monthly report on the City of Midwest City Employees' Health Benefits Plan by the City Manager and action as deemed necessary by the Council to maintain the plan.

6. Discussion and consideration of accepting the Monthly Neighborhood Services report for September 2019.

7. Discussion and consideration approving entering into an agreement with Municode in an amount of $34,500, for a new City website for redesign, hosting and support services.

8. Discussion and consideration of granting permission to Inasmuch Foundation to pay for repairs and upgrades in an amount of $11,032.00 for the City of Midwest City's Centennial Clock at Town Center.

9. Discussion and consideration approving and adopting Resolution 2019-28 selecting H. W. Lochner as the engineer responsible for the annual city bridge inspections for compliance with National Bridge Inspection Standards for the term of April 1, 2020 to March 31, 2022.

10. Discussion and consideration of approving the Tree Board's 2019-20 Landscape Plan.

11. Discussion and consideration of accepting a Temporary Easement for the accessing of property adjacent to 116 West Ridgewood Drive. The easement is located within the corporate limits of the City of Midwest City, located in the Southwest Quarter of Section Thirty-Four (34), Township Eleven (11) North, Range Two (2) West of the Indian Meridian, Oklahoma County, Oklahoma.

12. Discussion and consideration of accepting Grants of Temporary Easements from Brand and Mark Jennings, Triangular Silt Dike Co., Inc., Amalia Z. Segura, Kevin and Dian White, Dale and Patricia A. Stevens, and C&S Property Investments, LLC and a Permanent Easement from C&S Property Investments, LLC across certain parcels of land located within the corporate boundaries of Midwest City in Mappes Addition, Glenwood 5th Addition, and Glenwood 6th Addition of Section Eleven (11), Township Eleven (11) North, Range Two (2) West of the Indian Meridian, Oklahoma County, Oklahoma.

13. Discussion and consideration to approve change order #1 amending the funding agreement for Federal-Aid Project Number STP-155E(919)EH, State Job Number 28817(04), with the Oklahoma Department of Transportation for the construction of the Mid-America Trail, in the amount of $6,589.10.

14. Discussion and consideration to approve the final quantity change order for Federal- Aid Project Number TAP-255D(329)AG. State Job Number 31436(04), with the Oklahoma Department of Transportation for the construction of the 29th Street Trail, no funds required since the change order is being reconciled with escrow account set up for this project.

15. Discussion and consideration of the final quantity change order for Federal-Aid Project Number STPG-255F(336)AG. State Job Number 31475(04), with the Oklahoma Department of Transportation for the construction of the city-wide striping, no funds required since the change order is being reconciled with escrow account set up for this project.

16. Discussion and consideration of an agreement with Schwarz Paving Company for temporary staging of construction equipment at 9100, 9200, and 9300 SE 29th Street, for an approximate term of 12 months, payment for use will be $2,400 in borrow soil and/or crushed concrete.

17. Discussion and consideration of rejecting the bid submitted for the City Hall Boiler Replacement Project, authorize the City Manager to Re-bid the project, and to find that the best interests of the people of the State of Oklahoma and the citizens of the City of Midwest City, would be best served by rejection of all bids.

DISCUSSION ITEMS.

1. **(PC – 2017) Discussion and consideration of approval of the Replat of a part of Lot 5, Block 1 of the Harper Addition, described as a part of the NW/4 of Section 31, T12N, R1W and addressed as 10301 NE 7th Street. No action was taken on this item at the September 24, 2019 meeting.** Perry Kaufman with Lex LLC of 3325 Brush Creek Road and Staff spoke with Council after which Reed made a motion to approve the Replat without the variances waived, seconded by Bowen. Voting aye: Byrne, Bowen, Reed, Allen, and Mayor Dukes. Nay: none. Absent: Eads and Moore. Motion carried.

2. **(PC-2021) Public hearing with discussion and consideration of an ordinance to redistrict from C-3, Community Commercial to SPUD, Simplified Planned Unit Development, governed by the C-3, Community Commercial and C-4, General Commercial districts, subject to staff comments, for the property addressed as 6308 E. Reno Ave.** After applicant Grail Pendarvis of 1108 Howard Drive spoke with the Council, no action was taken.

3. **(PC – 2022) Public hearing with discussion and consideration approving an ordinance to amend the Soldier Creek Industrial Park (SCIP) Planned Unit Development governed by the C-4, General Commercial district and I-2, Moderate Industrial district for the property described as a part of the NE/4 of Section 27, T-12-N, R-2-W, of the Indian Meridian, Oklahoma County, OK.** Staff and Council had discussion after which Allen made a motion to approve Ordinance 3393, as submitted, seconded by Reed. Voting aye: Byrne, Bowen, Reed, Allen, and Mayor Dukes. Nay: none. Absent: Eads and Moore. Motion carried.

4. **(PC – 2023) Public hearing with discussion and consideration of approval of an ordinance redistricting from R-6, Single Family Detached Residential to a Planned Unit Development (PUD) governed by the R-MD, Medium Density Residential District, and of a resolution to amend the comprehensive plan from LDR, Low Density Residential, to MDR, Medium Density Residential, for the property described as a part of the Lots 7-10 of the Thomas Acres Addition.** Applicants Adam Stephens of 9501 S. Lake Dr. and Jim McWhirter of 3201 Wayfield Lake, and Staff spoke with Council after which Allen made a motion to approve Ordinance 3394 and Resolution 2019-29, as submitted, seconded by Byrne. Voting aye: Byrne, Bowen, Allen, and Mayor Dukes. Nay: Reed. Absent: Eads and Moore. Motion carried.

5. **(PC-2024) Discussion and consideration of approval of the Animal Shelter Preliminary Plat for the properties described as a part the SW/4 of Section 35, T12N, R2W, addressed as 8485 E Reno, 2901 Woodside Drive and 2905 Woodside Drive.** Byrne made a motion to approve the Preliminary Plat, as submitted, seconded by Bowen. Voting aye: Byrne, Bowen, Reed, Allen, and Mayor Dukes. Nay: none. Absent: Eads and Moore. Motion carried.

6. **(PC-2026) Public hearing with discussion and consideration of an ordinance amending Appendix A, Zoning Regulations, of the Midwest City Code; by amending Section 5, Supplemental Regulations, Section 5.15 Single-Family Driveways and Garages; Section 5.15.1 Standards for Garages for Single-Family Units; 5.15.1(A) Applicability; providing for repealer and severability; and declaring an emergency.** Reed made a motion to approve Ordinance 3392, as submitted, seconded by Byrne. Voting aye: Byrne, Bowen, Reed, Allen, and Mayor Dukes. Nay: none. Absent: Eads and Moore. Motion carried. Then, Reed made a motion to approve the emergency clause, as submitted, seconded by Byrne. Voting aye: Byrne, Bowen, Reed, Allen, and Mayor Dukes. Nay: none. Absent: Eads and Moore. Motion carried.

7. **(PC – 2027) Discussion and consideration of approval of the final plat of the Kambree Square, Section 1 described as a part of the SW/4 of Section 1, T11N, R2W, located at 9205 SE 15th Street.** Byrne made a motion to approve the final plat, as submitted, seconded by Bowen. Voting aye: Byrne, Bowen, Reed, Allen, and Mayor Dukes. Nay: none. Absent: Eads and Moore. Motion carried.

8. **Public hearing with discussion and consideration of an appeal of the Notice and Order for "tall grass & weeds" and for "inoperative vehicle" filed by the owner of the property located at 325 North Richards Avenue.** No Action Needed.

9. **Discussion and consideration of a Memorandum of Understanding with the City of Choctaw regarding its employment of Mr. J. Guy Henson on a part-time basis to include no economic development work by Mr. Henson for the first three years of that employment.** Bowen made a motion to approve the Memorandum, as submitted, seconded by Reed. Voting aye: Bowen, Reed, Allen, and Mayor Dukes. Nay: Byrne. Absent: Eads and Moore. Motion carried.

10. **Discussion and consideration of approving the minutes of the September 10, 2019 meeting**. Reed made a motion to approve the minutes, as submitted, seconded by Allen. Voting aye: Byrne, Bowen, Reed, Allen, and Mayor Dukes. Nay: none. Absent: Eads and Moore. Motion carried.

NEW BUSINESS/PUBLIC DISCUSSION.

At 7:46 PM, Reed made a motion to recess, seconded by Allen. Voting aye: Byrne, Bowen, Reed, Allen, and Mayor Dukes. Nay: none. Absent: Eads and Moore. Motion carried. Mayor Dukes called the meeting back to order at 7:49 PM.

EXECUTIVE SESSION.

1. **Discussion and consideration of entering into executive session as allowed under Title 25 SS 307(B)(1) to discuss the employment, hiring, appointment, promotion, demotion, disciplining or resignation of any individual salaried public officer or employee.** Item not needed.

2. **Discussion and consideration of entering into executive session as allowed under Title 25 SS 307(B)(4) for the purpose of discussion of confidential communications between a public body and its attorney concerning a pending investigation, claim, or action.**

   At 7:56 PM, Reed made a motion to go into executive session, seconded by Allen. Voting aye: Byrne, Bowen, Reed, Allen, and Mayor Dukes. Nay: none. Absent: Eads and Moore. Motion carried.

   At 8:18 PM, Reed made a motion to return to open session, seconded by Allen. Voting aye: Byrne, Bowen, Reed, Allen, and Mayor Dukes. Nay: none. Absent: Eads and Moore. Motion carried. Byrne then made a motion to authorize the City Manager and Staff to proceed as discussed in executive session, seconded by Reed. Voting aye: Byrne, Bowen, Reed, Allen, and Mayor Dukes. Nay: none. Absent: Eads and Moore. Motion carried.

ADJOURNMENT.

There being no further business, Mayor Dukes adjourned the meeting at 8:18 PM.

_____
MATTHEW D. DUKES II, Mayor

ATTEST:

_____
SARA HANCOCK, City Clerk

City of Midwest City Police Department
100 N. Midwest Boulevard
Midwest City, OK 73110
Office 405.739.1320
Fax 405.739.1398

Memorandum

TO: Honorable Mayor and Council

FROM: Brandon Clabes, Chief of Police

DATE: November 12, 2019

SUBJECT: Discussion and consideration of 1) approving and entering into the 2020 Safe Oklahoma Grant Program Contract with the Oklahoma Attorney General's Office to establish the terms and conditions under which the City will receive a law enforcement grant in the amount of $45,000; and 2) authorizing the mayor and/or city manager to execute such documents and enter into such agreements as are necessary or appropriate to carry out the objectives of the grant.

The Midwest City Police Department requests that you enter into an agreement with the Oklahoma Attorney General's Office for the Law Enforcement Grant 2020 Safe Oklahoma Grant in the amount of $45,000.00. Safe Oklahoma Grant funds would be used to reestablish overtime emphasis in high crime areas in Midwest City using GIS technology to reduce escalating violent crime. The grant funds will directly target crime hot spots and increase the number of patrols in those areas. The new crime prevention tactics will use data-driven techniques to help reduce the number of violent crimes in Oklahoma. Grant contract period is for one year.

Staff recommends approval.

Brandon Clabes
Chief of Police

Attachment: Contract

THE OFFICE OF ATTORNEY GENERAL
2020 SAFE OKLAHOMA GRANT PROGRAM CONTRACT

This agreement is made between the Office of Attorney General (OAG) and the City of Midwest City (Recipient). OAG agrees to provide funding to Recipient for the purposes provided in Appendix A of this contract and in accordance with the terms and conditions provided in this contract. Recipient agrees to carry out the purposes for funding provided in Appendix A timely and in good faith and to abide by all terms and conditions of this contract.

1. AMOUNT AND PURPOSE OF FUNDS

    a. OAG is providing $45,000.00 to Recipient for overtime funds to target violent crime. The terms of use for the funds are more fully described in Appendix A.

2. AVAILABILITY OF FUNDS

    a. Payment pursuant to this contract is to be made only from monies appropriated to the Office of Attorney General (OAG) by the Oklahoma Legislature for the Safe Oklahoma Grant Program established in Title 74, Section 20k of Oklahoma Statutes. Notwithstanding any other provisions, payments to the Recipient by OAG are contingent upon sufficient appropriations being made by the Oklahoma Legislature. We may terminate our obligation under this contract if sufficient appropriations are not made available by the Legislature. OAG may take any action necessary in accord with such determination.

3. TERM OF CONTRACT

    a. The term of this contract shall expire twelve (12) months from **the date of receipt of funds** unless otherwise agreed in Appendix A or an extension is granted by OAG in writing. The date of receipt of funds by Recipient shall be used as a time reference date for purposes of reporting.

    b. If the funds are not fully spent by the expiration of this contract, Recipient shall return all unencumbered funds to OAG, unless an extension is granted by OAG in writing.

4. MODIFICATION AMENDMENT

a. This contract is subject to such modification as may be required by law or regulation. Any such modification may be done unilaterally by OAG.

b. Revisions to the contract and any attachment in Appendix A, which is part of this contract, must be approved in writing in advance by OAG.

c. A waiver by OAG to any provision in this contract must be signed and in writing by OAG.

5. OAG PERFORMANCE

a. In accordance with the terms of this contract, the OAG will provide funding for the project up to the total amount detailed in Appendix A. **Funding will be dispersed only upon receipt of an invoice received by OAG from Recipient for the full amount of the awarded funds.**

6. RECIPIENT PERFORMANCE

a. Recipient agrees to perform those duties, obligations and representations contained in this contract and Appendix A, and to be bound by the provisions of this contract and Appendix A, and all amendments thereto, which were submitted to OAG.

b. In no event shall any subcontract or subcontractor of the Recipient incur obligation on the part of OAG or beyond the terms of Appendix A of this contract.

c. Recipient shall commence implementation of the project described in Appendix A within sixty (60) days from the date of receipt of funds unless otherwise agreed to in Appendix A or in writing by OAG.

d. Recipient agrees to cooperate with, and provide information to, any third-party evaluator for the purpose of tracking results of the Safe Oklahoma Grant Program.

7. FUNDING TO RECIPIENT

a. Funds made available shall be used only for the purposes and expenses approved by OAG under this contract. These funds are distributed to Recipient who shall be responsible for the payment of all expenses incurred by Recipient in performing under this contract. **The funds provided to the Recipient shall be expended only for expenses incurred during the term of this contract as specified in Appendix A and shall not be expended for expenses incurred prior to, or after, the term of this contract.**

b. Funds made available to Recipient under this grant shall be used to supplement, and not supplant, other funds expended to carry out activities of the Recipient.

8. EMPLOYEE BENEFITS

a. Recipient has full responsibility for the payment of Workers' Compensation insurance, unemployment insurance, social security, State and federal income tax, salaries, benefits, and any other obligations required by law for its employees.

b. The parties intend that each shall be responsible for its own intentional and negligent acts or omissions to act. OAG shall not be responsible for the acts and omissions to act of Recipient or any of Recipient's subcontractors or vendors.

9. CERTIFICATIONS BY RECIPIENT

a. Recipient expressly agrees to be solely responsible to ensure that the use of monies received under this contract complies with all federal, State and local statutes, regulations and other legal authority, including any laws relating to nondiscrimination, equal opportunity, and labor standards.

10. NO-CONFLICT COVENANT

a. Recipient covenants that no officers or employees of recipient have any interest, direct or indirect, and that none shall acquire any such interest during their tenure that would conflict with the full and complete execution of this contract. Recipient further covenants that no employee of OAG received anything of value in connection to this contract.

11. NON-COLLUSION

a. OAG and Recipient certify that neither has been a party to any collusion among applicants to the Safe Oklahoma Grant Program, collusion with any state official or employee in the awarding of this grant, or in any discussions with any applicants or state officials concerning the exchange of anything of value for special consideration in awarding this grant.

b. Recipient has not paid, given or donated or agreed to pay, give or donate to any officer or employee of the State of Oklahoma any money or other thing of value, directly or indirectly, in the procuring of this contract.

c. No person who has been involved in any manner in the development of this contract while employed by the State of Oklahoma will be employed to fulfill any of the services provided for under this contract.

12. PUBLICATIONS AND OTHER MATERIALS

a. Any material produced in whole or in part as a result of this contract may be subject to the Open Records Act of Oklahoma. OAG shall have authority to publish,

disclose, distribute and otherwise use any reports, data or other materials prepared under this contract.

13. PROCUREMENT

a. Recipient agrees and is responsible for ensuring that procurement, management, and disposition of property acquired with contract funds shall be governed by any applicable federal and State laws, including any competitive bidding requirements and requirements for the accounting of public funds.

14. RECORDS, REPORTS, DOCUMENTATION

a. Recipient shall provide a report every three (3) months to OAG of funds dispersed during the term of this contract and a report detailing the progress of the project. The reporting period shall commence on the date of the receipt of funds. Reports shall be due within two (2) weeks of the end of the reporting period. The reports shall include, but not be limited to, the following information:

   i. A detailed itemization of the funds spent during the three (3) month reporting period (including the attachment of supporting financial documents to the report);
   ii. An explanation of what was funded under item i. above;
   iii. The remaining balance of the funds provided under this contract;
   iv. An explanation of measurement and evaluation tools used to track progress and results;
   v. An explanation of any observed change in violent crime rates or trends as a result of this project; and
   vi. A brief narrative of the results, successes, and other observations from this reporting period.

b. The Recipient shall maintain records and accounts, including property, personnel, and financial records that properly account for all project funds. Recipient shall make these records available to OAG upon request.

c. Recipient shall keep and maintain appropriate books and records reflecting the services performed and costs and expenses incurred in connection with its performance of this contract for a period of five (5) years from the ending date of this contract. Upon reasonable notice, OAG, the State Auditor's Office, the State Purchasing Director, or their representatives, shall be entitled to access any books, records, and other documents and items directly pertaining to the project funds for purpose of audit and examination, at Recipient=s premises during normal business hours. In the event any audit, litigation, or other action involving these pertinent records is started before the end of the five (5) year period, the Recipient agrees to retain these records until all issues arising out of the action are resolved or until the end of the five (5) year period, whichever is later.

d. Recipient shall provide any status updates during the term of this contract to OAG upon request.

15. CLOSING OUT OF CONTRACT

a. Recipient shall promptly return to OAG any funds received under this contract that are not expended for the agreed purposes under this contract in Appendix A.

b. Recipient shall submit any closeout documents showing proof of completion of the terms of this contract to OAG.

c. Recipient agrees to provide any additional information required by OAG after the expiration of this contract for the purpose of showing completion and results of the project.

16. INTERPRETATION, REMEDIES, VENUE, CHOICE OF LAW

a. This contract shall be construed and interpreted pursuant to Oklahoma law.

b. Venue for any disagreement or cause of action arising under this contract shall be Oklahoma County, Oklahoma.

17. TERMINATION OR SUSPENSION

a. This contract may be terminated or suspended in whole or in part at any time by written agreement of the parties.

b. This contract may be terminated or suspended by OAG in whole or in part, for cause, after notice and an opportunity for Recipient to present reasons why such action should not be taken. Grounds for cause include, but are not limited to:

i. Recipient fails to commence implementation of the terms of this contract within 60 days or as otherwise agreed in writing or in Appendix A.

ii. Recipient fails to comply with the terms of this contract or with any applicable laws or regulations or is unduly dilatory in executing its commitments under this contract.

iii. Purposes for the funds have not been or will not be fulfilled or would be illegal to carry out.

iv. The Recipient has submitted incorrect or incomplete documentation pertaining to this contract.

c. In the event of termination or suspension, Recipient shall be entitled to payment for otherwise valid and allowable obligations incurred in good faith prior to notice of termination or suspension.

18. SEVERABILITY

a. If any provision of this contract is held invalid by any court of competent jurisdiction, such invalidity does not affect any other provision of this contract that can be given effect.

19. POINT OF CONTACT

a. Correspondence and contact to the OAG shall be made through the primary and secondary contact persons listed below:

Primary Contact Name: Marie Schuble
Title: Assistant Attorney General
Phone Number: (405) 522-2887
Email: marie.schuble@oag.ok.gov

Secondary Contact Name: Lori Carter
Title: Director of Legislative Affairs
Phone Number: (405) 522-4744
Email: lori.carter@oag.ok.gov

Agreed to the _____ day of _____, 2019.

X_____
Brandon Clabes
Police Chief, Midwest City Police Department

X_____
Tim Lyon
City Manager, City of Midwest City

X_____
Dawn Cash
First Assistant Attorney General, Oklahoma Office of Attorney General

APPENDIX A – Purposes of Funding

City of Midwest City Police Department

Appendix A must include a copy of the Recipient's itemized budget for the project with of all items/labor/services to be purchased with funds, and provide descriptions and overviews of the activities planned. These documents are attached to this contract and incorporated into the terms and requirements of this contract.

Funding is provided solely for the purposes in Appendix A and shall be spent solely on items in Appendix A.

Funds awarded: $45,000.00

Purpose: Overtime funds to target violent crime

(Please attached an itemized budget as described above)

APPENDIX A – Purpose of Funding

(7) PURPOSE AREA PRIORITIZATION SCHEDULE

PRIORITY*	PURPOSE AREA	DESCRIPTION	ESTIMATED COST**
1	1	*Funds will be used for overtime targeted policing in high Violent crime areas.*	***$45,000.00***
2			
3			
4			
5			

***Prioritize each request**
****Attach price quote or supporting documentation**

BUDGET BREAKDOWN FOR OVERTIME IS BASED UPON THE FOLLOWING

Overtime:	$45,000.00	900 overtime hours @ $50 per hour. (Using 2 officers, working 5 hour shifts.)
Fringe Benefits:	$3,442.50	FICA @ 7.65%
	$8,100.00	Retirement @ 18%
Total:	$56,542.50	
Overage:	$ -11,542.50	Paid out of department funds.

The funding will be utilized for overtime. Depending on what crime trends we are attacking will also determine what resources we will utilize.

- Uniformed officers in marked vehicles.
- Un-marked units and officer in uniform or plain clothes.
- Motor Officers
- Bike Patrol
- Street Crime's Unit / Gang Unit/ Special Investigations Unit (This is our under cover Unit. 4 personnel unit.)
- Community Action Officers (These officers work with the various neighborhood associations throughout the city. They can pass suspect information or identify heavy traffic areas or houses the will assist in identifying possible criminal activity.)
- Investigations Division (7 personnel 1Supervisor and 1 Commander)

Utilizing the available computer aided software in addition to resources available to include several not listed. We should be able to identify crime trends (Hot Spots) and come up with a viable plan to deploy special emphasis to the targeted areas.

In addition, utilize the funding more efficiently rather than just putting them out there every Saturday and Sunday. As crime trends change so will we. If the crimes are only happening on specific days and times then that will be our focus. For example; if we are experiencing an increase in stolen motor vehicles but they are only happening on Tuesday's, that's where will focus our efforts. No need to just waist the funding. If it's happening on several days throughout the week, we may need to focus which days have higher frequency.

The City of Midwest City
NEIGHBORHOODS IN ACTION

1124 N. DOUGLAS BLVD. * MIDWEST CITY, OKLAHOMA,
73130 * (405) 736-1973 * FAX * (405) 869-9289

TO: Honorable Mayor and Council

FROM: Tom Bridgett, Neighborhoods in Action Coordinator

Date: November 12, 2019

Subject: Discussion and consideration of approving and entering into a contract in an amount not to exceed $10,000 for fiscal year 2019/2020 with Jay D. Collins to establish the terms and condition under which he shall serve as the Volunteer Income Tax Assistance Center Coordinator.

Jay D. Collins, VITA Center Coordinator, would like to partner with the City of Midwest City for the City to provide the facility for the Volunteer Income Tax Assistance Program. Jay D. Collins will provide oversight of tax preparation to community residents each Tuesday and Thursday between the hours 1:00 p.m. and 7:00 p.m. at the City of Midwest City Community Center.

This contract, a copy which is attached for your review, provides for a comprehensive scope of services associated with tax preparation to community residents.

Staff recommends approval.

Tom Bridgett
Neighborhoods in Action Coordinator

Attachment (1)

CONTRACT FOR PROFESSIONAL SERVICES

This agreement is made and entered into the 12th day of November 2019, by and between the City of Midwest City (the City) and Jay Dee Collins, who agree to the following:

1. For the duration of this agreement, Mr. Collins shall serve as the City's VITA (Volunteer Income Tax Assistance) Center Coordinator, with the primary responsibility for coordination and training of volunteers, oversight of tax preparation, reviewing and revising returns, e-filing all prepared returns, trouble shooting, contacting tax payers as necessary, compiling and submitting all required reports as well as day to day operations of the VITA center. Mr. Collins shall provide the City proof of site coordinator training completion and IRS certification to the highest level available. During the term of this agreement, Mr. Collins agrees to represent the City in all such matters. The City agrees to pay Mr. Collins the sum of $23.00 per hour as consideration for said representation.

2. Jay Dee Collins, for the duration of this agreement, shall be and is considered an independent contractor and, as such, no benefit of city employment, such as medical insurance, vacation leave, sick leave, mileage, retirement benefits or any other benefits provided to its employees by the city, will be extended to Mr. Collins.

3. The term of this agreement shall extend from November 12, 2019 through April 30, 2020

4. Projected hours of work shall be as follows:

   November 12, 2019 through April 30, 2020: 16-24 hours/week

During the term of this contract, Mr. Collins total wages are not to exceed $10,000.00.

City of Midwest City

_____

Matthew D. Dukes II, Mayor
City of Midwest City
100 N. Midwest Boulevard
Midwest City, OK 73110
Phone: (405) 739-1204

_____

Date

Volunteer Income Tax Assistance

_____

Jay Dee Collins
721 S. Margene Road
Midwest City, OK. 73130
Phone: (405) 831-3153

_____

Date

MIDWEST CITY
OKLAHOMA

MEMORANDUM

TO: Honorable Mayor and Council

FROM: Bert Norton, Fire Chief

DATE: November 12, 2019

RE: Discussion and consideration of awarding the bid to MagneGrip, DBA Clean Air Concepts, and entering into a contract for purchase and installation of five (5) new Fire Station Exhaust Removal Systems in an amount not to exceed $224,122.00.

On Tuesday, October 22, 2019 at 2:00 p.m., the City of Midwest City opened two (2) bids for Diesel Vehicle Exhaust System, Suction Rail Systems, also known as, Fire Station Exhaust Removal Systems.

MagneGrip Group, a Division of Clean Air Concepts, was the lowest and best bid in the total amount of $224, 122. Amount includes the purchase and installation of systems at the following five (5) fire stations: Fire Station #1, Station #2, Station #3, Station #4, and Station #6.

The funds for this purchase are budgeted from the 2018 General Obligation Bond.

Staff recommends approval.

Bert Norton
Fire Chief

Diesel Vehicle Exhaust System, Suction Rail System
BID TAB
10-22-19

VENDOR	**BID AMOUNT**
Air Cleaning Technologies	$259,700.00 Systems $4,900.00 Bonds $264,600.00 Total
MagneGrip , DBA: Clean Air Concepts	$224,122.00 Total

Invitation for Sealed Bids

CITY OF MIDWEST CITY

100 N. MIDWEST BLVD.
MIDWEST CITY, OKLAHOMA 73110

Write legibly in ink or use typewriter.

Published In
The Journal Record

Dates Advertised
September 30, 2019
October 7, 2019

Bids must be in the Office of the City Clerk By:
Tuesday, October 22, 2019 at 2:00 p.m.

IMPORTANT: Bid envelope must indicate bid item enclosed and date of bid opening.

Description	Quantity	Unit Price	Total Net Price
Diesel Vehicle Exhaust System, Suction Rail System	(5) Five	SEE ATTACHED FOR BREAKDOWN	$224,122.00

*****Midwest City Standard bid bond or surety bid bond form or cashier's check is required in the amount of five percent (5%) of the total bid (cashier's checks will be returned to the unsuccessful bidders following the acceptance of the bid).*****

THE CITY OF MIDWEST CITY IS EXEMPT FROM PAYMENT OF OKLAHOMA SALES TAX AND FEDERAL EXCISE TAX.

I have examined the specifications and agree, provided I am awarded a contract within thirty (30) days from the date fixed for opening bids, to provide the above described items for the sum shown, in accordance with the terms and conditions attached to this sheet as "Agreement By Bidder."

DELIVERY WILL BE MADE IN 180 DAYS OR LESS FROM DATE OF ORDER. DATED THIS _____ DAY OF _____, 2019.

FIRM Rossman Enterprises Inc. DBA Clean Air Concepts BY MRossman

ADDRESS 11449 Deerfield Road, Cincinnati, OH 45242 TITLE President

Accepted by the CITY OF MIDWEST CITY this _____ day of _____, 20 _____.

Matthew Dukes, II, MAYOR

Sara Hancock, City Clerk

Approved as to form this _____ day of _____, 20 _____.

Heather Poole, City Attorney

DATE: October 16, 2019

PROPOSAL FOR: City of Midwest
Midwest City Municipal Center
100 North Midwest Boulevard
Midwest City, Oklahoma 73110

ATTENTION: Sara Hancock, City Clerk

REF: *Diesel Vehicle Exhaust System, Suction Rail System*

PROJECT SCOPE: Provide and install a fully automatic MagneGrip™ Diesel Exhaust Extraction System for the source capture and the removal of vehicle exhaust emissions from Apparatus' start up to door threshold.

EQUIPMENT, MATERIAL AND LABOR PRICE:

STATION #1:

Five Drop MagneGrip™ Straight Suction Rail Exhaust Removal System
Package Includes:

- (1) SSRM-782 Suction Rail systems complete with 5" inch high temperature hose, with (2) Crab Assemblies with external guide wheels, (2) MagneGrip™ Nozzle Assemblies that seal completely around the tailpipe to contain contaminated air and (2) Adaptor assemblies that provide easy connection and cool air induction per rail. Each hose drop includes 850-degree extreme high temperature 2' lower hose section with handle.
- (2) SSRM-781 Suction Rail systems complete with 5" inch high temperature hose, with (1) Trolley Assembly with external guide wheels, (1) MagneGrip™ Nozzle Assembly that seals completely around the tailpipe to contain contaminated air and (1) Adaptor assembly that provides easy connection and cool air induction per rail. Each hose drop includes 850-degree extreme high temperature 2' lower hose section with handle.
- (1) SBTM-241-05 Sliding Balancer Track with standard box-loc track and spring balancer with 5" high temperature hose drop, complete with MagneGrip™ Nozzle Assembly that seals completely around the tailpipe to contain contaminated air and Adaptor assembly that provides easy connection and cool air induction per track. Each hose drop includes 850-degree extreme high temperature 2' lower hose section with handle.
- (1) CF363-7.5 MagneGrip™ Exhaust Fan Model CF363 with durable powder coating and of continuous welded construction throughout. Fan has an efficient backward incline, spark resistant fan wheel and is rated at 7.5hp 4400 cfm @ 6"sp, meets AMCA #2 standard and bench balanced to ANSI Standard for stability. Fan shall be wired for three-phase.

11449 Deerfield Road | Cincinnati, OH 45242 | 513-489-4440 | 800-875-5440 | Fax: 513-247-2502 | email: info@magnegrip.com
www.magnegrip.com

- (1) 500181-08 Wireless Auto-Start Control Panel in NEMA 4X enclosure with automatic start/stop operation. Entire assembly is UL/CUL listed with timer, manual override switch, and wireless capable.
- Wireless receiver, transmitters and pressure sensors for automatic system activation.
- (1) 500157-14 14" Up-blast Back Draft Damper Type Rain Cap
- (1) 500151-14 Fan Silencer 14"X42"

STATION #1 PRICE.....$55,623.00

STATION #2:

Three Drop MagneGrip™ Straight Suction Rail Exhaust Removal System
Package Includes:

- (3) SSRM-481 Suction Rail systems complete with 5" inch high temperature hose, with (1) Trolley Assembly with external guide wheels, (1) MagneGrip™ Nozzle Assembly that seals completely around the tailpipe to contain contaminated air and (1) Adaptor assembly that provides easy connection and cool air induction per rail. Each hose drop includes 850-degree extreme high temperature 2' lower hose section with handle.
- (1) CF363-3 MagneGrip™ Exhaust Fan Model CF363 with durable powder coating and of continuous welded construction throughout. Fan has an efficient backward incline, spark resistant fan wheel and is rated at 3hp 2100 cfm @ 6"sp, meets AMCA #2 standard and bench balanced to ANSI Standard for stability. Fan shall be wired for three-phase.
- (1) 500177-08 Wireless Auto-Start Control Panel in NEMA 4X enclosure with automatic start/stop operation. Entire assembly is UL/CUL listed with timer, manual override switch, and wireless capable.
- Wireless receiver, transmitters and pressure sensors for automatic system activation.
- (1) 500157-10 10" Up-blast Back Draft Damper Type Rain Cap
- (1) 500151-10 Fan Silencer 10"X30"

STATION #2 PRICE.....$42,486.00

STATION #3:

Two Drop MagneGrip™ Straight Suction Rail Exhaust Removal System
Package Includes:

- (2) SSRM-481 Suction Rail systems complete with 5" inch high temperature hose, with (1) Trolley Assembly with external guide wheels, (1) MagneGrip™ Nozzle Assembly that seals completely around the tailpipe to contain contaminated air and (1) Adaptor assembly that provides easy connection and cool air induction per rail. Each hose drop includes 850-degree extreme high temperature 2' lower hose section with handle.

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www.magnegrip.com

- (1) CF363-3 MagneGrip™ Exhaust Fan Model CF363 with durable powder coating and of continuous welded construction throughout. Fan has an efficient backward incline, spark resistant fan wheel and is rated at 3hp 2100 cfm @ 6"sp, meets AMCA #2 standard and bench balanced to ANSI Standard for stability. Fan shall be wired for three-phase.
- (1) 500177-08 Wireless Auto-Start Control Panel in NEMA 4X enclosure with automatic start/stop operation. Entire assembly is UL/CUL listed with timer, manual override switch, and wireless capable.
- Wireless receiver, transmitters and pressure sensors for automatic system activation.
- (1) 500157-10 10" Up-blast Back Draft Damper Type Rain Cap
- (1) 500151-10 Fan Silencer 10"X30"

STATION #3 PRICE.....$35,468.00

STATION #4:

Two Drop MagneGrip™ Straight Suction Rail Exhaust Removal System
Package Includes:

- (2) SSRM-481 Suction Rail systems complete with 5" inch high temperature hose, with (1) Trolley Assembly with external guide wheels, (1) MagneGrip™ Nozzle Assembly that seals completely around the tailpipe to contain contaminated air and (1) Adaptor assembly that provides easy connection and cool air induction per rail. Each hose drop includes 850-degree extreme high temperature 2' lower hose section with handle.
- (1) CF363-3 MagneGrip™ Exhaust Fan Model CF363 with durable powder coating and of continuous welded construction throughout. Fan has an efficient backward incline, spark resistant fan wheel and is rated at 3hp 2100 cfm @ 6"sp, meets AMCA #2 standard and bench balanced to ANSI Standard for stability. Fan shall be wired for three-phase.
- (1) 500177-08 Wireless Auto-Start Control Panel in NEMA 4X enclosure with automatic start/stop operation. Entire assembly is UL/CUL listed with timer, manual override switch, and wireless capable.
- Wireless receiver, transmitters and pressure sensors for automatic system activation.
- (1) 500157-10 10" Up-blast Back Draft Damper Type Rain Cap
- (1) 500151-10 Fan Silencer 10"X30"

STATION #4 PRICE.....$35,468.00

11449 Deerfield Road | Cincinnati, OH 45242 | 513-489-4440 | 800-875-5440 | Fax: 513-247-2502 | email: info@magnegrip.com
www.magnegrip.com

STATION #6:

Four Drop MagneGrip™ Straight Suction Rail Exhaust Removal System
Package Includes:

- (4) SSRM-601 Suction Rail systems complete with 5" inch high temperature hose, with (1) Trolley Assembly with external guide wheels, (1) MagneGrip™ Nozzle Assembly that seals completely around the tailpipe to contain contaminated air and (1) Adaptor assembly that provides easy connection and cool air induction per rail. Each hose drop includes 850-degree extreme high temperature 2' lower hose section with handle.
- (1) CF363-5 MagneGrip™ Exhaust Fan Model CF363 with durable powder coating and of continuous welded construction throughout. Fan has an efficient backward incline, spark resistant fan wheel and is rated at 5hp 3300 cfm @ 6"sp, meets AMCA #2 standard and bench balanced to ANSI Standard for stability. Fan shall be wired for three-phase.
- (1) 500179-08 Wireless Auto-Start Control Panel in NEMA 4X enclosure with automatic start/stop operation. Entire assembly is UL/CUL listed with timer, manual override switch, and wireless capable.
- Wireless receiver, transmitters and pressure sensors for automatic system activation.
- (1) 500157-12 12" Up-blast Back Draft Damper Type Rain Cap
- (1) 500151-12 Fan Silencer 12"X36"
-

STATION #6 PRICE.....$55,077.00

TOTAL.....$224,122.00

INCLUDED ALL STATIONS:

- Electrical Power Wiring from available supply to control panel and to fan. Safety disconnect for fan motor. Does Not include any subpanels if required, and excludes any modifications required to bring service to code.
- Tailpipe Modifications as required but, limited to vehicle tailpipes from the muffler out. Large modifications and severely damaged tailpipes may be excluded.
- All spiral ductwork, lateral connectors, dampers and hangers for Class 2 Mechanical Installation included.
- Adjustable Telescopic Support Legs to hang rail or track systems
- Shipping to Job Site, Included
- Factory provided labor to install above system to provide a complete turnkey project
- Start up and Training
- Five-Year Warranty
- Equipment is 100% American Made by an ISO9001-2015 Company

MagneGrip EXHAUST REMOVAL SYSTEMS | AirHAWK AIR PURIFICATION SYSTEMS | HazVent Pneumatic Exhaust Removal Systems

MagneGrip Group

TERMS:

- Does not include roof penetration and sealing, if required
- Net Due upon Receipt of Invoice
- Pricing does not include any state taxes, sales tax or special tax if required.

SUBMITTED BY:

Clean Air Concepts

Maggie Rossman-Roach, President

10/17/19
Date

ACCEPTED BY:

Sign _____

Print _____

Title _____

Date _____

PO #, If Required _____

MIDWEST CITY
OKLAHOMA

Emergency Management
100 N. Midwest Boulevard
Midwest City, OK 73110
office 405.739.1386

TO: Honorable Mayor and Council

From: Mike Bower, Emergency Manager

Date: November 12, 2019

Subject: Discussion and consideration of approving a resolution between the City of Midwest City and Oklahoma County for the purpose of adopting a partnership for a Hazard Mitigation Plan where the City of Midwest City will accept the Plan developed by the County as outlined in Section 9 of the Oklahoma County Hazard Mitigation Plan 2019 Update.

Midwest City has received preliminary approval of a hazard mitigation plan from FEMA that will be good for a period of 5 years. In 2007, Midwest City, Oklahoma County, and several other jurisdictions within the county created the initial hazard mitigation plan and we are currently in our third adoption phase. The plan is very important to our community and has input from several departments. The plan is also a required document in order to be eligible for mitigation funding during disasters.

Mike Bower

Mike Bower
Emergency Manager

RESOLUTION NO.
A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF MIDWEST CITY AUTHORIZING THE ADOPTION OF THE OKLAHOMA COUNTY HAZARD MITIGATION PLAN – 2019 UPDATE

WHEREAS, Unincorporated Oklahoma County and its incorporated municipalities have exposure to natural hazards that increase the risk to life, property, environment and the economy; and

WHEREAS; pro-active mitigation of known hazards before a disaster event can reduce or eliminate long-term risk to life and property; and

WHEREAS, The Disaster Mitigation Act of 2000 (Public Law 106-390) established new requirements for pre and post disaster hazard mitigation programs; and

WHEREAS; a coalition of Oklahoma County municipalities with like planning objectives has been formed to pool resources and create consistent mitigation strategies within the County; and

WHEREAS, the coalition has completed a planning process that engages the public, assesses the risk and vulnerability to the impacts of natural hazards, develops a mitigation strategy consistent with a set of uniform goals and objectives, and creates a plan for implementing, evaluating and revising this strategy;

NOW, THEREFORE, BE IT RESOLVED that the **CITY OF MIDWEST CITY**:

1) Adopts in its entirety, the 2019 Update of the Oklahoma County Mitigation Plan (the "Plan") as the jurisdiction's Natural Hazard Mitigation Plan, and resolves to execute the actions identified in the Plan that pertain to this jurisdiction.
2) Will use the adopted and approved portions of the Plan to guide pre- and post-disaster mitigation of the hazards identified.
3) Will coordinate the strategies identified in the Plan with other planning programs and mechanisms under its jurisdictional authority.
4) Will continue its support of the Mitigation Planning Committee as described within the Plan.
5) Will help to promote and support the mitigation successes of all participants in this Plan.
6) Will incorporate mitigation planning as an integral component of government and partner operations.
7) Will provide an update of the Plan in conjunction with the planning partnership no less than every five years.

PASSED AND ADOPTED on this 22nd day of November, 2019, by the following vote:

AYES:
NOES:
ABSENT:
ABSTAIN:

_____
Mayor, City of Midwest City

ATTEST: _____
Clerk, City of Midwest City

RECEIVED

OCT 21 2019

OKLAHOMA
EMERG. MGMT.

ACTION: 1/21/2020

U.S. Department of Homeland Security
FEMA Region 6
800 North Loop 288
Denton, TX. 76209-3698

FEMA

Dir	c
Deputy	c Palladino
Admin	c McKelvey
Finance	c Heavy
Purchasing	
PIO	c
Response	c Mack
EM Coor	Rollins
Recovery	a Graybill
OPS Supp	
Training	
Haz/Mat	
Vol	

October 15, 2019

Matthew Rollins, State Hazard Mitigation Officer
Oklahoma Department of Emergency Management
P.O. Box 53365
Oklahoma City, OK 73152-3365

RE: Approvable Pending Adoption of the Oklahoma County, Oklahoma Multi-Jurisdiction Hazard Mitigation Plan

Dear Mr. Rollins:

This office has concluded its review of the referenced plan, in conformance with the Final Rule on Mitigation Planning (44 CFR § 201.6). Formal approval of this plan is contingent upon the adoption by resolution by the participants on Enclosure A, as well as the receipt of a CD containing all components of this plan.

Adopting resolutions must be submitted to this agency for review and approval no later than 1 year from the date of this letter. Failure to submit these resolutions in a timely manner could lead to a required update of the plan prior to FEMA approval.

Once this final requirement has been met, a letter of official approval will be generated. The Local Hazard Mitigation Planning Tool, with the reviewer's comments has been enclosed to further assist the jurisdictions in complying with planning requirements.

If you have any questions, please contact Shanene Thomas, HM Community Planner, at (940) 898-5492.

Sincerely,

for Ronald C. Wanhanen
Chief, Risk Analysis Branch

Enclosures

cc: Brianne Schmidtke, R6-MT-HM

Enclosure A

Attached is the list of approved participating governments included in the October 15, 2019 review of the referenced Hazard Mitigation plan.

	Community Name
1)	Arcadia
2)	Bethany
3)	Choctaw
4)	Del City
5)	Edmond
6)	Forest Park
7)	Harrah
8)	Luther
9)	Midwest City
10)	Nichols Hills
11)	Nicoma Park
12)	Oklahoma County
13)	Spencer
14)	The Village
15)	Warr Acres

Oklahoma County Hazard Mitigation Plan 2019 Update

March 2019

Jurisdictions include:

Oklahoma County
Town of Arcadia
City of Bethany
City of Choctaw
City of Del City
City of Edmond
Town of Forest Park
City of Harrah
Town of Luther
City of Midwest City
City of Nichols Hills
City of Nicoma Park
City of Spencer
City of The Village
City of Warr Acres

TABLE OF CONTENTS

Page

SECTION 1: INTRODUCTION

BACKGROUND

Organizations Involved in the Mitigation Planning Effort

The following jurisdictions within the County have participated in the planning process:

Table 1-1. Participating Jurisdictions

Participating Jurisdictions		
Oklahoma County	City of Edmond	City of Nichols Hills
Town of Arcadia	Town of Forest Park	City of Nicoma Park
City of Bethany	City of Harrah	City of Spencer
City of Choctaw	Town of Luther	City of The Village
City of Del City	City of Midwest City	City of Warr Acres

IMPLEMENTATION OF THE PLANNING PROCESS

Table 1-2 summarizes the requirements outlined in the DMA 2000 Interim Final Rule and where each of these requirements is addressed in this Plan.

Table 1-2. FEMA Local Mitigation Plan Review Tool

FEMA Local Mitigation Plan Review Tool	
Plan Criteria	**Primary Location in Plan**
Prerequisites	
Adoption by the Local Governing Body: §201.6(c)(5)	Section 2.0; Appendix B
Planning Process	
Documentation of the Planning Process: §201.6(b) and §201.6(c)(1)	Section 3.0
Risk Assessment	
Identifying Hazards: §201.6(c)(2)(i)	Sections 5.2 and 5.3
Profiling Hazards: §201.6(c)(2)(i)	Section 5.3
Assessing Vulnerability: Overview: §201.6(c)(2)(ii)	Section 5.3
Assessing Vulnerability: Identifying Structures: §201.6(c)(2)(ii)(A)	Sections 4.0
Assessing Vulnerability: Estimating Potential Losses: §201.6(c)(2)(ii)(B)	Section 5.3
Assessing Vulnerability: Analyzing Development Trends: §201.6(c)(2)(ii)(C)	Section 4.0 and 5.3
Mitigation Strategy	
Local Hazard Mitigation Goals: §201.6(c)(3)(i)	Sections 6.0 and 9
Identification and Analysis of Mitigation Actions: §201.6(c)(3)(ii)	Sections 6.0 and 9
Implementation of Mitigation Actions: §201.6(c)(3)(iii)	Sections 6.0 and 9
Plan Maintenance Process	
Monitoring, Evaluating, and Updating the Plan: §201.6(c)(4)(i)	Section 7.0

FEMA Local Mitigation Plan Review Tool	
Plan Criteria	**Primary Location in Plan**
Incorporation into Existing Planning Mechanisms: §201.6(c)(4)(ii)	Section 7.0
Continued Public Involvement: §201.6(c)(4)(iii)	Section 7.0

SECTION 2: PLAN ADOPTION

OVERVIEW

This section contains information regarding adoption of the Plan by Oklahoma County and each participating jurisdiction.

Plan Adoption by Local Governing Bodies

Adoption by the local governing bodies demonstrates the commitment of Oklahoma County and each participating jurisdiction to fulfill the mitigation goals and objectives outlined in the Plan. Adoption legitimizes the Plan and authorizes responsible agencies to execute their responsibilities. In order for the multi-jurisdictional plan to be approved, each jurisdiction included in the Plan must have its governing body adopt the Plan, even when a cross-jurisdiction agency has the authority to prepare such plans in the name of the respective jurisdictions.

Each participating jurisdiction will proceed with formal adoption proceedings when FEMA provides conditional approval of this Plan. Each participating jurisdiction understands that a conditional approval of the Plan will be provided for those municipalities that meet the planning requirements with the exception of the adoption requirement as stated above. Following adoption or formal action on the Plan, each participating jurisdiction must submit a copy of the resolution or other legal instrument showing formal adoption (acceptance) of the Plan to Oklahoma Department of Emergency Management (OEM). Each participating jurisdiction understands that FEMA will transmit acknowledgement of verification of formal plan adoption and the official approval of the Plan to the mitigation plan coordinator.

The resolutions issued to support adoption of the Plan by each jurisdiction are included below.

SECTION 3: PLANNING PROCESS

INTRODUCTION

This section includes a description of the planning process used to develop the Plan Update, including how it was prepared, who was involved in the process, and how the public was involved.

PLANNING PARTNERSHIP - ORGANIZATION AND ACTIVITY

Organization of Planning Partnership

The 2018 planning process was led by Oklahoma County Emergency Management, which has remained the key to the County hazard mitigation "management team" for overseeing plan implementation, review and updating. The Oklahoma County Emergency Management Resource Specialist serves as the primary hazard mitigation planner, along with volunteer Timothy Skaggs (the Oklahoma County EM planners).

During December 2017, Oklahoma County Emergency Management invited the incorporated municipalities within the County to participate in the plan update process via email, and in multiple fire chief's meetings. These committee meetings began with two in March of 2018, and another in April 2018. All jurisdictions were represented during these initial meetings. Several jurisdictions attended individual jurisdictional local support meetings to assist in finalizing the plan.

The Planning Committee consisted of representatives from the various Unincorporated County departments and agencies, and representatives from each of the participating municipalities. County Emergency Management led the meetings and was charged with helping the jurisdictions with the following:

- Represent their jurisdiction throughout the planning process;
- Establish Plan development goals;
- Establish a timeline for completion of the Plan;
- Ensure that the Plan meets the requirements of DMA 2000 and FEMA and OEM guidance;
- Solicit and encourage the participation of regional agencies, a range of stakeholders, and citizens in the Plan development process;
- Assist in gathering information for inclusion in the Plan, including the use of previously developed reports and data;
- Organize and oversee the public involvement process;
- Assist with updating of "Hazards of Concern"
- Assist with the update of the hazard mitigation planning Goals and Objectives
- Assist with the review of a broad range of potential mitigation initiatives
- Identify, develop and prioritize appropriate mitigation initiatives.
- Update the jurisdictional annex for their jurisdiction;
- Review, amend and approve all sections of the Plan;
- Develop, revise, adopt, and maintain the Plan.

Table 3-1 identifies the Planning Committee and other county and municipal representatives that provided input to the Plan Update process.

Table 3-1. County and Municipal Planning Partnership

Jurisdiction or Agency	Name, Title, Department
Unincorporated Oklahoma County	Eric Brandt, County Planner, Oklahoma County Department of Planning David Barnes, Emergency Management Director, Oklahoma County Emergency Management Greg Whitworth, Oklahoma County Emergency Management Timothy Skaggs, Oklahoma County Emergency Management Volunteer Michael Taylor, Roads Superintendent, Oklahoma County Highway District 2 Ron Cardwell, Roads Superintendent, Oklahoma County Highway District 3
Town of Arcadia	James Woodard, Mayor
City of Bethany	Danielle Barker, Community Development Specialist Amanda McCellon, Planning and Community Development Director Shaum Jennings, Fire Chief SR Hunter, Former Fire Chief
City of Choctaw	Loren Bumgarner, Fire Chief Edward Brown, City Manager
City of Del City	Brandon Pursell, Fire Major, Del City Fire Department Monica Cardin, Community Services, City Planner
City of Edmond	Brook Pintens, Emergency Management Coordinator Jeff Byram, Hydrologist, Edmond Drainage Utility TJ Menzer, Emergency Management Resource Specialist
Town of Forest Park	Wesley “Chuck” Blair, Emergency Manager (Forest Park-Spencer combined FD)
City of Harrah	Robert “Neal” Young, Fire Chief Dewayne Jenkins, Fire Captain
Town of Luther	John W. Brown Sr., Fire Chief Mike Class, Assistant Chief, Luther Police
City of Midwest City	Patrick Meneffee, City Engineer, NFIP Floodplain Administrator Brandon Bundy, Asst. City Engineer Mike Bower, Emergency Manager Bert Norton, Fire Chief Vaughn Sullivan, Public Works Director R. Paul Streets, Asst. Public Works Director
City of Nichols Hills	Kevin Boydston, Fire Chief & Emergency Manager Kenny Reyes, Deputy Fire Chief Randy Lawrence, Director of Public Works Thomas W. Gibson, Floodplain Admin, Code Enforcement, Stormwater Quality
City of Nicoma Park	TJ Chartney, Fire Chief

Jurisdiction or Agency	Name, Title, Department
City of Spencer	Wesley "Chuck" Blair, Spencer Fire (Forest Park-Spencer combined FD)
City of The Village	T.J. Hamill, Fire Chief Ken Nelson, Inspector, Building and Code Enforcement
City of Warr Acres	Stephen Coy, Fire Chief Michael Turman, Public Works Director, NFIP Floodplain Administrator

Note: Various other regional, county and local agencies, departments, stakeholders and the public have participated in and contributed to the development of this Plan, as identified later in this Section.

To help facilitate the plan update process, Oklahoma County worked internally to:

- Developing a plan update strategy and schedule
- Assisting with the development and implementation of public and stakeholder outreach
- Data collection
- Facilitation and attendance at meetings (planning committee, stakeholder, public and other)
- Updating the hazards of concern, hazard profiling and risk assessment
- Reviewing and updating the mitigation planning goals and objectives
- Assistance with the screening of mitigation actions and the identification of appropriate actions
- Assistance with the prioritization of mitigation actions
- Authoring of the Plan update documents

Planning Partnership Activities:

Municipal participation in the plan update process included the following activities:

At the March and April 2018 planning committee meetings and subsequent individual jurisdiction meetings, all municipalities were provided with electronic copies of the 2013 Plan. During the meetings, all municipalities were provided with worksheets to facilitate municipal input on hazard events and losses since the 2013 Plan, review of the 2013 plan goals and objectives, local capability assessment, identify hazard areas and specific vulnerabilities in their community, and identify past, ongoing and potential mitigation activities.

Implementation and ongoing maintenance will continue to be a function of the Planning Committee, with most plan maintenance conducted by County Emergency Management. The Planning Committee will review the Plan and accept public comment as part of as part of the five year mitigation plan update. Periodic review will be conducted at monthly fire chiefs meetings which are widely attended by fire and occasionally other jurisdictional representatives (technological schools, EMS providers, police, sheriff's office, and neighboring jurisdiction fire departments).

Table 3-2 presents a summary of the planning partnership efforts implemented during the development process for this Plan, as well as key milestones in the Plan's development. The persons listed above attended for each jurisdiction.

Table 3-2. Summary of Planning Partnership Activities and Project Milestones

Date	Description of Activity	Participants
December 2017	County invites municipalities to participate in the plan update process;	OK Planning Department; all incorporated municipalities in the plan
March 5, 2018	Public meeting signage sent to local jurisdictions	Incorporated municipalities in the plan
March 12, 2018	Plan Update Kick-Off Meeting – Identical format/content to March 20th meeting below. Not all participants could attend on the same day, hence two kickoff meetings were scheduled.	**Edmond** – Hydrologist, EM Coordinator, EM Resource Specialist **Midwest City** – Public Works Director, Public Works Asst. Director, City Engineer, EM **Oklahoma County** – Planning, EM Director, EM Resource Specialist **The Village** – Fire Chief, Building Inspector
March 20, 2018	Plan Update Kick-off meeting – Provided partnership with an overview of the plan update process; provided electronic copy of 2013 plan, reviewed original hazards of concern; provided local worksheets for updating hazard events and losses, local capability assessment, and goals and objectives; reviewed outreach strategy; discussed mitigation grant opportunities. Asked jurisdictions to review plans, studies, reports and technical information relevant to the mitigation plan. Identical format to prior meeting for those who could not attend March 12th. The April public meeting notice was included in an information packet for local jurisdictions to post.	**Arcadia** - Mayor **Bethany** – Director of Planning, Community Development Specialist, Fire Chief, Asst. Fire Chief **Choctaw** – City Manager, Development Director, Fire Chief **Del City** – Fire Dept Major **Forest Park** – EM (combined FD with Spencer) **Harrah** – Fire Chief **Luther** – Fire Chief, Asst. Chief of Police **Nichols Hills** – Fire Chief, Code Inspector **Nicoma Park** – Asst. Fire Chief **Oklahoma County** – EM Director, Resource Specialist **Spencer** – EM (combined FD with Forest Park) **Warr Acres** – Fire Chief
April 3, 2018	Local planning support meeting – City of Warr Acres	Warr Acres FD/EM; Oklahoma County EM
April 24, 2018	Plan Progress Meeting and grant education – Review of historical events to be added to the plan, review of planning process, acceptance of returned paperwork, explanation of grant requirements and the grant process, explanation of 404 vs. 406 mitigation, capability assessment (continued). The Committee decided on the removal of incomplete/inaccurate HAZUS data, removal of incomplete/inaccurate critical facility list, and removal of low hazard dams. The committee desired to remove expansive soils. NRCS data later determined some jurisdictions do not have the hazard.	**Bethany** – Community Development Specialist **Choctaw** – Fire Chief **Edmond** – EM Coordinator **Harrah** – Fire Chief, Fire Captain **Nichols Hills** – Code Inspector/Stormwater **Midwest City** - EM **Oklahoma County** – Highway District 2 Superintendent, Highway District 3 Superintendent, EM Director, Resource Specialist **The Village** – Building Inspector, Fire Chief **Warr Acres** – Fire Chief
May-August 2018	Acceptance of local jurisdiction annexes for review. These jurisdictions revised their annexes and submitted through their primary planning committee member listed to the right. Oklahoma County reviewed each annex and worked with the jurisdictions through emails and phone calls to obtain any incomplete information.	Choctaw Fire Chief; Edmond EM Coordinator; Harrah Fire Chief; Nichols Hills Fire Chief; The Village Fire Chief
June 8, 2018	Local Planning support meeting – Oklahoma County	Oklahoma County Highway District 2 and 3 Superintendents; Oklahoma County Planning, Oklahoma County EM Director & Resource Specialist
June 19, 2018	Plan support meeting – Oklahoma County EM Volunteers	Oklahoma County EM Volunteers; EM Director, Resource Specialist, Technical Specialist
September 11, 2018	Local planning support meeting – City of Bethany	Bethany Planning; Oklahoma County EM Planners
September 11, 2018	Local planning support meeting – Town of Forest Park, City of Spencer	Forest Park EM/Spencer Fire Chief; Oklahoma County EM Planners
September 13, 2018	Local planning support meeting – City of Midwest City	Midwest City Fire Chief; Midwest City EM; Midwest City Engineering; Oklahoma County EM Planners
September 13,	Local planning support meeting – City of Del City	Del City Fire Chief; Del City Planning; Oklahoma

Date	Description of Activity	Participants
2018		County EM Planners
September 19, 2018	Local planning support meeting – Town of Nicoma Park	Nicoma Park Fire Chief; Oklahoma County EM Planners
October 4, 2018	Local planning support meeting – City of Choctaw	Choctaw Fire Chief; Oklahoma County EM Planners
October 7, 2018	Local planning support meeting – Town of Luther	Luther Fire Chief; Oklahoma County EM Planners
December 6, 2018	Local planning support meeting – City of Arcadia	City of Arcadia Mayor, phone conference with building inspector

STAKEHOLDER OUTREACH AND INVOLVEMENT

Efforts were made throughout the plan update process to assure broad regional, county and local representation and participation. Stakeholder outreach was performed early on, and continually throughout, the planning process. Several stakeholders and neighboring jurisdictions attended planning committee meetings, or were engaged through existing meetings and forums of stakeholder groups.

The following is list of the various stakeholders that were invited to participate in the development of this Plan, along with a summary of how these stakeholders participated and contributed to the Plan.

FEMA Region VI: provided plan update guidance through OEM; indirectly provided local NFIP data; provided regulatory review and ultimately approval of the plan update documents.

Oklahoma Water Resources Board: two floodplain management specialists attended a kickoff meeting and provided local NFIP data obtained from FEMA.

Oklahoma State Emergency Management: OEM mitigation planners provided plan update guidance; attended planning committee meetings; provided review and comment on the draft plan documents.

Oklahoma County Department of Planning: provided county and local data and information including maps, future and ongoing project information, assisted with the update of county-level mitigation strategies, and reviewed and edited draft and final plan sections. Planner Eric Brandt provided input. Gordon Murray, GIS coordinator, provided mapping.

Oklahoma County Emergency Management: managed and facilitated the plan update process, provided county and local data and information, assisted with the update of county-level mitigation strategies, reviewed and edited draft and final plan sections. The County EOP was re-written concurrently with the plan update, and each plan was reviewed for incorporation of data into the other. Emergency Management Director David Barnes, Resource Specialist Greg Whitworth, and volunteer planner Timothy Skaggs were involved with this process.

Oklahoma County Engineering: through Planning Department, provided county and local data and information. Stacy Trumbo, County Engineer, provided information to the Planning Department for the update of county-level mitigation strategies.

County Highway Districts: provided input to the plan update process via meetings held with Emergency Management, including information on vulnerable infrastructure and potential mitigation projects. Michael Taylor, District 2 Superintendent; and Ron Cardwell, District 3 Superintendent assisted with this process.

Oklahoma County Board of County Commissioners: The three County commissioners were invited to participate in the planning process, and have been notified of all formal meetings conducted as part of the plan update process. The county commissioners have been variously involved in the process through outreach by the Planning Department, with respect to specific vulnerable areas and potential mitigation projects considered during this plan update process. Our County Commissioners include Willa Johnson (District 1), Brian Maughan (District 2), and Ray Vaughn (District 3). Note: Commissioner Johnson and Commissioner Vaughn have retired as of January 2, 2019.

Eastern Oklahoma County Fire Chiefs: Updates on the planning process were presented at regular meetings of this group by OK County Emergency Management, encouraging local participation and input to the plan update. Most of the participating municipalities have had direct input from their local fire departments and fire chiefs among other key leaders. This group covers a wide geographic base, well outside of the County limits. Many of the Chiefs are contact points for the plan and are listed in the annexes contained herein.

Oklahoma City Metro Fire Chiefs (Metro Chiefs): The project was presented at regular meetings of this group by OK County Emergency Management, encouraging local participation and input to the plan update process.

Deer Creek Fire Protection District: The fire chief provided project ideas for unincorporated northwest Oklahoma County.

Cleveland County Emergency Management: Deputy Director attended our mitigation planning meetings to gather ideas for their mitigation plan meetings and potential coordination of mitigation projects. Oklahoma County EM planning attended a Cleveland County mitigation planning meeting as well to gather ideas for data collection and coordination.

Shawnee/Pottawatomie County Emergency Management: Deputy Director attended a mitigation planning meeting to gather ideas and potential coordination of mitigation projects. Oklahoma County EM visited their office subsequently to provide information on requirements and ideas for updating their hazard mitigation plan.

City of Yukon Emergency Management (in Canadian County): attended a planning meeting to gather information on mitigation project ideas. This is an important relationship to Oklahoma County as waterways in Yukon flow through Oklahoma County.

United States Army Corps of Engineers: provided information during the original floodplain management planning effort. The Corps provided input on current and planned Corps studies and projects. Mark Locke and Lloyd Lewis from the Dam Safety Infrastructure Section at the Southwestern Division in Tulsa were contacted regarding the dam inundation maps included herein.

PUBLIC OUTREACH AND PARTICIPATION

In order to facilitate coordination and communication between the Planning Committee and citizens, various methods of public outreach were conducted to inform the public of the Plan and encourage participation in the planning process. The following public outreach efforts were made during this plan update process:

- Flyers were provided to the jurisdictions to post prior to the three major Hazard Mitigation meetings. One person outside our jurisdictions, in the city of Moore, saw one of the flyers and arrived at the

conclusion of one of the meetings. She was provided some information on Hazard Mitigation but did not provide input to the plan.

- The plan, hazards and mitigation planning concepts were presented at a quarterly meeting of Oklahoma County Emergency Management volunteers. These citizens have varying levels of knowledge of Emergency Management. Several questions were asked about the plan and grants. The process helped them understand Hazard Mitigation planning and the need for improved resiliency.
- A draft and ultimately final versions of the Plan have been posted to the public website (https://www.oklahomacounty.org/325/Plans) for public review and comment.
- Unincorporated Oklahoma County and all participating jurisdictions have identified continued public outreach as a high priority mitigation initiative (see Section 9.1). Under these initiatives, the County attends various public events during the year which are opportunities to gather ongoing input, and may include additional public meetings to further promote awareness of the Plan.

INTEGRATION/COORDINATION WITH EXISTING PLANS AND PROGRAMS

Section 6 "Mitigation Strategy" includes a Capability Assessment subsection which provides a summary and description of the existing plans, programs and regulatory mechanisms in Oklahoma County that support hazard mitigation. These capabilities are further documented in the jurisdictional annexes. This section documents how these existing plans and programs have been integrated into this updated plan, and how this plan will continue to promote and effect that coordination.

The integration of existing data, plans and programs is further documented in the "Data and Methodology" sections of the hazard profiles (Section 5).

National Flood Insurance Program

Table 3-3 identifies the local NFIP Floodplain Administrators for the participating municipalities during this plan update process. Several floodplain administrators have been involved in this planning process, at minimum providing specific flood-related information and mitigation initiatives, as well as providing review and input on the planning documents.

Community Rating System (CRS)

CRS is a voluntary program designed to reward participating jurisdictions for their efforts to create more disaster-resistant communities using the principles of sustainable development and management. Of the communities participating in this Plan, currently only the City of Edmond (CRS Class 7) and the City of Del City (CRS class 6) participate in CRS, however some of the municipalities have included a high priority mitigation initiative to join the CRS program.

Table 3-3. Municipal Floodplain Administrators (2018)

Jurisdiction	Name	Title
Town of Arcadia	David Franklin	Floodplain Administrator
City of Bethany	Steve Katen	Appointed by City Council
City of Choctaw	Chad Denson	City Building Official by Code
City of Del City	Monica Cardin	Designated by City Manager (currently Community Services Director and City Planner)
City of Edmond	Nancy Kennedy	Stormwater Manager, Edmond Drainage Utility; alt. City Manager or Designee per City Code
Town of Forest Park	L. Dorsey	TBD
City of Harrah	Art Sipes	Code Enforcement / Building Inspector

Jurisdiction	Name	Title
Town of Luther	Kim Bourns	Clerk/Treasurer
City of Midwest City	Patrick Menefee	City Engineer
City of Nichols Hills	Walt Gibson	Code Enforcement Officer
City of Nicoma Park	TJ Chartney	City Building Official per city code
Oklahoma County	Erik Brandt	County Planner
City of Spencer	Dwight Peoples	Code Enforcement Officer
City of The Village	Ken M. Nelson	Emergency Management, per Flood Damage Prevention Ordinance
City of Warr Acres	Kevin Strong	Building Inspector

Source: As identified by municipalities, or within their municipal code

Floodplain Management Plans and Other Flood Studies

Flood studies and other floodplain management planning efforts have been ongoing in the planning area. In June 2017, the City of Edmond hosted a Discovery Meeting for the Deep Fork Watershed RiskMAP program. The FEMA Discovery Report of June 26, 2017 was reviewed for this plan update. Areas of high average annualized loss associated with the Deep Fork Watershed are located in Edmond and Luther.

Comprehensive / Master Planning

Information from the County Comprehensive Plan and available local comprehensive plans were incorporated into the regional profile (Section 4), hazard profiles (Section 5), and used to develop the updated vulnerability assessments (Section 5).

INTEGRATION OF EXISTING DATA AND PLANS INTO MITIGATION PLAN

The mitigation plan integrates local and federal data as discussed below.

Local Data

The Planning Committee reviewed and incorporated existing data and plans to support the mitigation plan. A number of electronic and hard copy documents were made available to support the planning process. These documents are too numerous to list below; therefore, a summary is provided. A complete listing is included in the references section of this document.

- Oklahoma County Geographic Information System (GIS) data
- Documentation of past mitigation actions and grant applications
- Historic maps
- Oklahoma County Comprehensive, and Emergency Management Plans

Cross-referencing this Plan when such documents are updated will need to occur and has been included as mitigation activities in the jurisdictional annexes in Section 9.

Federal and State Data

Federal and State data was collected and used throughout the mitigation process including:

- US Census data
- HAZUS-MH provided data (limited inclusion due to incomplete datasets)
- Data from the National Weather Service
- Data from the Oklahoma Geological Survey
- Data from the US Geological Survey (USGS)
- Data from the Natural Resource Conservation Service (NRCS)
- Data from FEMA
- Public laws and other programs such as the NFIP were examined to complete this Plan.

CONTINUED PUBLIC AND STAKEHOLDER INVOLVEMENT

Oklahoma County and the mitigation planning partnership are committed to the continued involvement of the public, as detailed in Section 7, "Plan Implementation, Maintenance and Update Procedures". This detailed public involvement plan includes the following elements:

The Oklahoma County mitigation planning partnership has identified continued public outreach as a high priority mitigation initiative (see Section 9.1), with various projects listed. Additional outreach will be through the County website and jurisdictional websites.

The plan will continue to be posted on County website (https://www.oklahomacounty.org/325/Plans)
A hard copy of the Plan shall continue to be made available in hard-copy for review during normal business hours at the following location:

Oklahoma County Emergency Management
Oklahoma County Annex Building
320 Robert S. Kerr Avenue, Suite 101
Oklahoma City, OK 73102

Municipal supervisors/mayors or clerks and the Oklahoma County HMP Coordinator will be responsible for receiving, tracking, and filing public comments regarding this HMP. Contact information for the County and all participating municipalities is included in the Point of Contact information in the jurisdictional annexes in Section 9 of this Plan.

The Oklahoma County Hazard Mitigation Planning Coordinator is responsible for collecting and maintaining public comment and input, as provided through the municipal mitigation planning representatives.

COMPLETION OF THE PLANNING PROCESS

All participating municipalities in the County completed the planning and annex-preparation process. Completed jurisdictional annexes are presented in Section 9.

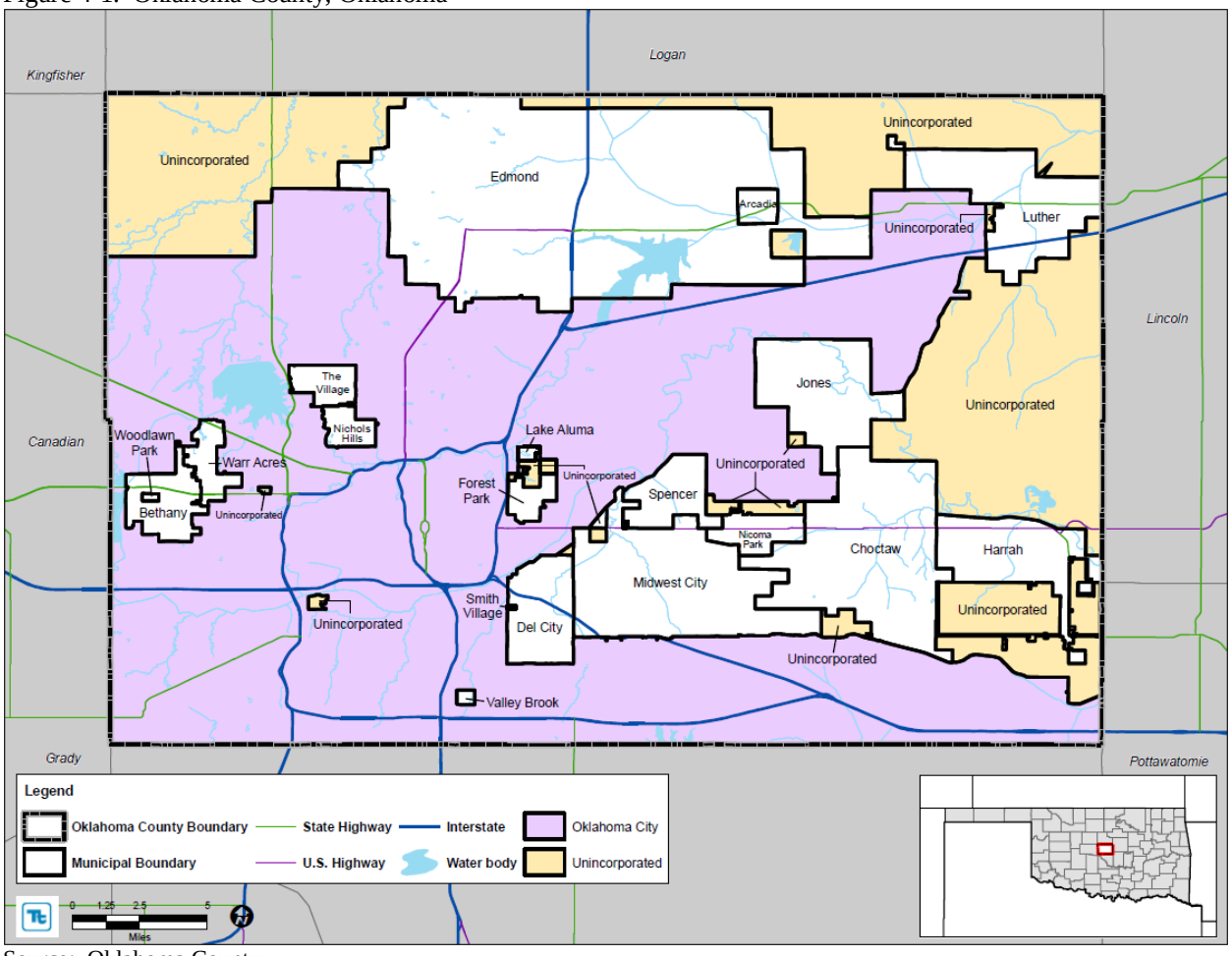
SECTION 4: REGIONAL PROFILE

This section provides profile information which is presented and analyzed to develop an understanding of a study area, including the economic, structural, and population assets at risk and the particular concerns that may be present related to hazards analyzed later in this plan (e.g., low lying areas prone to flooding or a high percentage of vulnerable persons in an area). The profile describes the general information of the Planning Area (physical setting, population and demographics, general building stock, and land use and population trends) located within the Oklahoma County Planning Area.

Location

Oklahoma County is located in the center of the State, encompassing about 720 square miles. Oklahoma City is the county seat, as well as the state capital (Figure 4-1).

Figure 4-1. Oklahoma County, Oklahoma



Source: Oklahoma County

Government and Political Subdivisions

There are 20 cities and towns located in Oklahoma County, as well as unincorporated Oklahoma County. Oklahoma County has a constitutional form of government composed of eight elected officials. There are three County Commissioners forming the Board of County Commissioners. Other officials are the County Assessor, County Clerk, Court Clerk, Sheriff, and County Treasurer.

Oklahoma County is divided into three districts: District 1, District 2, and District 3. Of the 720 total square miles in Oklahoma County, 578 square miles are located within incorporated cities and 142 square miles are unincorporated. There are scattered unincorporated areas within the three County Districts, that is, relatively small parcels surrounded by incorporated lands.

Geographically speaking, the unincorporated areas of Oklahoma County can be separated into three areas that will be used throughout this document: 1) Northeast Oklahoma County is primarily composed of District 1, 2) Southeast Oklahoma County area is primarily composed of District 2, and 3) Northwest Oklahoma County is primarily composed of District 3.

Physical Setting

This section presents the physical setting of the Oklahoma County Planning Area, including: hydrography and hydrology, topography and geology, climate, and land use/land cover.

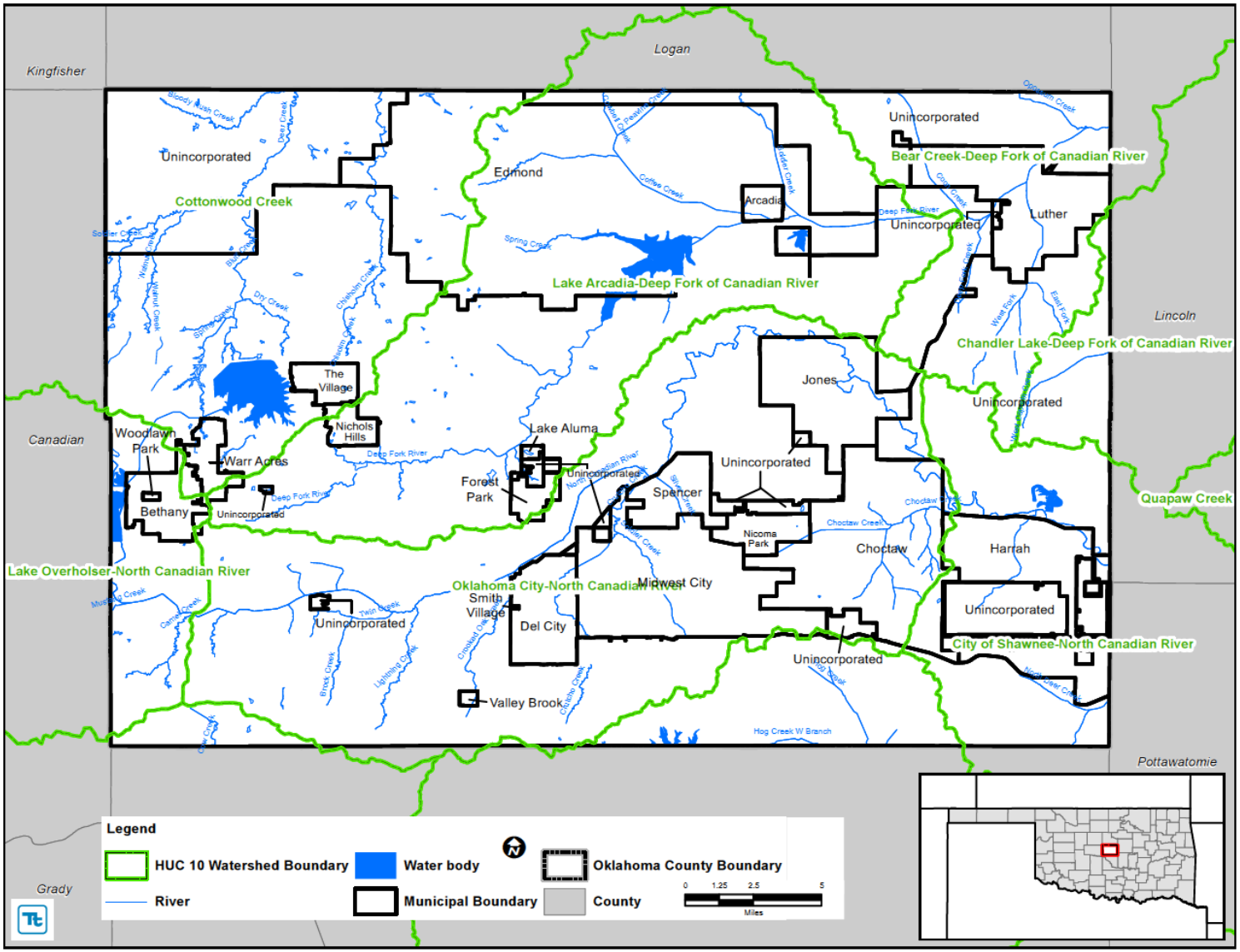
Hydrography and Hydrology

Creeks, rivers, riparian and floodplain areas are prevalent throughout the unincorporated areas of Oklahoma County (see Figure 4-2) (OK COUNTY CP, 2007). The major stream systems include Deer Creek, Deep Fork, Coffee Creek, Crutcho Creek, Cherry Creek, and Soldier Creek, which are all small tributaries to the Canadian and Cimarron Rivers (OK COUNTY HMP, 2006).

There are three major lakes: Overholser, Hefner, and Arcadia. Lake Overholser is located in Central Oklahoma along the Canadian County/Oklahoma County line. Arcadia Lake is located on the Deep Fork River in the eastern city limits of the City of Edmond with Highway 66 on the north, Post Road on the east, I-35 on the west and Memorial Road on the south. Lake Hefner is located in northwest Oklahoma City with Hefner Parkway (Hwy 74) on the east, Wilshire Blvd. on the south, MacArthur Blvd. on the west and Hefner Road (108th St) on the north.

Further information on hydrography and hydrology within the County may be found in the Flood Hazard Profile later in this Plan.

Figure 4-2. Oklahoma County Waterbodies and Hydrologic Unit Code (HUC) 10 Watershed Boundaries



Source: Oklahoma County

Topography

The topography of Oklahoma County is a mixture of low rolling hills and level plains. Elevations range from approximately 1,100 to 1,300 feet above the National Geodetic Vertical Datum of 1929 (NGVD). Slopes range from 1 percent on the uplands to 12 percent near streams.

The topography of the county is generally divided by I-35 running North and South through the center of the county. West of I-35, the topography is basically flat with trees, and mostly urban. East of I-35, the topography consists of rolling hills, wooded areas and pasture lands (OK COUNTY HMP, 2006).

Geology

Oklahoma County has predominately clay and sandy loam soils (Soil Survey of OK County, NRCS). The presence of clay in these soils results in expansive soil conditions being common throughout the County.

Climate

Oklahoma County's climate is variable with pronounced, but gradual, seasonal changes. Spring and fall seasons are mild with warm, humid days and cool nights, but summers are long and hot, and winters are usually mild and short. Snowfall is typically light in winter months. The average length of the growing season is 215 days.

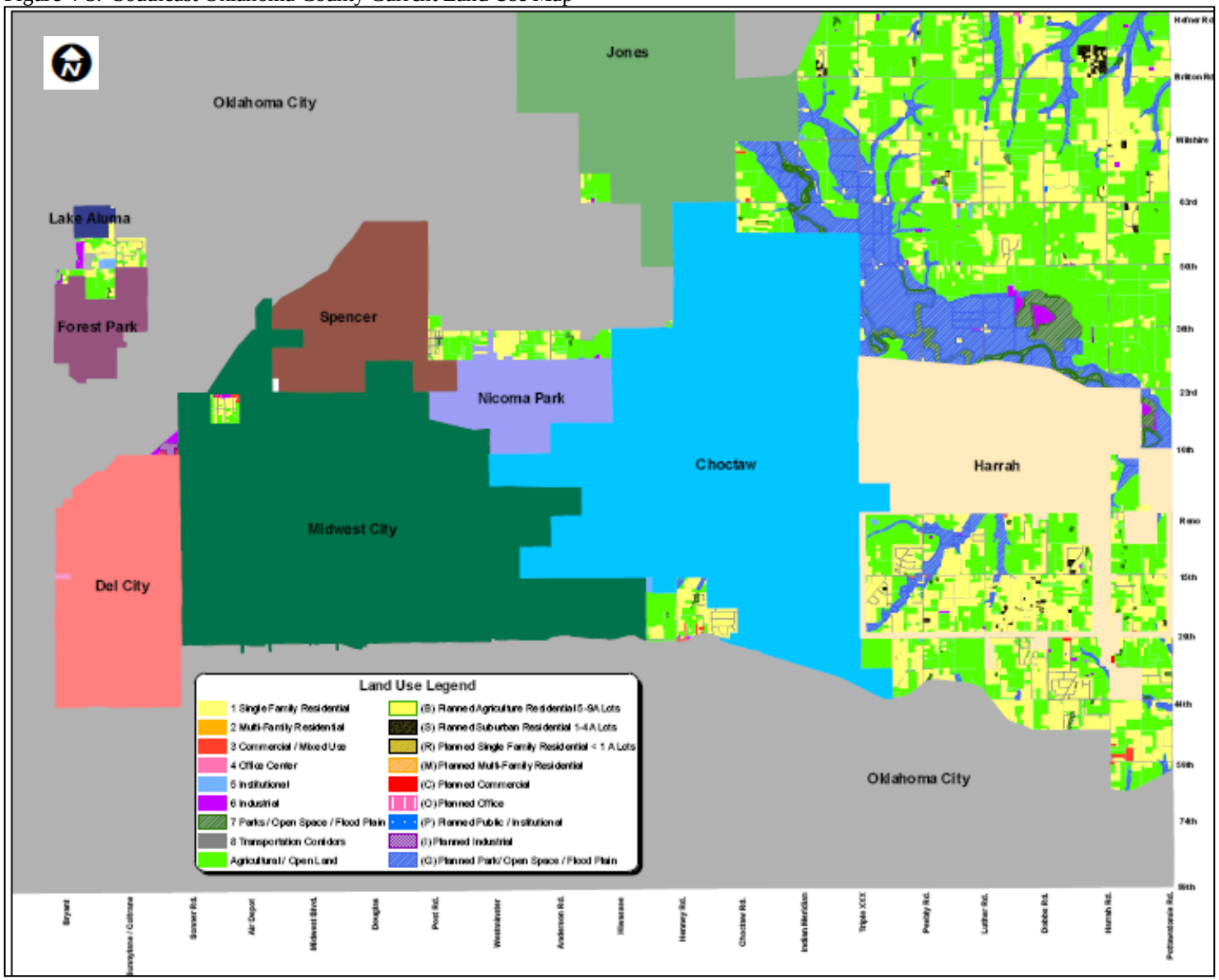
Temperatures range from below freezing in winter to more than 100 degrees Fahrenheit in the summer. Average daily maximum temperatures vary from 49 degrees Fahrenheit in January to 95 degrees Fahrenheit in July and August, while daily minimum temperatures average 28 degrees Fahrenheit in January and 73 degrees Fahrenheit in July and August. In some years, more than 15 consecutive days of temperatures higher than 100 degrees Fahrenheit have been recorded in July and August. Winter temperatures below freezing occur an average of 71 days, with the temperature dropping below 0 degree Fahrenheit averaging a couple of times per decade.

The average annual precipitation is 36 inches with accumulations varying throughout the year. Winter is the driest season, receiving 19% percent of the total annual precipitation, with an average of 4 inches of snow in January and February. Spring into early summer season is the wettest time of year, with March through June receiving 43 percent of the annual precipitation. After a typically dry and hot summer, fall is the second wet season, averaging 21% of annual precipitation. [NWS NOWData, 2018] Locally intense and scattered thunderstorms are the source of precipitation in the spring, summer and fall, which sometimes results in extensive flooding.

Land Use and Land Cover

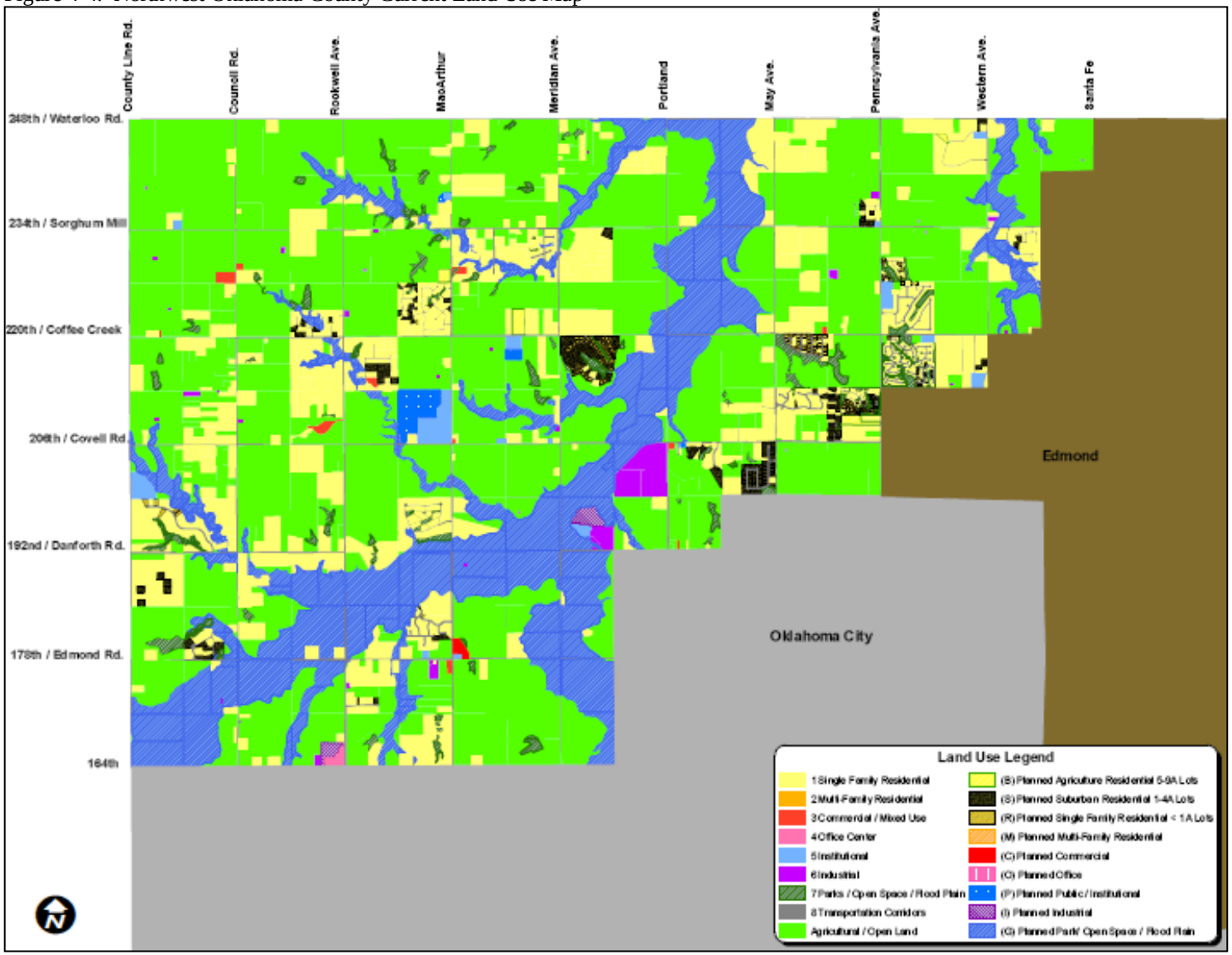
Oklahoma County currently has a land area of approximately 720 square miles, with approximately 142 square miles located in the unincorporated area. Historically, the land use in the majority of the unincorporated areas of Oklahoma County has been agricultural. Although the trend in recent years has been toward residential development, currently over 131 square miles remain zoned for agricultural uses (OK COUNTY CP, 2018). Refer to Figures 4-3 and 4-4 for land use in the unincorporated areas of Oklahoma County and Figure 4-5 for urbanized areas in the County. Since the 2013 plan, the land use map has not changed significantly. Thus, the same maps will be used in the 2019 update.

Figure 4-3. Southeast Oklahoma County Current Land Use Map



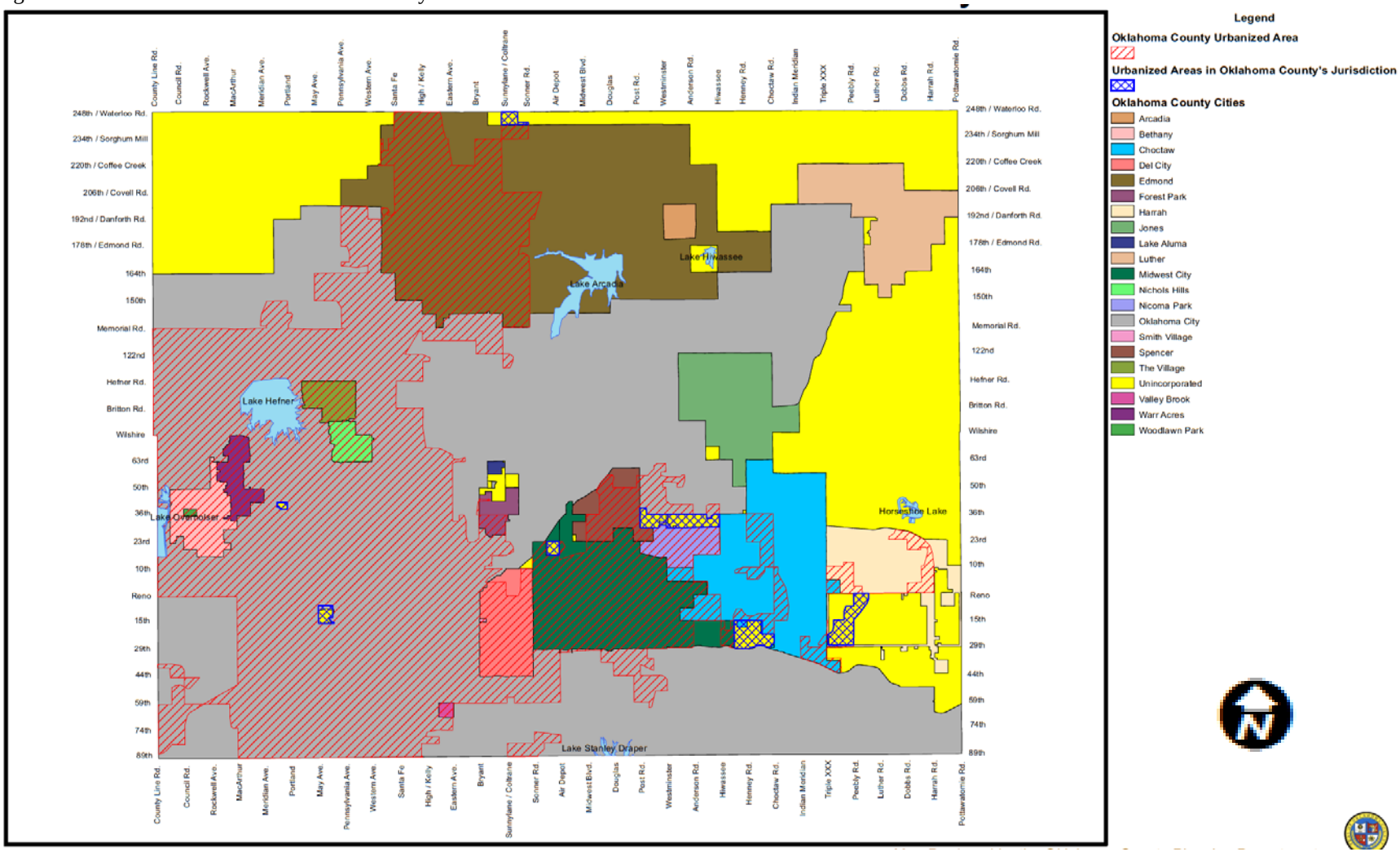
Source: OK COUNTY CP, 2007

Figure 4-4. Northwest Oklahoma County Current Land Use Map



Source: OK COUNTY CP, 2007

Figure 4-5. Urbanized Area in Oklahoma County.



Source: OK COUNTY CP, 2007

POPULATION AND DEMOGRAPHICS

According to 2010 U.S. Census figures, the Oklahoma County Planning Area had a population of 246,655. DMA 2000 requires that HMPs consider socially vulnerable populations. These populations can be more susceptible to hazard events, based on a number of factors including their physical and financial ability to react or respond during a hazard and the location and construction quality of their housing. For the purposes of this study, vulnerable populations shall include (1) the elderly (persons aged 65 and over) and (2) those living in low-income households. Further, non-English speaking populations are important to consider as communication issues are important when addressing emergency preparedness, response and mitigation.

The population and demographic data currently available for direct processing is based on the 2000 U.S. Census. According to 2000 and 2010 U.S. Census figures, Oklahoma County experienced approximately an eight (8) percent increase in population, from 228,699 in 2000 to 246,655 in 2010. The change in population and demographics since 2000 has not been consistent across the planning area. Table 4-1 presents these general and socially-vulnerable population statistics for the Oklahoma County Planning Area based on the 2000 and 2010 U.S. Census.

Table 4-1. Oklahoma County Plan Participants Population Statistics (2010 and 2000 U.S. Census)

Municipality	Census 2010 Pop.	HAZUS-HM 2000 Pop.	HAZUS-MH Pop. Over 65*	Percent of HAZUS-MH Pop. Over 65*	HAZUS-MH Low-Income Pop. **	Percent of HAZUS-MH Low-Income Pop. **
Arcadia (T)	247	279	18	6.5	30	10.8
Bethany (C)	19,051	20,199	1,350	6.7	1,872	9.3
Choctaw (C)	11,146	9,412	434	4.6	450	4.8
Del City (C)	21,332	22,128	1,338	6.0	2,507	11.3
Edmond (C)	81,405	68,312	2,354	3.4	3,908	5.7
Forest Park (T)	998	888	78	8.8	30	3.4
Harrah (C)	5,095	4,641	223	4.8	327	7.0
Luther (T)	1,221	958	49	5.1	59	6.2
Midwest City (C)	54,371	54,010	2,856	5.3	5,608	10.4
Nichols Hills (C)	3,710	4,056	347	8.6	137	3.4
Nicoma Park (C)	2,393	2,415	161	6.7	238	9.9
Spencer (C)	3,912	3,749	223	5.9	410	10.9
The Village (C)	8,929	10,157	653	6.4	869	8.6
Unincorporated County	19,345	13,151	607	4.6	649	4.9
Warr Acres (C)	10,043	10,997	595	5.4	1,096	10.0

Source: Census 2010 (U.S. Census Bureau); HAZUS-MH 2.0
Note: Pop. = population
* Individuals over the age of 65. Percentage is calculated out of total population of municipality. Please note the population over the age of 65 appears to be underestimated (statistics from the flood model).
** Households with an income of less than $20,000. Percentage is calculated out of total population of municipality.

It is noted that the census data for household income includes two ranges ($0-10,000 and $10,000-$20,000/year) that were totaled to provide the "low-income" data used in this study. This does not correspond exactly with the "poverty" thresholds established by the U.S. Census Bureau, which identifies households with an annual household income below $15,000 per year as "low income" for this region. This difference is not believed to be significant for the purposes of this planning effort.

Development Trends and New Development

A steady rise in residential development has occurred primarily in the northwest corner of the County. The availability of public water (Deer Creek Rural Water District) has played a primary role in this trend. Public sanitary sewer from Oklahoma City is also available in limited locations in the northwest area of the County (County District 3).

Known and anticipated development, along with their proximity to hazard risk zones, is identified for each municipality in their municipal annexes (Section 9) of this Plan Update. As development continues across the county, the jurisdictions with identified areas of growth each have additional buildings and infrastructure susceptible to drought, earthquake, hail, lightning, wind, and winter storm due to their being additional buildings and infrastructure that could potentially be impacted by any given event. Unique and varied risks and associated increases or decreases in vulnerability are identified in the jurisdictional annexes.

High-Potential Loss Facilities

High-potential loss facilities include dams, levees, nuclear power plants, military installations and hazardous materials (HAZMAT) facilities. No levees or nuclear power plants were identified in the Planning Area.

There are multiple dams within Oklahoma Count. The “Dam Failure” section of the plan, (5.3.1) handles all critical dams and the extent of potential damage due to a failure. It is worth noting that none of the “High Hazard” dams within the county are owned/managed by any of the jurisdictions found in this plan.

5.1 METHODOLOGY AND TOOLS

Methodology

This process identifies and profiles the hazards of concern and assesses the vulnerability of assets (population, infrastructure and the economy) at risk in the community. A risk assessment provides a foundation for the community's decision makers to evaluate mitigation measures that can help reduce the impacts of a hazard when one occurs (Section 6 and Section 9 of this plan).

Step 1: The first step of the risk assessment process is to identify the hazards of concern. Natural hazards are natural events that threaten lives, property, and many other assets. Often, natural hazards can be predicted, where they tend to occur repeatedly in the same geographical locations because they are related to weather patterns or physical characteristics of an area.

Step 2: The next step of the risk assessment is to prepare a profile for each hazard of concern. These profiles assist communities in evaluating and comparing the hazards that can impact their area. Each type of hazard has unique characteristics that vary from event to event. That is, the impacts associated with a specific hazard can vary depending on the magnitude and location of each event (a hazard event is a specific, uninterrupted occurrence of a particular type of hazard). Further, the probability of occurrence of a hazard in a given location impacts the priority assigned to that hazard. Finally, each hazard will impact different communities in different ways, based on geography, local development, population distribution, age of buildings, and mitigation measures already implemented.

Steps 3 and 4: To understand risk, a community must evaluate what assets it possesses and which assets are exposed or vulnerable to the identified hazards of concern. Hazard profile information combined with data regarding population, demographics, and infrastructure at risk, prepares the community to develop risk scenarios and mitigation ideas for each hazard.

Tools

To address the requirements of DMA 2000 and better understand potential vulnerability and losses associated with hazards of concern, Oklahoma County used standardized tools, combined with local, state, and federal data and expertise to conduct the risk assessment. Our standardized tools used to support the risk assessment are described below.

For this risk assessment, hazard-specific vulnerability evaluations rely on the best available data and methodologies. Uncertainties result from the following:

1) Approximations and simplifications necessary to conduct such a study in HAZUS
2) Incomplete or dated inventory, demographic, or economic parameter data
3) The unique nature, geographic extent, and severity of each hazard
4) Mitigation measures already employed by the participating municipalities and the amount of advance notice residents have to prepare for a specific hazard event

These factors can result in a range of uncertainty in loss estimates, possibly by a factor of two or more. Committee members determined the HAZUS data from the previous plan was grossly inaccurate. Therefore, HAZUS potential exposure and loss estimates were removed from this update of the hazard mitigation plan.

5.2 IDENTIFICATION OF NATURAL HAZARDS OF CONCERN

Hazards of Concern is defined as those hazards that are considered most likely to impact a community. These are identified using available data and local knowledge.

Oklahoma County considered a full range of natural hazards that could impact the area, and then identified and ranked those hazards that presented the greatest concern. The natural hazard of concern identification and update process incorporated input from the County and participating jurisdictions review of the 2013 Oklahoma County HMP and previous hazard identification efforts. It also included updated local, state, and federal information on the frequency, magnitude (including a cursory review of the State of Oklahoma 2014 HMP), and costs associated with the various hazards that have previously affected the area. Table 5.2-1 documents the process of identifying and updating the natural hazards of concern for further profiling and evaluation.

The "Flood" hazard includes riverine, flash and urban flooding.

"High Winds" and "Tornados" are presented together in the "High Winds and Tornado" profile.

The "Severe Winter Storm" hazard includes heavy snowfall, blizzards, freezing rain/sleet, and ice storms.

Please note that technological (for example, hazardous material incidents) and man-made hazards (for example, terrorism) are not being addressed in this planning process. The DMA 2000 regulations do not require consideration of such hazards. Further, the risks of man-made and technological hazards are generally mitigated and/or managed through other regulatory programs and plans.

Table 5.2-1. Identification of Natural Hazards of Concern for Oklahoma County, Oklahoma

Hazard	Step 1	Step 2	Step 3	
	Is this a hazard that may occur in Oklahoma County?	If yes, does this hazard pose a significant threat to Oklahoma County?	Why was this determination made?	Source(s)
Dam Failure	Yes	Yes	• The OK HMP identifies this as a hazard of concern for the State of Oklahoma • The Planning Committee considers it as a risk for the planning area.	• OK HMP
Drought	Yes	Yes	• The OK HMP identifies drought as a hazard of concern for the State of Oklahoma. • Various sources indicated that many drought events or periods impacted large regions of the State, including Oklahoma County. Such events include: o 2000-2001 o August 2000 o 2005 – 2007 – Many counties in the State were affected, including Oklahoma County. Drought levels ranged from severe to exceptional. Wildfires became a serious problem during this time. o 2011-2012 o Winter-Spring of 2017 and again in 2018	• OK HMP • NOAA-NCDC • Drought Impact Reporter • SHELDUS
Earthquake	Yes	Yes	• The OK HMP indicates earthquake as a hazard of concern for the State of Oklahoma. • According to the USGS online seismic hazard maps, the peak ground acceleration with a 10% probability of exceedance over 50 years for Oklahoma County is between 3 and 5% g. FEMA guidance recommends earthquakes are evaluated further if an area has a 3% g peak acceleration or more. • The following sizeable earthquake events affected Oklahoma County: o April 9, 1952 – the one of the largest earthquakes to ever strike Oklahoma; magnitude of 5.7; caused by slippage along the Nemaha fault line; damage was moderate in Oklahoma County. Damage included toppled chimneys and smokestacks, cracked and loosened bricks on buildings, and broken windows and dishes. o October 13, 2010 – mag. 4.7 - struck approximately eight miles southeast of Norman; USGS received reports of the earthquake being felt over the eastern two-thirds of the State; Oklahoma County reported having felt this earthquake. o November 6, 2011 – mag. 5.7 - the largest earthquake in the State in recent times, and possibly stronger than the 1952 quake, rattled Prague, OK and was felt from southwest Illinois to the Big Country area of West Texas. Walls cracked and plates fell. At St. Gregory's	• OK HMP • USGS

Hazard	Step 1	Step 2	Step 3	
	Is this a hazard that may occur in Oklahoma County?	If yes, does this hazard pose a significant threat to Oklahoma County?	Why was this determination made?	Source(s)
			University in Shawnee, a spire on a building fell and three others were damaged. o September 3, 2016 – mag. 5.8 Pawnee earthquake felt strongly in the area with several reports of sheetrock and bricks cracking.	
Expansive Soils	Yes	Isolated areas	• The OK HMP identifies expansive soils as a hazard of concern for the State of Oklahoma. In 2018 the NRCS map depicted parts of the county are not vulnerable to expansive soils. Expansive soils have been removed from these jurisdictions. • USGS indicated that Oklahoma County's soils consists of clay having slight to moderate swelling potential • The planning committee has indicated that expansive soils continue to be a hazard, particularly to subsurface infrastructure, in parts of the county.	• OK HMP • USGS • NRCS web soil survey
Extreme Temperature	Yes	Yes	• The OK HMP identifies extreme heat as a hazard of a concern for the State of Oklahoma. However, for the purpose of this Plan, extreme temperatures will include both heat and cold events for Oklahoma County. • NOAA's NCDC storm events database indicates that Oklahoma County was impacted by approximately 33 extreme temperature events between 1950 and 2018. However, most events are of a regional extent rather than localized to just one county or community.	• OK HMP • NOAA-NCDC • National Atlas
Flood (Riverine, Flash and Urban Flooding)	Yes	Yes	• The OK HMP identifies flooding as the main hazard of concern for the State of Oklahoma. • Oklahoma County has been issued more than 45 FEMA Disaster Declarations for flood-related events, each event resulting in extensive damages. • NOAA's NCDC storm events database indicates that Oklahoma County was impacted by approximately 59 flood events between 1950 and 2018. This includes flash flooding. • NFIP identifies that Oklahoma County has made over 1,770 flood claims as of April 2018, totaling over $24 million in payments.	• OK HMP • OEM • FEMA • SHELDUS • NOAA-NCDC • NFIP
Hailstorm	Yes	Yes	• The OK HMP identifies hailstorms as a hazard of concern for the State of Oklahoma. • Oklahoma County has experienced numerous hailstorm events that have resulted in significant damage throughout the County.	• OK HMP • SHELDUS • NOAA-NCDC

Hazard	Step 1	Step 2	Step 3	
	Is this a hazard that may occur in Oklahoma County?	If yes, does this hazard pose a significant threat to Oklahoma County?	Why was this determination made?	Source(s)
Ice Storm	Yes	Yes	Please see Severe Winter Storm	
Land Subsidence / Sinkholes	Yes	No	• The OK State HMP indicates that counties on the eastern side of the state are susceptible to sinkholes as a result of historic mining operations. Oklahoma County was not identified as a county particularly vulnerable to sinkhole hazards • The Planning Committee does not consider land subsidence/sinkholes to be a significant risk for the planning area.	• OK HMP
Landslide	No	No	• The OK State HMP indicates "landslides may occur anywhere in Oklahoma but generally east of I-35. Most of the area west of I-35 is flat land where landslides are not an issue. Few counties in Oklahoma will consider that landslides are a hazard". • The Planning Committee does not consider landslide to be a significant risk for the planning area.	• OK HMP
Lightning	Yes	Yes	• The OK HMP identifies this as a hazard of concern for the State of Oklahoma • The Planning Committee considers it as a risk for the planning area.	• OK HMP
Severe Winter Storm (Heavy Snow, Blizzards, Freezing Rain/Sleet, and Ice Storms)	Yes	Yes	• The OK HMP identifies all types of severe winter storms as hazards of concern for the State of Oklahoma. • The FEMA, OK HMP and OEM indicate that Oklahoma County has been issued several FEMA Disaster Declarations for winter storm events. • NOAA's NCDC storm events database indicates that Oklahoma County was impacted ~~by~~ approximately 18 winter storms between 1993 and 2017. However, most events are of a regional extent rather then localized to just one county or community.	• OK HMP • OEM • FEMA • NOAA-NCDC • SHELDUS
Tornado	Yes	Yes	• The OK State HMP indicates that the entire State is vulnerable to the tornado hazard. • Oklahoma County has a history of tornado events that have resulted in significant property damage and loss of life. • The Planning Committee considers tornados to be a significant risk for the planning area.	• OK HMP
Wildfire	Yes	Yes	• The OK State HMP indicates that most of the counties in the State are vulnerable to the wildfire hazard. • Oklahoma County has a history of wildfire events that have resulted in significant damages.	• OK HMP

Hazard	Step 1	Step 2	Step 3	
	Is this a hazard that may occur in Oklahoma County?	If yes, does this hazard pose a significant threat to Oklahoma County?	Why was this determination made?	Source(s)
			• The Planning Committee considers wildfire to be a significant risk for the planning area.	
Windstorm	Yes	Yes	See "Tornado" hazard.	

CRREL	Cold Regions Research and Engineering Laboratory
DPC	Disaster Preparedness Commission
DR	Presidential Disaster Declaration Number
EM	Presidential Emergency Declaration
FEMA	Federal Emergency Management Agency
HMP	Hazard Mitigation Plan
NCDC	National Climatic Data Center
NOAA	National Oceanic and Atmospheric Administration
OK	Oklahoma
SHELDUS	Spatial Hazard Events and Losses Database for the United States
USACE	U.S. Army Corp of Engineers
USGS	U.S. Geologic Survey

According to input from Oklahoma County, and review of all available resources, a total of eleven (11) natural hazards of concern were identified as significant hazards affecting the County, to be addressed within this plan:

- Dam Failure
- Drought
- Earthquake
- Expansive Soils
- Extreme Temperatures
- Flooding (riverine, flash and urban)
- Hail
- Lightning
- Wildfire
- Wind (including tornado)
- Severe Winter Storms

Other natural hazards of concern have occurred within the County, but typically have a low potential to result in significant impacts. The County deemed other natural hazards as minor in comparison to those bulleted above; therefore, additional natural hazards will not be further addressed within this version of the Plan. However, if deemed necessary by the County, these hazards may be considered in future versions of the Plan.

5.3.1 DAM FAILURE

HAZARD PROFILE

Description

A dam is an artificial barrier usually constructed across a stream channel to impound water. Timber, rock, concrete, earth, steel or a combination of these materials may be used to build the dam. In Oklahoma County, most dams are constructed of earth or concrete. Dams must have spillway systems to safely convey normal stream and flood flows over, around, or through the dam. Spillways are commonly constructed of non-erosive materials such as concrete. Dams should also have a drain or other water-withdrawal facility for control of the pool or lake level and to lower or drain the lake for normal maintenance and emergency purposes. A dam that impounds water in the upstream area is referred to as a reservoir. The amount of water impounded is measured in acre-feet. An acre-foot is the volume of water that covers an acre of land to a depth of one foot. As a function of upstream topography, even a very small dam may impound or detain acre-feet of water. Two factors influence the potential severity of a full or partial dam failure: the amount of water impounded, and the density, type, and value of development and infrastructure located downstream.

Dams assigned the Low Hazard Potential classification are those dams where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Significant Hazard Potential classification are dams that are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure, and where failure or mis-operation results in no probable loss of human life but can cause serious economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns. High Hazard Potential classifications are those dams where failure or mis-operation will probably cause loss of human life. For the purpose of this plan, only High Hazard dams are profiled.

Extent

Flood severity from a dam failure can be measured with a low, medium or high severity, which are further defined as follows:

- Minor Severity - This happens when water from a small breach or seepage stays within the downstream river channel. Minimal or no property damage likely, but possibly some public threat or inconvenience.
- Moderate Severity - A breach large enough to exceed the capacity of the river or creek channel and overflow. Some inundation of structures and roads near streams. Some evacuations of people and/or transfer of property to higher elevations are likely.
- Major Severity - A breach large enough to exceed the capacity of the river or creek channel and overflow where extensive inundation of structures and roads happens. Significant evacuations of people and/or transfer of property to higher elevations are necessary.

Flood inundation depths (extents) for each jurisdiction are shown as elevation above sea level on the maps found in an Appendix A (restricted from public view). Zones of severity will vary based on distance from the damn and topography of the surrounding area.

Location

The Dam Incident Notification (DIN) system maintained by the National Performance of Dam Program (NPDP) maps the location of state and federally monitored dams throughout the state. The database shows 70 dams appearing to be located within Oklahoma County; 23 of those are categorized as High Hazard. Table 5.3.1-1 lists the High Hazard dams located and adjacent to Oklahoma County (NCDP, 2016).

Table 5.3.1-1: High Hazard Dams in and/or adjacent to Oklahoma County

Name	National / State ID #	Owner Type	Water Course	Year Built	Dam Type	Crest Length (ft)	Height (ft)	Storage Capacity (acre-ft)	Drainage Area (sq. mi.)	Affect Jurisdictions in Plan? (Y/N)*	Comments
Lake Arcadia	OK22178	Federal	Deep Fork River	1986	Earth	5250	102	190700	105	Yes	
Ski Island Lake	OK02406	Private	Spring Creek	1957	Earth	2000	27	386	6.3	Yes	Unincorporated Oklahoma County bridges and roads along Deer Creek between Meridian Ave and May Ave., north of 164th St. The area is largely undeveloped.
Blue Stem	OK02412	Private	Spring Creek	1925	Earth	250	23	355	7.5	Yes	Immediately downstream from Ski Island Lake. Dam failure would flow into unincorporated OK County.
Regal	OK02418	Private	Tr – Spring Creek	1920	Earth	424	16	81	1.2	No	
American Fidelity	OK02422	Private	Tr - Deep Fork River	1965	Earth	950	14	99.3	0.63	No	
Northeast (Zoo Lake)	OK02424	Local Gvt.	Tr – Deep Fork River	1908	Earth	890	43	800	2.92	No	
Aluma	OK02425	Private	Tr – Deep Fork River	1921	Earth	745	38	260	N/A	No	
Sportsman Club	OK02426	Private	Tr – Deep Fork Creek	1948	Earth	330	15	313	0.3	No	
Hefner	OK02535	Local Gvt.	Bluff Creek	1943	Earth	1	112	107400	9.69	Yes	Unincorporated Oklahoma County bridges and roads along Deer Creek between Meridian Ave and May Ave., north of 164th St. Significant damage to bridges and roads around the area.
Overholser	OK02537	Local Gvt.	N. Canadian River	1919	Earth	1	61	31100	738	Yes	Inundation along North Canadian River. At risk: Choctaw, Del City, Harrah, Midwest City, Spencer, unincorporated County. See North Canadian River floodplain area in annex maps.
Brixton Heights Addition (St. Francis West Lake)	OK02543	Private	Tr – Spring Creek	1957	Earth	860	20	90	0.79	No	
Northwood Lake Dam	OK10709	Private	Tr – Deer Creek/Spring Creek	1961	Earth	2665	42	2700	12	Yes	Located in Canadian County but drains into unincorporated OK Co

Name	National / State ID #	Owner Type	Water Course	Year Built	Dam Type	Crest Length (ft)	Height (ft)	Storage Capacity (acre-ft)	Drainage Area (sq. mi.)	Affect Jurisdictions in Plan? (Y/N)*	Comments
Twin Lakes East	OK11000	Private	Tr – Spring Creek	1930	Earth	500	23	65	0.34	Yes	Dam failure could flood homes north of NW 67th near and west of MacArthur Blvd. in Warr Acres
Knight (Lyrewood Lake)	OK11001	Private	Tr – Spring Creek	1962	Earth	300	15	75	0.51	No	
Twin Lakes West	OK11005	Private	Tr – Spring Creek	1930	Earth	345	20	60	1.54	Yes	Dam failure could flood homes north of NW 67th near and west of MacArthur Blvd in Warr Acres.
Pines West	OK11006	Private	Tr – Spring Creek	1925	Earth	120	17	51	1.75	Yes	Affects Warr Acres, between Brookside and Hammond Ave.
Pines East	OK11007	Private	Tr – Spring Creek	1925	Earth	304	17	63	0.41	Yes	Affects Warr Acres, Miles Ln , Ellen Ln and nearby streets, feeds into Pines West.
NW Oklahoma City Sludge Lagoon No 1	OK11051	Local Gvt.	Bluff Creek	1954	Earth	1265	30	403	0.15	No	
Dry Creek Detention	OK11061	Local Gvt.	Dry Creek	1978	Earth	1290	25	281	10.97	No	
Will Rogers Park Holding Pond	OK11069	Local Gvt.	Tr – Deep Fork	1967	Earth	1230	24	323	3.8	No	
Lightning Creek Holding Pond A	OK11070	Local Gvt.	Tr – Lightning Creek		Earth	4000	16	187	0.63	No	Located in Cleveland Co, affects Oklahoma City
Lightning Creek Holding Pond C	OK11071	Local Gvt.	Tr – Lightning Creek	1977	Earth	4000	16	187	0.63	No	
Masseys	OK12201	Private	Tr – Deep Fork	1970	Earth	650	21	122	N/A	No	
Dolese Youth Park	OK22001	Local Gvt.	Tr – Bluff Creek	1960	Earth	1	25	80	N/A	No	
Lakeside Dam	OK30068	Private	Tr – Deep Fork	2005	Earth	2000	24	245.8	0.53	No	

Source: NPDP, 2012

* Potential jurisdiction dam failures specified in Table 5.3.1-2 Note: TR = Tributary BR = Branch

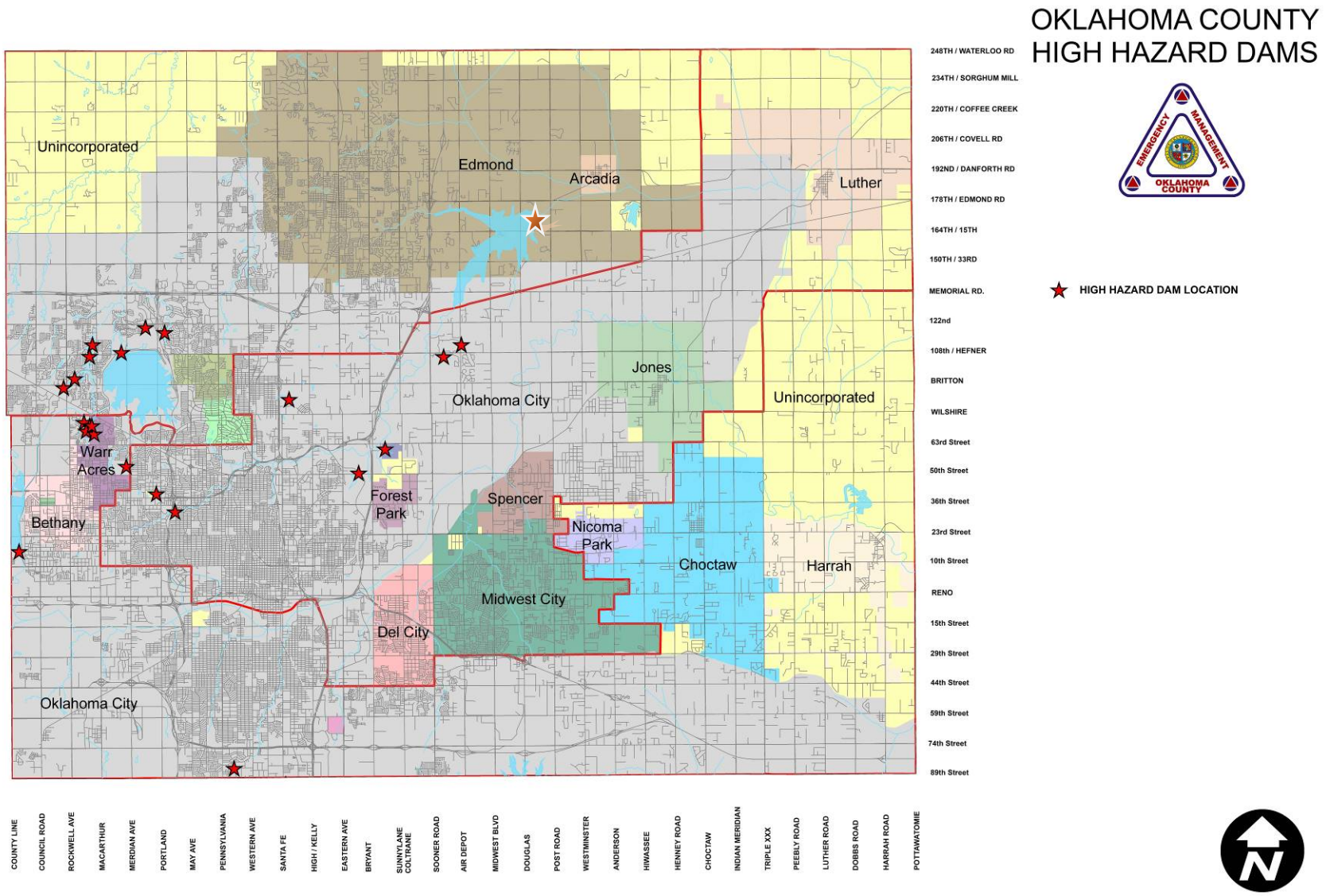

OKLAHOMA COUNTY
HIGH HAZARD DAMS
EMERGENCY MANAGEMENT
OKLAHOMA COUNTY
HIGH HAZARD DAM LOCATION
Unincorporated
Edmond
Arcadia
Luther
Jones
Unincorporated
Oklahoma City
Warr Acres
Bethany
Forest Park
Spencer
Nicoma Park
Choctaw
Harrah
Midwest City
Del City
Oklahoma City
248TH / WATERLOO RD
234TH / SORGHUM MILL
220TH / COFFEE CREEK
206TH / COVELL RD
192ND / DANFORTH RD
178TH / EDMOND RD
164TH / 15TH
150TH / 33RD
MEMORIAL RD.
122nd
108th / HEFNER
BRITTON
WILSHIRE
63rd Street
50th Street
36th Street
23rd Street
10th Street
RENO
15th Street
29th Street
44th Street
59th Street
74th Street
89th Street
COUNTY LINE
COUNCIL ROAD
ROCKWELL AVE
MACARTHUR
MERIDIAN AVE
PORTLAND
MAY AVE
PENNSYLVANIA
WESTERN AVE
SANTA FE
HIGH / KELLY
EASTERN AVE
BRYANT
SUNNYLANE COLTRANE
SOONER ROAD
AIR DEPOT
MIDWEST BLVD
DOUGLAS
POST ROAD
WESTMINSTER
ANDERSON
HWASSEE
HENNEY ROAD
CHOCTAW
INDIAN MERIDIAN
TRIPLE XXX
PEEBLY ROAD
LUTHER ROAD
DOBBS ROAD
HARRAH ROAD
POTTAWATOMIE

Figure 5.3.1-1

Figure 5.3.1-1 above shows Warr Acres is the only jurisdiction in the plan to contain high hazard dams (four) within its municipal boundary. Of the 23 high hazard dams in the county and 3 additional in the planning area (including dams affecting Oklahoma County in Canadian, Cleveland and Blaine counties), four are significant in size, purpose, and hazard potential in Oklahoma County. Digitized inundations are available for Arcadia and Canton Lake, but are not available for all at-risk jurisdictions or high hazard dams. Most high hazard dams in Oklahoma County are privately owned. As a result, inundation information is not available or deficient.

Arcadia Lake Dam

Arcadia Lake is located in northeast Oklahoma County, approximately 1.5 miles southwest of the town of Arcadia, in the metropolitan areas of Oklahoma City and Edmond. Arcadia Lake was formed in 1986 by impounding the Deep Fork arm of the Canadian River below its convergence with Spring Creek. Water released from Arcadia Lake flows east into the Deep Fork of the Canadian River until it reaches Lake Eufaula (OCWP, 2000 : http://www.owrb.ok.gov/studies/reports/arcadia/arcadia_e.php).

Arcadia Lake is a source of recreation for the Oklahoma City metropolitan area. The dam is federally owned and maintained, and located on the east side of the lake, which contains 1,820 acres of water. Should the lake experience a breach in its dam, the water release would affect the Deep Fork Creek upstream to Okmulgee, Oklahoma. The towns of Arcadia and Luther in Oklahoma County would be the primary areas affected, (Oklahoma County HMP, 2006) along with rural east Edmond.

This lake provides water supply, flood control and recreation opportunities along the Deep Fork River in Oklahoma County. The Lake provides 12,100 acre-feet per year of water supply. The entire available yield is allocated to the Edmond Public Works Authority (Oklahoma Water Resources Board, 1997).

Appendix A (restricted from public view) illustrates the inundation of a potential dam failure of Arcadia Lake Dam for Arcadia and Luther, respectively. Just downstream of the dam, a water treatment plant exists in Edmond City Limits. A convenience store and tourist stop in Arcadia is also in the direct path, and would be affected approximately 2 hours after a major failure according to the EOP. The main flow would travel south of Arcadia, however much of the southern half of Arcadia could receive some inundation should a total failure of the dam occur. The Soldier Creek bridge east of Arcadia in Edmond near Danforth and Anderson Rd would be inundated. Many miles of Historic Route 66 would be underwater through east Edmond and Unincorporated Oklahoma County. High tension electric lines east of Danforth and Hiwassee could be taken down if a highline stand is destroyed. The inundation area in unincorporated Oklahoma County is almost entirely regulatory floodplain with very few structures. A few homes and oil wells exist northeast Covell Rd. and Dobbs Rd. along Hogback Rd. along with a high tension line that crosses east to west. The Stillwater Central Railroad line travels along Hogback Rd. and would be inundated for several miles as the tracks follow the Deep Fork Creek to Wellston in Lincoln County just east of Oklahoma County.

Canton Lake Dam

Canton Lake Dam is located in Blaine County, approximately two miles north of the town of Canton. The dam is a 15,140-foot-long structure with a 640-foot gated, concrete spillway, which rises to a maximum height of 68 feet above the streambed. Completed in 1948, the Canton Lake stores 114,370 acre-feet of water and drains a total area of 12,483 square miles (including upstream projects). The dam provides flood control protection as well as water storage on the Canadian River in Oklahoma. State Highway 58-A extends across the dam embankment and spillway. Oklahoma City obtained water rights to Canton Lake so water from Canton flows to Oklahoma City's Lake Hefner and Lake Overholser (OK State HMP, 2014).

The stability of the Canton Dam spillway and the amount of floodwater the dam could safely hold was the subject of concern and discussion for over 30 years. Restrictions on the amount of water the dam could safely hold affected the dam's ability to provide flood protection to the level for which it was originally designed. Due to these restrictions, downstream flooding could occur. This potential flooding could impact areas in Oklahoma County including, but not limited to, downtown Oklahoma City (OK State HMP, 2014).

Canton Lake Dam has recently undergone construction of an auxiliary spillway to reduce seepage under the existing embankment and ensure the dam can pass the probable maximum flood requirements and to meet seismic requirements. This construction was completed in 2016, including an auxiliary spillway 720 feet long. This includes a 670 foot long cut off wall to reduce upstream erosion (www.swt.usace.army.mil and www.swd.usace.army.mil).

Bethany would be inundated in a small area near the corner of NW 23rd and Eagle Ln. In addition, most of two mile sections north of NW 36th St. Expressway and west of Council would be inundated. This includes a heavily residential area south of NW 39th St. and two city Parks north of NW 39th St., a mobile home park, residences, and the city water treatment plant.

The inundation of a potential dam failure of Canton Lake Dam for northwest parts of Del City is mostly undeveloped or abutting an industrial area. A few homes may be at risk east of Burk Way and south of Reno Ave along with an industrial park near Bryant Pl. In addition a few buildings on Tinker Diagonal north of Delmar Rd. may be at risk. A tank battery farm in the industrial area may be at risk in a complete failure.

In Midwest City, a train depot for loading of new automobiles may be at risk if a full failure occurs. A mobile home park northeast of the depot is at risk, along with homes in a small unincorporated area near Northeast 23rd and Air Depot. Oklahoma County has used multiple mitigation grant projects to remove homes in this area that flooded when Crutcho Creek overtops its bank. Floodwaters could back into Soldier Creek all the way to NE 10th and Midwest Blvd. In Spencer, a few homes near NE 46th and Spencer Rd. could be inundated in a worst case scenario. In Jones, the area affected is east of NW 4th and primarily north of Main St and contains businesses and homes. In Harrah, NE 23rd could be inundated west of Peebly Rd and east of Luther Rd. Much of the inundation area is open floodplain in the rural unincorporated parts of eastern Oklahoma County.

Detailed inundation maps (with flood depths) are located in Appendix A (restricted from public view). The FEMA floodways in the North Canadian River cover much of the same area as the dam failure risk.

Hefner Dam

Lake Hefner Dam, owned and operated by Oklahoma City, was built in 1943 on Bluff Creek in northwest Oklahoma County for the purposes of water supply and recreation. The lake serves as terminal storage for diversions from the North Canadian River and releases from Canton Lake. Built on the highest point of land in Oklahoma City, it is only 5 miles north of downtown and contains 2,580 surface acres of water. The dam is located on the North side of the impoundment.

Since it was impounded in 1947, there has not been a breach of the Lake Hefner Dam. However, in recent years, there have been extensive construction projects occurring below the dam in Oklahoma City from NW 108th Street to NW 164th, including housing developments, a major hospital complex (Mercy Hospital) and several shopping centers. Should there be a breach of the Lake Hefner dam, the water from the lake would travel through these areas to the Deer Creek Watershed and spread northeast to the Cimarron River on the north side of Guthrie, OK (OK County HMP, 2006). See the information above in Table 5.3.1-1.

Overholser Dam

Lake Overholser is located in Central Oklahoma County along the Canadian County/Oklahoma County line. The Overholser Dam was built in 1917 and 1918 to impound water from the North Canadian River to satisfy the needs of future growth in Oklahoma City. The dam, located on the east side of the lake on the North Canadian River, is 62 feet high and 1,258 feet long. Today, Lake Overholser is a 'backup' reservoir, tapped during the summer to meet the increased seasonal demand. The dam was added to the National Register of Historic Places in 2007. The lake is owned by Oklahoma City and covers 1700 surface acres (OK County HMP, 2006).

Floods resulting from a breach in the Overholser Dam would affect the downtown Oklahoma City area, as well as all throughout the county along the North Canadian River (OK County HMP, 2006).

Lake Overholser is downstream of the Canton Lake Dam and would receive much of the water should a dam failure of Canton Lake Dam occur. Water from this dam can be channeled into Lake Hefner mentioned above. Otherwise, a failure of Overholser Dam would follow the same path as a Canton Lake Dam failure through Oklahoma City and into the jurisdictions in this plan east of Bethany as noted in the table below (Bethany would not be impacted as it is upstream of the Overholser dam).

Small lakes and dams

There are other small impoundments throughout the County, ranging from farm ponds to small lakes such as Lake Aluma and Horseshoe Lake.

Lake Aluma, a private community, would have no impact. A failure would only affect Oklahoma City. Horseshoe Lake would affect rural areas inside of Harrah city limits; north of 23rd St. Streets may be damaged and a bridge at Luther Rd N of 23rd and another on Whites Meadow Dr. In addition, a hydroelectric plant is present on the island in Horseshoe Lake and the loss of the lake may cause an electrical outage to the area which it supplies.

Jurisdictions potentially impacted by dam failure are found in Table 5.3.1-2 below:

Table 5.3.1-2: Potential Jurisdiction Dam Failures

Jurisdiction	Potential Dam Hazard
Arcadia	Arcadia Lake
Bethany	Canton Lake, Overholser
Choctaw	Canton Lake, Overholser
Del City	Canton Lake, Overholser
Edmond	Arcadia Lake
Forest Park	None
Harrah	Canton Lake, Overholser
Luther	Arcadia Lake
Midwest City	Canton Lake, Overholser
Nichols Hill	None
Nicoma Park	None
Spencer	Canton Lake, Overholser
The Village	None
Warr Acres	Twin Lakes East and West Pines Lakes East and West
Unincorporated	Hefner, Ski Island Lake, Arcadia Lake, Canton Lake, Overholser, Northwood Lake, Blue Stem

Range of Magnitude

Two main factors which influence the potential severity of a full or partial dam failure include (1) The amount of water impounded; and (2) The density, type, and value of development and infrastructure located downstream (City of Sacramento Development Service Department, 2005). Failures of small dams, such as those created to form a pond or other small water body, may result in a flood of only a few hundred gallons of water, and may not impact any structures or other property. Failures of large dams, such as those created to form large water supply reservoirs or recreational lakes, may result in millions of gallons of water destroying hundreds of structures and potentially killing large numbers of people.

The environmental effects of dam failure can also be significant. Reservoirs held behind dams affect many ecological aspects of a river, and water releases from dams usually contain very little suspended sediment; this can lead to scouring of river beds and banks. The environment would be exposed to a number of risks in the event of dam failure. The inundation could introduce many foreign elements into local waterways, resulting in potential destruction of downstream habitat and detrimental effects on many species of animals, especially endangered species-listed aquatic species (Contra Costa County, 2011).

Previous Occurrences and Losses

The Oklahoma Water Resources Board reports there have been two high hazard dams break in Oklahoma since 1950, although neither of those have occurred within Oklahoma County. While flood events frequently cause small earth dams on farm or ranch ponds to break, usually due to erosion caused by the heavy rains, these events are inconsistently recorded and most often do not have a significant impact.

A significant dam failure was recorded in Oklahoma City in 1923, when heavy rains caused Lake Overholser dam to fail resulting in the displacement of approximately 15,000 residents. Estimated damages, recovery costs, fatalities, and injuries are unknown. This historical failure of Lake Overholser is highly unlikely to occur with present day mitigation measures, spillway construction, and siting of structures. In the event that Lake Overholser was to fail in present day the impact would be minimal and at most a handful of homes would be impacted (OK City HMP, 2017).

In August 2007, water once again flowed over the Overholser Dam again due to Tropical Storm Erin. Overtopping occurred even though the flood gates were fully opened (OK State HMP, 2014).

A potential dam failure occurred at the Dry Creek Detention Pond Dam on April 10, 2008. Heavy rains had occurred in the days prior to April 10, 2008. The Overflow Pipe that runs from the pond, under the dam, and into Dry Creek had failed and the leaking water had eroded the earthen dam above it causing two large holes, one on the back of the dam and one front of the dam. There was a potential for the remaining portions of the earthen dam to collapse and cause a sudden release of water from the pond resulting in a flash flood along Dry Creek north of the dam. Public Works took immediate mitigation actions and prevented any failure. Public safety personnel notified residents in the potential inundation zone of the hazard and provide information on protective actions they should take (OK City HMP, 2017).

On June 14, 2015 a privately owned and maintained stock pond dam on private property in Oklahoma City was breached releasing all of the water impounded behind it, near the 7700 block of S. Indian Meridian. No structures were damaged and the extent of the washout of two public roads in OKC was minor (OKC HMP, 2017).

No other dam failure events have been recorded in Oklahoma County.

Probability of Future Events

The likelihood of a dam failure in Oklahoma County is extremely difficult to predict. Nonetheless, the risk of such an event increases for each dam as the dam's age increases and/or frequency of maintenance decreases. Given the variety and multitude of impoundment structures throughout Oklahoma County, it is likely that multiple jurisdictions will be at risk from the dam failure hazard in the future. However, provided that the recommended repairs, regular maintenance, and routine inspections of the dams in in Oklahoma County are performed in the future, dam failures are considered unlikely.

In Section 5.3, the identified hazards of concern for Oklahoma County were ranked. The probability of occurrence, or likelihood of the event, is one parameter used for hazard rankings. Based on historical records and input from the Planning Committee, and the limited amount of recorded dam failures in the past 100 years in Oklahoma County, the probability of occurrence for dam failure affecting any of the jurisdictions participating in the Oklahoma County HMP that have a dam failure risk (Table 5.3.1-2) is considered '1 – Unlikely.' A dam failure event is possible within the next ten years. Event has a 1 in 10 chance of occurring.

Though an unlikely event, it is estimated that a dam and impoundment failure event may cause direct and indirect impacts in Oklahoma County. Some of the events may induce secondary hazards such as flooding and water quality and supply concerns. Residents may also experience evacuations, transportation delays/accidents/inconveniences and public health concerns.

VULNERABILITY ASSESSMENT

To understand risk, a community must evaluate what assets are exposed or vulnerable in the identified hazard area. For dam failure events, the dam inundation zones are identified as the hazard areas. Therefore, all assets in the dam inundation zones (population, structures, critical facilities and lifelines), are exposed and considered vulnerable when there is a dam failure event.

Overview of Vulnerability

The dam failure hazard is a significant concern to Oklahoma County due to potential failure of 70 dams reported dams in the County, 23 of which are classified as high hazard. The direct and indirect losses associated with these events include injury and loss of life, damage to structures and infrastructure, agricultural losses, utility failure (power outages), and stress on community resources.

Data and Methodology

The Oklahoma Water Resources Board (OWRB) coordinates the Oklahoma Dam Safety Program to ensure the safety of almost 5,000 dams in the State. The program requires inspections every five years for "low" hazard dams, three years for "significant" hazard dams, and annual for "high" hazard dams. In addition, owners of "high hazard" dams are required to have an OWRB-approved emergency action plan (EAP) (OWRB, 2012).

An EAP is a formal document to identify potential emergency conditions at a dam and specify actions to be followed to minimize property damage and loss of life. In general, EAPs contain six basic elements: 1) Notification Flowchart; 2) Emergency Detection, Evaluation, and Classification; 3) Responsibilities; 4) Preparedness; 5) Inundation Maps; and 6) Appendices. The inundation maps that are part of the EAP show emergency management authorities the critical areas for action in case of an emergency. As specified by OWRB, inundation mapping should include:

- North arrow and a bar scale
- Clearly delineated and labeled inundation areas. This is especially important if there are "sunny day" failure and PMF plus breach inundation limits shown on the inundation maps?
- A qualification statement that the inundation limits for an actual dam failure may vary from what is shown
- Clearly labeled local roads, drainages, and other landmarks
- Downstream limit of the inundation mapping
- Channel cross sections taken at critical downstream locations, such as at major road crossings, schools, major population centers, etc.
- Information at important downstream cross sections:
  - Peak flood stage
  - Flood wave arrival time
  - Maximum water surface elevation
  - Peak discharge (OWRB, 2012).

For dam failures of high hazard dams, inundation areas are likely to be similar to the 1% and 0.2% annual chance flood events downstream of each dam. Refer to Section 5.3.6 (Flood) for exposure and potential loss estimates associated with these flood events. A qualitative assessment of the dam failure hazard is provided below.

Impact on Life, Health and Safety

All population in a dam failure inundation zone is considered exposed and vulnerable. Of the population exposed, the most vulnerable include the economically disadvantaged and the population over the age of 65. Economically disadvantaged populations are more vulnerable because they are likely to evaluate their risk and make decisions to evacuate based on the net economic impact to their family. The population over the age of 65 is also highly vulnerable because they are more likely to seek or need medical attention which may not be available to due isolation during a flood event and they may have more difficulty evacuating.

There is often limited warning time for dam failure. These events are frequently associated with other natural hazard events such as earthquakes, landslides or severe weather, which limits their predictability and compounds the hazard. Populations without adequate warning of the event are highly vulnerable to this hazard.

Impact on General Building Stock, Critical Facilities and the Economy

All buildings and infrastructure located in the dam failure inundation zone are considered exposed and vulnerable. Property located closest to the dam inundation area has the greatest potential to experience the largest, most destructive surge of water. All transportation infrastructure in the dam failure inundation zone are vulnerable to damage and potentially cutting off evacuation routes, limiting emergency access and creating isolation issues. Utilities such as overhead power lines, cable and phone lines could also be vulnerable. Loss of these utilities could create additional isolation issues for the inundation areas.

Future Growth and Development

As discussed in Section 4, areas targeted for future growth and development have been identified across the County. Any areas of growth could be potentially impacted by the dam failure hazard if located within the dam failure inundation zones.

Effect of Climate Change on Vulnerability

The potential effects of climate change on Oklahoma County's vulnerability to dam failure shall need to be considered as a greater understanding of regional climate change impacts develop.

Overall Vulnerability Assessment

According to the Oklahoma State HMP, a breach in the Overholser Dam would cause flooding in part of downtown Oklahoma City, Spencer, part of Harrah, and unincorporated parts of the County. Flooding could continue as far as McLoud and Shawnee. The effects of a dam failure would be catastrophic to the area around Oklahoma City, whether it was from Canton Lake Dam or from Lake Overholser Dam (OK State HMP, 2014).

If a breach occurred in the Canton Lake Dam, several communities downstream would be affected and some possibly destroyed. Much of the area between Canton and Oklahoma City is agricultural and several highways and two railroads would be unusable so the economic loss would be huge. The Town of Canton is located only two miles below the Canton Dam and would likely be nearly totally inundated with floodwaters. Other towns that would be affected would include Greenfield, Watonga, parts of El Reno, parts of Yukon and parts of downtown Oklahoma City (OK State HMP, 2014).

Several unincorporated areas are threatened by a dam failure event. High hazards dams that pose such a threat to the unincorporated areas include Hefner, Ski Island Lake, Northwood Lake in Canadian County, Arcadia Lake, Canton Lake, and Overholser. Damages caused by a dam failure around these areas would largely be to bridges, roads, and undeveloped lands.

Existing and future mitigation efforts including personal and structural dam safety should continue to be developed and employed that will enable the study area to be prepared for these events when they occur and lower their risk.

5.3.2 DROUGHT

HAZARD PROFILE

Description

A drought is a period of drier-than-normal conditions that results in water-related problems. Precipitation (rain or snow) falls in uneven patterns across the country. When no rain or only a small amount of rain falls, soils can dry out and plants can die. When rainfall is less than normal for several weeks, months or years the flow of streams and rivers declines causing water levels in lakes and reservoirs to fall, and the depth of water in wells decreases. If dry weather persists and water supply problems develop, the dry period can become a drought.

Extent

The extent (e.g., magnitude or severity) of drought can depend on the duration, intensity, geographic extent, and the regional water supply demands made by human activities and vegetation. The intensity of the impact from drought could be minor to total damage in a localized area or regional damage affecting human health and the economy. All of Oklahoma County in the past has experienced exceptional droughts as defined in table 5.3.2-3 below. All Oklahoma County jurisdictions participating in this plan are expected to experience exceptional drought in the future.

A variety of measures is used to predict the severity and impact of droughts:

Palmer Classifications	
4.0 or more	Extremely Wet
3.0 to 3.99	Very Wet
2.0 to 2.99	Moderately Wet
1.0 to 1.99	Slightly Wet
0.5 to 0.99	Incipient Wet Spell
0.49 to -0.49	Near Normal
-0.5 to -0.99	Incipient Dry Spell
-1.0 to -1.99	Mild Drought
-2.0 to -2.99	Moderate Drought
-3.0 to -3.99	Severe Drought
-4.0 or less	Extreme Drought

Table 5.3.2-1. Palmer Drought Severity Index (PDSI) Classifications
Source: US Drought Portal, 2018

Palmer Drought Severity Index

Palmer developed a formula for standardizing drought calculations for each individual location based on the variability of precipitation and temperature at that location. The advantage of the Palmer Index is that it is standardized to local climate, so it can be applied to any site for which sufficient precipitation and temperature data is available (NOAA, 2018). (Table 5.3.2-1)

Category	Description	Possible Impacts	Palmer Drought Severity Index (PDSI)
D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures; fire risk above average. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered.	-1.0 to -1.9
D1	Moderate Drought	Some damage to crops, pastures; fire risk high; streams, reservoirs, or wells low, some water shortages developing or imminent, voluntary water use restrictions requested	-2.0 to -2.9
D2	Severe Drought	Crop or pasture losses likely; fire risk very high; water shortages common; water restrictions imposed	-3.0 to -3.9
D3	Extreme Drought	Major crop/pasture losses; extreme fire danger; widespread water shortages or restrictions	-4.0 to -4.9
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; exceptional fire risk; shortages of water in reservoirs, streams, and wells, creating water emergencies	-5.0 or less

Table 5.3.2-2. NDMC Drought Severity Classification Table
Source: NDMC, 2003

Drought Severity Classification Table

The National Drought Mitigation Center (NDMC) helps develop and implement measures to reduce societal vulnerability to drought, stressing preparedness and risk management rather than crisis management. (Table 5.3.2-2)

Location

All jurisdictional areas of this plan are susceptible to drought.

Previous Occurrences and Losses

Based on sources researched, known drought events that have affected Oklahoma County and its municipalities are identified in Table 5.3.2-3.

Table 5.3.2-3. Drought Events Between 1909 and 2018.

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
1909 – 1918	Drought	N/A	N/A	Drought consisted of two severe multi-year episodes, interrupted by 1915, one of the wettest years of the 20th Century. This event comprises the lowest ten-year statewide rainfall on record. 1910 was the smallest annual rainfall Statewide and for four of Oklahoma's nine climate divisions.	OKS HMP
1930 – 1940	Drought	N/A	N/A	Statistically, the climate's contribution to the Dust Bowl was not as severe as during the 1910's or 1950's, but it left the deepest scar on Oklahoma's economy and psyche. The Dust Bowl was at its worst in during the mid-1930's, when severe drought, intense heat, immature and/or inappropriate agricultural practices and overall economic conditions combined to cause the greatest exodus of citizens in State history. Reaction to the event revolutionized farm and conservation practices in much of the U. S.	OKS HMP
1952 – 1958	Drought	N/A	N/A	Drought was accompanied by intense summer heat, insect invasions, and crop failures, specifically in the "Wheat Belt" of central and north-central Oklahoma.	OKS HMP
July 1998	Drought	N/A	N/A	A devastating drought and heat wave affected southeastern Oklahoma farmers. This event was recorded as the fourth driest. The southeast Oklahoma climate division (which includes Choctaw, Pushmataha, Latimer and Le Flore Counties) received 50 percent of normal rainfall from May 1 through July 31. The southeastern portion of the state was classified by the Palmer Drought Index as being in the midst of a "severe drought" while the east-central portion was experiencing "moderate drought". Oklahoma Agriculture Secretary estimated crop damage throughout the state at $2 billion, of which $500 million might have taken place in the southeast and east-central portion of the state. The President declared the area a drought disaster.	OKS HMP
August 2000	Drought	N/A	N/A	An extended period of unusually dry weather affected the state, including Oklahoma County. Many parts of the state did not receive rainfall for 30 to 90 days. Total crop losses of wheat, cotton, and peanuts, were estimated between $60 million and $1 billion dollars statewide ($399.8 million in Oklahoma County). Seven counties near the Texas border, including Carter, Comanche, Cotton, Jefferson, Love, Marshall, and Tillman, were declared federal disaster areas. Reservoir levels 50 percent below normal across the southwestern and south central portion of the state.	OKS HMP; OKC HMP; NOAA

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
July-September 2001	Drought	N/A	N/A	An extended period of excessive heat affected all of western and central portions of the state, including Oklahoma County. Daily mean temperatures were five degrees above normal with most areas regularly experienced high temperatures at or above 100 degrees. Eight fatalities resulted from the heat. In addition to the excessive heat, rainfall averaged about one-third of normal, resulting in a drought.	OKS HMP; OKC HMP; UNL Drought Monitor
November 2001-February 2002	Drought	N/A	N/A	The period during this drought event produced a long series of dry episodes dating to the winter of 1995 – 1996. The timing, location, and duration of the event made it most damaging to the state's agricultural industry. The largest sectors to be adversely affected were winter wheat producers and those livestock operations that rely on wheat for winter forage. Row crops were injured by the lack of rainfall and associated heat wave during summer 2001. Hay operations also suffered greatly from the event. Crop loss exceeded $1 billion.	OKS HMP; UNL Drought Monitor
December 1, 2005	Drought	N/A	N/A	Approximately $10 million in property damage and $500,000 in crop loss was incurred during this drought event.	NOAA-NCDC
January 1, 2006	Drought	N/A	N/A	More than $15 million in property damage and an estimated $750,000 in crop loss was incurred during this drought event. Drought levels ranged from severe to exceptional with the driest conditions in the southeastern portion of the state. Some precipitation did fall during the month, mainly in the form of snow, which did not do much to alleviate the dry conditions over the area. Wildfires caused by the severe dry conditions, created major problems throughout the state.	OKS HMP; NOAA-NCDC
April 1, 2006	Drought	N/A	N/A	More than $1.5 million in property damage and over $750,000 in crop loss was incurred during this drought event. Strong winds, warm temperatures, and dry conditions caused wildfires and blowing dust that reduced visibilities across western and central Oklahoma. Farm ponds dried up and available food for livestock decreased. Programs were developed to assist farmers and ranchers in building new wells. Some ranchers were forced to sell off livestock herds. Farmers and agriculture professionals predicted the worst wheat crop since 1957; many fields of crops were declared disasters in spring. Towns instituted volunteer water rationing programs.	OKS HMP
August 1, 2006	Drought	N/A	N/A	Oklahoma State was declared a disaster area allowing federal assistance. Approximately $100,000 in property damages were	OKS HMP

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
				incurred during this event. Drought conditions ranged from extreme to exceptional, with the worst conditions in the southern portion of the state. Dry conditions maintained an increase in wildfire potential across the region with burn bans being issued by the state. Communities instituted water-rationing programs. Recreation was limited as some lakes were closed to boating, swimming, and fishing. Fish kills were reported due to increased temperatures. Crop damage was in excess of $2 million. Ranchers and farmers sold off their livestock herds due to dried up farm ponds, lack of pastureland, and the lack of hay. Cotton crops and those crops that rely on irrigation suffered from the dry and hot conditions.	
2005 – 2007	Drought	N/A	N/A	49 counties, including Oklahoma County, experienced drought from 2005 – 2007. Drought levels ranged from severe to exceptional, with the driest conditions in the southeastern portion of the state. Dry conditions maintained an increase in wildfire potential throughout the state. Costs associated with property damage and crop failure are unknown. No fatalities or injuries were reported.	OKS HMP
2011	Drought	N/A	N/A	2011 was one of the hottest and driest years in the history for the Southern Plains. It was the driest period in the state since the 1920s and 1930s. Extremely hot and dry conditions and record drought conditions struck much of the region. The hot and dry condition caused crop and livestock losses, water restrictions, brush fires, losses in recreation due to low lake levels, and many heat-related deaths and illnesses. In the State of Oklahoma, a majority of range and grazing pastures were classified as being in 'very poor' condition for much of the 2011 growing season. Summer and fall crops, hay forages, and alfalfa were hit hard due to lack of precipitation. Many crops were declared a total loss. Farm ponds dried up, affecting the livestock as well. Many of the lakes (Grand Lake, Keystone Lake, Fort Gibson Lake, Lake Tenkiller, Skiatook Lake, and Lake Eufaula) in the state were closed or under an advisory due to the development of a toxic algae.	Drought Impact Reporter, NWS
January 2012	Drought	N/A	N/A	0.04 inches of precipitation since 12/20/11. Starting to worry La Nina might be beginning to take hold again. We saw a wet fall (little more than normal) and most ponds are back to normal. But one month with almost no measureable precipitation is not good and hoping it is not a sign of things to come.	Drought Impact Reporter
March 2012	Drought	N/A	N/A	Extreme to exceptional drought conditions across southwest Oklahoma and northwestern Texas. Warm, dry and windy conditions led to many wildfires in Oklahoma.	Drought Impact Reporter

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
July 2012-April 2013	Drought	N/A	N/A	2011-2012 was the fourth driest two-year period on record and left water storage at reservoirs at an all-time low. Oklahoma City implemented mandatory outdoor water rationing starting July 31, 2012 including cities that buy water from OKC. This includes Deer Creek Rural Water District (unincorporated county), Edmond, The Village and Warr Acres. January 17, 2013 odd/evening outdoor watering was re-implemented and by spring became a permanent program. August 4, 2012 fire near Luther consumed almost 60 homes and other structures.	NCDC, Drought Impact Reporter, NewsOK, UNL Drought Atlas
March 2014-July 2014	Drought	N/A	N/A	Drought and freezing weather destroyed the canola crop. Oklahoma County reached D3. Slight drought lingered until April 2015.	Drought Impact Reporter, UNL Drought Atlas
December 2016- April 2017	Drought	N/A	N/A	Very dry conditions. Slight drought started July 2016. A break occurred with abundant rain in April 2017.	NCDC, UNL Drought Atlas
July-August 2017	Drought	N/A	N/A	Typical summer ridging high pressure prevented rain across the region.	NCDC, UNL Drought Atlas
January 2018-April 2018	Drought	N/A	N/A	Several local small wildfires. D2 drought in January and February. Massive wildfires in NW OK in April necessitated mutual aid task force response.	NCDC, UNL Drought Atlas, local knowledge

OKS HMP Oklahoma State Hazard Mitigation Plan
OKC HMP Oklahoma County Hazard Mitigation Plan
NOAA National Oceanic and Atmospheric Administration
FEMA Federal Emergency Management Agency
N/A Not Applicable
NWS National Weather Service

Probability of Future Events

It is estimated that Oklahoma County will continue to experience direct and indirect impacts of drought and its impacts on occasion, with the secondary effects causing potential disruption or damage to agricultural activities and creating shortages in water supply within communities.

Based on historical records and input from the Planning Committee, the probability of occurrence for drought in all the jurisdictions participating in Oklahoma County HMP is considered "4 – Highly Likely" (Event is probable within the calendar year. Event has a 1 in 1 year chance of occurring).

VULNERABILITY ASSESSMENT

To understand risk, a community must evaluate what assets are exposed or vulnerable in the identified hazard area. For the drought hazard, all of Oklahoma County has been identified as the hazard area. Therefore, all assets (population, structures, and lifelines), as described in the County Profile (Section 4), are vulnerable to a drought. Assets at particular risk would include any open land or structures at located along the wildland/urban interface (WUI) that could become vulnerable to the wildfire hazard due to extended periods of low rain and high heat, usually associated with a drought. Assets outside of the WUI may also be at risk due to the secondary hazard of expansive soil. In addition, water supply resources could be impacted by extended periods of low rain. Finally, vulnerable populations could be particularly susceptible to the drought hazard and cascading impacts due to age, health conditions, and limited ability to mobilize to shelter, cooling and medical resources.

Overview of Vulnerability

All of Oklahoma County is vulnerable to drought. However, areas at particular risk are: areas used for agricultural purposes (farms and cropland), open/forested land vulnerable to the wildfire hazard, areas where communities rely on private water supply, and certain areas where elderly, impoverished or otherwise vulnerable populations are located.

Data and Methodology

Data was collected from Oklahoma State, the County, and Planning Committee sources. Available information and a preliminary assessment are provided below.

Impact on Life, Health and Safety

Any loss of life or immediate destruction of property during drought comes from secondary sources such wildfires and heat related injuries due to extreme temperatures that usually coincide with drought in summer.

Droughts conditions can cause a shortage of water for human consumption and reduce local fire-fighting capabilities. The drought hazard is a concern because private water supply sources are used in Oklahoma County.

For the purposes of this HMP, the entire population in the County is vulnerable to drought events.

Impact on Economy

It is difficult to estimate financial damages as a result of a drought because droughts produce a complex web of impacts. A prolonged drought can have serious environmental and direct and indirect economic impacts on a community.

Droughts can directly impact municipal and private water supply sources (i.e., declining aquifers, reduced stream flows, etc). As noted, agricultural resources need ample water supplies for successful production, relying on natural precipitation and the supply and demand of groundwater resources, both of which become limited or compromised during times of drought. According to the U.S. Department of Agriculture (USDA) National Agricultural Statistics Service (NASS), there are 1,289 farms in Oklahoma County, occupying 159,823 acres of land in the County. Land is used to grow agricultural products as well as to raise livestock (USDA NASS, 2007).

The entire agricultural industry in Oklahoma County is vulnerable to the drought hazard. The historic record may assist Oklahoma County in estimating potential future losses as a result of this hazard of concern.

Effect of Climate Change on Vulnerability

Droughts are projected to increase in severity and frequency due to climate change. Even if annual precipitation amounts do not change much, higher temperatures will increase evaporation from lakes, soils, and plants, stressing agricultural and natural systems. Models project that Oklahoma will experience a decrease in soil moisture across all seasons by the end of the century, with the greatest decrease in summer (Wehner et al. 2017). Futher, rising temperatures will lead to increase demand for water and energy, which could stress natural resources (Shafer et al. 2014) [SCIPP, 2018].

Overall Vulnerability Assessment

Historic data available indicate that droughts can impact Oklahoma County. Drought events can cause significant impacts and losses to the County's water supply and economy. The cascade effects of drought include increased susceptibility to the wildfire hazard, increased and thus shortages on local resources (i.e., water supply). Losses associated with the wildfire hazard are discussed later in this section.

5.3.3 EARTHQUAKE

HAZARD PROFILE

Description

Most earthquakes occur as the result of slowly accumulating pressure that causes the ground to slip abruptly along a geological fault plane on or near a plate boundary. The resulting waves of vibration within the earth create ground motion at the surface that vibrates in a very complex manner.

Extent

Seismic waves are the vibrations from earthquakes that travel through the Earth and are recorded on instruments called seismographs. The magnitude or extent of an earthquake is a measured value of the earthquake size, or amplitude of the seismic waves, using a seismograph. The Richter magnitude scale (Richter Scale) was developed in 1932 as a mathematical device to compare the sizes of earthquakes (USGS, 1989). The Richter Scale is the most widely-known scale that measures the magnitude of earthquakes (Shedlock and Pakiser, 1997; USGS, 2004).

The County and participating jurisdictions follow the State plan and consider a reading of 5.4 and below on the Richter scale a minor severity and 5.5 and above to be a major severity (OK State HMP, 2014). Table 5.3.3-1 presents the Richter Scale magnitudes and corresponding earthquake effects.

Table 5.3.3-1. Richter Scale

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 only causes 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 totally destroy communities near the epicenter

Source: USGS, 2006

Seismic hazards are often expressed in terms of Peak Ground Acceleration (PGA) and Spectral Acceleration (SA).

The 2014 USGS seismic hazard data shows that Oklahoma County has a PGA between 12 and 20%. This data is based on peak ground acceleration (%g) with 2% probability of exceedance in 50 years.

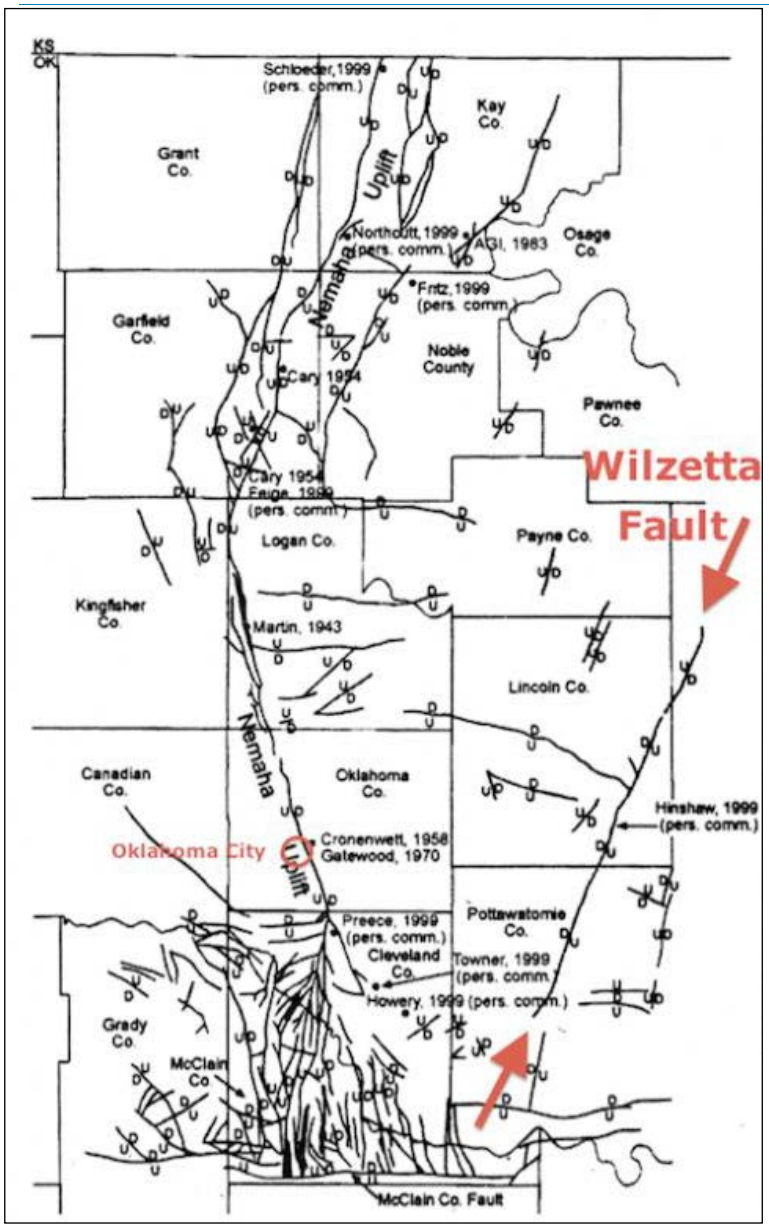


Figure 5.3.3-1. Location of the Wilzetta Fault
Source: Countywide & Sun, Date Unknown

Location

The largest earthquakes felt in the United States were along the New Madrid fault in Missouri, where a three-month long series of quakes from 1811 to 1812 included three quakes larger than a magnitude of 8 on the Richter Scale (Oklahoma County Hazard Mitigation Plan, 2007). During 2016, a magnitude 5.8 earthquake, the largest event to hit Oklahoma County in modern times, was recorded during this period of increased seismic activitiy. The State of Oklahoma averages have risen sharply over the last several years and are now beginning to decline due to better understanding of induced seismicity (OGS, 2018). From 2013 to 2016 the number of earthquakes spiked from 109 to 903 respectivly.

The State of Oklahoma has a great number of faults of different sizes, but very large earthquakes are not expected to occur in the State. The State is at moderate risk for an earthquake due to its close proximity to the New Madrid Seismic Zone. Seven main regions of earthquake activity exist in Oklahoma and include:

- The El Reno-Mustang area in central Oklahoma;
- Love and Carter counties;
- An area in southeastern Oklahoma north of the Ouachita Mountains in the Arkoma Basin;
- The Meers fault, located near Meers on the eastern edge of the Anadarko Basin;
- The area around Lindsay in Garvin County;
- An area near Ada in Pontotoc County; and
- In eastern Oklahoma County near Jones (Memorial Rd. / Indian Meridian Rd.) (OK State HMP, 2014).

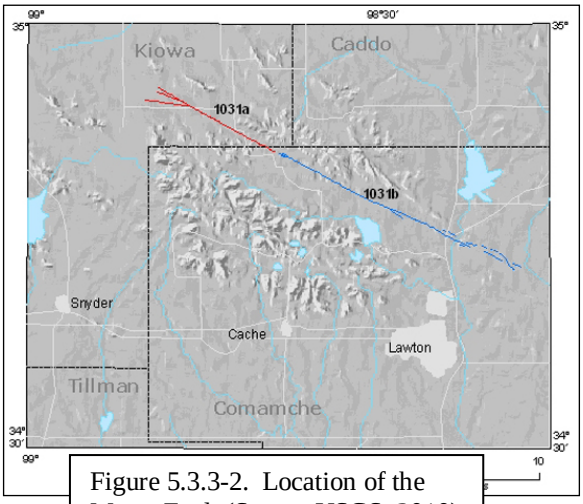
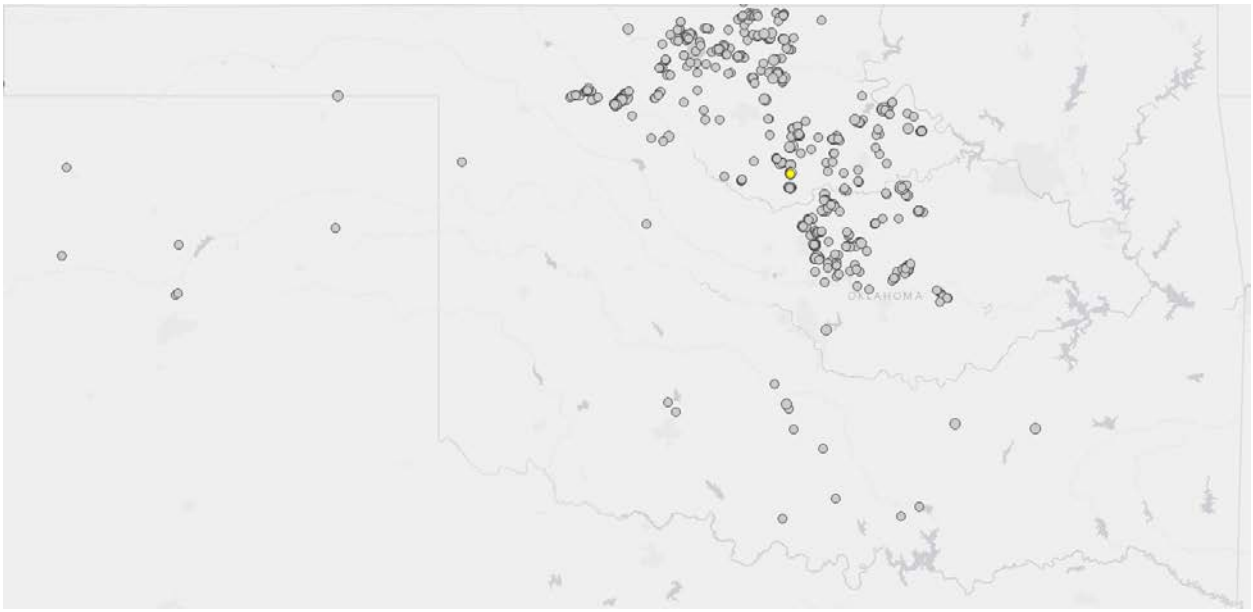


Figure 5.3.3-2. Location of the Meers Fault (Source:USGS, 2010)

Earthquakes that have been felt in the State tend to concern people the most. Figure 5.3.3-3 plots the locations of earthquakes, with a magnitude greater than 3.5, from 1882 to 2018. There have been significant events within the vicinity of the Meers Fault; however, there has also been activity in other areas. From 2008 to 2010, eastern Oklahoma County, near the Town of Jones, had seen an increase in activity. Between 2009 and 2010, at least nine earthquakes of magnitude 3.5 occurred in this area. A magnitude 4.1 quake happened in southeast Lincoln County near Sparks on February 27, 2010. This was topped by a 4.7 earthquake, rated the second strongest in the history of Oklahoma, on October 13, 2010. This earthquake occurred just south of the aforementioned active area and was felt widely across much of the eastern two thirds of the State and into the Dallas-Fort Worth area (OK State HMP, 2014).
Increased quake activity occurred from 2013-2015 near NE 122nd and Midwest Boulevard in Oklahoma City, and from 2014-2018 in east Edmond near Danforth Rd and N Air Depot Blvd.

Figure 5.3.3-3. Oklahoma Earthquakes of Magnitude 3.5 or Greater, 1974 to 2018 – Count: 606 (Source: USGS 2018)



Previous Occurrences and Losses

According to the USGS and OGS, over 700 earthquakes at M2.5 or above have occurred in Oklahoma County between 1974 and 2018.

Many sources provided historical information regarding previous occurrences and losses associated with earthquakes throughout the State of Oklahoma. Therefore, with so many sources reviewed for the purpose of this HMP, loss and impact information for many events could vary depending on the sources. Not all earthquake occurrences have been documented in the below table. Due to the increase in frequency of earthquakes, only earthquakes affecting Oklahoma County above 4.0 magnitude are documented below after 2010.

Table 5.3.3-2. Earthquake History in Oklahoma between 1950 and 2018

Event Date / Name	County	Town	Size / General Magnitude	Losses / Impacts	Source(s)
April 9, 1952	Canadian	Concho	Approx 5.7	Largest quake reported during the time. Caused slippage along the Nemaha fault. Moderate damage in Canadian, Oklahoma, and Kay Counties including toppled chimneys and smokestacks, cracked and loosened bricks on buildings, and broken windows and dishes. Slight damage reoprted from other towns in Oklahoma, kansas, Arkansas, Iowa, Missouri, Nebraska, and Texas.	OK HMP; Oklahoma Geological Survey; USGS
October 7, 1952	Hughes	Holdenville	N/A	Homes and buildings shook. Tremors were felt in Kingfisher, Oklahoma, and Tulsa Counties.	Oklahoma Geological Survey
March 17, 1953	Oklahoma	Edmond	N/A	Two earthquakes about an hour apart caused minor damage to a building foundation and plaster. Tremors were felt in Canadian, Oklahoma, and Grady Counties.	Oklahoma Geological Survey
February 16, 1956	Pushmataha	Antlers	N/A	No reference and/or no damage reported.	Oklahoma Geological Survey
April 2, 1956	Rogers	Catoosa	N/A	Buidings shook and objects fell. Minor effects were reported from other nearby towns.	Oklahoma Geological Survey
October 30, 1956	Pontotoc	Ada	4.1	Maximum intensity of VII was reported west of the Town of Catoosa (Rogers County), where a slippage of the formation caused an oil well to be shut down.	OK HMP; Oklahoma Geological Survey
June 15, 1959	Comanche	NE Faxon	4.0	No reference and/or no damage reported.	OK HMP
June 17, 1959	Latimer	Wilburton	4.2	Slight damage consisting of cracks in plaster, pavement, and a house foundation.	OK HMP; Oklahoma Geological Survey
April 27, 1961	N/A	N/A	4.1	No reference and/or no damage reported.	OK HMP
October 14, 1968	N/A	N/A	N/A	Minor damage at Durant (Bryan County) consisted of cracked walls and glass. Slight foreshocks were felt at Durant and October 10 and 11, 1968.	Oklahoma Geological Survey
May 2, 1969	Cimarron	N/A	4.5	The only reported damage consisted of cracked plaster in the Town of Wewoka (Seminole County). The quake was felt primarily in the eastern portion of the state.	Oklahoma Geological Survey
March 30, 1976	Kingfisher	N/A	2.7	No reference and/or no damage reported.	Oklahoma Geological Survey
December 8, 1987	Garvin	Lindsay	3.7	No reference and/or no damage reported.	Oklahoma Geological Survey
November 15, 1990	Garvin	Antioch	3.9	Largest earthquake in the state since 1987 that rattled windows. No death or injuries were reported.	SHMP; Oklahoma Geological Survey
January 18, 1995	Coal	Stonewall	4.2	No reference and/or no damage reported.	OK HMP
September 6, 1997	Comanche	NW Richards Spur	4.4	No reference and/or no damage reported.	OK HMP
August 3, 2009	Oklahoma	Oklahoma	3.4	No reference and/or no damage reported.	USGS

Event Date / Name	County	Town	Size / General Magnitude	Losses / Impacts	Source(s)
		City			
October 13, 2010	Cleveland	Norman	4.7	Minor damage, primarily to windows due to items falling from shelves. No fatalities were reported; however, EMSA reported two people required medical attention after suffering a fall. The quake was reportedly felt over the eastern 2/3rds of the state, mainly east of highway U.S. 281 and west of U.S. 269.	OK HMP
November 6, 2011	Lincoln	Prague	5.6	Largest earthquake to hit the state in modern times. Knocked pictures off walls and woke people and pets as it shook an area that stretched into Arkansas, Kansas, Missouri and Texas.	USGS; Huffington Post
December 01, 2013	Oklahoma	Edmond	4.5	This earthquake near Arcadia Lake was 8.4 km in depth and was felt throughout the Oklahoma County area. There was reports of strong shaking and light damage reported.	USGS
June 16, 2014	Oklahoma	Spencer	4.3	At a depth of 5.0 km, this earthquake was felt throughout Oklahoma County and beyond. Reports of light to moderate shaking, with some very light damage were received.	USGS
June 18, 2014	Oklahoma	Spencer	4.1	USGS reports this quake is at a 5.0 km depth. Multiple reports throughout the county ranging from light to strong shaking. Some light damage was also reported.	USGS
December 29, 2015	Oklahoma	Edmond	4.3	In the county, this earthquake, at a depth of 6.5 km, there were multiple reports of light to moderate shaking with very light damage.	USGS
January 01, 2016	Oklahoma	Edmond	4.2	At a depth of 5.8 km, there were multiple reports of light to strong shaking with light damage reported with this quake.	USGS
April 07, 2016	Oklahoma	Luther	4.2	This quake registered at a depth of 6.1 km. Though most of the county felt shaking, the northeast side had multiple reports of strong shaking with light damage.	USGS
September 3, 2016	Pawnee	Pawnee	5.8	Largest earthquake in the state to date. Scattered reports of cracks in sheetrock and bricks in the county.	USGS/Multiple sources
August 03, 2017	Oklahoma	Edmond	4.2	All regions of the county felt this quake, per the USGS. Most areas were light with a few areas experiencing moderate shaking. Very light damage was also reported.	USGS

Source(s): USGS 2018; Oklahoma Geological Survey 2018; Oklahoma State Hazard Mitigation Plan 2011; Huffington Post 2011.

N/A Not Applicable/Not Available
OK HMP Oklahoma State Hazard Mitigation Plan
USGS U.S. Geological Survey

Historically, Oklahoma County has not experienced significant earthquakes. For this reason, buildings in the Oklahoma County area are not designed for major earthquakes and a major earthquake would result in heavy damage and casualties and would be devastating to the economy of the County and the State of Oklahoma. Increased seismic activity has broadened interest in researching the probability and severity of furture events in the local area; however, there is currently not a sufficient amount of data to presume the probability of future earthquakes and the monetary damages produced by such an event.

Probability of Future Events

The risk of small earthquakes has changed significantly during the time this plan was last updated. Oklahoma began seeing a significant rise in quakes around 2008, peaking in 2015. Seismologists have documented the relationship between wastewater disposal and triggered seismic activity. The Oklahoma Geological Survey has determined that the majority of recent earthquakes in central and north-central Oklahoma are very likely triggered by the injection of produced water in disposal wells (OGS, 2018) related to the oil industry. 2016-2018 has seen a decrease in the number and size of earthquakes, apparently due to efforts by state regulators and the oil industry to control wastewater injection.

According to the USGS, in 2014, Oklahoma County had a PGA of 12-20% for earthquakes with a two-percent probability of occurring within 50 years. The highest concern for a significant earthquake in the state, as indicated by USGS, is from the Meers fault located near Lawton in Comanche County. The probability of a future event of any significance along the Meers fault is still being debated by scientists (OK State HMP, 2014).

The probability of occurrence, or likelihood of the event, is one parameter used for ranking hazards. Based on historical records and input from the Planning Committee, the probability of occurrence for significant earthquakes in the Planning Area is considered “1 - Unlikely” (Event is possible within the next ten years. Event has a 1 in 10 year’s chance of occurring). It is anticipated that Oklahoma County will continue to experience impacts from small earthquakes that may affect the general building stock, local economy, and may induce secondary hazards such as fire ignition and utility failure.

VULNERABILITY ASSESSMENT

To understand risk, a community must evaluate what assets are exposed or vulnerable in the identified hazard area. For the earthquake hazard, the entire County has been identified as the exposed hazard area. Therefore, all assets in Oklahoma County (population, structures, critical facilities and lifelines), as described in the Regional Profile (Section 4), are vulnerable.

Overview of Vulnerability

Earthquakes usually occur without warning and can impact areas a great distance from their point of origin. The extent of damage depends on the density of population and building and infrastructure construction in the area shaken by the quake. Some areas may be more vulnerable than others based on soil type, the age of the buildings and building codes in place.

In summary, the entire population and general building stock inventory of Oklahoma County is at risk of being damaged or experiencing losses due to impacts of an earthquake.

Impact on Life, Health and Safety

The entire population of Oklahoma County is potentially exposed to direct and indirect impacts from earthquakes. The degree of exposure is dependent on many factors, including the age and construction type of buildings and the soil type buildings are constructed on. The impact of earthquakes on life, health and safety is dependent upon the severity of the event. Risk to public safety and loss of life from an earthquake in the County is minimal with higher risk occurring in buildings as a result of damage to the structure, or people walking below building ornamentation and chimneys that may be shaken loose and fall as a result of the quake. Business interruption may prevent people from working, road closures could isolate populations and loss of functions of utilities could impact populations that may not have suffered direct damage from the event itself.

Populations considered most vulnerable include the elderly (persons over the age of 65) and individuals living below the Census poverty threshold. These socially vulnerable populations are most susceptible, based on a number of factors including their physical and financial ability to react or respond during a hazard and the location and construction quality of their housing.

Impact on Economy

Strong earthquakes also have impacts on the economy, including: loss of business function, damage to inventory, relocation costs, wage loss and rental loss due to the repair/replacement of buildings. In a significant quake, the disruption of traffic flow will likely be impacted for residents as well as for critical services such as emergency police, fire and ambulance. Power and water outages and damages to buildings may cause critical and essential facilities to be closed for extended periods of time (OK State HMP, 2014).

Future Growth and Development

As discussed in Section 4, areas targeted for future growth and development have been identified across Oklahoma County. It is anticipated that the human exposure and vulnerability to earthquake impacts in newly developed areas will be similar to those that currently exist within the Planning Area. The State of Oklahoma has adopted the 2015 International Residential Code (IRC), with modifications effective July 2017. The 2015 IRC is the minimum building code for one- and two-family and townhouse residential construction. The County may require additional modifications to the building code to further decrease the built environment's vulnerability to the hazard.

Additional Data and Next Steps

In terms of general building stock data, updated building age, construction type and current replacement value would further support the refined analysis. Additionally, un-reinforced masonry critical facilities and privately-owned buildings (i.e., residences) can be identified using local knowledge and/or pictometry/orthophotos. These buildings may not withstand earthquakes of certain magnitudes and plans to provide emergency response/recovery efforts for these properties can be set in place.

5.3.4 EXPANSIVE SOILS

HAZARD PROFILE

Description

Soils and soft rock that tend to swell or shrink due to changes in moisture content are known as expansive soils. Expansive soils are often referred to as swelling clays because clay materials are most susceptible to swelling and shrinking. Changes in soil volume present a hazard primarily to structures built on expansive soils. The most extensive damage occurs to highways and streets (FEMA, 1997).

Expansive soils are clay-rich shales, or soils from the weathering of shales, that may contain clay minerals, that swell up to 1.5 to two times their original dry volume after adding water. Soil saturation from rainfall, lawn watering, or sewer leakage may cause major damage by soils expanding under sidewalks, highways, utility lines, and foundations. If construction takes place on wet expanded soils, then shrinkage may occur after drying, resulting in severe cracking in structures (Luza and Johnson, 2009).

When water is added to these expansive clays, the water molecules are pulled into gaps between the clay plates. As more is absorbed, the plates are forced further apart, leading to an increase in soil pressure or an expansion of the soil's volume. Soils that contain expansive clays become very stickey when wet and usually are characterized by surface cracks or a "popcorn" texture when dry. Therefore, the presence of surface cracks is usually an indication of an expansive soil (Oklahoma State HMP, 2014).

The affects of expansive soils are most prevalent in regions of moderate to high precipitation, where prolonged periods of drought are followed by long periods of rainfall. Expansive soils can be recognized either by visual inspection in the field or by conducting laboratory analysis (Oklahoma County HMP, 2006).

Extent

The effects of expansive soils are typically experienced in regions of moderate to high precipitation, where periods of drought are followed by periods of rainfall. Damages from expansive soils also result from increases in moisture volume from broken or leaking water and sewer lines (Oklahoma County HMP, 2006).

Dry clays are capable of absorbing water and will increase in volume in an amount proportional to the amount of water absorbed. This soaking and subsequent swelling of dry clay is the Coefficient of Linear Extensibility (COLE). COLE correlates with the volume change of a soil upon wetting and drying.
Areas capable of these changes in soil volume present a hazard to buildings, slabs, concrete, asphalt, and other structures built over the soils and to pipelines buried in them. The greatest damage occurs when structures are constructed when clays are dry and then subsequent soaking rains swell the clay. Damage can be so severe that the cost of repair can exceed the value of the building (Oklahoma County HMP, 2006).

Volume expansion measures the free swelling of a disturbed soil on wetting from air dry to saturated. A volume expansion of 20-40% indicated a large potential expansion on wetting and subsequent shrinkage on drying.

The following tables illustrate the potential volume change of expansive soils. Please note that Oklahoma County and its municipalities would be considered within the "Arid to semi-arid climate." All jurisdictions within Oklahoma County may experience High Potential Volume Change during periods of extremely dry weather.

Potential Volume Change	Arid to semi-arid climate		Humid climate	
	Plasticity Index (%)	Linear Shrinkage (%)	Plasticity Index (%)	Linear shrinkage
Low	0-15	0-5	0-30	0-12
Medium	15-30	5-12	30-50	12-18
High	>30	>12	>50	>18

Location

The effects of expansive soils are most prevalent in regions of moderate to high precipitation, where prolonged periods of drought are followed by long periods of rainfall. The expansive soil hazard occurs mainly in the southern, central and western parts of the U.S. (FEMA, 1997).

Several Permian shales have been identified in Oklahoma County. These areas have been identified as having high shrink-swell potential. Figure 5.3.4-1 identifies the areas in Oklahoma County that have an abundance of shrink-swell soils from the National Resource Conservation Service (NRCS) survey of 2017. .

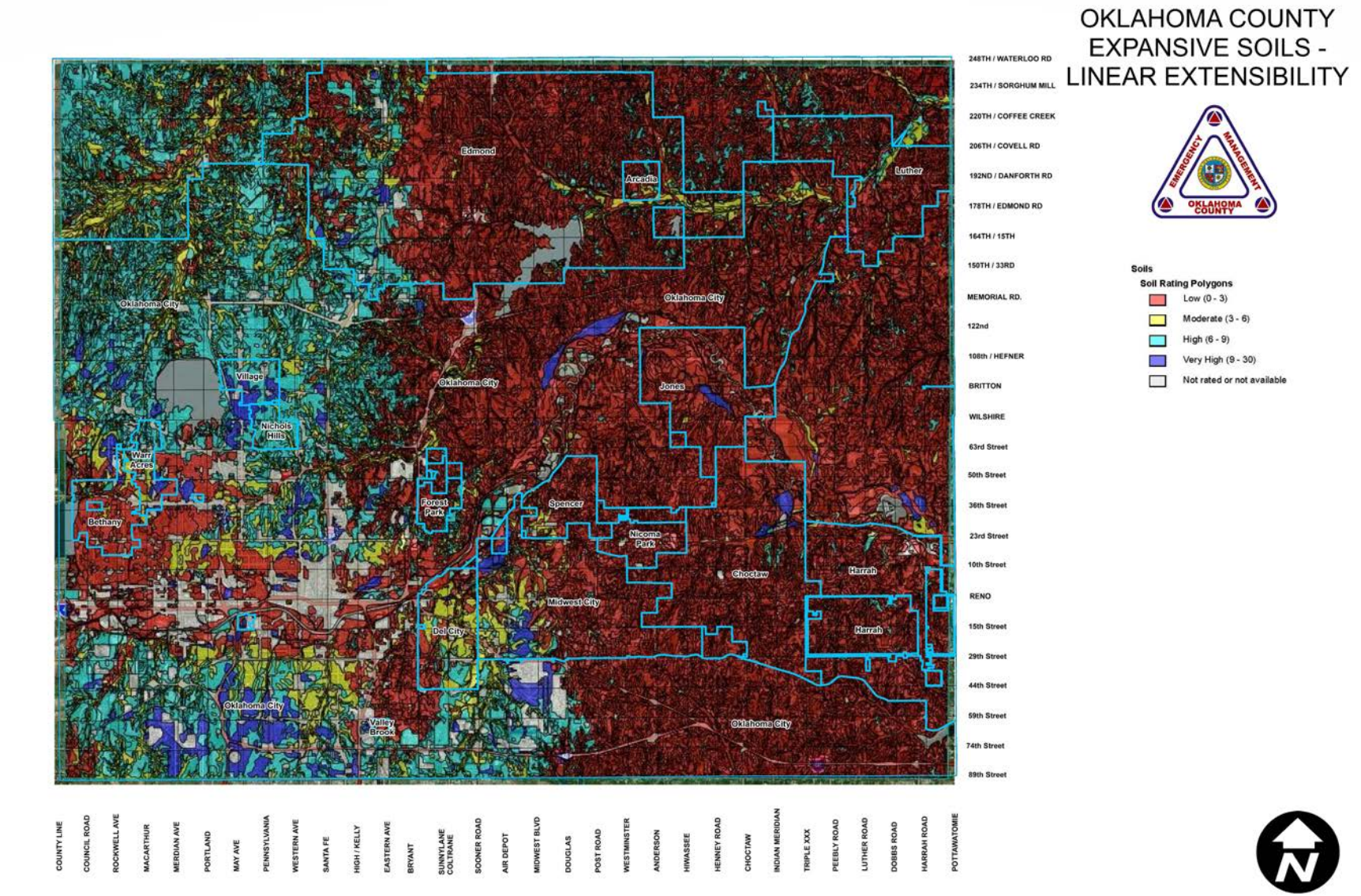


Figure 5.3.4-1. Linear Extensibility of expansive soils in Oklahoma County.
Source: NRCS, 2017

Previous Occurrences and Losses

Though the mapping survey does show potential in several areas of Oklahoma County, there are relatively few occurrences of expansive soils creating damage or loss to public buildings. Two exceptions should be noted: per the 2013 HMP, Nichols Hills found expansive soils at their Public Works site. Since 2013, the soil has been stabilized and the issue remediated. In Midwest City, a newly constructed fire station that was built within the Crutcho basin may not have had adequate soil stabilization and has shown evidence of soil shrink-swelling in the past year.

Probability of Future Events

The probability of occurrence, or likelihood of the event, is one parameter used for ranking hazards. Based on historical records and input from the Planning Committee, the probability of occurrence for expansive soils in the Planning Area is considered "1 - Unlikely" (Event is possible within the next ten years. Event has a 1 in 10 year's chance of occurring). It is anticipated that Oklahoma County will continue to experience indirect impacts from expansive soils that may affect the general building stock, local economy and may induce secondary hazards such ignite fires and cause utility failure.

VULNERABILITY ASSESSMENT

Overview of Vulnerability

Expansive soil hazards are slow to develop but can cause a range of structural impacts to the built environment. Damage to residential homes, commercial buildings, highways and streets can cause a financial drain on the local and regional economy.

Data and Methodology

Linear Extensibility to a depth of 72 inches was used in this study. Data sampled at a depth of 96 inches resulted in little change to the map above. Depth to sample was determined from data from the Advanced Engineering Geology & Geotechnics, Spring 2004 article "Various Aspects of Expansive Soils Relevant to Geoengineering Practice." Insufficient data is available to model the long-term potential impacts of expansive soils on Oklahoma County. Over time, additional data will be collected to allow better analysis for this hazard. Available information and a preliminary assessment are provided below.

Impact on Life, Health and Safety

Expansive soil hazards are slow and do not pose a risk to life, health and safety.

Impact on General Building Stock and Critical Facilities

Because of differences in building construction, residential structures and one-story commercial structures are more susceptible to damage by expansive soils compared to multi-story buildings. Multi-story buildings are heavier and can generally counter the swelling pressures. The exception is when multi-story buildings are built on wet clay, and may experience damage by shrinkage of the clay if moisture levels are substantially reduced (be evapotranspiration or by evaporation from under heated buildings) (FEMA, 1997).

Various types of structural damage to buildings include sticking doors; uneven flooring; and cracked foundations, floors, walls, ceilings and windows. Damage to small buildings is greatest when the structure is built on dry clay, such as during drought conditions, followed by rain which swells the soil.

Human activities can also influence the moisture of the soils including an increase in moisture from broken or leaking water and sewer lines, watering the landscaping, and surface ponding (FEMA, 1997).

According to FEMA's *Multi Hazard Identification and Risk Assessment*, the best way to mitigate structural damage from expansive soils is to avoid building on them. However, when this is not possible, engineering practices can be applied including removal of the soil; application of heavy loads to offset the swelling pressure; preventing access to water; presetting and chemical stabilization (FEMA, 1997).

Property maintenance to prevent excessive moisture from entering the soil near foundations should be implemented for owners of buildings in areas of expansive soils. This would include proper grading and keeping gutters/downspouts clear of debris and not discharging adjacent to the foundation. In addition, inspection of the property after heavy rainfall to address drainage issues should also be put into practice.

Impact on Economy

As summarized by FEMA, the greatest damage from expansive soils is to highways and roads. Damages result from differential vertical movement that occurs as clay moisture content adjusts to the changed environment. For pavement, differential movement of 0.4 inches (or 1 centimeter) with a horizontal distance of 20 feet (6 meters) can pose an engineering problem for fast travel (FEMA, 1997). Infrastructure damage is costly and can impact the local and regional economy.

Impact on Future Development

As discussed and illustrated in Section 4, areas targeted for future growth and development have been identified across the County. Any new development in terms of structures and infrastructure (i.e., highways and streets) on known expansive soils could be potentially impacted. Proper grading and building regulations/code including proper slab design and emplacement procedures can mitigate structural damage to new development in areas where expansive soils exist. In most cases, structural damage due to expansive soils is not covered by insurance (FEMA, 1997).

Effect of Climate Change on Vulnerability

The potential effects of climate change on Oklahoma County's vulnerability to expansive soils events shall need to be considered as a greater understanding of regional climate change impacts develop.

Additional Data and Next Steps

For future plan updates, Oklahoma County can continue to document damages to buildings and infrastructure. Future new development can be planned or avoided, soils stabilized prior to construction, and mitigation measures developed or refined for the built environmental already present on these soils.

5.3.5 EXTREME TEMPERATURES

HAZARD PROFILE

Description

As part of the Southern Great Plains, the State of Oklahoma is prone to wide swings of temperature. Summer temperatures typically climb above the 100 degree mark and during the winter, temperatures drop below zero.

Extreme temperatures include both cold and hot events, which can have a significant impact to human health, commercial/agricultural businesses and primary and secondary effects on infrastructure (e.g., burst pipes and power failure). What constitutes "extreme cold" or "extreme heat" can vary across different areas of the country, based on what the population is accustomed to.

Extreme Cold

In Oklahoma County, the NWS issues a "Wind Chill Advisory" when wind chill values reach -5°F to -19°F. From 2009-2018, the NWS averaged one advisory per year for Oklahoma County (NWS, Iowa State University data).

Extreme cold often accompanies a winter storm. What constitutes as extreme cold and its effects varies across different areas of the U.S. In areas unaccustomed to winter weather, near freezing temperatures are considered extreme cold. Freezing temperatures can cause severe damage to crops. Pipes may freeze and burst in homes that are poorly insulated.

Figure 5.3.5-1 illustrates the number of days per year with an average low below 32°F. Figure 5.3.5-2 illustrates the number of days per year with an average high below 32°F.

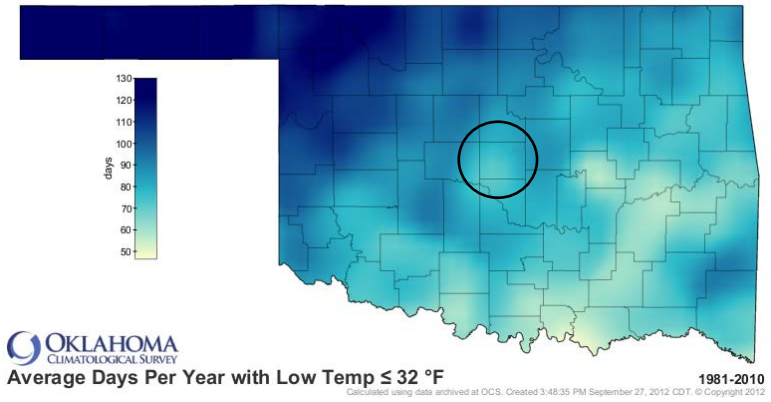


Figure 5.3.5-1. Annual Number of Days with a Low below 32°F Source: Oklahoma Climatological Survey
Note: Average based on 1981 – 2010 data. The black circle indicates the location of Oklahoma County. The County experiences between 60 to 80 days, each year, with a low below 32 degrees.

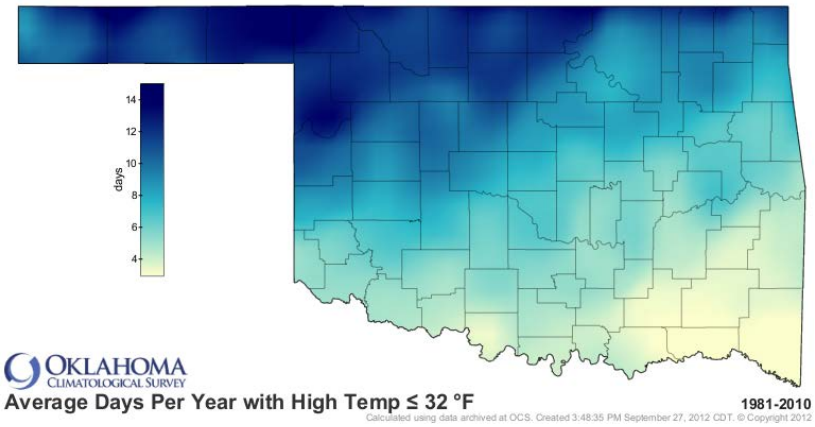


Figure 5.3.5-2. Annual Number of Days with a High below 32°F

Source: Oklahoma Climatological Survey
Note: Average based on 1981 – 2010 data. The County experiences between 6-10 days, each year, with a high below 32 degrees.

Extreme Heat

Temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks are defined as extreme heat. Given Oklahoma's disposition towards high average temperatures, extreme heat may also constitute any temperature over 100 degrees. Humid or muggy conditions occur when a ridge of high atmospheric pressure traps hazy, damp air near the ground. Excessively dry and hot conditions can provoke dust storms and low visibility. Droughts occur when a long period passes without substantial rainfall and a heat wave combined with a drought is a very dangerous situation. An extreme heat event or heat wave is a period of excessive daytime and nighttime heat in association with high humidity relative to geographic location and time of year (Oklahoma City HMP, 2011).

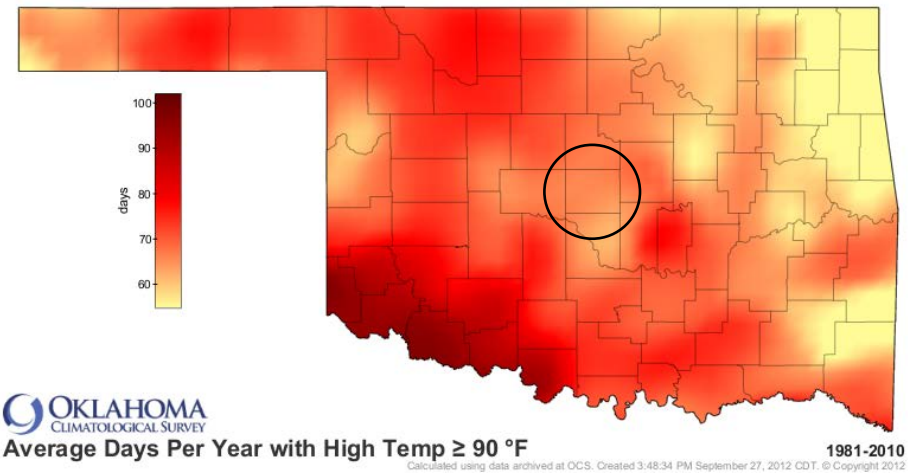


Figure 5.3.5-3. Annual Number of Days Exceeding 90°F
Source: *Oklahoma Climatological Survey*
Note: *Average based on 1981 – 2010 data. The black circle indicates the location of Oklahoma County. The County experiences between 60 to 80 days, each year, with temperatures over 90 degrees.*

In Oklahoma, the warmest period of summer extends from mid-July through mid-August. The gradually shortening days and the occasional arrival of cooler temperatures from the north bring some relief by late August. August is Oklahoma County's second hottest, sixth driest and least windy month, with an average temperature in Oklahoma City between the low and high of 82.4°F (NWS NOWData, 1981-2010). Figure 5.3.5-3 illustrates the number of days per year with a daily temperature exceeding 90°F. Figure 5.3.5-4 illustrates the number of days per year with a daily temperature exceeding 100°F.

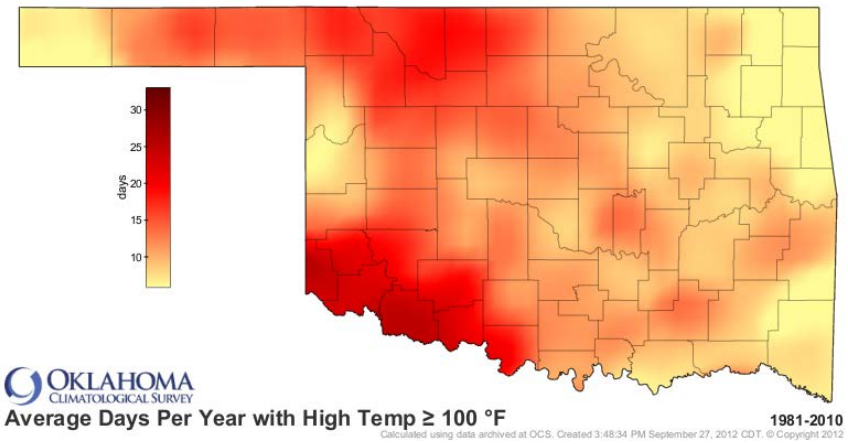


Figure 5.3.5-4. Annual Number of Days Exceeding 100°F

Source: *Oklahoma Climatological Survey*
Note: *Average based on 1981 – 2010 data. The County experiences between 10 to 20 days, each year, with temperatures over 100 degrees.*

Extreme heat is hazardous to livestock and agricultural crops. It can result in water shortages, exacerbate fire hazards, and prompt demands for energy.

Roads, bridges and railroad tracks are susceptible to damages from extreme heat. In Oklahoma from 1998-2017, 21 children died of heatstroke after being left in a hot car, the fourth highest number per capita in the nation (noheatstroke.org).

Extent

The extent (severity or magnitude) of extreme temperatures are generally measured through the Wind Chill Temperature (WCT) Index for cold extremes, and the Heat Index (HI) for heat extremes.

Wind Chill Temperature Index

Whenever temperatures drop well below normal and wind speed increases, heat can leave a person's body more rapidly (known by the National Weather Service (NWS) as the Wind Chill Temperature Index). The Wind Chill Temperature (WCT) Index is the temperature your body feels when the air temperature is combined with the wind speed. It is based on the rate of heat loss from exposed skin caused by the effects of wind and cold. As the speed of the wind increases, it can carry heat away from your body much more quickly, causing skin temperature to drop. When there are high winds, serious weather-related health problems are more likely, even when temperatures are only cool. The importance of the wind chill index is as an indicator of how to dress properly for winter weather to avoid extreme cold affects to human health. The Wind Chill Chart (Figure 5.3.5-5), which was improved from its original 1945 version, by NWS in November 2001, shows the difference between actual air temperature and perceived temperature, and amount of time until frostbite occurs.

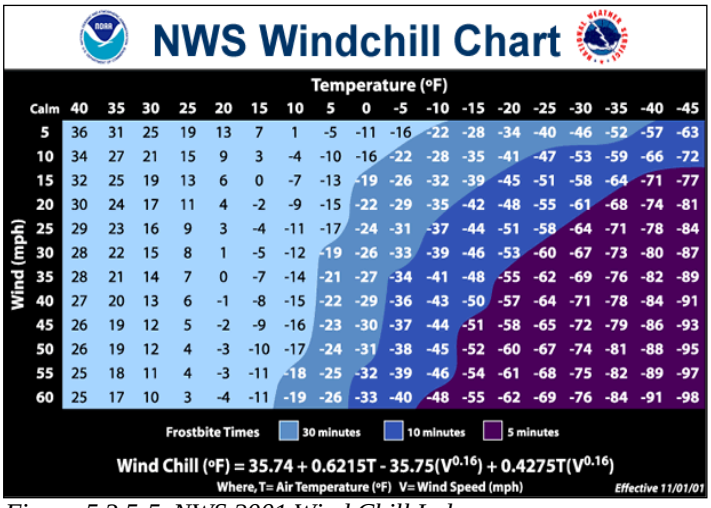


Figure 5.3.5-5. NWS 2001 Wind Chill Index
Source: NWS, 2006

Exposure to cold temperatures, whether indoors or outside, can lead to serious or life-threatening health problems such as hypothermia, cold stress, frostbite or freezing of the exposed extremities such as fingers, toes, nose and ear lobes [Centers for Disease Control and Prevention (CDC), 2005]. From 1999-2015, CDC U.S. data indicated every year except 2006 experienced more deaths from extreme cold than heat (Washington Post, 2016).

The Heat Index

As identified by the NWS and the National Oceanic and Atmospheric Administration (NOAA), the Heat Index is the temperature the body feels when heat and humidity are combined. Higher humidity plus higher temperatures often combine to make us feel a perceived temperature that is higher than the actual air temperature. As presented by the NWS, Figure 5.3.5-6 shows the Heat Index that corresponds to the actual air temperature and relative humidity. According to the Oklahoma Climatological Survey, the County can expect to experience an around 6-10 days a year in which expected temperature highs are below 32 degrees.

Figure 5.3.5-6. Heat Index Chart

Temperature (°F)

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

Heat Index	Notes
80-90	Caution - fatigue is possible with prolonged exposure and activity
90-105	Extreme caution - sunstroke, heat cramps, and heat exhaustion are possible
105-130	Danger - sunstroke, heat cramps, and heat exhaustion are likely; heat stroke is possible
over 130	Extreme danger - heat stroke or sunstroke are likely with continued exposure

Source: NWS, 2012

Location

In addition, the County averages 20 to 25 days each year of daytime high temperatures greater than 100°F. Therefore, extreme heat and cold is likely to occur within and affect all of Oklahoma County (OKC HMP, 2006).

Previous Occurrences and Losses

Many sources provided historical information regarding previous occurrences and losses associated with extreme temperature events throughout the State of Oklahoma and Oklahoma County. With so many sources reviewed for the purpose of this HMP, loss and impact information for many events could vary depending on the source. Therefore, the accuracy of monetary figures discussed is based only on the available information identified during research for this HMP.

Based on information provided by the Oklahoma Climatological Survey, Oklahoma County experienced a record high on July 8, 1970. On this day, the temperature reached 117 degrees Fahrenheit at Lake Overholser. The record low for Oklahoma County was experienced on February 12, 1899. On this day, temperatures in Edmond were recorded at -17°F.

According to NOAA's NCDC storm events database, Oklahoma County experienced 33 extreme temperature events between April 30, 1950 and May 31, 2018. These events include excessive heat, heat, cold/wind chill, and extreme cold. These events may also include other counties. According to the Hazard Research Lab at the University of South Carolina's Spatial Hazard Events and Losses Database for the U.S. (SHELDUS), between 1960 and 2018, over 55 extreme temperature events occurred within the County.

Based on all sources researched, known extreme temperature events that have affected Oklahoma County and its municipalities are identified in Table 5.3.5-1. With temperature documentation for the State of

Oklahoma being so extensive, not all sources have been identified or researched. Therefore, Table 5.3.5-1 may not include all events that have occurred throughout the County and region.

Table 5.3.5-1. Extreme Temperature Events between 1950 and 2018

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
July 1980	Extreme Heat	N/A	N/A	An extreme heat event caused over $2.5 M in crop damages.	SHELDUS
June 27, 1994	Extreme Heat	N/A	N/A	Temperatures reached the 110 degree mark in southwest Oklahoma and exceeded the 100 degree mark in the northwest and central portions of the state.	NOAA-NCDC
January 18-20, 1996	Extreme Cold	N/A	N/A	A strong arctic air mass settled across Oklahoma and resulted in two deaths. Low temperatures fell into the single digits and high temperatures rose only to around 20°F. Wind chill values fell as low as 35 to 40° below zero.	NOAA-NCDC
February 1-5, 1996	Extreme Cold	N/A	N/A	A cold front moved across the State, bringing single digit temperatures and wind chills of 30 to 40 degrees below zero. Temperatures did not go above freezing for a week.	NOAA-NCDC
May 25, 1996	Extreme Cold	N/A	N/A	A transient took shelter from the cold weather in a parked pickup truck near the intersection of North Santa Fe and NE 50th in OKC. He died of hypothermia and was found the next day.	NOAA-NCDC
July 1-7, 1996	Extreme Heat	N/A	N/A	High temperatures exceeded 100°F in central Oklahoma. Highs in Oklahoma City ranged from 102°F to 110°F during this time. There were seven deaths attributed to this heat event.	OK State HMP, NOAA-NCDC
May – October 1998	Extreme Heat	N/A	N/A	Excessive heat and drought conditions affected western and central Oklahoma, with the most intense heat and severe drought conditions occurring from mid-June through early September across central and southern Oklahoma. There were 19 fatalities and three injuries related to this heat wave. Agriculture losses were estimated at $2 billion.	Oklahoma City HMP
July 26-31, 1999	Extreme Heat	N/A	N/A	A period of temperatures ranging from the upper 90s to near 105°F affected portions of central and southwest Oklahoma. Eight people died and one serious injury resulted from this event.	NOAA-NCDC
July 31, 2001	Extreme Heat	N/A	N/A	An extended period of excessive heat affected all of western and central Oklahoma. Daily mean temperatures ranged from the mid-80s to near 90°F. Most areas experienced temperatures at or above 100°F. In addition to the heat, rainfall averaged about one-third of normal, resulting in a drought.	OK State HMP
July 2006	Extreme Heat	N/A	N/A	Temperatures reached triple digits across Oklahoma during the month of July. Many locations reached 105°F. The heat caused 10 fatalities across the area during this time period. The heat caused a portion of I-44 in Oklahoma City to buckle. Many power outages occurred as a result of this event.	OK State HMP

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
August 2006	Extreme Heat	N/A	N/A	During the first half of August, triple digit heat struck across central and eastern Oklahoma. The heat caused eight fatalities. Many streets buckled from the heat.	OK State HMP
January 12-18, 2007	Cold/Wind Chill	N/A	N/A	A strong arctic cold front moved through the State, bringing several rounds of wintery precipitation and cold temperatures. Two people died of hypothermia due this event.	NOAA-NCDC
July – August 2008	Excessive Heat	N/A	N/A	A period of excessive heat occurred across much of central and eastern Oklahoma. High temperatures reached the 100 to 105 degree range, with maximum heat index values that reached the 105 to 115 degree range. Three deaths and 47 injuries were a result from this event.	OK State HMP
February 10, 2011	Extreme Cold	N/A	N/A	A cold front moved in during this time and brought temperatures to a frigid -5°F. This set a record low.	NWS-Norman
June – July, 2011	Excessive Heat	N/A	N/A	Multiple daily record high temperatures were broken throughout this period of time. The beginning of July's temperatures reached 110 degrees. Unusually warm temperature lasted through the month September.	NWS-Norman
July 20, 31 – August 4, 2012	Excessive Heat	N/A	N/A	These dates broke historical record highs. With multiple days hitting 110° and above, with the highest hitting 113°F. Unusually warm temperature lasted through the month September.	NWS-Norman
March 5, 2015	Extreme Cold	N/A	N/A	This day saw a record low temperature of 10°F after 3" of snow and ice accumulated the previous day.	NWS-Norman
August 11-13 2016	Excessive Heat	N/A	N/A	With high pressure firmly over the area, heat indices ranged from 92°F to 111° between the 11th and the 13th. 911 received multiple calls for heat related injuries over this period.	NOAA-NCDC
December 18, 2016	Extreme Cold	N/A	N/A	The day before brought freezing rain and snow into Oklahoma County. With the ice and now, the temperatures dipped to 4°F. This set a record low.	NWS-Norman
January 7, 2017	Extreme Cold	N/A	N/A	Freezing fog and the accumulation of nearly 2" of snow from days before forced temperatures to dive to a frigid -3°F. This set a record low.	NWS-Norman

Source: OK State HMP, 2011; NOAA-NCDC Storm Query; Oklahoma City HMP; Oklahoma County HMP, 2006; SHELDUS

Probability of Future Events

Extreme temperature events occur each year throughout the State of Oklahoma and the County. It is estimated that Oklahoma County and all of its jurisdictions, will continue to experience extreme temperature events annually that may induce secondary hazards such as thunderstorms, drought, human health impacts, and utility failure, as well as many other anticipated impacts.

Based on historical records and input from the Planning Committee, the probability of occurrence for extreme temperature events in the County is considered 'Highly Likely' (Event is probable within the calendar year. Event has a 1 in 1 year chance of occurring).

VULNERABILITY ASSESSMENT

To understand risk, a community must evaluate what assets are exposed or vulnerable in the identified hazard area. Most extreme temperature events involve a large region; therefore, the entire County has been identified as the hazard area.

Overview of Vulnerability

Extreme temperatures generally occur for a short period of time but can cause a range of impacts, particularly to vulnerable populations that may not have access to adequate cooling or heating. This natural hazard can also cause impacts to agriculture (crops and animals), infrastructure (e.g., through pipe bursts associated with freezing, power failure) and the economy.

Data and Methodology

Available information and a preliminary assessment are provided below.

Impact on Life, Health and Safety

For the purposes of this HMP, the entire population in Oklahoma County is vulnerable to extreme temperature events. Extreme temperature events have potential health impacts including injury and death. The County Profile summarizes population of Plan participants in Oklahoma County over the age of 65, and population with an annual income below the poverty threshold.

According to the CDC, populations most at risk to extreme cold and heat events include the following: 1) the elderly, who are less able to withstand temperatures extremes due to their age, health conditions and limited mobility to access shelters; 2) infants and children up to four years of age; 3) individuals who are physically ill (e.g., heart disease or high blood pressure), 4) low-income persons that cannot afford proper heating and cooling; and 5) the general public who may overexert during work or exercise during extreme heat events or experience hypothermia during extreme cold events.

Between 1990 and 2001, Oklahoma County recorded the most heat-related deaths in the State (total of 55), while heat related deaths between 2010 and 2017 totaled 17 (or 2.8 per 1 million population). More than two-thirds of deaths occurred in July and August of each year. The Number of deaths were higher among people age 45 and older, while approximately 70% of heat-related deaths were among males according to Oklahoma State Public Health Department.

Impact on General Building Stock

All of the building stock in Oklahoma County is exposed to the extreme temperature hazard. Extreme temperatures may impact buildings through weathering of materials and additional heating and cooling costs. Losses may be associated with the overheating of HVAC systems. Extreme cold temperature events can damage buildings through freezing/bursting pipes and freeze/thaw cycles.

Impact on Critical Facilities

All critical facilities in Oklahoma County are exposed to the extreme temperature hazard. Impacts to critical facilities are the same as described for general building stock (above). Additionally, it is essential that critical facilities remain operational during natural hazard events. Extreme heat events can sometimes cause short periods of utility failure, commonly referred to as "brown-outs", due to increased usage from air conditioners, appliances, etc. Similarly, heavy snowfall and ice storms, associated with extreme cold temperature events, can cause power interruption as well. Backup power is recommended for critical facilities and infrastructure.

Impact on Economy

Extreme temperature events also have impacts on the economy, including loss of business function and damage/loss of inventory. Business-owners may be faced with increased financial burdens due to unexpected repairs caused to the building (e.g., pipes bursting), higher than normal utility bills or business interruption due to power failure (i.e., loss of electricity, telecommunications).

The agricultural industry is most at risk in terms of economic impact and damage due to extreme temperature events. Extreme heat events can result in drought and dry conditions and directly impact livestock, livestock products and crop production.

Impact on Future Development

Although the trend in recent years has been toward residential development, currently over 131 square miles remain zoned for agricultural uses in the County. With the loss of farmland, the overall impacts of extreme temperature on agriculture will likely decrease due to the decrease of the industry.

Effect of Climate Change on Vulnerability

For USA climate data since the 1930s, since the mid-1970s, record high maximum temperatures are 50% more common in the USA, and record low minimums are less than half of the pre-1990s (Forbes, 2018). This trend is also seen in Oklahoma (Frankson et. Al. 2017). Warmer winters signify a shorter cold season which will subsequently lead to a longer frost-free period and growing season. By mid-century, models are projecting that Oklahoma will see 10 to 30 fewer days below 32°F. Also by mid-century the coldest day of the year is projected to be 5°F warmer and the most intense cold wave 10°F warmer (Vose et al. 2017) An additional 20 to 27 days a year are projected to exceed the historical top 2% of hot days of the year (95°F-100°F) by mid-century. The top 2% of warmest nights (70°F-75°F) are expected to increase by 35 nights/year (Shafer et al. 2014) [SCIPP, 2018].

Additional Data and Next Steps

For future plan updates, Oklahoma County can track data on extreme temperature events, obtain additional County and jurisdiction-specific information on past and future events, particularly in terms of any injuries, deaths, shelter needs, pipe freeze, agricultural losses and other impacts. This will help to identify any concerns or trends for which mitigation measures should be developed or refined.

5.3.6 FLOOD

HAZARD PROFILE

Description

Flooding is a natural event for rivers and streams. River flooding is when a river rises to its flood stage and spills over the banks. The amount of flooding is usually a function of the amount of precipitation in an area, the amount of time it takes for rainfall to accumulate, previous saturation of local soils, and the terrain around the river system. For instance, a river located in a broad, flat floodplain will often overflow to create shallow and persistent flood waters in an area that do not recede for extended periods of time. The excess water can be from snowmelt or rainfall far upstream. Flood effects can be local, impacting a neighborhood or community; or very large, affecting entire river basins and multiple states. The two general types of flooding are flash flooding and river flooding.

Extent

In the case of riverine or flash flooding, once a river reaches flood stage, the flood extent or severity categories used by the NWS include minor flooding, moderate flooding, and major flooding. Each category has a definition based on property damage and public threat:

- Minor Flooding - minimal or no property damage, but possibly some public threat or inconvenience.
- Moderate Flooding - some inundation of structures and roads near streams. Some evacuations of people and/or transfer of property to higher elevations are necessary.
- Major Flooding - extensive inundation of structures and roads. Significant evacuations of people and/or transfer of property to higher elevations (NWS, 2008).

The Oklahoma County jurisdictions consider a rainfall of one inch per hour or a river rise that stays within the river's banks to be a minor severity. A major severity to the County jurisdictions is identified as a rainfall of three inches or more an hour, or more than one inch in three hours on saturated ground, or a river that overflows its bank.

Creeks, rivers, riparian and floodplain areas are common throughout the County (Oklahoma County Master Plan, 2007). The State of Oklahoma is divided into eight water planning areas. Oklahoma County is located within the Central Planning Area.

Within the County, there are several waterways that cause major flooding. These include the North Canadian River, Deep Fork Creek, Deer Creek, Crutcho Creek, Chisholm Creek, Bluff Creek and Lightning Creek. The North Canadian River has its headwaters in New Mexico and flows in a southeasterly direction through western Oklahoma to Oklahoma City and then to Eufaula Reservoir in Eastern Oklahoma. The reach of the River that flows through the County is controlled at the very end of the Canton Reservoir which is approximately 75 miles upstream and the rest is affected by Lake Overholser. Major flooding has occurred within the County along the River. Oklahoma City and the City of Del City have experienced major flooding associated with this River (FEMA, 2009).

The Deep Fork basin headwaters are located within Oklahoma City and drain the areas immediately north of the City's business district. The Deep Fork flows northeasterly out of the County.

The Deer Creek basin is located in the northwest part of the County and flows in a northeasterly direction out of the County. Most of the basin in located within a rural setting, except for one major tributary, Bluff Creek. Bluff Creek drains an extensive urban area, including several urban lakes (Lake Hefner), which is a major water supply lake for Oklahoma City.

FEMA Flood Hazard Areas

According to FEMA, flood hazard areas are defined as areas that are shown to be inundated by a flood of a given magnitude on a map. These areas are determined using statistical analyses of records of river-flow, storm tides, and rainfall; information obtained through consultation with the community; floodplain topographic surveys; and hydrologic and hydraulic analyses.
A countywide FIS for Oklahoma has been completed (December 2009). The 2009 FIS indicated the following principal flood problems:

- City of Choctaw – The City has low-lying areas that are subject to periodic flooding caused by overflow of the Choctaw Creek and its tributaries, along with the North Canadian River. The most severe flooding occurs upstream from roadways that restrict the flow. Flooding along the Creek has not caused extensive property damage; however, future development could increase the threat of flood problems.
- City of Del City – Flooding in the City is mainly caused by the Crutcho and Cherry Creeks. Areas where natural and man-made obstructions in the floodplains have an increased severity of flooding.
- City of Edmond – Flooding in the City typically results from intense thunderstorms associated with squall line activity. The greatest potential for flood damage in the City exists along the upper portion of Spring Creek, west of Bryant Avenue. The main reasons why this area floods is due to increased urbanization, residential development along the floodplain, and inadequate bridge and culvert openings.
- City of Midwest City – Low-lying areas in the City are subject to periodic flooding caused by overflow of Crutcho, Soldier and Silver Creeks. Most flooding occurs upstream from roadways that restrict the flow. Urban expansion and future development in floodplains could increase the severity of flooding in the City.
- Town of Nicoma Park – Low-lying areas in the Town are subject to periodic flooding caused by overflow of Choctaw Creek and its tributaries. The most severe flooding occurs as a result of thunderstorms and intense rainfall. Most flooding occurs upstream from roadways that restrict the flow.
- City of Spencer – Low-lying areas in the City are subject to periodic flooding caused by overflow from the North Canadian River, Crutcho Creek, Silver Creek and Tributary 9. The most severe flooding typically occurs after thunderstorms with intense rainfall. Most flooding occurs upstream from roadways that restrict the flow.
- City of The Village – Potential for flood damage exists within the City along the Chisholm Creek channel from Barclay Road downstream to Hefner Road. The potential for the greatest flood damage exists for the homes bordering Village Drive from Goldstone Terrace to Finley Drive and within the apartment complex along the floodplains from Finley Drive to Cavanaugh.
- City of Warr Acres – Low-lying areas in the City are subject to periodic flooding caused by overflow of Spring Creek. The most severe flooding occurs as a result of thunderstorms and intense rainfall. Most flooding occurs upstream from roadway and ponds that restrict the flow (FEMA, 2009).

Previous Occurrences and Losses

Major flooding is not a significant concern to Oklahoma County; however, moderate flooding is considered a concern to County, as this could affect isolated areas and communities within the County. Many sources provided historical information regarding previous occurrences and losses associated with flooding events throughout the State of Oklahoma and Oklahoma County. With so many sources reviewed for the purpose of this HMP, loss and impact information for many events could vary depending on the source. Therefore, the accuracy of monetary figures discussed is based only on the available information identified during research for this HMP.

According to NOAA's NCDC storm events database, Oklahoma County experienced 60 flood events between April 30, 1950 and May 31, 2018. Between 1954 and 2018, FEMA declared Oklahoma County a disaster area as a result of 14 flood events (FEMA, 2018; OEM, 2018).

Based on all sources researched, known flooding events that have affected Oklahoma County and its municipalities are identified in Table 5.3.6-1. With flood documentation for the State being so extensive, not all sources have been identified or researched. Therefore, Table 5.3.6-1 may not include all events that have occurred throughout the County and region.

Table 5.3.6-1. Flooding Events Between 1950 and 2012

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
June 8-10, 1974	Flooding	DR-441	Yes	The County had approximately $620K in property damage and 14 injuries.	FEMA, SHELDUS
November 26, 1974	Flooding	DR-453	Yes		FEMA
October 17-19, 1983	Flooding	DR-693	Yes	The County had approximately $656K in property damage and $2.1 M in crop damage.	FEMA, SHELDUS
September 29 – October 1, 1986	Flooding	DR-778	Yes	The County had approximately $2M in property damage and $892 K in crop damage.	FEMA
May 2, 1990	Flooding, Tornado	DR-866	Yes	The County had approximately $500K in property damage and one fatality.	FEMA, SHELDUS
May 8, 1993	Tornadoes	DR-991	Yes	Four fatalities; $50M in property damage	FEMA, NOAA-NCDC
June 9, 1993	Flash Flooding	N/A	N/A	Severe storms moved across northern Oklahoma, causing lightning, large hail, damaging winds, flash flooding and three tornadoes. The three tornadoes were not in Oklahoma County. Oklahoma County had approximately $50K in property damage.	NOAA-NCDC
July 26 – August 2, 1995	Tornado, Flooding	DR-1066	Yes	The County had approximately $268K in property damage.	FEMA, SHELDUS
April 24-26, 1999	Flooding	N/A	N/A	Between five and seven inches of rain across portions of the State. Some areas had over 10 inches of rain. In Oklahoma County, the City of Choctaw on NE 23rd was closed due to flooding. Oklahoma County had approximately $932 K in property damage.	NOAA-NCDC
May 3-4, 1999	Tornadoes, Flooding	DR-1272	Yes	The County had over $450M in property damage, 234 injuries and 12 fatalities.	FEMA, SHELDUS
June 23, 1999	Flash Flooding	N/A	N/A	Storms formed across portions of central Oklahoma, causing widespread street flooding. In Oklahoma County, West Reno Ave. in Oklahoma City was flooded. A pick-up truck was almost submerged. Water had to be removed by pumps at NW 6th and Penn, and sections of SE 74th near Hiawassee Road caved in. Oklahoma County had approximately $50K in property damage.	NOAA-NCDC

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
October 21-29, 2000	Flooding	DR-1349	Yes	The County had approximately $670K in property damage.	FEMA, SHELDUS
May 30, 2001	Flooding	N/A	N/A	Severe storms formed over portions of northern and western Oklahoma. Strong winds and hail accompanied the TSTMs and flooding occurred in many areas. In Oklahoma County, portions of Interstate 35 were inundated with one foot of water in Oklahoma City. Cars were stalled in high water on the Interstate, near SW 89th. The North Deer Creek at SE 59th and Dobbs Road overflowed its banks. Oklahoma County had approximately $30K in property damage.	NOAA-NCDC
September 7, 2001	Urban Flooding	N/A	N/A	In Oklahoma City, a car stalled in high water at the intersection of NE 18th and Walnut, and four vehicles stalled in high water at NW 79th and Broadway Ave. The County had approximately $25K in property damage.	NOAA-NCDC
August 11-12, 2004	Flash Flood	N/A	N/A	Strong storms brought heavy rainfall and flooding to the north central portion of Oklahoma, affecting Garfield, Logan, Oklahoma, and Pottawatomie Counties. Rainfall totals ranged between 2.5 inches and five inches. The heavy rain caused flash and riverine flooding in the affected counties. In Oklahoma County, there was minor flooding along the North Canadian River, which crested at 19.1 feet. Deer Creek overflowed its banks and flooded Meridian Avenue. Flash flooding was reported in Oklahoma City, which closed the underpass on NE 23rd Avenue at the junction of Interstate 235. Flood depths were up to six feet in some locations. In the City of Bethany, Eldon Lynn Park was inundated by flash flooding. Water had to be pumped out of the park. In the City of Edmond, flash flooding inundated the intersection of Western Avenue and NE 234th Street. In Midwest City, Soldier Creek overflowed its banks and flooded the intersection of NE 10th Street and Midwest Boulevard, and Woodside Drive and E. Reno Avenue. The flooding caused Midwest City to close the NE 10th Street/Midwest Boulevard intersection. Approximately 50 apartment units were flooded in this area. Many residents were evacuated. Crutcho Creek overflowed its banks near the intersection of NE 23rd Street and Air Depot Boulevard. Interstate 40 was closed due to flooding. The County had approximately $500K in property damage.	NOAA-NCDC

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
January 12-26, 2007	Severe Winter Storms and Flooding	EM-3272	Yes		FEMA
May 4-11, 2007	Tornadoes, Flooding	DR-1707	No	Storms brought large hail, high winds, tornadoes and heavy rain to the area. The heavy rains caused flooding in Oklahoma County. In Oklahoma City, there were reports of widespread flash flooding. One to two feet of water was on Morgan Road. Two feet of water was reported on Interstate 40. Ramps to the Interstate were closed. High water rescues were performed. Two vehicles were swept into the North Canadian River near Sooner Road. In the City of Harrah, NE 50th and Harrah Road were closed due to flooding. The County had over $45K in road and bridge repairs.	NOAA-NCDC, Planning Committee Input
June 10 – July 25, 2007	Flooding, Tornadoes	DR-1712	Yes	June 14th – Showers and storms developed over the State, bringing heavy rains, hail and wind. The heavy rains caused flooding in many locations. In the City of Harrah, two feet of water was reported on the roadway at NE 50th and Harrah Road. June 26th – Intense showers and storms moved through the eastern two-thirds of the State, bringing heavy rainfall and flash flooding. In the City of Bethany, high water covered the road at Ski Island. Water rescues were performed. The County had approximately $5K in property damage. June 29th – Slow moving showers and storms developed and moved northeast into the State. Flash flooding resulted over parts of southwest and central Oklahoma. In Oklahoma City, numerous roads were closed in the northern portion of the City due to flooding. July 10th – Storms brought hail, high winds and flash flooding to the area. In Oklahoma City, a bridge north of Danforth Road on Western Avenue was closed due to a creek overflowing its banks.	FEMA
August 19, 2007	Tornadoes, Flooding (Remnants of Tropical Storm Erin)	DR-1718	Yes	Remnants of Tropical Storm Erin brought heavy rainfall to the area. Sustained wind speeds of 35 to 45 mph struck the area. The heavy rain caused flooding and rivers and creeks to overflow their banks. In Oklahoma City, several feet of water inundated the intersection of NW 36th and Broadway. Numerous City streets were closed due to flooding. The County	FEMA, NOAA-NCDC

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
				had approximately $15 K in property damage.	
April 10, 2008	Flash Flooding	N/A	N/A	A cold front moved through the State, bringing strong storms, heavy rain and hail. Numerous locations had up to several inches of rain, causing flash flooding. In Oklahoma City, several streets were closed due to flooded roadways. The County had approximately $5K in property damage.	NOAA-NCDC
June 13-15, 2010	Tornadoes, Straight-Line Winds, and Flooding	DR-1926	Yes	Significant flooding occurred over parts of central Oklahoma. Many homes and cars were flooded. One person died, 136 injured. At the end of the storm, widespread rainfall totals ranged between five and nine inches. At Will Rogers Airport in Oklahoma City, the largest daily precipitation was reported, with 7.61 inches. In Oklahoma City, the heavy rain led to flash flooding. Several roadways were flooded and closed. In the City of Choctaw, roads were barricaded due to flooding in the City; bridges and culverts had to be repaired as a result of this event. In the City of Del City, roads and intersections were closed due to flooding; residential and commercial properties had damage due to flooding; debris removal from roadways and culverts; Del City had over $27K in expenses. In the City of Nichols Hills, three streets were damaged from this storm – Trenton Road, Huntington Ave., and Dorchester Drive, causing the City over $55K in expenses. The County had received almost a foot of rain after this event. This storm affected 122 homes – 52 with minor damage, 11 with major damage and one completely destroyed. Damages to Oklahoma County included a two-lane roadway and culvert washed out by floodwaters. In the City of Forest Park, floodwaters washed out a roadway and two culverts. Roadways throughout the County were flooded and damaged. The County had over $340K in expenses. The County had approximately $5.5M in property damage.	FEMA, NOAA-NCDC, Input from Planning Committee
May 31 – June 1, 2013	Tornado/Flood	N/A	No	A potent set of ingredients came together during this time that brought about a major severe weather episode over central Oklahoma. Several tornadoes occurred, including the El Reno tornado, which unfortunately claimed several lives. This flash flood event ranked as one of the worst in the area in history in terms of fatalities and damages to property.	NCDC, Media

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
May 5-10, 2015	Flood	DR-4222	Yes	A series of organized significant thunderstorms and flooding event happened during this time frame. Multiple tornados were reported during this event. Over this time, a total of 11.61" rain reported. May 6th broke the all-time May record for rainfall at Will Rogers Airport with 7.10". One fatality was reported during this time due to storm activity. Multiple stranded vehicles required high water rescue. Southern parts of Oklahoma County saw the greatest rainfall. Del City, The Village and Warr Acres experienced flooded roadways along with an unincorporated road south of Harrah being washed out.	NWS
May 23rd, 2015	Flood	DR-4222	Yes	Numerous flooded roadways all over the metro area. Most of the major flooding was in OKC, including a mall.	KFOR, KWTV
July 2nd, 2015	Flood	DR-4222	Yes	In Edmond, Santa Fe Rd washed out between Waterloo & Sorghum Mill Rd. Major flooding along Danforth and Covell Rd throughout Edmond. Minor flooding of buildings at Broadway & Hurd.	NewsOK
April 29, 2017	Flood		N/A	Numerous widespread showers and storms formed in the vicinity boundary started just after midnight on the 29th, continuing till mid-morning. Jurisdictions impacted included Edmond, Warr Acres, Arcadia & The Village. Flooding of roadways was widespread with depths of up to one (1) foot.	NOAA-NCDC
June 7, 2018	Flood		N/A	Widespread flooding across the north Metro. Reports of flooding including NW 234th and Rockwell, parts of The Village, Edmond and Nichols Hill stranding multiple cars and closing roadways. 2-2.5 inches of rain fell over 2-3 hours.	KFOR

Note (1): Monetary figures within this table were U.S. Dollar (USD) figures calculated during or within the approximate time of the event. If such an event would occur in the present day, monetary losses would be considerably higher in USDs as a result of increased U.S. Inflation Rates.

FEMA	Federal Emergency Management Agency
K	Thousand ($)
M	Million ($)
Mph	Miles Per Hour
N/A	Not applicable
NCDC	National Climate Data Center
NOAA	National Oceanic Atmospheric Administration
NWS	National Weather Service
SHELDUS	Spatial Hazard Events and Losses Database for the U.S.
TSTM	Thunderstorm

Probability of Future Events

Given the history of flood events that have impacted Oklahoma County, it is apparent that future flooding of varying degrees will occur. The fact that the elements required for flooding exist and that major flooding has occurred throughout the county in the past suggests that many people and properties are at risk from the flood hazard in the future.

It is estimated that Oklahoma County will continue to experience direct and indirect impacts of floods annually. Table 5.3.6-2 summarizes the occurrences of flood events and their annual occurrence (on average).

Table 5.3.6-2. Occurrences of Flood Events in Oklahoma County, 1950 - 2018

Event Type	Total Number of Occurrences
Flash Flood	48
Flood	11
Total:	**59**

Source: NOAA-NCDC, 2018

Based on historical records and input from the Planning Committee, the probability of occurrence for flood in the County and all participating jurisdictions in this HMP is considered 'Highly Likely' (Event is probable within the calendar year. Event has a 1 in 1 year chance of occurring.). Although Forest Park, Nichols Hills, and Valley Brook do not currently have population in the 100 year or 500 year flood zone (see below), they are considered equally at risk of flooding of streets and culverts as Oklahoma County jurisdictions have experienced heavy rain events where cells stall or repeatedly train across the same area causing rainfall amounts sufficient enough to cause flash flooding of varying depths over widespread areas. Given recent occurrences over the past 10 years, this is expected to continue to be a problem in the future.

VULNERABILITY ASSESSMENT

Overview of Vulnerability

All types of flooding can cause widespread damage throughout rural and urban areas, including but not limited to: water-related damage to the interior and exterior of buildings; destruction of electrical and other expensive and difficult-to-replace equipment; injury and loss of life; proliferation of disease vectors; disruption of utilities, including water, sewer, electricity, communications networks and facilities; loss of agricultural crops and livestock; placement of stress on emergency response and healthcare facilities and personnel; loss of productivity; and displacement of persons from homes and places of employment (Foster, Date Unknown).

Data and Methodology

The 100- and 500-year MRP flood events were examined to evaluate Oklahoma County's risk and vulnerability to the flood hazard. These MRP flood events are generally those considered by planners and evaluated under federal programs such as the NFIP.

Figure 5.3.6-1 illustrates the flood boundaries used for this vulnerability assessment.

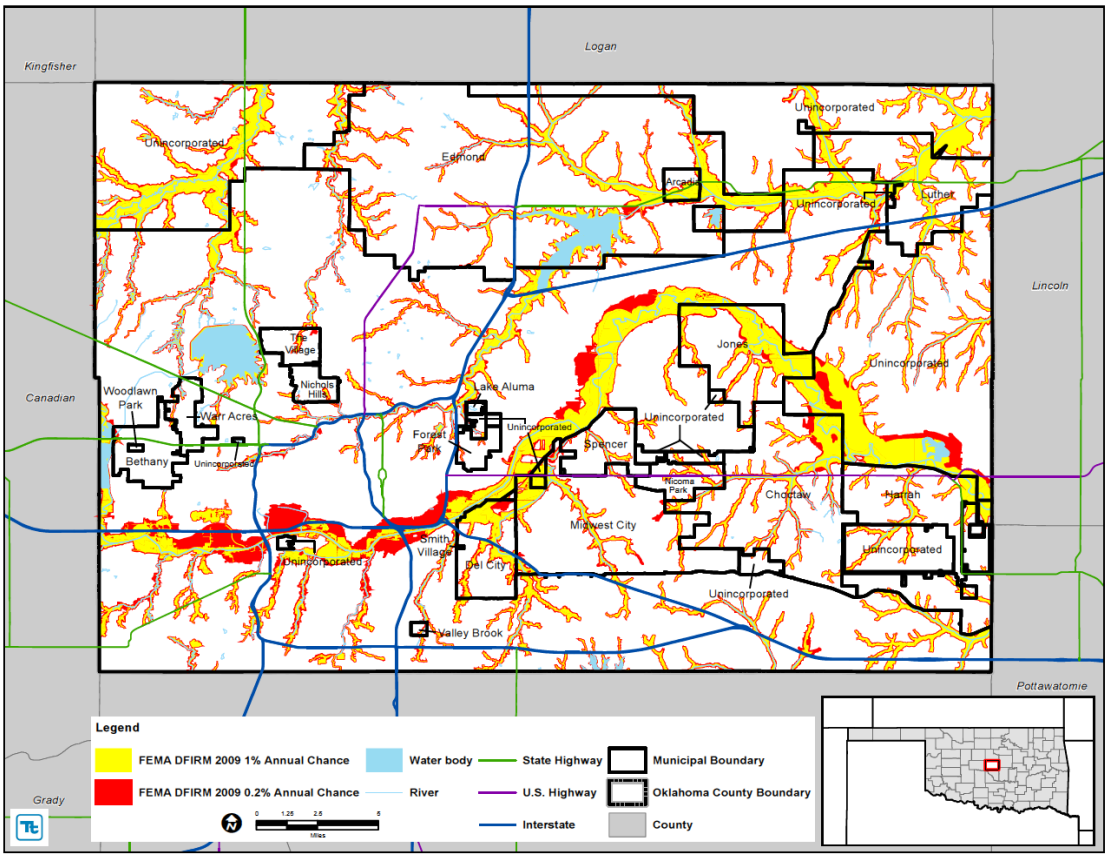


Figure 5.3.6-1. Floodplains in Oklahoma County
Source: FEMA, 2009

Impact on Life, Health and Safety

The impact of flooding on life, health and safety is dependent upon several factors including the severity of the event and whether or not adequate warning time is provided to residents. Exposure represents the population living in or near floodplain areas that could be impacted should a flood event occur. Additionally, exposure should not be limited to only those who reside in a defined hazard zone, but everyone who may be affected by the effects of a hazard event (e.g., people are at risk while traveling in flooded areas, or their access to emergency services is compromised during an event). The degree of that impact will vary and is not measurable.

The previous plan estimated the population exposed to the 100- and 500-year flood events, using the FEMA DFIRM floodplain boundaries overlaid upon the 2010 Census population data in GIS (U.S. Census 2010). Census blocks do not follow the boundaries of the floodplain. The Census blocks with their centroid in the flood boundaries were used to calculate the estimated population exposed to this hazard. This method appeared to have gross overestimates in some municipalities while underestimating the totals in others. Therefore, this data was discarded for this version of the plan. Forest Park, Nichols Hills and Valley Brook do not have population in the 100 or 500 year flood zones, according to the prior study.

Impact on General Building Stock

There are approximately 42,570 and 44,626 acres of land in Oklahoma County located in the DFIRM 100-year and 500-year floodplains, respectively. Approximately 8- to 9-percent of the developed land in the County is located within the 100- and 500-year DFIRM floodplains and thus exposed to the flood hazard (FEMA, 2009 USGS, 2011). Repetitive Loss Properties (RLP) and Severe RLPs were examined in Oklahoma County.

Repetitive loss properties are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

Table 5.3.6-3 summarizes the NFIP policies, claims and repetitive loss statistics for Oklahoma County Plan participants. According to FEMA, there were 14 repetitive loss properties and zero severe repetitive loss property among the Plan participants in 2011 (FEMA, 2011). All jurisdictions, except Nichols Hills, showed a significant decrease in the number of policies in 2018 compared to 2011. Choctaw and Midwest City have had significant claims since 2011. Spencer reduced the total number of repetitive loss properties by 2. This information was provided through the Oklahoma Water Resources Board (OWRB) in June 2018.

Table 5.3.6-3. NFIP Policies, Claims and Repetitive Loss Statistics

Municipality	# Policies	# Claims (Losses)	Total Loss Payments	# Rep. Loss Prop.	# Severe Rep. Loss Prop.	Type of Rep. Loss Structure	
Arcadia (T)	2	5	$169,600	0	0	N/A	
Bethany (C)	15	9	$19,455	1	0	Residential	
Choctaw (C)	55	28	$505,963	0	0	N/A	
Del City (C)	233	73	$876,342	2	0	Residential	
Edmond (C)	284	111	$1,776,522	4	2	Residential 1 Commercial RL	
Forest Park (T)	2	1	$16,346	0	0	N/A	
Harrah (C)	17	1	$1,053	0	0	N/A	
Luther (T)	4	1	$0	0	0	N/A	
Midwest City (C)	225	59	$2,144,394	7	0	5 Residential, 2 Commercial	
Nichols Hills (C)	20	16	$59,602	2	0	Residential	
Nicoma Park (C)	4	3	$7,694	1	0	Commercial	
Spencer (C)	20	11	$298,205	1	0	Residential	
The Village (C)	35	3	$18,752	0	0	N/A	
Unincorporated County	70	64	$827,960	4	1	Residential	
Warr Acres (C)	10	6	$6,133	1	1	Residential	
Total	**1,295**	**280**	**$2,621,098**	**23**	**4**	**19-Residential**	**4-Commercial**

Source: FEMA, 2018

Notes: [1]Data provided by FEMA in June 2018. Statistics are totals using the "Community Name" field.

[2] C = City; Prop. = Property; T = Town

Impact on Economy

Direct building losses are the estimated costs to repair or replace the damage caused to the building. The potential damage estimated to the general building stock inventory associated with the 100-year flood is greater than $338 million. This estimated building damage represents approximately 1.3-percent of the County's overall total general building stock inventory exposed to this hazard. For the 500-year event, the potential damage estimate is nearly $465 million (structure and contents), or 1.7-percent of the total exposed building value. These dollar value losses to the County's total building inventory replacement value, in addition to damages to roadways and infrastructure, would greatly impact Oklahoma's tax base and the local economy.

When a flood occurs, the agricultural industry is at risk in terms of economic impact and damage (i.e., damaged crop, financial loss to the farmer). In 2007, according to the Census of Agriculture, the market value of all agricultural products sold from Oklahoma County was greater than $28.8 billion with a majority of the value (62-percent) in crop sales including nursery and greenhouse sales. The number of farms and the amount of farmland has increased in Oklahoma County from 2002 to 2007 by two-percent (USDA NASS, 2007). Approximately 43 to 46-percent of the farmland in Oklahoma County is located in the 100- and 500-year floodplains.

Effect of Climate Change on Vulnerability

Heavy rainfall events in Oklahoma (top 1% of annual events) increased by 12% between 1958 and 2016. There is strong confidence that there will continue to be an increase in the frequency and intensity of heavy rainfall events over the 21st century (Easterling et al. 2017), which increases the chance of flooding. However, flooding is a locally complex phenomenon and can be exacerbated by human action (or inaction) as much as it can be caused by atmospheric conditions [SCIPP, 2018].

Future Growth and Development

As discussed in Section 4, areas targeted for future growth and development have been identified across the County. Any areas of growth could be potentially impacted by the flood hazard if located within the identified hazard areas. Specific areas of development vulnerable to the flood hazard are also indicated on hazard maps included in the jurisdictional annexes in Section 9 of this plan.

5.3.7 HAIL

HAZARD PROFILE

Description

Hail is a form of solid precipitation that consists of balls or irregular lumps of ice, which are individually called hailstones. Hail formation requires an atmospheric environment of strong, upward moving air, called an updraft, within the subfreezing region of a thunderstorm cloud. Large hail stones greater than an inch in diameter (quarter size), can result from a severe thunderstorm and require a very powerful updraft to form. Most large hail is the product of supercell thunderstorms, which have a sustained rotating updraft that moves growing hailstones a long distance through the height of the cloud before falling to the ground.

Extent

Hail can be produced from many different types of storms. Typically, hail occurs with thunderstorm events. The size of hail is estimated by comparing it to a known object. Most hail storms are made up of a variety of sizes, and only the very largest hail stones pose serious risk to people, if exposed (NSSL, Date Unknown). Table 5.3.7-1 shows the different types of hail and the comparison to real-world objects.

Table 5.3.7-1. Hail Size & TORRO Damage Impacts

Description	Diameter (in inches)	Typical Damage Impacts
Pea	0.25	Slight general damage to plants, crops
Marble or mothball	0.50	Moderate damage to agriculture and vegetation
Penny or dime	0.75	Significant damage to fruit, crops, vegetation
Nickel	0.88	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
Quarter	1.00	Damage to 14-18+ gauge metal on vehicles and structures
Half Dollar	1.25	Damage to composite roofing shingles
Walnut or Ping Pong Ball	1.50	Widespread glass damage, damage to tiled roofs, vehicle bodywork damage
Golf ball	1.75	Wholesale destruction of glass, significant risk of injuries
Lime or Hen's Egg	2.00	Bodywork of grounded aircraft dented, brick walls pitted
Tennis Ball	2.50	Severe roof damage, risk of serious injuries
Baseball	2.75	Widespread vehicle windshield damage
Tea Cup	3.00	Severe damage to aircraft bodywork
Grapefruit	4.00	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
Softball	4.50	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

Source: NWS, 2012

The peak periods for hailstorms, late spring and early summer, coincide with the Midwest's most critical agricultural season for wheat, grapes, corn, barley, oats, rye, and fruit trees. Unfortunately all jurisdictions in the county may experience the full range of the scale presented in Table 5.3.7-1.

Location

Hailstorms are more frequent in the southern and central plain states, where the climate produces violent thunderstorms. However, hailstorms have been observed in almost every location where thunderstorms occur (Federal Alliance for Safe Homes, Inc, 2006). The entire State of Oklahoma is susceptible to hailstorm events, include Oklahoma County. Figure 5.3.7-1 illustrates that Oklahoma County experiences an average 10 hailstorms per year.

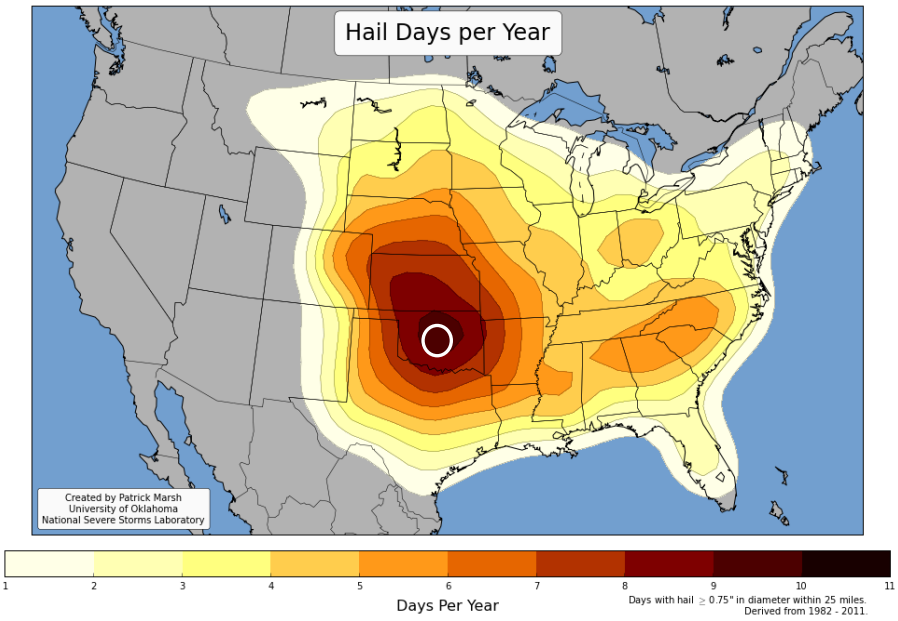


Figure 5.3.7-1. Annual Frequency of Hailstorms in the U.S.

Source: NVRC, 2018
Note: The white circle indicates the approximate location of Oklahoma County.

Previous Occurrences and Losses

Many sources provided historical information regarding previous occurrences and losses associated with severe storm events throughout the State of Oklahoma and Oklahoma County. With so many sources reviewed for the purpose of this HMP, loss and impact information for many events could vary depending on the source. Therefore, the accuracy of monetary figures discussed is based only on the available information identified during research for this HMP.

According to NOAA's NCDC storm events database, Oklahoma County experienced 106 hail events 2.00 inches or greater in diameter or greater between April 30, 1950 and May 01, 2018. Total property damages, as a result of these hail events, were estimated at $451.7 million experienced within Oklahoma County.

Based on all sources researched, known severe storm events that have affected Oklahoma County and its municipalities are identified in Table 5.3.7-2. With severe storm documentation for the State of Oklahoma being so extensive, not all sources have been identified or researched. From 2011-2018, 44 hail events of golfball size or larger occurred in Oklahoma County. 17 events were 2" or larger. Due to the frequent number of hail events, only events with reported damage will be included in the table update. Therefore, Table 5.3.7-2 does not include all events that have occurred throughout the County and region.

Table 5.3.7-2. Hail Events between 1950 and 2018

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
April 28, 1960	Tornado, Wind, and Hail	N/A	N/A	$500K in property damage; 67 injuries	SHELDUS
May 16, 1960	Hail	N/A	N/A	$500K in property damage	SHELDUS
May 26, 1963	Severe Storm and Hail	N/A	N/A	$100K in property damage; $10K in crop damage	SHELDUS
May 23-24, 1968	Severe Storm and Hail	N/A	N/A	$5M in property damage and two deaths	SHELDUS
June 27, 1972	Hail	N/A	N/A	$500K in property damage	SHELDUS
July 2, 1972	Hail	N/A	N/A	$500K in property damage	SHELDUS
May 22, 1974	Hail	N/A	N/A	$100K in property damage; $100K in crop damage	SHELDUS
May 23, 1974	Hail	N/A	N/A	$250K in property damage; $250K in crop damage	SHELDUS
June 20, 1978	Hail	N/A	N/A	$5M in property damage	SHELDUS
June 1, 1981	Hail	N/A	N/A	$7M in property damage	SHELDUS
November 22, 1983	Hail	N/A	N/A	$500K in property damage	SHELDUS
May 15, 1988	Hail	N/A	N/A	$5M in property damage	SHELDUS
April 21, 2004	Hail	N/A	N/A	A major hailstorm moved through the Oklahoma City metro area. Hail up to the size of baseballs was observed in many areas, ranging from three inches deep to two feet deep. Hail damaged many structures and vehicles. The County had approximately $100M in damages.	SHELDUS, NOAA-NCDC

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
May 1, 2008	Hail	N/A	N/A	Severe TSTMs developed and produced large hail, wind gusts and tornadoes. The County had approximately $100K in property damage.	SHELDUS, NOAA-NCDC
July 16, 2009	Hail	N/A	N/A	Damaging TSTMs entered Oklahoma County, bringing large hail and strong winds. Baseball sized hail was reported near Midwest City.	NOAA-NCDC
August 5, 2009	Hail	N/A	N/A	Showers and TSTMs developed in Oklahoma, causing heavy rainfall and TSTMs that brought hail and strong winds. In the Town of Valley Brook, hail was reported near the corner of SW 44th Street and Western Avenue.	NOAA-NCDC
May 10, 2010	Hail	N/A	N/A	Between 3.5 and 4 inch diameter hail was reported in Del City; 1.75 inch diameter hail was reported in the City of Choctaw	NWS
May 16, 2010	Hail	N/A	N/A	A large supercell TSTM developed over Major County and moved southeast. It brought large hail and wind speeds of over 60 mph. Wind speeds averaged around 50 mph. Reports of damage to cars, trees, and vegetation in the Oklahoma City metro area. Hail sizes ranged from 0.88-inches in the City of Bethany to 4.25 inches in the City of Nichols Hills. In the City of Nichols Hills, hail broke windows.	NWS
May 24, 2011	Hail	N/A	N/A	Strong to violent tornadoes moved across parts of western and central Oklahoma. The storms that produced these tornadoes also brought hail to some areas. In Oklahoma County, hail sizes ranged from one inch in the City of Del City to 1.5 inch at Tinker Air Force base.	NWS
June 14, 2011	Hail	N/A	N/A	TSTMs developed over central and southern Oklahoma producing severe storms in some areas. The storms brought large hail and damaging winds. In Oklahoma County, the City of Edmond experienced 1.75-inch diameter hail heavily dented copper fixtures on a roof, damaged gutters and roof trim and stripped the leaves from trees. At Arcadia Lake, 2.25-inch diameter hail was reported and also near the intersection of SW 89th Street and Pennsylvania Avenue.	NOAA-NCDC
June 20, 2011	Hail	N/A	N/A	A strong storm system traveled through the southern and central plains. Very strong winds were common in Oklahoma, with wind gusts of over 40 mph. This system, combined with warm temperatures, produced TSTMs in central and north-central Oklahoma. The storms produced golf ball sized hail and wind gusts of up to 70 mph. In Oklahoma County, in the City of Warr Acres, hail was	NOAA-NCDC

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
				reported near the intersection of Western Avenue and Britton Road. In the City of the The Village, 0.75-inch diameter hail fell and wind speeds of up to 55 mph. Four car windows and six patio doors were broken by the hail. The County had approximately $7K in property damage.	
October 22, 2011	Hail	N/A	N/A	Strong and severe TSTMs moved over the eastern half of Oklahoma, which produced large hail and damaging winds. In Midwest City, the hail was reported near SE 15th Street and Westminster Road.	NOAA-NCDC
May 29, 2012	Hail			Significant damage occurred across the Oklahoma County area due to very large hail. Nichols Hills, Edmond and The Village saw hail ranging between 2.50 to 3.00 inches. Total damages of $400M to $500M were estimated across the Oklahoma County area.	
April 26, 2013	Hail			Scattered supercells developed and moved southeastward across Central Oklahoma including Edmond. Very large hail up to 2.50 inches were reported. Property Damage estimated grew to $400K.	
May 19, 2013	Hail			Several supercells developed along the dryline during the mid and late afternoon hours, producing large hail. Edmond (Coffee Creek & I-35) & Luther saw hail ranging from to 2.60-2.75 inches.	

Sources: NOAA-NCDC, NWS, SHELDUS - Note: Monetary figures within this table were U.S. Dollar (USD) figures calculated during or within the approximate time of the event. If such an event would occur in the present day, monetary losses would be considerably higher in USDs as a result of inflation. K = Thousand ($), M = Million ($), NCDC = National Climate Data Center, NOAA = National Oceanic Atmospheric Administration, NWS = National Weather Service
SHELDUS = Spatial Hazard Events and Losses Database for the U.S., TSTM = Thunderstorms

Probability of Future Events

Based on recent historical events, it is likely that Oklahoma County will experience two hail events over 1.5" each year and less than one severe hail event of 2" or greater.

Based on historical records and input from the Planning Committee, the probability of occurrence for significant damaging severe hail events in the County and all the jurisdictions included in this plan is considered 'Likely' (Event is probable within the next three years. Event has a 1 in 3 year's chance of occurring).

VULNERABILITY ASSESSMENT

To understand risk, a community must evaluate what assets are exposed or vulnerable in the identified hazard area. For hail events, the entire Oklahoma County has been identified as the hazard area. Therefore, all assets in the County (population, structures, critical facilities and lifelines), as described in the County section, are vulnerable.

Overview of Vulnerability

The hail hazard is a significant concern to Oklahoma County because of their geographic location and climate. Convective weather (lightning, thunderstorms, tornado and hail) frequents the State with peak season for hail events in the middle to late spring months. The direct and indirect losses associated with these events include injury, damage to structures, utilities and personal assets, agricultural losses, and stress on community resources. Once hail size approaches 2 inches, the County considers the incident severe and experiences an increase in damage claims.

Data and Methodology

National weather databases, the Oklahoma State Hazard Mitigation Plan and local resources were used to collect and analyze hazard impacts on Oklahoma County and the participating municipalities.

Impact on Life, Health and Safety

People located outdoors (i.e., recreational activities, farming) are considered most vulnerable to the hazard. This is because there is little to no warning and shelter may not be available. Moving to a lower risk location will decrease a person's vulnerability.

Impact on General Building Stock, Critical Facilities and the Economy

For the purposes of this HMP, the entire general building stock, critical facilities, utilities and personal assets in the County are considered exposed to the hail hazard. Hail can be responsible for damages to buildings, roofs, windows and automobiles. Agricultural losses can also be devastating due to this hazard. Utility damage is mainly to power lines and communication towers (OKDEM, 2011).

Future Growth and Development

As discussed and illustrated in Section 4, areas targeted for future growth and development have been identified across the County. Any areas of growth could be potentially impacted by the hail hazard because the entire planning area is exposed and vulnerable. Please refer to Section 4 (County Profile) for a map that illustrates where potential new development is located.

Effect of Climate Change on Vulnerability

Climate models project an increase in the frequency and intensity of severe thunderstorms, and events with large hail are projected to increase (Kossin et al. 2017) At the same time, models project an overall decrease in the number of days with hail per year (Briemlow et al. 2017). Confidence in the projections is currently low, however due to the isolated and sporadic nature of hail events and limited comprehensive datasets which make it difficult to track long-term trends (Wuebbles et al. 2017) [SCIPP, 2018].

Additional Data and Next Steps

The assessment above identifies vulnerable populations and potential structural and economic losses associated with this hazard of concern. The collection of additional/actual loss data specific to the Plan participants will further enhance Oklahoma County's vulnerability assessment.

5.3.8 LIGHTNING

HAZARD PROFILE

Description

Lightning is a discharge of intense atmospheric electricity, accompanied by a vivid flash of light, from one cloud to another, or from a cloud to the ground. Lightning is formed by the separation of positive and negative charges that occur when ice crystals collide high up in a thunderstorm cloud. As lightning passes through the atmosphere the air immediately surrounding it is heated, causing the air to expand rapidly. The resulting sound wave produces thunder.

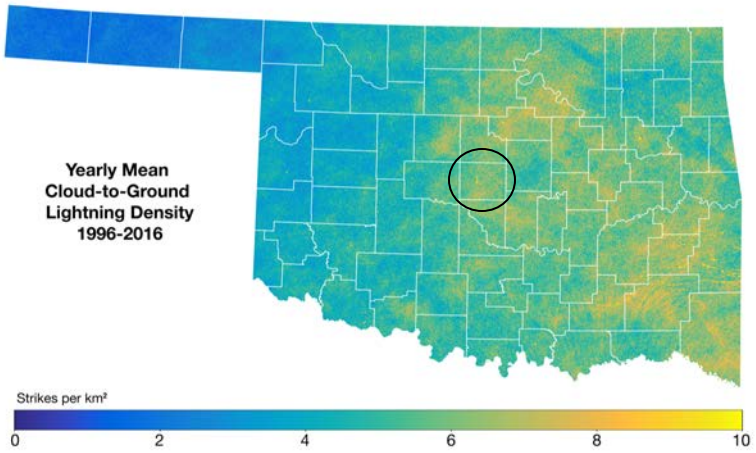
Extent

Cloud-to-ground lightning peak currents and electric fields are dependent on the polarity of the lightning discharge. For negative cloud-to-ground lightning, first return strokes have an average peak current of 30 kA and an electric field peak of 6 V/m at 100 km. Peak currents and fields for negative subsequent strokes are, on average, half of the respective values for negative first strokes. For positive cloud-to-ground lightning the average peak fields and currents are roughly a factor of two greater than those for negative first strokes (http://www.vaisala.com). The State of Oklahoma, Oklahoma County, and the County municipal planning partners consider a flash density of less than one to be a minor severity and a flash density of two and greater to be a major severity. Any lightning strike that causes death or property damage is considered a major severity.

The average areal density of cloud-to-ground lightning flashes in the U.S. has been measured by the National Lightning Detection Network (NLDN). The greatest flash density is found in central Florida and high flash densities are also found throughout the southeast and Midwest. Almost half of the U.S. has a flash density of greater than four flashes per square kilometer per year. The lightning flash rate decreases through the winter, with a minimum occurring during January. The summer months experience a higher flash rate. Most lightning occurs during the afternoon or early evening (NWS, 2002).

Figure 5.3.8-1 displays the cloud-to-ground lightning incidences in the Oklahoma from 1996 to 2016. This figure shows the yearly mean of cloud to ground lightning that occurs in any given area. According to this figure, Oklahoma County experiences approximately 10 mean cloud to ground flashes a year. It is evident that the amount of cloud-to-ground flashes in the densely populated high-rise buildings of the downtown Oklahoma City area play a significant role in the number of strikes. Within the jurisdictions included in the plan, it appears the southcentral part of the county (i.e. Del City to Midwest City) has a slightly higher density of strikes (likely due to terrain and infrastructure height) while the western side of the county seems to have a lower density of strikes.

Figure 5.3.8-1. Cloud-to-Ground Lightning Incidence in the U.S., 1996 – 2016 Source: OK Geological Survey



Location

No place in the U.S. is free from a lightning threat. Lighting can occur anywhere at anytime during the year; however, lightning activity has a strong annual cycle in the U.S. The lightning rate peaks during the summer months and begins to decrease during September (NWS, 2002). As can be seen in Figure 5.3.8.-1, the entire county is at risk for lightning.

Previous Occurrences and Losses

According to NOAA's NCDC storm events database, Oklahoma County experienced 33 damaging lightning events between April 30, 1950 and April 30, 2018. Total property damages, as a result of these severe storm events, were estimated at $8.2 million (NCDC).

Based on all sources researched, known severe storm events that have affected Oklahoma County and its municipalities are identified in Table 5.3.8-1. With lightning documentation for the State of Oklahoma being so extensive, not all sources have been identified or researched. Therefore, Table 5.3.8-1 may not include all events that have occurred throughout the County and region.

Table 5.3.8-1. Lightning Events between 1950 and 2012

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
September 4, 1969	Lightning	N/A	N/A	The County had approximately $500K in property damage.	SHELDUS
May 29, 1970	Lightning	N/A	N/A	The County had approximately $50K in property damage	SHELDUS
September 3, 1973	TSTM, Lightning and Hail	N/A	N/A	The County had approximately $50K in property damage	SHELDUS
February 15, 1974	Lightning	N/A	N/A	The County had approximately $50K in property damage	SHELDUS
August 30, 1984	Lightning	N/A	N/A	The County had approximately $300K in property damage.	SHELDUS
September 12, 1987	Lightning	N/A	N/A	The County had approximately $140K in property damage.	SHELDUS
May 7-8, 1993	Lightning	N/A	N/A	The County had approximately $550K in property damage.	SHELDUS
September 2, 1993	Lightning	N/A	N/A	Severe thunderstorms on the afternoon and evening hours on the 2nd produced strong winds and hail to quarter-size. In Oklahoma County, a lightning strike started a fire which destroyed an oil tank battery on the south side of the City of Edmond.	NOAA-NCDC
May 26, 1996	Lightning	N/A	N/A	Lightning struck an 80-foot radio tower at city hall in the City of Warr Acres. The telephone and computer systems in the police and fire departments and the city offices were knocked out. The County had approximately $20K in property damage.	NOAA-NCDC, SHELDUS
June 19, 1996	Lightning	N/A	N/A	Lightning struck and set fire to a home in southeast Edmond. The fire was confined mainly to the roof and damages were estimated at $50,000.	NOAA-NCDC, SHELDUS
August 1, 1996	Lightning	N/A	N/A	Lightning struck a house, setting the attic on fire in the City of Edmond. Damage to the house and its contents was estimated at $55,000.	NOAA-NCDC, SHELDUS
August 2, 1996	Lightning	N/A	N/A	Lightning struck a house chimney, splitting the bricks and setting a fire in the attic in the City of Edmond. Damage was estimated at $1,250.	NOAA-NCDC

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
September 21, 1998	Lightning	N/A	N/A	The County had approximately $200K in property damage.	SHELDUS
October 28, 1998	Lightning	N/A	N/A	The County had approximately $200K in property damage.	SHELDUS
April 30, 2000	TSTM / Lightning	N/A	N/A	TSTMs formed over areas of western and central Oklahoma and brought strong winds, large hail, lightning and flooding. In Oklahoma County, numerous lightning strikes resulted in house fires and a chimney collapse. The County had approximately $50K in property damage.	NOAA-NCDC, SHELDUS
May 9, 2000	Lightning	N/A	N/A	TSTMs resulted in lightning strikes across Oklahoma and Payne Counties. In the City of Edmond, the roof of a house was set on fire due to a lightning strike, causing major damage to the roof and attic. Other homes in the area were struck by lightning as well. The County had approximately $150K in property damage.	NOAA-NCDC, SHELDUS
October 22, 2000	Lightning	DR-1349	Yes	Storms brought significant flash flooding and six tornadoes to the area. Rainfall amounts totaled between four and eight inches. In Oklahoma County, lightning struck a house in the City of Bethany, causing a fire and significant damage to the home. The County had approximately $30K in property damage.	NOAA-NCDC, SHELDUS, FEMA
September 3, 2001	Lightning	N/A	N/A	Lightning struck a man in a boat on Arcadia Lake, suffering only minor injuries.	NOAA-NCDC
August 13, 2002	Lightning	N/A	N/A	At Tinker Air Force Base, lightning struck a utility pole causing a power outage. In the City of Edmond, lightning struck a home, causing a fire. The County had approximately $125K in property damage.	NOAA-NCDC
August 28, 2004	Lightning	N/A	N/A	The County had approximately $250K in property damage	SHELDUS
August 12, 2005	Lightning	N/A	N/A	In the City of The Village, lightning struck a powerline that severed. The severed line set part of a yard and roof of a nearby home on fire.	NOAA-NCDC
July 27, 2006	Lightning	N/A	N/A	Lightning struck the UPS building at Will Rogers World Airport, injuring seven people.	NOAA-NCDC
May 13, 2009	TSTMs / Lightning	N/A	N/A	Supercell TSTMs developed over Oklahoma, causing baseball sized hail, wind gusts of over 60 mph and four tornadoes. In Oklahoma County, lightning struck four homes which caused a	NOAA-NCDC

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
				fire in the City of Midwest City. Four firefighters were injured.	
July 09, 2014	Lightning			Multiple storms produced numerous cloud to ground lightning flashes. At least three homes were damaged or destroyed in Nichols Hills. Property damages was estimated to be $2.80M	NOAA-NCDC

Sources: FEMA, NOAA-NCDC, NWS, SHELDUS
Note: Monetary figures within this table were U.S. Dollar (USD) figures calculated during or within the approximate time of the event. If such an event would occur in the present day, monetary losses would be considerably higher in USDs as a result of inflation.
FEMA Federal Emergency Management Agency
K Thousand ($)
M Million ($)
NCDC National Climate Data Center
NOAA National Oceanic Atmospheric Administration
NWS National Weather Service
SHELDUS Spatial Hazard Events and Losses Database for the U.S.

Probability of Future Events

The probability of occurrence, or likelihood of the event, is one parameter used for ranking hazards. Based on historical records and input from the Planning Committee, the probability of occurrence for lightning events in the County and all jurisdictions participating in this plan is considered '4 – Highly Likely' (Event is probable within the calendar year. Event has a 1 in 1 year chance of occurring).

It is estimated that Oklahoma County will continue to experience direct and indirect impacts of lightning events annually that may induce secondary hazards such as infrastructure deterioration or failure, utility failures, power outages, and fires.

VULNERABILITY ASSESSMENT

To understand risk, a community must evaluate what assets are exposed or vulnerable in the identified hazard area. All assets in the County (population, structures, critical facilities and lifelines), as described in the County section, are vulnerable.

Overview of Vulnerability

The lightning hazard is a significant concern to Oklahoma County because of their climate. Being located southeast of the Rocky Mountains which provide cool air masses; proximate to the Gulf of Mexico, a source of moisture; and northeast of the dry hot southwest brings frequent convective weather (lightning, thunderstorms, tornado and hail) to the State of Oklahoma. The peak lightning season is from April to June, which is also the State's major tornado season (OKDEM, 2011). The direct and indirect losses associated with these events include injury and loss of life, damage to structures and infrastructure, agricultural losses, utility failure (power outages), and stress on community resources.

Data and Methodology

National weather databases and local resources were used to collect and analyze lightning impacts on Oklahoma County and the participating municipalities. .

Impact on Life, Health and Safety

Across the U.S., the ten year average (2008 to 2017) for fatalities caused by lightning is 27 (was 37 from 2001-2011) while the 30-year average (1988 to 2017) is 44 (was 54 1982-2011) (NOAA, 2018). Refer to Figure 5.3.8-2 for an illustration of these statistics. According to Vaisala and NOAA, in the State of Oklahoma there were 100 fatalities as a result of lightning events from 1959 to 2016. Oklahoma is ranked #11 in number of deaths per million people (NOAA, May 2017).

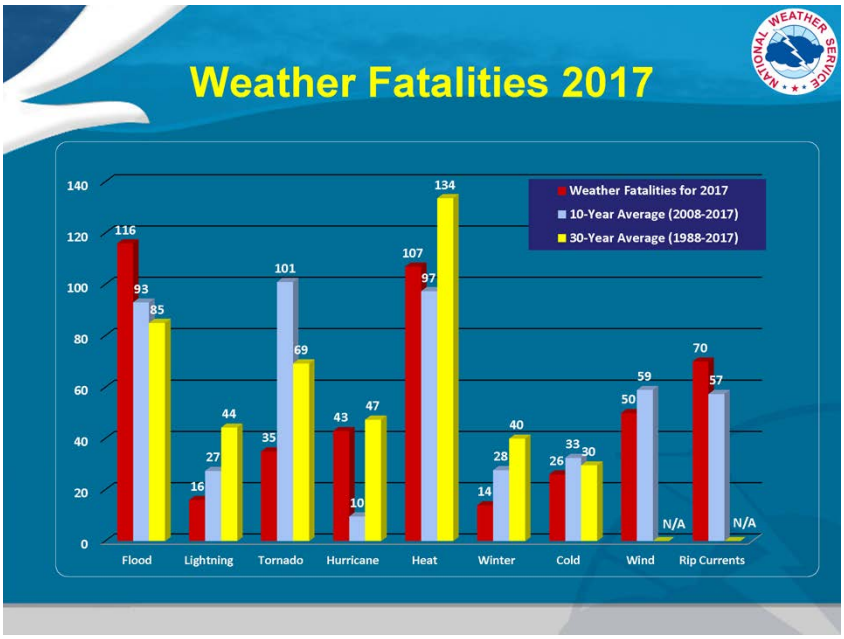


Figure 5.3.8-2. Weather Fatalities Source: NOAA, 2017

The entire population of Oklahoma County is considered exposed to the lightning hazard. The peak lightning season in the State of Oklahoma is from April to June; however, the most fatalities occur in August. According to the State HMP, fatalities occur most often when people are outdoors and/or participating in some form of recreation. The following are considered vulnerable locations: 1) in water; 2) under a tree; 3) on the telephone; 4) outside in the open; 5) on a ball field; 6) golfing; 7) boating; 8) operating heavy equipment/construction; 9) camping and 10) proximate to antenna, towers, transmitters (OKDEM 2011; NOAA, 2012.) Population located outdoors is considered at risk and more vulnerable to a lightning strike compared to being inside a shelter. Moving to a lower risk location will decrease a person's vulnerability.

Impact on General Building Stock, Critical Facilities and the Economy

For the purposes of this HMP, the entire general building stock and all infrastructure of Oklahoma County are considered exposed to the lightning hazard. According to NOAA's Technical Paper on *Lightning Fatalities, Injuries, and Damage Reports in the United States from 1959 - 1994*, monetary losses for lightning events range from less than $50 to greater than $5 Million (larger losses associated with forest fires with homes destroyed and crops loss) (NOAA, 1997). Lightning can be responsible for damages to buildings; cause electrical, forest and/or wildfires; and damage infrastructure such as power transmission lines and communication towers. Agricultural losses can be devastating due to lightning and resulting fires.

Future Growth and Development

As discussed and illustrated in Section 4, areas targeted for future growth and development have been identified across the County. Any areas of growth could be potentially impacted by the lightning hazard because the entire planning area is exposed and vulnerable. Please refer to Section 4 (County Profile) for a map that illustrates where potential new development is located.

Effect of Climate Change on Vulnerability

While the number of days with severe storm events has decreased in recent years, the intensity of significant severe weather events has increased (Storm Prediction Center Data, 2018, others). Lightning occurrences are also projected to increase (Kossin et al. 2017).

Additional Data and Next Steps

The assessment above identifies vulnerable populations and potential structural and economic losses associated with this hazard of concern. According to the State HMP, research at NOAA and other private organizations is ongoing to improve warning and threat information for the public. The collection of additional/actual loss data specific to the Plan participants will further enhance Oklahoma County's vulnerability assessment.

Overall Vulnerability Assessment

Existing and future mitigation efforts including personal and structural lightning safety should continue to be developed and employed that will enable the study area to be prepared for these events when they occur and lower their risk.

5.3.9 WILDFIRE

HAZARD PROFILE

Description

A wildfire is an uncontrolled fire in a rural or wilderness area. The majority of wildfires in Oklahoma County occur in the late fall through winter and into early spring, which coincides with dormant vegetation and the time of the year the state receives the least amount of precipitation. A wildfire often begins unnoticed and can spread quickly, lighting brush, trees and even homes. It may be started by a campfire that was not doused properly, a tossed cigarette, burning debris, lightning or arson. There are three different classes of wildfires. A surface fire is common in grasslands or areas with open vegetation and can spread quickly. A ground fire is a dense, very hot fire that has a thick fuel source and significantly damages the soil health where it occurs. Crown fires are those that move by jumping along the tops of trees. Wildfires often begin unnoticed, but are usually signaled by dense smoke that fills the area for miles around.

Extent

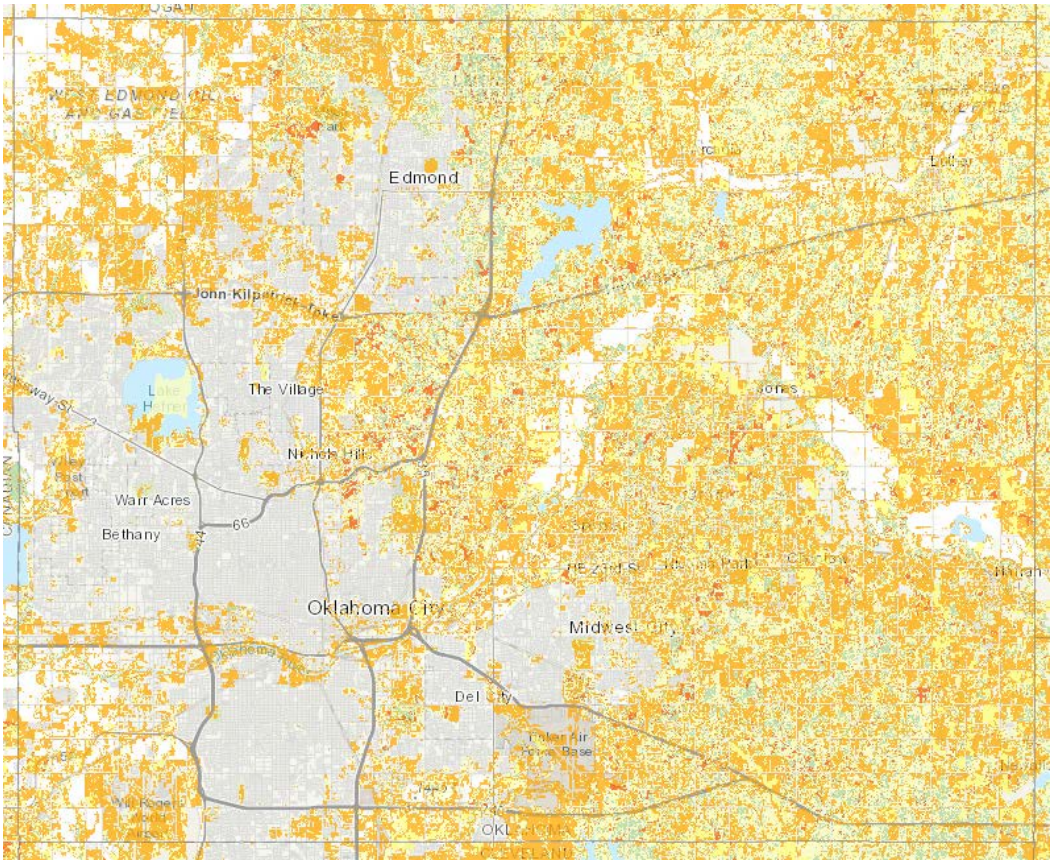
A scale was created according to fuels and terrain that are found across an area. This scale measures intensity of potential fires from Lowest to Highest. (See Figure 5.3.9-1) Per the Southern Wildfire Risk Assessment Portal, Oklahoma County most of the county's jurisdictional areas fall into the Moderate bracket, with flames up to 8 feet in length. However, Figure 5.3.9-2 shows there are multiple small areas the intensity level is indicated as High with up to 30 foot flames. These fires can create spot fires, and should be attacked with a variety of methods including highly trained firefighters, engines, and dozers for fast, effective suppression.

Figure 5.3.9-1 SouthWRAP Fire Intensity Scale (2018)

	1	Lowest Intensity	Very small, discontinuous flames, usually less than 1 foot in length; very low rate of spread; no spotting. Fires are typically easy to suppress by firefighters with basic training and non-specialized equipment.
	1.5		
	2	Light Intensity	Small flames, usually less than two feet long; small amount of very short range spotting possible. Fires are easy to suppress by trained firefighters with protective equipment and specialized tools.
	2.5		
	3	Moderate	Flames up to 8 feet in length; short-range spotting is possible. Trained firefighters will find these fires difficult to suppress without support from aircraft or engines, but dozer and plows are generally effective. Increasing potential for harm or damage to life and property.
	3.5		

	4	High	Large Flames, up to 30 feet in length; short-range spotting common; medium range spotting possible. Direct attack by trained firefighters, engines, and dozers is generally ineffective, indirect attack may be effective. Significant potential for harm or damage to life and property.
	4.5		
	5	Highest	Very large flames up to 150 feet in length; profuse short-range spotting, frequent long-range spotting; strong fire-induced winds. Indirect attack marginally effective at the head of the fire. Great potential for harm or damage to life and property.

Figure 5.3.9-2 South WRAP Potential Fire Intensity Map of Oklahoma County (2018)



Location

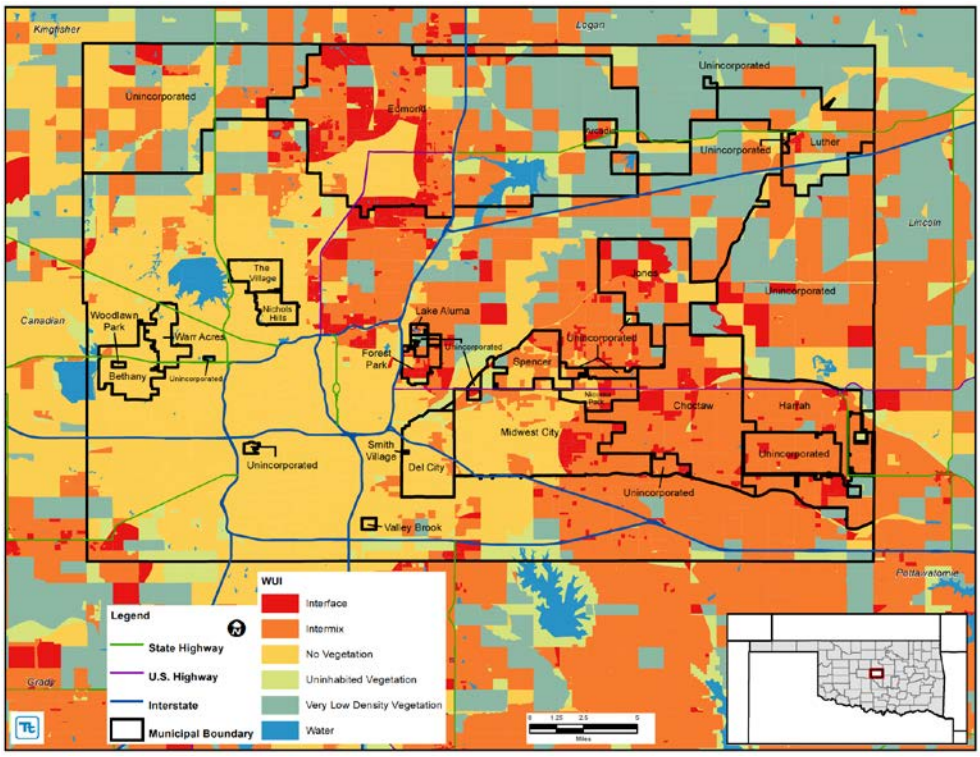
Wildland/Urban Interface (WUI) is the area where houses and wildland vegetation coincide. The WUI is divided into two categories: intermix and interface. Intermix WUI are areas where housing and vegetation 'intermingle'. Intermix areas have more than one house per 40 acres and have more than 50-percent vegetation. Interface WUI are areas with housing in the vicinity of contiguous wildland vegetation. Interface areas have more than one house per 40 acres, have less than 50-percent vegetation, and are within 1.5 miles of an area over 1,235 acres that is more than 75-percent vegetated (Spatial Analysis for Conservation and Sustainability [SILVIS Lab], Date Unknown).

The Geospatial Multi-Agency Coordination Group (GeoMAC) is an internet-based mapping application developed by various government agencies, designed for fire managers to access online maps of current or recent fire locations (ranging from 2002 to present) and perimeters in the conterminous 48 states and Alaska (GeoMAC, 2018). This mapping application identifies not only where fires have occurred during that time period, but also identifies the WUI within the states and counties of the U.S.

A more detailed WUI (interface and intermix) was obtained through the SILVIS Lab, Department of Forest Ecology and Management, University of Wisconsin-Madison which also defines the wildfire hazard area. The California Fire Alliance determined that areas within 1.5 miles of wildland vegetation

are the approximate distance that firebrands can be carried from a wildland fire to the roof of a house. Therefore, even structures not located within the forest are at risk to wildfire. This buffer distance, along with housing density and vegetation type were used to define the WUI illustrated in Figure 5.3.9-3 below (University of Wisconsin, date unknown). Using this WUI, approximately 287 square miles or approximately 40-percent of the County is located in the WUI (interface and intermix).

Figure 5.3.9-3. SILVIS Lab Wildland Urban Interface in Oklahoma County Source: Radeloff et al, 2005



Previous Occurrences and Losses

The short-term effects of wildfires can include destruction of timber, forest, wildlife habitats, scenic vistas, and watersheds. Business and transportation disruption can also occur in the short-term. Long-term effects can include reduced access to recreational areas, destruction of community infrastructure and cultural and economic resources (USGS, 2006).

Oklahoma County experiences frequent wildfires. Between 2007 and 2016, over 27,000 acers were burned within the jurisdictions incorporated within this report. Damages from these wildfires totaled over $737,600 (OK State Fire). The most destructive fire year, 2011, burned nearly 12,000 acres for a total loss of over $400,000.

Table 5.3.9-1. Wildfire Events in Oklahoma County Between 1950 and 2018. Note no FMAG level significant fires have occurred since 2012.

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
January 1, 1990	Wildfire	N/A	N/A	A wildfire resulted in the loss of several homes throughout the County.	OKC HMP
February 1, 1990	Wildfire (Spencer Wildfire)	N/A	N/A	A wildfire resulted in the loss of over 80 homes in the County.	OKC HMP
July 26, 2000	Wildfire (Memorial and Douglas)	N/A	N/A	No reference and/or no damage reported.	OKC HMP
November 19-20, 2005	Wildfires	FM-2587 FM-2588 FM-2589	No	No reference and/or no damage reported.	GeoMAC, FEMA
January 1, 2006	Wildfires	DR-1623	No	In the City of Choctaw, all residents in the path of the wildfire were evacuated. Road within the affected area were closed. Sixty-eight homes were lost due to this wildfire.	Planning Committee Input
February 11-15, 2006	Wildfire (Hefner Wildfire)	N/A	N/A	No reference and/or no damage reported.	GeoMAC
March 12-18, 2006	Wildfire (Cedar Lake Wildfire)	N/A	N/A	On March 16, 2006, two fires burned almost 2,000 acres east of Moore and south of Midwest City beginning during the mid afternoon hours. The fire caused the temporary closure of Interstate 240 during rush hour and threatened many homes. Aircraft were used to fight these fires which caused a hold on air traffic into Tinker AFB. One home and several outbuildings were burned by these fires	GeoMAC, NOAA Storm Data
March 22, 2008	Wildfire	FM-2756	N/A	The County numerous, wide-spread evacuations. Roads were closed for approximately six days. Deer Creek schools had approximately $6,000 in damages. The County had $120,000 in expenses for assistance with road closures.	Planning Committee Input
April 15, 2008	Wildfire (Blue Gate Wildfire)	N/A	N/A	No reference and/or no damage reported.	GeoMAC
April 9-12, 2009	Wildfires (Choctaw Wildfire)	DR-1846	Yes	A powerful early spring storm system moved into the State of Oklahoma. The system brought strong winds that moved across central and western Oklahoma. The winds brought dry air, and when combined with the warm temperatures, created favorable conditions for wildfires. Disaster assistance was approved for residents and business owners in Carter, Cleveland, Grady, Lincoln, McClain, Murray, Oklahoma, Payne, and Stephen Counties.	Planning Committee Input, GeoMAC, OKOEM, FEMA

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
				In Oklahoma County, 100 structures were destroyed, with 12 homes destroyed in Midwest City and 58 homes destroyed in Choctaw. In the City of Choctaw, all residents in the path of the wildfire were evacuated. Road within the affected area were closed. Eight homes were lost due to this wildfire. In the City of Del City, Fire personnel and equipment were used to contain and extinguish wildfires; City had over $10,000 in expenses. The County had over three miles of road closures within three days. Expenses totaled over $32,000 for personnel assistance with road closures.	
March 11-12, 2011	Midwest City Fire Complex	FM-2869	Yes	The Governor declared a state of emergency for all 77 counties in the State of Oklahoma. Over 24 wildfires were reported statewide during this timeframe. These fires were located in Beggs, Choctaw, Goldsby, Harrah, Kingfisher, Midwest City, Norman, Oklahoma City, Shaween, and Stroud. In Oklahoma County, 30 homes were destroyed, one home had major damage, one home had minor damage and five homes were affected. In the City of Harrah, 29 residential and commercial buildings were lost or heavily damaged in the City; electrical, gas and cable services were out; roads were closed; shelters were open and several facilities were evacuated. In the City of Choctaw, the wildfires struck an area of approximately one square mile from SE 29th Street to just north of SE 15th Street and from Hiwassee Road to Henney Road. Seven homes were destroyed with an estimated $1.1 million in damages/losses. In Oklahoma County, more than $3M in damages to 39 properties, caused by wildfires that hit part of the southeastern portion of the County.	Planning Committee Input, OKC, Farley (Eastwood News), OKOEM, FEMA

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
April 2011	Jones-Spencer Fire	FM-2883	Yes	Hot and dry conditions combined with dormant vegetation produced critical wildfire conditions. A state of emergency was issued for all 77 counties in the State of Oklahoma (issued on March 11th). In Oklahoma County, a large fire was located in the Jones/Spencer area and evacuations occurred. Wildfires hit parts of Oklahoma County in early April. The Choctaw area was the hardest hit. The County had approximately $120,294 in damages from these wildfires.	OKC
July – August 2011	Wildfires (Edmond Fire, Westminster Fire, Coffee Creek Fire)	FM-2938 FM-2954 FM-2945	Yes	Prolonged drought, along with periods of extreme heat and gusty winds, created conditions that caused a series of wildfires across Oklahoma. Burn bans were ordered for counties in June, July and August. Overall, the Oklahoma Forestry Services battled 1,745 fires that burned over 132,000 acres.	NOAA, FEMA
August 30 – September 6, 2011	Wildfire (63rd Street Wildfire)	FM-2951	Yes	A wildfire scorched 3,000 acres and destroyed 21 houses on the edges of Oklahoma City as dry conditions and strong winds aided the fire.	Drought Impact Reporter, GeoMAC, FEMA
August 03-10, 2012	Wildfire	FM-5001	Yes	Extreme temperatures coupled with a low humidity and increased winds lead to multiple fires including a large wildfire in Luther totaling 2,621 acres. The fire moved quickly and damaged or destroyed 38 structures in and around the Luther area. Damage estimates were unavailable.	NOAA-NCDC, OKOEM

FEMA Federal Emergency Management Agency
FM Fire Management Assistance
HMP Hazard Mitigation Plan
OKC Oklahoma County
OKOEM Oklahoma County Office of Emergency Management
NOAA National Oceanic Atmospheric Administration

Although the Oklahoma County Wildland Task Force, consisting of fire apparatus from multiple departments of the county, has responded to multiple large fires outside of the county in the past five years, no large F-MAG fires have occurred in the county since 2012.

Probability of Future Events

Historically, many wildfires in the County and its jurisdictions have been caused accidentally or incendiary. Therefore, based on historical records and input from the Planning Committee, the probability of occurrence for wildfire in the County and all jurisdictions included in this plan is considered '3 – Likely' (Event is probable within the next three years. Event has a 1 in 3 year's chance of occurring).

VULNERABILITY ASSESSMENT

Overview of Vulnerability

According to the State of Oklahoma HMP 2014 Update, the one of the two most vulnerable counties to the wildfire hazard is Oklahoma County. The State Oklahoma's fire season is from July through April; therefore the County is vulnerable 10 months of the year according to Department of Emergency Management.

Impact on Life, Health and Safety, General Building Stock, Critical Facilities and the Economy

Wildfires can cost thousands of taxpayer dollars to suppress and control and involve hundreds of operating hours on fire apparatus and thousands of volunteer man hours from the volunteer firefighters. There are also many direct and indirect costs to local businesses that excuse volunteers from work to fight these fires (Central Pine Barrens, 2007).

According to 2006 land use/land cover data, approximately 58% of the land in Oklahoma County is forested land and nearly 30% is developed (Table 5.3.9-2). As shown in Figure 5.3.9-2 above, urban areas are located adjacent to forested and farmlands. Both vegetation and structures serve as fuel for wildfire events.

Table 5.3.9-2. Land Use Summary for Oklahoma County

Land Use Category	Acres	Percent of Oklahoma County
Barren (Quarry)	67.3	<1
Developed	74,458.3	29.26
Farmland	29,372.6	11.54
Forested	146,477. 8	57.57
Water	4,055.4	1.59
Wetlands	6.6	<1
TOTAL	**254,438**	**100**

Source: 2006 NLCD Land Cover

Buildings constructed of wood or vinyl siding are generally more likely to be impacted by the fire hazard than buildings constructed of brick or concrete. According to HAZUS-MH's default general building stock database, compiled from Census 2000 data, approximately 65% of the buildings in the County are constructed of wood.

Wildfire can also severely impact roads and infrastructure. Of particular note, Interstates 35, 235, 40 and 44 are located in the wildfire hazard area. Major north-south and east-west corridors through the County are vulnerable to this hazard which should be considered for evacuation route purposes.

It is recognized that a number of critical facilities are located in the wildfire hazard area, and are also vulnerable to the threat of wildfire. Many of these facilities are the locations for vulnerable populations (i.e., schools, senior facilities) and responding agencies to wildfire events (i.e., fire, police). Table 5.3.9-3 summarizes critical facilities identified by the Oklahoma County plan participants that are located within the wildfire hazard area (interface or intermix) obtained through the SILVIS Lab, Department of Forest Ecology and Management, University of Wisconsin-Madison.

Table 5.3.9-3. Facilities in the WUI

Name	Municipality	Type
Arcadia City Hall	Arcadia (C)	Government Facility
Bethany Water Treatment Plant	Bethany (C)	Government Facility
Deaconess At Bethany Hospital	Bethany (C)	Medical
Choctaw Police Dept	Choctaw (C)	Police
Choctaw Police Dept	Choctaw (C)	Police
Choctaw Fire Department	Choctaw (C)	Fire
Choctaw City Hall	Choctaw (C)	Government Facility
Fire Station #4	Edmond (C)	Fire
Fire Station #3	Edmond (C)	Fire
Fire Station #5	Edmond (C)	Fire
Fire Dept Apparatus Storage Bdg	Edmond (C)	Fire
Edmond Medical Center	Edmond (C)	Medical
MAC - Senior Center	Edmond (C)	Shelter
PSC Admin Building	Edmond (C)	Government Facility
PSC OPs Building	Edmond (C)	Government Facility
PSC OPs Yard	Edmond (C)	Government Facility
XTimbers Animal Welfare	Edmond (C)	Government Facility
Forest Park City Hall	Forest Park (C)	Government Facility
Forest Park Police Dept	Forest Park (T)	Police
Town of Forest Park Fire Dept.	Forest Park (T)	Fire
Family Care Center	Harrah (C)	Medical
Luther City Hall/Police Station	Luther (C)	Police
Luther City Hall	Luther (C)	Government Facility
Luther Mill And Farm Supply	Luther (C)	Other
Hickory Hills Volunteer Fire Department	Luther (T)	Fire
Fire Station 5	Midwest City (C)	Fire
Midwest Regional Medical Center	Midwest City (C)	Medical
Renaissance Medical Center	Midwest City (C)	Medical
MWC Animal Shelter	Midwest City (C)	Municipal Government
MWC Water Treatment Plant	Midwest City (C)	Municipal Government
Nicoma Park City Hall	Nichoma Park C)	Government Facility
Nicoma Park Police Dept	Nicoma Park (C)	Police
Nicoma Park Fire Department	Nicoma Park (C)	Fire
U.S. Filter--Deer Creek Wwtp	Oklahoma County	HAZMAT storage area

Source: Radeloff et al, 2005; Oklahoma County HMP Committee

Due to a lack of data regarding past structural and economic losses specific to Oklahoma County or its municipalities, it is not possible to estimate losses due to wildfire events at this time. All jurisdictions

that are susceptible to wildfires in the plan have residences in the WUI. These homes, their occupants and animals, storage barns, some businesses, and infrastructure such as street signs, water wells, oil wells, power poles, and other utility infrastructure are vulnerable to this hazard.

Future Growth and Development

As discussed in Section 4, areas targeted for future growth and development have been identified across the County. Approximately 40 percent of the County is considered to lie within the WUI zone (University of Wisconsin, date unknown). Any areas of growth within this 40 percent could be potentially impacted by the wildfire hazard due to exposure and vulnerability.

Effect of Climate Change on Vulnerability

Projected increases in temperatures that can dry fine fuels such as grasses and enhanced wet/dry cycles that promote vegetation growth and drying or dormancy, coupled with population growth along the wildland-urban interface, suggests the risks of wildfires is likely to continue to increase [SCIPP, 2018].

Additional Data and Next Steps

Data regarding the construction of structures in the study area, such as roofing material, fire detection equipment, structure age, etc., and proximity to fast burning/high intensity vegetative communities should be identified for further evaluation. Development and availability of such data would permit a more detailed estimate of potential vulnerabilities, including loss of life and economic damages, based on the population and resources exposed to the hazard.

Historic wildfire extent maps were not readily available and will be required to identify the geographic locations where wildfires have taken place in the past and areas prone to wildfires. Such data can be developed over time; however, based on the frequency of past wildfire events in the County, collection of this data is a lower priority than data collection for more prevalent hazard categories.

Overall Vulnerability Assessment

It is not possible to predict when and where a fire will start. Oklahoma County and its local fire departments are well-equipped and prepared to respond to moderate size fires as they arise. However, large F-MAG level fires can exceed the availability of manpower and equipment in the county.

The status of fire risk in the County will continue to be monitored and ongoing and new mitigation efforts to prevent fires and control them when they arise will continue to be developed.

5.3.10 TORNADO AND WIND

HAZARD PROFILE

Description

For the purpose of this HMP and as deemed appropriated by Oklahoma County, the wind hazard includes windstorms and tornadoes, which are defined below.

Windstorm: High winds can result from thunderstorms, strong cold front passages, or gradient winds between high and low pressure moving across Oklahoma County. High winds, sometimes referred to as "straight-line" winds, are speeds reaching 58 mph or greater, either sustaining or gusting. Wind is defined as the movement of air relative to the earth's surface. Downdraft winds are a small-scale column of air that rapidly sinks toward the ground, usually accompanied by precipitation as in a shower or thunderstorm. A downburst is the result of a strong downdraft associated with a thunderstorm that causes damaging winds near the ground. These winds can range from light breezes to sustained speeds of 80 to 100 mph.

Tornado: Tornadoes are traditionally defined as a violently rotating column of air that reaches from the bottom of a cumulonimbus cloud to the ground. Tornadoes are found in severe thunderstorms, but not all severe thunderstorms will contain tornadoes. While all tornadoes touch both the ground and the bottom of a cloud, it is possible for only part of the tornado to be visible. A tornado may be on the ground for only a few seconds, or last for over an hour. Tornadoes can appear in a variety of shapes and sizes ranging from thin ropelike circulations to large wedge shapes greater than one mile in width. However, a tornado's size is not necessarily related to its wind speed. The strongest tornadoes can have wind speeds in excess of 200mph. Over 80% of Oklahoma tornadoes have struck between 3PM and 9PM, but can still occur anytime. Spring is the peak season for Oklahoma tornadoes, but they can form during any season when the necessary atmospheric conditions of wind shear, lift, instability, and moisture are present.

Extent

The extent (that is, magnitude or severity) of a severe storm is largely dependent upon sustained wind speed. Straight-line winds, winds that come out of a thunderstorm, in extreme cases, can cause wind gusts exceeding 100 mph. These winds are most responsible for hailstorm and thunderstorm wind damage. One type of straight-line wind, the downburst, can cause damage equivalent to a strong tornado (NVRC, 2006).

Tornado

The magnitude or severity of a tornado was originally categorized using the Fujita Scale (F-Scale) or Pearson Fujita Scale introduced in 1971, based on a relationship between the Beaufort Wind Scales (B-Scales) (measure of wind intensity) and the Mach number scale (measure of relative speed). It is used to rate the intensity of a tornado by examining the damage caused by the tornado after it has passed over a man-made structure (Tornado Project, Date Unknown). The F-Scale categorizes each tornado by intensity and area. The scale is divided into six categories, F0 (Gale) to F5 (Incredible) (Edwards, 2011). Table 5.3.10-1 explains each of the six F-Scale categories.

Table 5.3.10-1. Fujita Damage Scale

Scale	Wind Estimate (MPH)	Typical Damage
F0	< 73	Light damage. Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
F1	73-112	Moderate damage. Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
F2	113-157	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
F3	158-206	Severe damage. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.
F4	207-260	Devastating damage. Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.
F5	261-318	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yards); trees debarked; incredible phenomena will occur.

Source: SPC, Date Unknown

The Enhanced Fujita Scale (EF) Scale became operational on February 1, 2007. It is used to assign tornadoes a 'rating' based on estimated wind speeds and related damage. When tornado-related damage is surveyed, it is compared to a list of Damage Indicators (DIs) and Degree of Damage (DOD), which help better estimate the range of wind speeds produced by the tornado. From that, a rating is assigned, similar to that of the F-Scale, with six categories from EF0 to EF5, representing increasing degrees of damage. The EF Scale was revised from the original F-Scale to reflect better examinations of tornado damage surveys. This new scale has to do with how most structures are designed (NOAA, 2008). Table 5.3.10-2 displays the EF Scale and each of its six categories.

Table 5.3.10-2. Enhanced Fujita Damage Scale

F-Scale Number	Intensity Phrase	Wind Speed (mph)	Type of Damage Done
EF0	Light tornado	65–85	Light damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
EF1	Moderate tornado	86-110	Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	Significant tornado	111-135	Considerable damage. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	Severe tornado	136-165	Severe damage. Entire stories 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	Devastating tornado	166-200	Devastating damage. Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
EF5	Incredible tornado	>200	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (109 yd); high-rise buildings have significant structural deformation; incredible phenomena will occur.

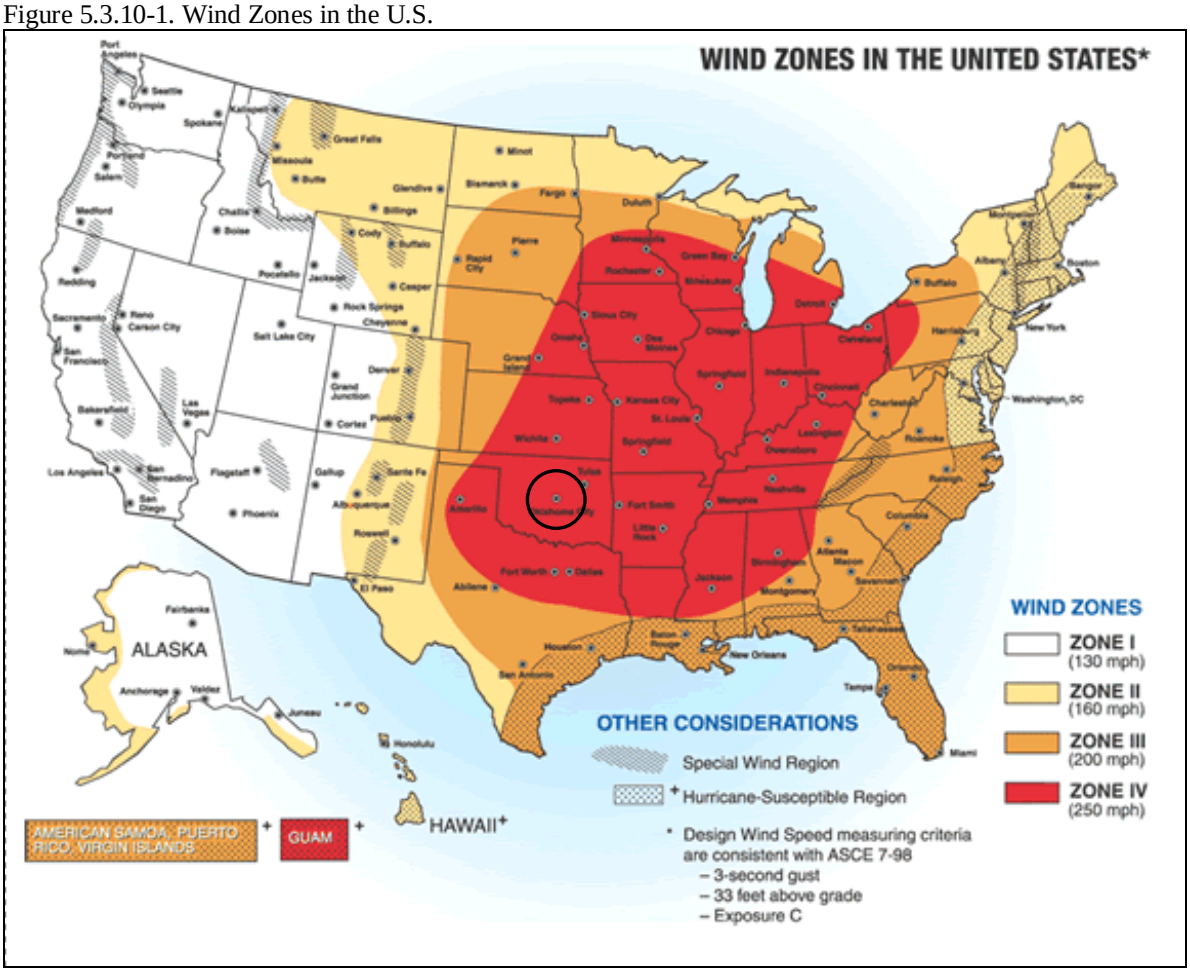
Source: SPC, 2007

Location

Windstorms

Oklahoma County is located in Wind Zone IV with speeds up to 250 miles per hour (FEMA, 2008) (Figure 5.3.10-1).

Figure 5.3.10-1. Wind Zones in the U.S.

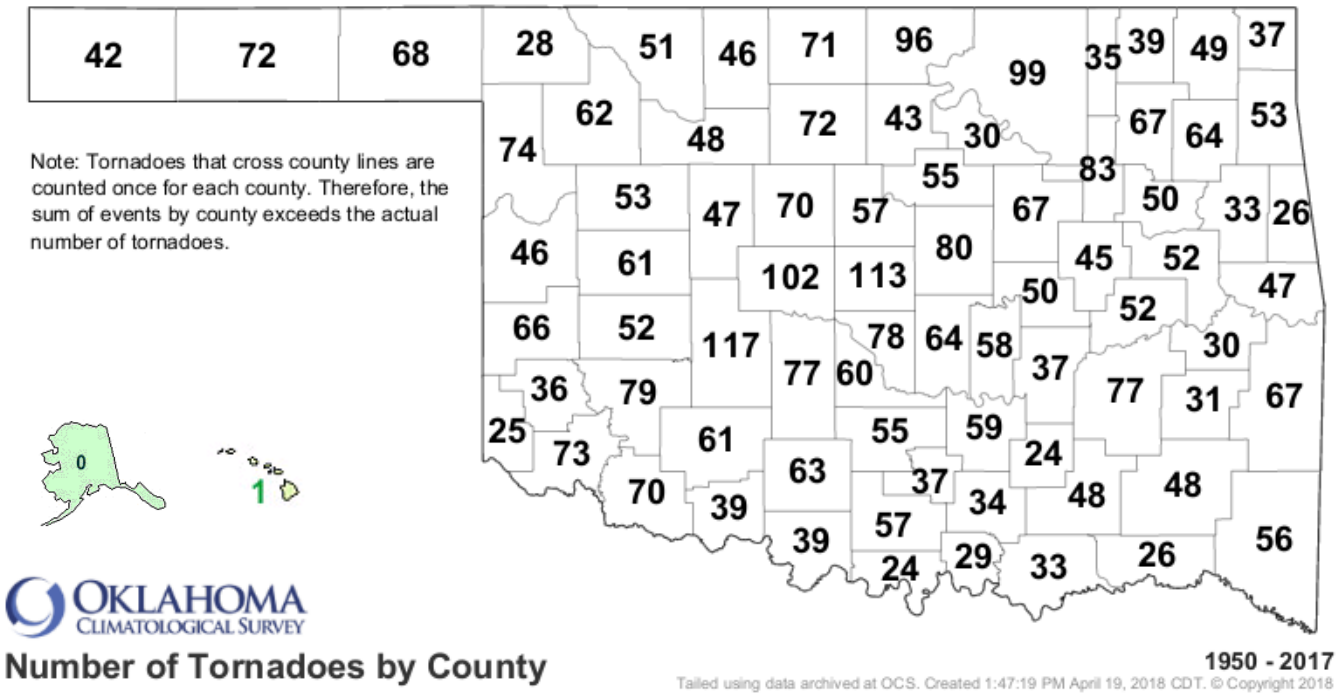


Source: FEMA, 2010
Note: The black circle indicates the approximate location of Oklahoma County.

Tornado

The U.S. experiences more tornadoes than any other country. In a typical year, approximately 1,000 tornadoes affect the U.S. The peak of the tornado season is April through June, with the highest concentration of tornadoes in the central U.S. Figure 5.3.10-2 shows the total number of tornados in Oklahoma by County.

Figure 5.3.10-2. Total Number of Tornadoes in Oklahoma by County, 1950 to 2017



Previous Occurrences and Losses

Between 1954 and 2016, FEMA declared that the State of Oklahoma experienced 39 wind-related disasters (DR) or emergencies (EM) classified as one or a combination of the following disaster types: severe storms, tornadoes, straight-line winds, heavy rains, hail, and flooding. Generally, these disasters cover a wide region of the State; therefore, they may have impacted many counties. However, not all counties were included in the disaster declarations. Of those events, FEMA other sources indicate that Oklahoma County has been declared as a disaster area as a result of 12 wind and tornado events (FEMA, 2017).

Based on all sources researched, known severe storm events that have affected Oklahoma County and its municipalities are identified in Table 5.3.10-3. With wind event documentation for the State being so extensive, not all sources have been identified or researched. Therefore, Table 5.3.10-3 may not include all events that have occurred throughout the County and region.

Table 5.3.10-3. Tornado and Wind Events between 1950 and 2018

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
November 19, 1930	Tornado	N/A	N/A	The County had approximately $250K in response/recovery costs and 148 people were affected.	OKC HMP
June 12, 1942	Tornado	N/A	N/A	The County had approximately $500K in response/recovery costs and 135 people were affected.	OKC HMP
April 12, 1945	Tornado	N/A	N/A	The County had approximately $1M in response/recovery costs and 208 people were affected.	OKC HMP
March 20, 1948	Tornado	N/A	N/A	The County had approximately $10.25 M in response/recovery costs and eight people were affected.	OKC HMP
March 25, 1948	Tornado	N/A	N/A	The County had approximately $6.1 M in response/recovery costs and one person was affected.	OKC HMP
April 30, 1951	Tornado	N/A	N/A	The County had approximately $250K respond/recovery costs and one person was affected.	OKC HMP
June 1, 1955	Tornado, Flood	DR-35	Yes	No reference and/or no damage reported.	FEMA
April 28, 1960	Tornado	N/A	N/A	The County had approximately $2.5M respond/recovery costs and 57 people were affected. The County had approximately $500K in property damage.	OKC HMP, SHELDUS
July 15, 1960	Tornado	DR-104	Yes	No reference and/or no damage reported.	FEMA
May 4, 1960	Tornado	N/A	N/A	The County had approximately $250K respond/recovery costs and four people were affected.	OKC HMP
April 14 - June 1, 1990	Flooding, Severe Storm, Tornado	DR-866	Yes	No reference and/or no damage reported.	FEMA
May 8-26, 1993	Flooding, Severe Storm, Tornado	DR-991	Yes	No reference and/or no damage reported.	FEMA
July 21-August 6, 1995	Tornado	DR-1066	Yes	No reference and/or no damage reported.	FEMA

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
January 17, 1996	High Wind	N/A	N/A	Oklahoma City and the City of Edmond experienced high winds that damaged structures. The County had approximately $2.3M in property damage.	OKC HMP
July 2, 1996	High Wind	N/A	N/A	The County experienced high winds of over 100 knots, causing approximately $3K in property damage.	OKC HMP
October 8, 1997	TSTM Wind	N/A	N/A	A line of severe TSTMs developed and moved across western and central Oklahoma that produced large hail, damaging winds and two tornadoes. The tornadoes did not occur in Oklahoma County; however, golf ball-sized hail fell in the County. In the City of Edmond, winds downed many trees and limbs.	NOAA-NCDC
June 13, 1998	Strong Winds and Tornado (F2)	N/A	N/A	Four supercell TSTMs developed in western Oklahoma and tracked eastward. This storm produced seven tornadoes as it tracked from Canadian County to Oklahoma County. The most damaging tornado, an F2, touched down in northeast Oklahoma City and crossed I-35. Other tornadoes damaged the Oklahoma City Boat Club, portions of the Cities of The Village and Nichols Hills and the Highland Park and the area near May and Grand Ave. in Oklahoma City. Extensive straight-line winds were also reported in Lake Hefner, in the Cities of Nichols Hills and The Village and parts of northeast Oklahoma County. Wind speeds exceeded 100 mph in some areas. There were no fatalities and 21 injuries in the County. The County had over $1.65 M in property damage.	NWS, NOAA-NCDC, SHELDUS
September 21, 1998	High Winds	N/A	N/A	The County experienced high winds of over 100 knots that caused approximately $200K in property damage.	OKC HMP
May 3-4, 1999	Great Plains Tornado Outbreak	DR-1272	Yes	This tornado was a violent and long-tracked tornado that produced F5 damage in Bridge Creek, Oklahoma City and Moore. In Oklahoma County, the tornado moved through the City of Del City, crossing SE 44th and moved through the highly populated Del Aire housing, killing six people and damaging or destroying hundreds of homes, many with F3/F4 damage. The tornado crossed Sooner Road, where it damaged an entry gate and structures at Tinker Air Force Base. The tornado crossed 29th Street into Midwest City, destroying one building in the Boeing Complex and damaging two others. Widespread F3/F4 damage continued as the tornado moved across I-40. Approximately 800 vehicles were damaged at Hudiburg Auto Group. Some of the damage in this area was rated high F4 and low F5.	NWS, OKC HMP, FEMA

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
December 2, 1999	TSTM Wind	N/A	N/A	Severe TSTMs formed across portions of western Oklahoma and moved into central Oklahoma. As these storms reached central Oklahoma, straight-line winds caused minor tree damage five miles northwest of the City of Edmond in Oklahoma County.	NOAA-NCDC
July 21-22, 2000	TSTM Wind	N/A	N/A	Tees and utility poles were downed due to a line of severe TSTMs in the Cities of Edmond and Nichols Hills. At Lake Hefner, a 40-foot sailboat was blown off a trailer. Also in the City of Nichols Hills, massive damage was sustained to trees across the City and the roof of a church was damaged. In the Town of Bethany, several airplanes and hangers were damaged at Wiley Post Airport. The County had approximately $280K in property damage.	NOAA-NCDC, OKC HMP
May 27, 2001	TSTM Wind	N/A	N/A	A large and severe line of TSTMs formed across southwest Kansas and moved into Oklahoma. Widespread damage due to straight-line winds was reported. Over 160,000 customers were without power. In Oklahoma County, the roof of a YMCA sustained significant damage due to a severe storm. Rain then fell on the gym floor, destroying it, in the Town of Bethany. The County had approximately $3M in property damage.	NOAA-NCDC, OKC HMP
July 21, 2001	High Winds	N/A	N/A	Over 160,000 residents were without power from high winds that exceeded 100 knots. The County had approximately $175K in property damage.	OKC HMP
May 8-9, 2003	Tornados, TSTM Wind	DR-1465	Yes	In Oklahoma County, the May 8th tornado was an F4 when it struck. It injured 45 people. The May 9th series of tornadoes caused F0 to F1 tornado in Bethany with F0 damage in Warr Acres, injuring 8 people. Some wind damage occurred in Nichols Hills. The storm cell went on to produce small pockets of F3 damage in Oklahoma City and injured 2 more people. Total property damage for this series of tornadoes was over $177 M. The May 8th event damaged the General Motors plant in the City of Del City. Other areas in the County affected by this event were the Cities of Midwest City and Choctaw. In Midwest City, multiple homes were heavily damaged and there were downed power lines. In the City of Harrah, a tornado on ground was reported. More than 1,500 homes were damaged, including 300 that were destroyed. The County had approximately $300K in property damage.	NWS, NOAA-NCDC, SHELDUS, OEM, FEMA, OKC HMP
August 10, 2004	TSTM Wind	N/A	N/A	In the City of Edmond, numerous trees and powerlines were downed. The hardest hit areas were in the southeast section of the City, near I-35. Trees up to 30 feet tall were down in roads and across roofs and lawns. The County had approximately	NOAA-NCDC

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
				$750K in property damage.	
August 12, 2005	TSTM Wind	N/A	N/A	In the City of Edmond, strong winds move two 450-pound air conditioners approximately 15 feet on top of a business at 9th and Broadway. The roof was blown off. The winds also downed many tree limbs. At Wiley Post Airport, several hangers were damaged. The County had approximately $30K in property damage.	NOAA-NCDC
June 10 – July 25, 2007	Severe Storms, Tornadoes, Flooding	DR-1712	Yes	No reference and/or no damage reported.	FEMA
August 18 – September 12, 2007	Severe Storms, Tornadoes and Flooding	DR-1718	Yes	No reference and/or no damage reported.	FEMA
July 16, 2009	TSTM Wind	N/A	N/A	TSTMs developed over half of the State that produced severe hail and damaging winds. The most damaging TSTM moved through Oklahoma City. In Midwest City, glass doors were blown in near SE 29th Street and Air Depot Boulevard. Minor roof damage was reported at Midwest City High School. In Del City, power lines were downed near Reno Avenue and Sunnyland Road. In the Town of Forest Park, three to four inch diameter tree limbs were downed near NE 23rd Street and I-35. The County had approximately $45K in property damage.	NOAA-NCDC
August 5, 2009	TSTM Wind	N/A	N/A	Showers and TSTMs developed over parts of Oklahoma, bringing heavy rainfall, hail and strong winds. In the City of Nicoma Park, winds downed utility poles near SE 35th Street and Hiwassee Road. The County had approximately $8K in property damage.	NOAA-NCDC
May 10-13, 2010	Severe Storms, Tornadoes, and Straight-Line Winds	DR-1917	Yes	In the City of Nichols Hills, several hundred homes were without power; city buildings had damage from hail, causing $310,000 in damages; most of the roofs of homes in Nichols Hills were destroyed; numerous windows and vehicles were damaged or destroyed, causing millions in damages; over 30 pine trees were removed due to disease from the hail, causing $40,000 in damages. An EF4 tornado was reported near the Cities of Choctaw and Harrah. There were two deaths and 49 injuries reported from this tornado.	Planning Committee Input, NWS

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
May 16, 2010	TSTM / Wind	N/A	N/A	A large supercell TSTM developed over Major County and moved southeast. It brought large hail and wind speeds of over 60 mph. Wind speeds averaged around 50 mph. Reports of damage to cars, trees, and vegetation in the Oklahoma City metro area. In the City of The Village, strong winds downed multiple trees and caused power outages near Penn and Britton Roads.	NWS
June 13-15, 2010	Severe Storms, Tornadoes, Straight-line Winds, and Flooding	DR-1926	Yes	In the City of Choctaw, roads were barricaded due to flooding in the City; bridges and culverts had to be repaired as a result of this event. In the City of Del City, roads and intersections were closed due to flooding; residential and commercial properties had damage due to flooding; debris removal from roadways and culverts; City had over $27,000 in expenses. In the City of Nichols Hills, three streets were damaged from this storm – Trenton Road, Huntington Ave., and Dorchester Drive, causing the City over $55,000 in expenses.	Planning Committee Input
September 2, 2010	TSTM Wind	N/A	N/A	A line of TSTMs developed bringing strong winds and severe hail. Wind gusts of over 70 mph were reported in Oklahoma County. In the City of Edmond, widespread damage was reported between Council Road and MacArthur Avenue and between NW 150th and Hefner Road. Thousands of tree limbs were blown down. A roof of a nursing home was partially removed. The peak wind gusts were estimated at 75 mph. The County had approximately $2.5M in property damage.	NOAA-NCDC
May 24, 2011	Severe Storms / Tornado	DR-1989	No	Strong to violent tornadoes moved across parts of western and central Oklahoma. The storms that produced the tornadoes also brought strong winds. In Oklahoma County, wind gusts reached 69 mph at Tinker Air Force base.	NWS
August 8, 2011	TSTM Wind	N/A	N/A	A series of severe TSTMs struck the area, bringing wind gusts of over 70 mph, with maximum gusts of 96 mph. Widespread wind damage was reported including parts of Oklahoma County. In the Town of Bethany, numerous fences and utility poles were blown down. The County had approximately $15K in property damage.	NOAA-NCDC
August 9, 2011	TSTM Wind	N/A	N/A	A widespread damaging wind event occurred over a large portion of Oklahoma. TSTMs developed causing severe wind gusts. Widespread wind damage was reported over northern Oklahoma City. In the Towns of Arcadia and Luther, widespread	NOAA-NCDC

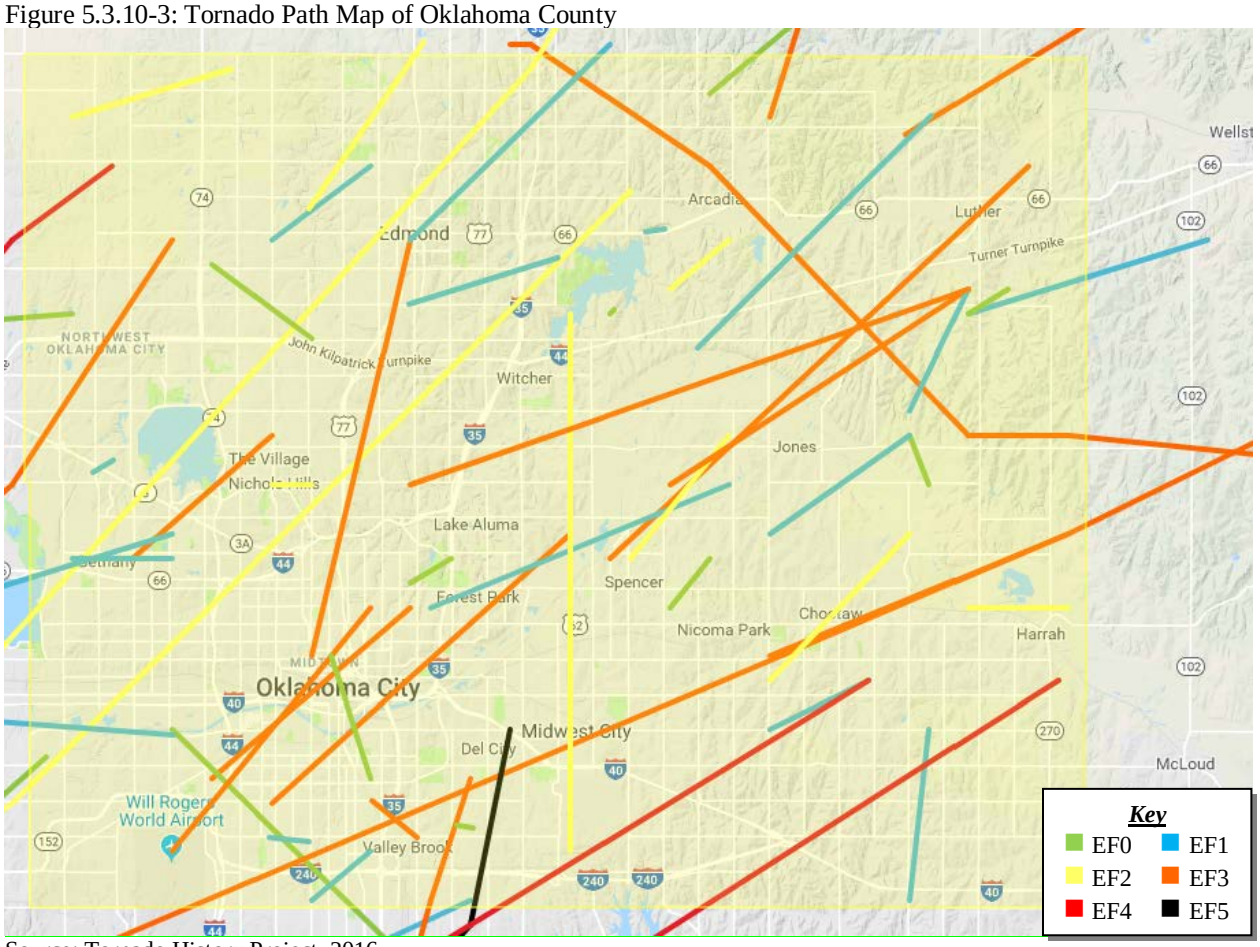
Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
				tree damage was reported. In the City of Warr Acres, a few tree limbs and street signs were blown down. The County had approximately $7K in property damage.	
February 20, 2012	Wind	N/A	N/A	Strong thunderstorm winds up to 61 MPH caused isolated areas of damage in Edmond. 4 power poles downed and 4 others damaged near Edmond Hyundai.	NOAA-NCDC
May 29, 2012	Wind	N/A	N/A	Significant damage occurred across the Oklahoma City Metropolitan area due to very large hail and severe winds. Edmond received an estimated $100.00K in damages with total estimated damages ranging from $400M to $500M across the Oklahoma City Metropolitan area including The Village.	NOAA-NCDC
May 19, 2013	Tornado	DR-4117	Yes	. Multiple tornados touched down in Edmond, Arcadia Lake and Luther that was rated up to EF2 that created damage to buildings. An estimate of damages was not available.	NOAA-NCDC
December 14, 2014	Tornado	N/A	N/A	These storms occasionally exhibited supercell characteristics, producing large hail and funnel clouds. One very brief EF0 tornado occurred over northeastern Oklahoma county including Arcadia.	NOAA-NCDC
March 25, 2015	Tornado	N/A	N/A	A tornado was spotted in Bethany with multiple buildings sustaining severe damage.	NOAA-NCDC
May 06, 2015	Tornado	N/A	N/A	This tornado was a part of a larger strong system that lasted for several days that brought about much flooding. The tornado rated as a EF3 with a two mile path length located near I-35 and 44th St. One fatality was reported.	NWS
April 26, 2016	Tornado	N/A	N/A	An EF0 tornado was spotted just south of Lake Arcadia in Edmond that caused an estimated 4.00K damage. An EF1 tornado traveled from 4 NW Jones to 3 NNW Luther. An EF0 tornado started 3 N Arcadia and traveled to 7 SSW Meridian.	NOAA-NCDC
October 9, 2018	Tornado	N/A	N/A	Several small “QLCS” tornados developed along the leading edge of a tropical-like line of storms. One tornado apparently started on Tinker AFB and traveled NNE through a shopping center east of Air Depot Blvd and I-40 (SE 29th & Town Center Dr.), damaging the roof of the JC Penny’s store and a few homes. Cars were flipped on Tinker AFB and in front of the JC Penny store. Two buildings suffered roof damage on Tinker AFB. Additional QLCS intermittent tornado damage around Spencer and Jones from the same circulation. A total of four areas of rotation crossed the county, with another QLCS tornado east of I-35 in Edmond.	Local Media, Midwest City FD reports, Tinker AFB Fire Dept

Sources: FEMA, NOAA-NCDC, NWS, SHELDUS

Note:	Monetary figures within this table were U.S. Dollar (USD) figures calculated during or within the approximate time of the event. If such an event would occur in the present day, monetary losses would be considerably higher in USDs as a result of inflation.
DR	Federal Disaster Declaration
EM	Federal Emergency Declaration
FEMA	Federal Emergency Management Agency
K	Thousand ($)
M	Million ($)
Mph	Miles Per Hour
NCDC	National Climate Data Center
NOAA	National Oceanic Atmospheric Administration
NWS	National Weather Service
OKC HMP	Oklahoma County Hazard Mitigation Plan
SHELDUS	Spatial Hazard Events and Losses Database for the U.S.

Figure 5.3.10-3 illustrates the path of recent tornado events in Oklahoma County.

Figure 5.3.10-3: Tornado Path Map of Oklahoma County



Source: Tornado History Project, 2016

Probability of Future Events

Based on historical records and input from the Planning Committee, the probability of occurrence for wind or tornado events in the County is considered '4 – Highly Likely' (Event is probable within the calendar year. Event has a 1 in 1 year chance of occurring).

It is estimated that Oklahoma County will continue to experience direct and indirect impacts of wind events annually that may induce secondary hazards such as infrastructure deterioration or failure, utility failures, power outages, water quality and supply concerns, and transportation delays, accidents and inconveniences.

VULNERABILITY ASSESSMENT

To understand risk, a community must evaluate what assets are exposed or vulnerable in the identified hazard area. For wind events, the entire Oklahoma County has been identified as the hazard area. Therefore, all assets in the County (population, structures, critical facilities and lifelines), as described in the County section, are vulnerable.

Overview of Vulnerability

The high winds of a wind storm, thunderstorm, and tornado often result in power outages, disruptions to transportation corridors and equipment, loss of workplace access, significant property damage, injuries and loss of life, and the need to shelter and care for individuals impacted by the events. A large amount of damage can be inflicted by trees, branches, and other objects that fall onto power lines, buildings, roads, vehicles, and, in some cases, people. Additionally, some storm events can bring heavy rainfall causing flooding and related damages.

The entire inventory in Oklahoma County is at risk of being damaged or lost due to impacts of wind. Certain areas, infrastructure, and types of building are at greater risk than others due to proximity to falling hazards and manner of construction. The vulnerability of various structure types was exampled for high wind speed events for Oklahoma County. The potential impacts on population, existing structures and critical facilities are presented below, following a summary of the data and methodology used.

Impact on Life, Health and Safety

The impact of the tornado and wind hazard on life, health and safety is dependent upon several factors, including the severity of the event and whether or not adequate warning time was provided to residents. The entire population of Oklahoma County is exposed to the tornado and wind hazards.

Unfortunately some tornadoes strike with little or no warning and residents must act quickly. The following populations are more vulnerable to a tornado and wind event: 1) population located in communities without or have ineffective early warning systems; 2) population with functional needs and/or over the age of 65 because they may have more difficulty evacuating or seeking shelter; 3) economically disadvantaged populations because they are likely to evaluate their risk and make decisions based on the major economic impact to their family and may not have funds to evacuate; 4) population with a language barrier unable to following warning messages; 5) population in mobile homes; and 5) population in automobiles at the time of a tornado. The elderly and functional needs populations are considered most vulnerable because they require extra time or outside assistance to seek shelter and are more likely to seek or need medical attention which may not be available due to isolation during and/or after an event.

Post-event residents should take extreme caution when returning home and walking through debris. Residents should not re-enter damaged buildings or homes until authorities say it is safe.

Additionally, flying debris (or windborne missiles) can cause much damage. On occasions where wind speeds are high enough, missiles can be thrown at buildings, with enough force to penetrate windows, walls, or the roof. This can be seen through an example of a 15 pound object being carried by a 250 mph wind at speeds of an excess of 100 mph. This is enough force to penetrate most common building materials used in houses today. Due to the ability that these missiles have to penetrate walls and roofs, not only do they pose a threat to the buildings, but the occupants as well.

Impact on General Building Stock and Critical Facilities

After considering the population exposed to the wind hazard the vulnerability of the built environment was examined. The entire study area is considered at risk to the wind hazard.

Damage to buildings is dependent upon several factors including wind speed, storm duration, path of the tornado, distance from the tornado funnel and building construction. Because of differences in building construction, residential structures are generally more susceptible to wind damage than commercial and industrial structures. Wood and masonry buildings in general, regardless of their occupancy class, tend to experience more damage than concrete or steel buildings. High-rise buildings are also very vulnerable structures. Mobile homes are the most vulnerable to damage, even if tied down, and offer little protection to people inside.

Utility infrastructure (power lines, gas lines, electrical systems) could suffer damage and impacts can result in the loss of power, which can impact business operations and can impact heating or cooling provision to citizens (including the young and elderly, who are particularly vulnerable to temperature-related health impacts). Post-event, there is a risk of fire, electrocution or an explosion.

Impact on Economy

Wind events and tornadoes can greatly impact the economy, including: loss of business function, damage to inventory, relocation costs, wage loss and rental loss due to the repair/replacement of buildings. Recovery and clean-up costs can also be costly and impact the economy as well. In addition, smaller jurisdictions may fall upon economic hardship due to the destruction caused by a tornado/high wind event due to a lack of funding resources needed to repair or replace destroyed infrastructure.

Effect of Climate Change on Vulnerability

Records over the past 40 years show that there has been an increase in the frequency of days with a large number of tornadoes (i.e. tornado outbreaks). However, there has also been a decrease in the frequency of days with tornadoes (Kossin et al. 2017). In other words, increasingly, when tornados occur, they are more likely to occur in conjunction with a tornado outbreak [SCIPP, 2018].

Overall Vulnerability Assessment

Oklahoma County is highly vulnerable to tornado and wind events which can cause significant impacts and losses to the area's structures, facilities, utilities, and population. Existing and future mitigation efforts should continue to be developed and employed that will enable the study area to be prepared for these events when they occur.

5.3.11 SEVERE WINTER STORM

HAZARD PROFILE

Description

Winter Storm can refer to a combination of winter precipitation, including snow, sleet and freezing rain. A severe winter storm can range from freezing rain or sleet to moderate snow over a few hours to blizzard conditions and extremely cold temperatures that lasts several days.

Severe snow storm is one that drops 4 or more inches of snow during a 12–hour period, or 6 or more inches during a 24- hour span.

Blowing snow is wind-driven snow that reduces visibility and causes significant drifting. Blowing snow may be snow that is falling and/or loose snow on the ground and picked up by the wind.

Blizzards occur when falling and blowing snow combine with high winds of 35 mph or greater reducing visibility to near zero.

Sleet is frozen precipitation that has melted by falling through a warm layer of the atmosphere and then refreezes into ice pellets before reaching the ground. Sleet usually bounces when hitting a surface and does not immediately stick to objects. However, it can accumulate like snow and cause a hazard to motorists.

Freezing rain is rain that falls as liquid onto a surface with a temperature below freezing. This causes the drops to freeze on contact onto surfaces like trees, utility lines, cars, and roads, forming a coating or glaze of ice. Even small accumulations of ice can cause a significant hazard.

Ice storms are extended freezing rain events, lasting several hours to sometimes days, when the freezing rain accumulates a thick enough glaze on surfaces to damage trees, utility lines, and cause major travel hazards. Ice storms can result in a heavy glaze an inch thick or more, but even a quarter inch ice accumulation can cause problems under windy conditions.

Extent

The magnitude or severity of a severe winter storm depends on several factors including a region's climatologically susceptibility to snowstorms, snowfall amounts, snowfall rates, wind speeds, temperatures, visibility, storm duration, topography, and time of occurrence during the day (e.g., weekday versus weekend), and time of season.

The NWS issues advisories to potential severe winter storms. The criteria for these advisories can vary from place to place. Those advisories include:

- Winter Storm Watch – A winter storm watch is issued by the NWS when there is a potential for heavy snow or significant ice accumulations, usually at least 24 to 36 hours in advance.
- Winter Storm Warning – A winter storm warning is issued when a winter storm is producing or is forecast to produce heavy snow or significant ice accumulations.
- Winter Weather Advisory – A winter weather advisory is issued when a low pressure system produces a combination of winter weather (snow, freezing rain, sleet) that present a hazard, but not does meet warning criteria.

- Blizzard Warning – A blizzard warning is issued for winter storms with sustained or frequent winds of 35 mph or greater with a considerable falling and/or blowing snow that reduces visibility to one-quarter of a mile or less. These conditions are expected to prevail for at least three hours.
- Frost Advisory – A frost advisory is issued during the growing season when widespread frost formation is expected over an extensive area. Surface temperatures are usually in the mid 30°Fs.
- Freeze Warning – A freeze warning is issued during the growing season when surface temperatures are expected to drop below freezing over a large area for an extended period of time, regardless whether or not frost develops (NWS, 2009).

This plan utilizes a range of physical intensities for winter storm events. These intensities are displayed in Table 5.3.11-1 and include potential effect for each intensity to Oklahoma County.

Table 5.3.11-1. Range of Physical Intensities for Winter Storm Events

Level	Type of Event	Effect
Level 1 – Nuisance Event No major impact	Little snow/ice accumulation. Roads not hazardous.	Little to no effect.
Level 2 – Minor Event Caution advised	Dusting to three inches of snow. No measurable ice. Winter weather advisory	Untreated roadways may be hazardous and slick. Livestock may need additional supplemental feed.
Level 3 – Major Event	Significant snow accumulation of four to eight inches. Ice accumulations of ¼ to ½ inch. Reduced visibility. Wind causing drifting snow. Winter storm warning.	Widespread hazardous road conditions. Travel discouraged. Areas isolated because of drifting snow. Isolated power outages because of down power lines from ice accumulation. Tree damage. Livestock loss potential increases, supplemental feed necessary.
Level 4 – Extreme Event	Crippling event. Snow accumulations over eight inches; winds over 35 mph. Drifting snow, little to no visibility. Ice accumulations of more than ½ inch. Blizzard warning.	Road conditions hazardous to impassable. People and livestock isolated. Widespread power and utility outages. Infrastructure damage. High potential for loss of livestock. Structures threatened from accumulating snow and ice. Communications infrastructure lost from ice accumulation. May be a long lasting event.

Source: Oklahoma State HMP, 2011

Location

The entire County and State of Oklahoma is susceptible to winter storms.

Previous Occurrences and Losses

Many sources provided historical information regarding previous occurrences and losses associated with severe winter storm events throughout the State of Oklahoma and Oklahoma County. With so many sources reviewed for the purpose of this HMP, loss and impact information for many events could vary depending on the source. Therefore, the accuracy of monetary figures discussed is based only on the available information identified during research for this HMP.

According to NOAA's NCDC storm events database, Oklahoma County experiences 36 days of severe winter weather events between 1997 and 2018. The accumulation of property damages rose to over $750,000 (NCDC, 2018).

Between 1954 and 2017, FEMA declared that the State of Oklahoma experienced 18 winter storm-related disasters (DR) or emergencies (EM) classified as one or a combination of the following disaster types: snowstorm, severe winter storm, snow, ice storm, and flooding. Generally, these disasters cover a wide region of the State; therefore, they may have impacted many counties. However, not all counties were included in the disaster declarations. Of those events, Oklahoma County has been included in eight winter storm-related disaster and/or emergency declarations (FEMA, 2018).

Based on all sources researched, known winter storm events that have affected Oklahoma County and its municipalities are identified in Table 5.3.11-2. With winter storm documentation for the State being so extensive, not all sources have been identified or researched. Therefore, Table 5.3.11-2 may not include all events that have occurred throughout the County and region.

Table 5.3.11-2. Winter Storm Events Between 1950 and 2018.

Incident Period	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
February 20-22, 1971	Blizzard	N/A	N/A	The County had approximately $20,000 in property damage.	SHELDUS
January 1, 1993	Ice Storm	N/A	N/A	Sleet and freezing rain fell in most parts of the State. Temperatures were below freezing and roads remained ice covered until temperatures warmed up. Many traffic accidents were reported, including accidents in Oklahoma County.	NOAA-NCDC
December 25, 2000 – January 10, 2001	Severe Winter Storm/Snow Storm	DR-1335 EM-3158	Yes	This was the first reported winter storm in Oklahoma County over the past 50 years. It was the worst ice storm in decades. Between one and two inches of rain and sleet accumulated in 24 hours.	OKC HMP, FEMA
November 27, 2001	Winter Storm	N/A	N/A	Between two and eight inches of snow fell across Oklahoma County	OKC HMP
December 23, 2002	Winter Storm	N/A	N/A	The State experienced its third winter storm in three years. It lasted three days and produced between six and eight inches of snow.	OKC HMP
January 30 – February 11, 2002	Ice Storm	DR-1401	Yes	A three-day winter storm struck the County, producing rain, freezing rain, sleet, and snow. This storm also produced an ice storm that caused massive power outages and traffic problems throughout the County.	OKC HMP, FEMA
January 4-5, 2005	Ice Storm	N/A	N/A	A powerful upper system moved toward the State of Oklahoma, bringing freezing temperatures, rain and freezing rain. In the hardest hit areas of the State, more than two inches of ice accumulated, downing tree limbs and power lines. Power outages were reported throughout the State, including Oklahoma County.	OEM
November 29-30, 2006	Winter Weather	N/A	N/A	Much of the State of Oklahoma was impacted by winter weather, bringing snow and ice to parts of the State. Road conditions throughout the State were dangerous. Many accidents were reported. Snowfall totals ranged from three to 13 inches, with drifts as high as three feet. Four inches of snow was reported at Will Rogers Airport in Oklahoma County.	OEM
January 12-26, 2007	Severe Winter Storms and Flooding	EM-3272	Yes	A strong winter storm affected most of Oklahoma, bringing snow, freezing rain and sleet. The freezing rain and sleet occurred mainly over central and southwest Oklahoma. The hardest hit areas with freezing rain were Atoka, Bryan, Coal, Cotton, Hughes, Seminole, and Johnston Counties. Many trees and power lines were downed, with thousands of customers without power. Fourteen deaths were associated with this	NOAA-NCDC, FEMA, OEM

Incident Period	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
				storm. The Oklahoma State Governor declared a state of emergency for all 77 counties. In Oklahoma County, in Del City, the school gymnasium roof collapsed. The County had approximately $50,000 in property damage.	
December 8, 2007 – January 3, 2008	Severe Winter Storms	EM-3280 DR-1735	Yes	An Arctic airmass moved into Oklahoma from Kansas, bringing freezing temperatures, freezing rain and ice. Areas in the State received between 1.5 inches and three inches of ice. At one point, over 600,000 customers were without power, which is considered one of the worst power outages in history. The storm caused over $200 M in damages statewide. Pecan crop loss was estimated at $25 M. In Oklahoma County, Jones High School burned. Seven deaths were reported in the County due to the storm.	OEM, FEMA, NOAA-NCDC
February 20-21, 2008	Winter Weather	N/A	N/A	A strong cold front brought near to below freezing temperatures to the area. Freezing rain developed north or I-40 and created slick spots on roadways, causing numerous car accidents. In Oklahoma County, more than 100 accidents were reported. The I-44 Belle Isle bridge in Oklahoma City was closed due to the ice. The County had approximately $200 K in property damage.	NOAA-NCDC
January 26-27, 2009	Winter Weather	DR-1823	No	A storm system moved over Oklahoma resulting in widespread freezing rain. The freezing rain amounts ranged from ¼ to ½ inches and caused travel problems throughout the State. The Governor declared a state of emergency for all 77 counties. Power outages occurred in many areas.	OEM, FEMA
December 24, 2009	Winter Weather	DR-1876	No	A storm system brought rain, freezing rain, sleet and snow to Oklahoma. Snowfall accumulations ranged from four to six inches, with 10 inches in some areas. At one point, all interstates roadways in Oklahoma City were closed. The Governor declared a state of emergency for all 77 counties. Blizzard warnings were issued for central, northeast and southeast Oklahoma. There were nine deaths attributed to this storm and 482 injuries. In Oklahoma County, snowfall accumulations ranged from seven to 11 inches, with isolated totals of over 12 inches. Frequent wind gusts of 50 to 60 mph caused blowing and drifting snow. A peak wind gust of 62 mph was recorded at Will Rogers Airport.	OEM, NWS, FEMA, NOAA-NCDC
January 28-29, 2010	Winter Weather	DR-1883	No	Freezing rain moved into southeast Oklahoma and spread northeast into Oklahoma County. Significant ice accumulations of one to 1.5 inches of ice occurred in southwest Oklahoma. Widespread power outages occurred. In central Oklahoma, ½	OEM, FEMA, NOAA-NCDC

Incident Period	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
				inch of ice fell, followed by sleet and four to six inches of snow. At the height of the storm, over 180,000 customers were without power. The Governor declared a state of emergency for all 77 counties. In Oklahoma County, at least ¼-inch ice accumulated before it changed to sleet. Over an inch of sleet accumulated on top of the ice.	
March 20-21, 2010	Winter Storm	N/A	N/A	Heavy snow, rain and ice fell over Oklahoma. Widespread snowfall totals ranged from three to five inches. Strong wind gusts were also associated with this storm, with gusts of over 40 mph. In Oklahoma County, between two and four inches of snow fell, with 2.5 inches measured at Will Rogers Airport and four inches near Warr Acres and Edmond. Wind gusts of 35 to 45 mph caused blowing and drifting snow.	NOAA-NCDC
January 31 - February 1, 2011	Winter Storm	DR-1985 EM-3316	No Yes	A record-breaking winter storm hit all of Oklahoma, causing periods of heavy sleet and snow and strong wind gusts. The storm also brought cold temperatures and wind chills. There were over 460 car accidents from this storm. It also caused power outages in some areas. In Oklahoma County, 12 inches of snow was reported at Will Rogers Airport. Between eight and ten inches fell near Edmond and Bethany. Wind gusts of over 50 mph were also reported.	NOAA-NCDC, FEMA, NWS
February 8-9, 2011	Winter Storm	N/A	N/A	A significant winter storm affected the southern Plains, bringing up to a foot of snow in parts of northern Oklahoma. Widespread totals for the state ranged between four and eight inches. In additional to the snowfall, strong winds blew, causing blowing and drifting snow. Wind gusts of over 30 mph were reported, with visibility at 1/8 mile. Approximately 240 injuries and two deaths, statewide, resulted from this event. In Oklahoma County, four to six inches of snow fell, with 5.9 inches at Will Rogers Airport. Wind gusts of over 30 mph were reported for several hours.	NOAA-NCDC
November 27-28, 2015	Winter Storm	DR-4247	Yes	An ice storm warning was in effect that included Oklahoma County. Precipitation was measured at 2.2 inches during this time frame at Will Rogers Airport. Multiple power lines were downed and large swaths of the county were affected with power outages during this time. This ice storm created approx. ¾" of ice in the west metro from Bethany and Warr Acres to Nichols Hills and The Village.	OEM, FEMA, AccuWeather, Corps of Engineers
December 27-28, 2015	Winter Storm	DR-4256	No	Due to freezing temperatures and precipitation, Oklahoma County saw an ice storm exactly one month from the previous event. Roads & bridges were icy with multiple incidents seeming	OEM, FEMA, OK Office of Chief Medical Examiner,

Incident Period	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
				from the event. Power outages were widespread in parts of the county due to 40 mph wind gusts with the ice. At least one fatality was reportedly due to the severe weather.	Corps of Engineers

Sources: NOAA-NCDC, FEMA, NWS, SHELDUS, OEM

Note: Monetary figures within this table were U.S. Dollar (USD) figures calculated during or within the approximate time of the event. If such an event would occur in the present day, monetary losses would be considerably higher in USDs as a result of inflation.

DR	Disaster Declaration	N/A	Not Applicable
EM	Emergency Declaration	NCDC	National Climatic Data Center
FEMA	Federal Emergency Management Agency	NOAA	National Oceanic and Atmospheric Administration
K	Thousand ($)	NWS	National Weather Service
M	Million ($)	OEM	Oklahoma Department of Emergency Management
Mph	Miles per hour	SHELDUS	Spatial Hazard Events and Losses Database for the United States

Probability of Future Events

Winter storm hazards in Oklahoma are typically mild in comparison with other states because these events are not as frequent and regular. Winter weather tends to magnify the effects on the population when it does occur. Based on historical data, Oklahoma County will experience another winter storm in the near future and should expect similar characteristics and effects from winter storms.

In Section 5.3, the identified hazards of concern for Oklahoma County were ranked. The probability of occurrence, or likelihood of the event, is one parameter used for hazard rankings. Due to the lack of large geographical elevation changes and based on historical records and input from the Planning Committee, the probability of occurrence for severe winter storms in the County and all plan participating jurisdictions is the same and is considered '3 - Likely' (Event is probable within the next three years. Event has a 1 in 3 year's chance of occurring).

VULNERABILITY ASSESSMENT

To understand risk, a community must evaluate what assets are exposed or vulnerable in the identified hazard area. For severe winter storm events, the entire County has been identified as the hazard area. Therefore, all assets in Oklahoma County (population, structures, critical facilities and lifelines) are vulnerable.

Overview of Vulnerability

Severe winter storms are of significant concern due to the direct and indirect costs associated with these events; delays caused by the storms; and impacts on the people and facilities of the region related to snow and ice removal, health problems, cascade effects such as utility failure (power outages) and traffic accidents, and stress on community resources.

Data and Methodology

National weather databases and local resources were used to collect and analyze severe winter storm impacts on Oklahoma County and the participating municipalities. The 2010 U.S. Census data used to support an evaluation of assets exposed to this hazard and the potential impacts associated with this hazard.

Impact on Life, Health and Safety

For the purposes of this HMP, the entire population of Oklahoma County is exposed to severe winter storm events (U.S. Census, 2010). Snow accumulation and frozen/slippery road surfaces increase the frequency and impact of traffic accidents for the general population, resulting in personal injuries. The elderly are considered most susceptible to this hazard due to their increased risk of injuries and death from falls and overexertion and/or hypothermia from attempts to clear snow and ice. In addition, severe winter storm events can reduce the ability of these populations to access emergency services. Residents with low incomes may not have access to housing or their housing may be less able to withstand cold temperatures (e.g., homes with poor insulation and heating supply). Refer to the table in the County Profile for population statistics for each participating municipality and a summary of the more vulnerable populations (over the age of 65 and individuals living below the Census poverty threshold).

Impact on General Building Stock

The entire general building stock inventory in Oklahoma County is exposed and vulnerable to the severe winter storm hazard. In general, structural impacts include damage to roofs and building frames, rather than building content.

Impact on Critical Facilities

Full functionality of critical facilities such as police, fire and medical facilities is essential for response during and after a severe winter storm event. Because power interruption can occur, backup power is recommended for critical facilities and infrastructure. Infrastructure at risk for this hazard includes roadways that could be damaged due to the application of salt and intermittent freezing and warming conditions that can damage roads over time. Severe snowfall requires infrastructure to clear roadways, alert citizens to dangerous conditions, and following the winter requires resources for road maintenance and repair. Additionally, freezing rain and ice storms impact utilities (i.e., power lines and overhead utility wires) causing power outages for hundreds to thousands of residents.

Impact on Economy

The cost of snow and ice removal and repair of roads from the freeze/thaw process can drain local financial resources. The potential secondary impacts from severe winter storms also impact the local economy including loss of utilities; interruption of transportation corridors; loss of business function, etc.

Future Growth and Development

As discussed and illustrated in Section 4, areas targeted for future growth and development have been identified across the County. Any areas of growth could be potentially impacted by the severe winter storm hazard because the entire planning area is exposed and vulnerable. For the severe winter storm hazard, the entire County has been identified as the hazard area. Please refer to Section 4 (County Profile) for a map that illustrates where potential new development is located.

Effect of Climate Change on Vulnerability

Models suggest although the number of snowfall events will likely continue to decrease, when snow [or other precipitation] does occur, accumulations will be greater due to increases in atmospheric moisture (Krasting et al. 2013; Easterling et al. 2017) [SCIPP, 2018].

Overall Vulnerability Assessment

Existing and future mitigation efforts should continue to be developed and employed that will enable the study area to be prepared for these events when they occur. The cascade effects of severe winter storm events include utility losses and transportation accidents and flooding. Losses associated with the flood hazard are discussed in Section 5.3.11. Particular areas of vulnerability include low-income and elderly populations, mobile homes, and infrastructure such as roadways and utilities that can be damaged by such storms and the low-lying areas that can be impacted by flooding related to rapid snow melt.

SECTION 6: MITIGATION STRATEGIES

This section describes the process by which the Oklahoma County Planning Committee performed the update to the county and local mitigation strategies. This section includes:

(1) Review and Update Mitigation Goals and Objectives and Update of capability Assessment
(2) Review of Progress on 2013 Mitigation Strategy
(3) Identification, analysis, and implementation of potential mitigation actions

Review and Update Mitigation Goals and Objectives and Update of Capability Assessment

Initial Planning Committee Meeting (Meeting #1)

As part of the plan update process, the planning committee reviewed the mitigation planning goals and objectives identified in the 2013 plan. At the March 2018 Kick-Off meetings, all participating jurisdictions were provided a packet contained a copy of each jurisdiction annex, update contact info, a capability assessment work sheet, and requested to review their mitigation actions from the 2013 plan and determine if their initiatives priorities were to remain the same and which projects would be deleted/added. Additionally, they were asked about in ongoing project initiatives and/or any completed projects from the 2013 plan.

During the first Planning Committee meeting, among other things, the following questions and talking points were asked and discussed:

- Have any risks changed within the individual jurisdictions within the past five years?
- Identify hazard prone areas due to changes in development.
- The evolution of hazards and reviewing data will help determine what to focus on for the next five year duration.
- With new data collected from NRCS soil survey, the committee decided in favor of removing jurisdictions that do not have significant areas with expansive soils.
- What priorities have changed due to economic instabilities within the state/jurisdiction?
- All jurisdictions were encouraged to consider Social, Technical, Administrative, Political, Legal, Economic & Environmental (STAPLEE) challenges to mitigation but in the end all jurisdictions opted to use the strategies from the 2013 iteration of the HM Plan due the economic downturn of the oil industry as stated in each of the impacted jurisdictional annexes in section 9.

Throughout the planning process, the relevance of the original goals and objectives continued to be evaluated for possible amendment based on the risk assessment results, discussions, research, and input from the committee, existing authorities, polices, programs, resources, and stakeholders within the planning area. The committee considered whether these goals and objectives complemented and supported other related planning documents and mechanisms including:

- County and Local Comprehensive/Master Plans
- Other county and municipal planning and land use documents

The Oklahoma State HMP (Feb 2014 Update) goals and objectives are:

1. Protect Life

2. Protect Property
3. Protect the Environment
4. Increase Public Preparedness for Disasters

The goals and objectives from the 2013 Plan were retained as they were found to embody the overarching needs and concerns of the planning partnership in addressing natural hazard risk reduction, and are in-line with the State mitigation goals.

The following are the mitigation goals and objectives for the ongoing Oklahoma County HMP:

Goal 1: Emergency Services

Goal Description: Improve the ability of the emergency services providers to respond to events and to aid in the overall recovery of the community. Promote interoperable communications between departments responsible for emergency operations and integrate the mitigation planning process into the overall emergency planning program for the community.

> **Objective 1.** Set clear policy with high-level approval for the continued advancement of the community emergency management program.
>
> **Objective 2.** Establish mutual aid programs and improve the ability for these various departments to communicate effectively in adverse conditions.
>
> **Objective 3.** Establish mitigation projects to help ensure that critical emergency response facilities can continue operations during and after large-scale events.

Goal 2: Prevention

Goal Description: Prevention measures are intended to keep a hazard risk problem from occurring or getting worse. They help ensure that future development does not increase hazard losses. Communities can achieve significant progress toward hazard resistance through prevention measures. This is particularly true in areas that have not been developed or where capital investment has not been substantial. Using prevention measures, future development can be guided away from hazards, while maintaining other community goals such as economic development and quality of life.

> **Objective 1.** Consider 'best-practices' mitigation measures when updating the comprehensive community land use and economic development plans.
>
> **Objective 2.** Modify local codes to regulate the placement and construction of new facilities when the natural hazard risk is high for the specific area.
>
> **Objective 3.** Integrate overall mitigation strategies into the community's current and future capital improvements program to help ensure that new projects have a minimal associated risk.

Goal 3: Protecting Critical Facilities

Goal Description: There are many locations throughout the community that are considered critical for any emergency response and others that are necessary for the recovery process. These locations must be protected in order to ensure that loss of life and additional damages can be avoided.

Objective 1. Avoid locating new facilities in high risk areas and work to make improvements to existing locations to aid in the mitigation of potential losses.

Objective 2. Implement voluntary and regulated programs to help ensure continued improvement to building structures, locations and on-going emergency planning initiatives.

Goal 4: Protection of Life and Property

Goal Description: This goal is associated with the implementation of activities that protect citizen life and property by making critical facilities, homes and businesses more resistant to damage from natural events. The goal is to reduce existing risk as much as possible and keep the community stable and capable of continuity when hazards strike.

Objective 1. Identify repetitive loss locations and reduce this impact on the public by convincing the individuals choosing to remain in high risk areas to accept responsibility for their choice. Promoting private insurance coverage, acquisition and relocation are ideal ways to achieve this objective.

Objective 2. Promote voluntary property improvements by individuals to reduce property vulnerability and related economic impacts.

Objective 3. Research funding opportunities to support increased mitigation activities.

Objective 4. Update and improve hazard assessment information in order to make better decisions about mitigation strategies.

Goal 5: Public Awareness and Partnerships

Goal Description: Promote coordination and communication between individual citizens, private businesses, public agencies and non-profit organizations to improve the overall ability of the community to respond to and recover from a natural disaster. From these partnerships, encourage leadership to prioritize and undertake specific projects for mitigation.

Objective 1. Educate the public about the risks associated with natural hazards and the steps they can take to be prepared.

Objective 2. Initiate programs to promote on-going partnerships within the community to address mitigation and emergency management.

Objective 3. Establish public programs and regulations for community involvement in emergency planning, including regular open forum meetings and an on-going public awareness campaign.

Goal 6: Structural Projects

Goal Description: Implement public works projects that improve the protection of important developed areas in the community.

Objective 1. Continually assess and evaluate the requirements for new structural projects that aid in the reduction of community risk.

Objective 2. Maintain these structural projects properly and regularly.

Identification, Prioritization, Analysis, and Implementation of Mitigation Actions

The update of the county and municipal mitigation strategies included a review of past mitigation activities, progress on the mitigation strategies identified in the 2013 Plan, and identification of new mitigation actions to be included in this update. The following section describes how the county and local mitigation strategies were updated.

Throughout the planning process, the County and municipalities were encouraged to consider their natural hazard risks and vulnerabilities, as identified specifically by the jurisdiction based on past and recent experience, through the results of the updated risk assessment, and based on stakeholder input, and to identify appropriate projects or initiatives to help mitigate those risks.

To help support the identification of mitigation actions and initiatives that apply to the whole planning area and to address the broad range of mitigation action types (prevention, property protection, public education and awareness, protection of the environment, emergency services, structural projects), the planning committee was asked to participate in a "brain-storming". Neighboring jurisdictions were asked to fill out a survey that included mitigation needs/efforts that crossed jurisdictional lines.

Throughout the writing of the 2019 Plan update, the County project team worked directly with each jurisdiction via email, phone and individual local support meetings to assist with the continuing update of the Plan's ongoing mitigation strategies.

Plan Progress Meeting (Meeting #2)

At the second meeting (April 2018) of the Planning Committee, the discussion took on a greater detailed approach that was twofold: What to maintain within the Plan (i.e., format, data set usage) and the purging of contactor verbiage that was not relevant to the County. Multiple decisions were made by the committee that included:

- Maintaining current format of the plan.
- Purging information carried over from the 2006 Plan.
- Added 11+ major events/declarations that impacted jurisdictions within the Plan.
- Maintaining full disaster history of significant events beyond the 10 year mark.
- Abandon the HAZUS Data due to highly incomplete and inaccurate data sets.
- Determined to remove most critical facilities lists due to lack of standardization of the term "critical facility" between jurisdictions within the previous plan and inaccuracy of associated HAZUS data.
- Resolved to remove all "low hazard" dams from plan that had no significant risk to loss of life/property.
- After being presented with information regarding the decrease in the number of days with tornadic activity but the increase in severity of resulting tornados, it was decided that no changes in priorities were needed since the end resulting response and recovery were relatively status quo.
- Although instances of earthquakes were on the rise within the last five year period, recent efforts of the Geological Survey and Corporation Commission seems to have resulted a decrease in the number of earthquake instances. Therefore, priorities to this hazard remain unchanged.

In addition, all stakeholders were educated of the processes to apply for HMGP funding, common pitfalls due to lack in information, and expectations from both the State and FEMA personnel.

Local Planning Support Meetings

Follow up individual jurisdiction meetings were held with several participating jurisdictions to gather incomplete data, clarify mitigation processes, and help local authorities understand the process. A list of these meetings is provided in Section 3. Additional phone calls and emails were exchanged to complete annexes.

Proposed Mitigation Actions

All proposed mitigation actions were identified in relation to the goals and objectives presented above. The mitigation actions include a range of options in line with the six types of mitigation actions described in FEMA guidance, including:

1. **Prevention:** Government, administrative or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning and zoning, local floodplain laws, capital improvement programs, open space preservation, and storm water management regulations.

2. **Property Protection:** Actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.

3. **Public Education and Awareness:** Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.

4. **Natural Resource Protection:** Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.

5. **Emergency Services:** Actions that protect people and property, during and immediately following, a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities.

6. **Structural Projects:** Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.

Mitigation Actions

The mitigation actions are the key element of the natural hazards mitigation plan. It is through the implementation of these actions that Oklahoma County and the participating jurisdictions can strive to become disaster-resistant through sustainable hazard mitigation. For the purposes of this Plan, mitigation actions are defined as follows:

Mitigation actions are activities designed to reduce or eliminate losses resulting from natural hazards.

Although one of the driving influences for preparing this Plan was grant funding eligibility, its purpose is more than just access to federal funding. It was important to the Planning Committee to look at mitigation actions that will work through all phases of emergency management. Some of the actions outlined in this Plan may not be grant eligible as grant eligibility was not the focus of the selection. Rather, the focus was the actions' effectiveness in achieving the goals of the Plan and whether they are within the County or each jurisdiction's capabilities.

A series of mitigation actions were identified by the County and each participating jurisdiction. These actions are summarized in Section 9 of this Plan. Along with the hazards mitigated, goals and objectives met, lead agency, estimated cost, potential funding sources and the proposed timeline are identified. The parameters for the timeline are as follows:

- Short Term = To be completed in 1 to 5 years
- Long Term = To be completed in greater than 5 years
- Ongoing = Currently being funded and implemented under existing programs.

Prioritization

Section 201.c.3.iii of 44 CFR requires an action plan describing how the actions identified will be prioritized. Oklahoma County and the planning committee developed a prioritization methodology for the Plan that meets the needs of the County and participating jurisdictions while at the same time meeting the requirements of Section 201.6 of 44 CFR. The mitigation actions identified were prioritized according to the criteria defined below.

- **High Priority:** A project that meets multiple plan goals and objectives, benefits exceed cost, has funding secured under existing programs or authorizations, or is grant-eligible, and can be completed in 1 to 5 years (short-term project) once the project is funded.
- **Medium Priority:** A project that meets at least one plan goal and objective, benefits exceed costs, funding has not been secured and would require a special funding authorization under existing programs, grant eligibility is questionable, and could be completed in 1 to 5 years once the project is funded.
- **Low Priority:** A project that will mitigate the risk of a hazard, benefits exceed costs, funding has not been secured, and project is not grant-eligible and/or timeline for completion is considered long-term (5 to 10 years).

Due to Oklahoma's heavy economic reliance on the oil industry, many jurisdictions saw a drastic reduction in sales tax revenue during the oil price collapse in the past five years. This has resulted in many jurisdictions choosing not to proceed with mitigation efforts due to tight budgets. The current Plans standings in priorities has been reflected in the prioritization of the mitigation projects, at least in part, by economic factors. Many projects that had previously labeled "short termed" remain on the initiatives for the next five years due to the aforementioned lack of funding sources and subsequent inability to meet matching funds required of grants. None of the jurisdictions identified significant political or legal challenges to mitigation and all jurisdictions opted to use the same prioritization parameters that were used in the 2013 HM Plan as outlined in the Benefit/Cost Review section found below.

Benefit/Cost Review

Section 201.6.c.3iii of 44CFR requires the prioritization of the action plan to emphasize the extent to which benefits are maximized according to a cost/benefit review of the proposed projects and their associated costs. The Planning Area conducted a review of benefits and costs to determine if each project appears to be cost-effective and to assist the municipality with prioritizing their mitigation actions. This exercise allows the community to select the most cost-effective actions for implementation first, not only to use resources efficiently, but to make a realistic start toward mitigating risks. The same parameters were used by each of the participating jurisdictions as outlined in this Plan.

Please note that this benefit/cost review did not include the level of detail required by FEMA for project grant eligibility under the Hazard Mitigation Assistance (HMA) grant programs. This qualitative approach was used because projects may not be implemented for up to 10 years, and the associated costs and benefits could change dramatically in that time.

Mitigation benefits are future damages and losses that would be eliminated and/or reduced by implementing the proposed mitigation project. Where actual project benefits could be identified per FEMA's benefit calculation methodology (e.g., physical damages, loss of service or function, emergency management costs, etc.), the benefits were noted in Table F of each annex (Section 9) and the appropriate rating as defined in Table 6-1 was assigned. When project benefits could not be reasonably established, a subjective rating was assigned based on the parameters outlined below.

Where the project cost for each mitigation initiative was reasonably estimated (including preliminary engineering, engineering, design, and construction) the appropriate rating as outlined in Table 6-1 was assigned in Table F of each annex (Section 9). Where actual project costs could not be reasonably established at this time, a best estimate was provided and a subjective rating was assigned as defined below.

Table 6-1. Cost and Benefit Definitions

Costs	
High	Existing funding levels are not adequate to cover the costs of the proposed project, and implementation would require an increase in revenue through an alternative source (for example, bonds, grants, and fee increases) or project costs are greater than approximately $100,000.
Medium	The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years or project costs are between approximately $10,000 and $100,000.
Low	The project could be funded under the existing budget. The project is part of or can be part of an existing, ongoing program or project costs are less than approximately $10,000.
Benefits	
High	Project will have an immediate impact on the reduction of risk exposure to life and property or benefits are greater than approximately $100,000.
Medium	Project will have a long-term impact on the reduction of risk exposure to life and property or will provide an immediate reduction in the risk exposure to property or benefits are between approximately $10,000 and $100,000.
Low	Long-term benefits of the project are difficult to quantify in the short term or benefits are less than approximately $10,000.

Using this approach, projects with positive benefit versus cost ratios (such as high over high, high over medium, medium over low, etc.) are considered cost-beneficial and are prioritized accordingly. For many

of the initiatives identified, Oklahoma County and participating jurisdictions may seek financial assistance under FEMA's HMGP, PDM, FMA, or SRL programs. These programs require detailed benefit/cost analysis as part of the application process. These analyses will be performed when funding applications are prepared, using the FEMA model process. The Planning Committee is committed to implementing mitigation strategies with benefits that exceed costs. For projects not seeking financial assistance from grant programs that require this sort of analysis, the Planning Committee reserves the right to define "benefits" according to parameters that meet its needs and the goals and objectives of this plan.

Using this approach, projects with positive benefit versus cost ratios (such as high over high, high over medium, medium over low, etc.) are considered cost-beneficial and are prioritized accordingly.

The annexes presented in Section 9 present the results of applying the prioritization methodology presented to the set of mitigation actions identified by the County and each participating jurisdiction, and includes the following prioritization parameters:

- Number of objectives met by the initiative
- Benefits of the project (high, medium, or low)
- Cost of the project (high, medium, or low)
- Do the benefits equal or exceed the costs?
- Is the project grant-eligible?
- Can the project be funded under existing programs and budgets?
- Priority (high, medium, or low)

The annexes in Section 9 of this Plan present the County's and each participating jurisdiction's mitigation action implementation strategy including:

- Mitigation actions for individual and multiple hazards
- Mitigation goals and objectives supported by each action.
- Implementation priority
- Potential funding sources for the mitigation action (grant programs, current operating budgets or funding, or the agency or jurisdiction that will supply the funding; additional potential funding resources are identified)
- Estimated budget for the mitigation action (financial requirements for new funding or indication that the action is addressed under current operating budgets)
- Time estimated to implement and complete the mitigation action
- Existing policies, programs, and resources to support implementation of the mitigation action (additional policies, programs, and resources identified)

Specific mitigation actions were identified to prevent future losses; however, current funding is not identified for all of these actions at present. Oklahoma County and the participating jurisdictions have limited resources to take on new responsibilities or projects. The implementation of these mitigation actions is dependent on the approval of the local elected governing body and the ability of the community to obtain funding from local or outside sources.

In general, mitigation actions ranked as high priorities will be addressed first. However, medium or even low priority mitigation actions will be considered for concurrent implementation. Therefore, the ranking levels should be considered as a first-cut, preliminary ranking and will evolve based on input from planning area departments and representatives, the public, OEM, and FEMA as the Plan is implemented.

SECTION 7: PLAN MAINTENANCE PROCEDURES

This section describes the system that Oklahoma County and all participating jurisdictions have established to monitor, evaluate, and update the mitigation plan; implement the mitigation plan through existing programs; and solicit continued public involvement for plan maintenance.

MONITORING, EVALUATING AND UPDATING THE PLAN

This section presents the procedures for monitoring, evaluating, and updating the plan.

The Oklahoma County Hazard Mitigation Planning Committee ("Planning Committee") intends to remain intact as the organization responsible for monitoring, evaluating and updating this Plan. The Oklahoma County Hazard Mitigation Planning Coordinator, Mr. Greg Whitworth (Oklahoma County Emergency Management) shall continue to act as the coordinator for the planning committee. Each participating jurisdiction is expected to maintain a municipal hazard mitigation representative to support their jurisdiction's input to the monitoring, evaluation and updating responsibilities identified in this Section. For most jurisdictions, the representative is the Emergency Manager or Fire Chief. Table 7-1 identifies the representation of the County Hazard Mitigation Team as of the date of this Plan. Ongoing municipal hazard mitigation planning points-of-contact are identified in each jurisdiction's annex (Section 9).

Oklahoma County will continue to include representatives from several departments and work groups to assist with in-house monitoring, work planning and follow-through for the Oklahoma County Hazard Mitigation Plan. Represented groups and departments include:

- Emergency Management
- Planning
- Engineering
- Floodplain Management
- Highway Districts (1, 2, 3)

It is recognized that individual commitments change over time, and it shall be the responsibility of each jurisdiction and its representatives to inform the County HMP Coordinator of any changes in representation by formal letter. The County HMP Coordinator shall maintain the current membership of the planning committee and municipal representatives on the Oklahoma County Hazard Mitigation Plan public website at https://www.oklahomacounty.org/325/Plans.

Monitoring and Evaluating:

The County HMP Coordinator shall be responsible for monitoring progress on, and evaluating the effectiveness of the Plan, and documenting this with Oklahoma Department of Emergency Management (OEM) and FEMA. The evaluation of the mitigation plan is an assessment of whether the planning process and actions have been effective, if the Plan goals are being reached, and whether changes are needed. These evaluations will assess whether:

- Goals and objectives address current and expected conditions.
- The nature or magnitude of the risks have changed.
- Current resources are appropriate for implementing the HMP and if different or additional resources are now available.

- Actions were cost effective.
- Schedules and budgets are feasible.
- Implementation problems, such as technical, political, legal or coordination issues with other agencies exist.
- Outcomes have occurred as expected.
- Changes in municipal resources impacted plan implementation (for example, funding, personnel, and equipment)
- New agencies/departments/staff should be included, including other local governments as defined under 44 CFR 201.6.
- Documentation for hazards that occurred during the last five years

Finally, the planning committee will evaluate how other programs and policies have conflicted with or augmented planned or implemented measures, and shall identify policies, programs, practices, and procedures that could be modified to accommodate hazard mitigation actions (see the "Implementation of Mitigation Plan through Existing Programs" subsection later in this Section).

Plan Review:

For the purpose of the Emergency Management Performance Grant Program, the plan will be reviewed annually by stakeholders in the jurisdictions found in this plan.

Post-Disaster:

After a declared disaster or major hazard event in the County, the County HMP Coordinator and ongoing County Hazard Mitigation Team may elect to meet with the planning partnership to:

- Discuss ongoing recovery and public assistance efforts.
- Discuss data and information collection on the disaster/event.
- Evaluate the effectiveness of mitigation projects completed in the county and participating municipalities.
- Identify specific areas of vulnerability evident in the wake of the disaster/event.
- Identify potential mitigation actions and opportunities to address new areas of vulnerability.
- Discuss current or anticipated grant opportunities (e.g. HMGP) in the wake of the disaster/event.

Plan Maintenance and Updating

44 CFR 201.6.d.3 requires that local hazard mitigation plans be reviewed, revised as appropriate, and resubmitted for approval in order to remain eligible for benefits awarded under DMA 2000. It is the intent of the Oklahoma County Hazard Mitigation Team to update this Plan on a five year cycle from the date of initial plan adoption. Ongoing maintenance and updating of the Plan shall be the responsibility of the County HM Coordinator, working with the County Hazard Mitigation Team and municipal planning partners.

IMPLEMENTATION OF MITIGATION PLAN THROUGH EXISTING PROGRAMS

Participating jurisdictions have provided a detailed listing of related programs, through which mitigation planning may be implemented, in the local capability assessments provided in each jurisdictional annex (Section 9). In addition, a full discussion on relevant county and regional programs is provided in Section 3, "Planning Process".

It is the intention of the County Hazard Mitigation Team and participating jurisdictions to incorporate mitigation planning as an integral component of daily government operations. County Hazard Mitigation Team members will work with local government officials to integrate the newly adopted hazard mitigation goals and actions into the general operations of government and partner organizations. Further, the standard adoption resolution includes a resolution item stating the intent of the local governing body to incorporate mitigation planning as an integral component of government and partner operations. By doing so, the County Hazard Mitigation Team anticipates that:

1) Hazard mitigation planning will be formally recognized as an integral part of overall emergency management efforts;
2) This Hazard Mitigation Plan and other planning documents and programs will become mutually supportive efforts that work in concert to meet the goals and needs of the county and municipalities; and
3) Duplication of effort can be minimized.

The information on hazard, risk, vulnerability and mitigation contained in this Plan is based on the best science and technology available at the time of the Plan's preparation. It is recognized by all participating jurisdictions that this information can be invaluable in making decisions under other planning programs, such as comprehensive, long-term community recovery plans, watershed management plans, capital improvement, and emergency management plans. Table 7-1 below includes existing processes and programs through which the mitigation plan should be implemented.

Table 7-1. Existing Processes and Programs for Mitigation Plan Implementation

Process	Action	Implementation of Plan
Administrative	Departmental or organizational work plans, policies, and procedural changes	• Planning Department • Public Works Department • Department of Emergency Management • Engineering • Environmental Health and Safety • Soil and Water Conservation District • Economic Development • Social Services
Administrative	Other organizations' plans	• Include reference to this plan in: o Comprehensive Emergency Management Plans o Comprehensive / Master Plans o Drought Management Plans o Other county and local plans as appropriate
Administrative	Job/Job Descriptions	• Unpaid internships to assist in hazard mitigation plan maintenance
Budgetary	Capital and operational budgets	• Continue to include mitigation related projects in annual Capital Improvement Program. • Leverage mitigation grant funding to support local funding for such mitigation projects.

Process	Action	Implementation of Plan
Regulatory	Executive Orders, ordinances, policies and other directives	• Comprehensive Planning - Institutionalize hazard mitigation for new construction and land use. • Zoning and Ordinances • Building Codes-enforcement of codes or higher standard in hazard areas • Capital Improvements Plan - Ensure that the person responsible for projects under this plan evaluates if the new construction is in a high hazard area, floodplain, etc. so the construction is designed to mitigate the risk. Revise requirements for this plan to include hazard mitigation in the design of new construction. • National Flood Insurance Program – Continue participation in this program. • Prior to formal changes (amendments) to comprehensive plans, zoning, ordinances, capital improvement plans, or other mechanisms that control development must be reviewed to ensure they are consistent with the hazard mitigation plan
Funding	Secure traditional sources of financing	• Apply for grants from federal (including FEMA Hazard Mitigation Assistance (HMA) and HMGP funding programs), state government, nonprofit organizations, foundations, and private sources. • Continue to make use of grant opportunities through U.S. Department of Housing and Urban Development's Community Development Block Grant (CDBG) • Other potential federal, state and regional funding sources include: o Stafford Act, Section 406 – Public Assistance Program Mitigation Grants o Federal Highway Administration o Catalog of Federal Domestic Assistance o United States Fire Administration – Assistance to Firefighter Grants o United States Small Business Administration Pre and Post Disaster Mitigation Loans o United States Department of Economic Development Administration Grants o United States Army Corps of Engineers o United States Department of Interior, Bureau of Land Management o Other sources as yet to be defined • See Appendix G for additional funding sources
Partnerships	Develop creative partnerships, funding and incentives	• Public-Private Partnerships • State Cooperation • In-kind resources
Partnership	Existing Committees and Councils	• Local Government Committees: o Planning Boards o Zoning Board of Appeals • Climate Change Task Force(s) • Chambers of Commerce • Property Owners Associations

Process	Action	Implementation of Plan
Partnership	Working with other federal, state, and local agencies	• Army Corps of Engineers (USACE) • American Red Cross • Department of Homeland Security (DHS) • Federal Emergency Management Agency (FEMA) • National Oceanic and Atmospheric Administration (NOAA) • National Weather Service (NWS) • National Fire Protection Association (NFPA) • National Park Service • Oklahoma Department of Emergency Management (OEM) • United States Department of Agriculture (USDA) • United States Department of Transportation (USDOT) • United States Geological Survey (USGS) • United Way of Central Oklahoma • Other Non-Profit and NGO Partners

During the annual plan evaluation process, the County Hazard Mitigation Team will identify additional policies, programs, practices, and procedures that could be modified to accommodate hazard mitigation actions.

CONTINUED PUBLIC INVOLVEMENT

The Oklahoma County mitigation planning partnership has identified continued public outreach as a high priority mitigation initiative (see Section 9.1). Under this initiative, the partnership will continue to maintain and provide links to the Plan's hazard mitigation webpage, continue to provide public notifications regarding where the public can review the Plan and provide ongoing input, and may include public meetings to further promote awareness of the Plan.

The public will have an opportunity to comment on the Plan during the 5-year plan update. The Oklahoma County HMP Coordinator is responsible for coordinating the Plan evaluation portion of the meeting, soliciting feedback, collecting and reviewing the comments, and ensuring their incorporation in the 5-year plan update as appropriate. Additional meetings may also be held as deemed necessary by the planning group. The purpose of these meetings would be to provide the public an opportunity to express concerns, opinions, and ideas about the mitigation plan. Annual progress reports will also be posted to the project web site.

Municipal representatives shall be responsible to assure that:

- Public comments and input on the Plan, and hazard mitigation in general, are recorded and addressed, as appropriate. Opportunity to comment on the plan will be provided directly on the project web site. Provisions for public comment in writing will also be made. All public comments shall be addressed to:

  Oklahoma County Hazard Mitigation Coordinator
  Oklahoma County Emergency Management
  320 Robert S. Kerr Avenue, Suite 101
  Oklahoma City, OK 73102

- Copies of the latest approved Plan (or draft in the case that the five year update effort is underway) are available for review at the locations identified above along with forms and instructions to facilitate public input and comment on the Plan.
- Appropriate local links to the Oklahoma County Hazard Mitigation Plan website are maintained by participating jurisdictions. The web site will be maintained throughout the course of the project, and during the plan implementation phase.
- Public notices are made as appropriate to inform the public of the availability of the Plan, particularly during Plan update cycles.

The Oklahoma County HMP Coordinator shall be responsible to assure that:

- Public comments and input on the Plan, and hazard mitigation in general, are recorded and addressed, as appropriate.
- The Oklahoma County Planning Area HMP website is maintained and updated as appropriate.
- All public and stakeholder comments received are documented and maintained.
- Copies of the latest approved Plan (or draft in the case that the five year update effort is underway) are available for review at the locations identified above, along with instructions to facilitate public input and comment on the Plan.
- Public notices are made as appropriate to inform the public of the availability of the Plan, particularly during Plan update cycles.

SECTION 8: PLANNING PARTNERSHIP

BACKGROUND

A Planning Committee was assembled consisting of representatives from the various Unincorporated County departments and agencies, and representatives from each of the participating municipalities. The Planning Committee was charged with the following:

- Represent their jurisdiction throughout the planning process;
- Ensure that the Plan meets the requirements of DMA 2000 and FEMA and OEM guidance;
- Solicit and encourage the participation of regional agencies, a range of stakeholders, and citizens in the Plan development process;
- Assist in gathering information for inclusion in the Plan, including the use of previously developed reports and data;
- Assist with the update of the hazard mitigation planning Goals and Objectives
- Assist with the review of a broad range of potential mitigation initiatives
- Identify, develop and prioritize appropriate mitigation initiatives.
- Develop, revise, adopt, and maintain the Plan in its entirety and their local jurisdictional annex.

JURISDICTION ANNEXES

Jurisdictional annex templates were created to help the plan participants prepare their jurisdiction-specific annexes and ensure all criteria of Section 201.6 of 44CFR would be met, based on the partners' capabilities and mode of operation. A template and detailed instructions were designed to lead each partner through a series of steps that would generate the DMA-required elements that are specific for each partner. Each participating jurisdiction was tasked with completing the template according to detailed instructions, with guidance and technical assistance from the County and planning consultant.

A jurisdictional annex workshop and local support meetings were held in March, 2018 for all plan participants. Technical support to complete the annexes was available to all plan participants through plan finalization in December 2018.

The jurisdictional annexes include the following sections/elements:

Section A: Local Mitigation Points-of-Contact

This section identifies the local hazard mitigation planning points-of-contact who provided the primary local support for the plan update (see Section 3, "Planning Process"), and for ongoing plan implementation and maintenance as described in Section 7.

Section B: Municipal Profile

This section provides a profile description of the municipality, and further identifies:

- Any known or anticipated growth and development as provided by the municipality;
- Specific hazard vulnerabilities;

- Completed or ongoing mitigation projects and activities in the municipality, including progress on any local initiatives in the 2013 Plan.

Section C: Natural Hazard Event History Specific to the Municipality

This section allows for each municipality to identify local damages and losses from specific hazard events. The hazard profiles/vulnerability assessments in Section 5 provide further event information on the county and regional level.

Section D: Capability Assessment

This section allows for each municipality to identify their local mitigation capabilities organized as:
Table D.1 – Legal and Regulatory Capabilities
Table D.2 – Administrative and Technical Capabilities
Table D.3 – Fiscal Capabilities
Table D4 – Community Classifications

Section E: Proposed Hazard Mitigation Initiatives

The section provides each jurisdiction's updated local mitigation strategy, including those initiatives that have been carried forward from the 2013 plan, as well as new initiatives. Section 6, "Mitigation Strategy", provides full details on the process by which the county and each municipality updated their mitigation strategy.

Section F: Future Needs to Better Understand Risk/Vulnerability

This section is independent to each jurisdiction's risks and may rely on climate trends and future risks, or data deficiencies.

Section G: Hazard Area Extent and Location

This section maps provides additional geographic detail on the wildland-urban interface and flood inundation risks .

BENEFIT/COST REVIEW

Each jurisdiction's annex includes an action plan of prioritized initiatives to mitigate natural hazards. Section 201.6.c.3iii of 44CFR requires the prioritization of the action plan to emphasize the extent to which benefits are maximized according to a cost/benefit review of the proposed projects and their associated costs. In addition, the County and each jurisdiction was requested to provide a project status for each of the projects included in the 2013 HMP as well as summarizing how the 2013 plan was integrated into their planning process.

As part of jurisdiction annex template completion, the Planning Committee was asked to weigh the estimated benefits of a project versus the estimated costs to establish a parameter to be used in the prioritization of a project. The Social, Technical, Administrative, Political, Legal, Economic & Environmental (S.T.A.P.L.E.E.) method was given to all participating jurisdictions as an additional guide for project prioritization. This benefit/cost review was qualitative; that is, it did not include the level of detail required by FEMA for project grant eligibility under the Hazard Mitigation Grant Program

(HMGP) and Pre-Disaster Mitigation (PDM) grant program. This qualitative approach was used because projects may not be implemented for up to 10 years, and the associated costs and benefits could change dramatically in that time. Each project was assessed by assigning subjective ratings (high, medium, and low) to its costs and benefits, as follows:

Table 8-2. Benefit/Cost Review

Costs	
High	Existing funding levels are not adequate to cover the costs of the proposed project, and implementation would require an increase in revenue through an alternative source (e.g., bonds, grants, and fee increases).
Medium	The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
Low	The project could be funded under the existing budget. The project is part of or can be part of an existing, ongoing program.
Benefits	
High	Project will have an immediate impact on the reduction of risk exposure to life and property.
Medium	Project will have a long-term impact on the reduction of risk exposure to life and property or will provide an immediate reduction in the risk exposure to property.
Low	Long-term benefits of the project are difficult to quantify in the short term.

Using this approach, projects with positive benefit versus cost ratios (such as high over high, high over medium, medium over low, etc.) are considered cost-beneficial and are prioritized accordingly. For many of the initiatives identified in the action plans, participating jurisdictions may seek financial assistance under FEMA's HMGP or PDM programs. Both of these programs require detailed benefit/cost analysis as part of the application process. These analyses will be performed when funding applications are prepared, using the FEMA model process. The Planning Committee is committed to implementing mitigation strategies with benefits that exceed costs. For projects not seeking financial assistance from grant programs that require this sort of analysis, the Planning Committee reserves the right to define "benefits" according to parameters that meet its needs and the goals and objectives of this plan.

9.1 COUNTY OF OKLAHOMA

This section presents the jurisdictional annex for Unincorporated County of Oklahoma.

A.) HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact	Alternate Point of Contact
Mr. David Barnes, Director Oklahoma County Emergency Management 320 Robert S. Kerr, Suite 101 Oklahoma City, OK 73102 (405) 713-1369 DBarnes@oklahomacounty.org	Greg Whitworth, Resource Specialist Oklahoma County Emergency Management 320 Robert S. Kerr, Suite 101 Oklahoma City, OK 73102 (405) 605-8991 gwhitworth@oklahomacounty.org

B.) COUNTY PROFILE

Please refer to Section 4, of this Plan for details on Oklahoma County's population, location, climate, history, growth and development. Please refer to the hazard profiles in Section 5 for information on identified hazard vulnerabilities throughout the County.

Growth/Development Trends

Over the past five years, there has not been significant development in the unincorporated areas. The Deer Creek area (northwest Unincorporated County) and Waterloo Rd. area north of Edmond have seen a minor increase in flooding and wildfire risk due to small pockets of development. Meanwhile, the Crutcho Creek project has reduced the risk of flooding due to buyouts near NE 23rd and Midwest Blvd.

Past Mitigation Activity/Efforts

Each initiative from the 2013 plan was reviewed going forward into this 2019 plan. Any initiatives that were completed or abandoned are stated below, while any new or ongoing initiatives will be found under the Proposed Hazard Mitigation Initiatives header of this section.

The following table summarizes progress on the mitigation strategy identified by Oklahoma County in the 2013 plan.

Abandoned Initiatives from 2013 plan	Comments
Deep Fork River & Cottonwood Creek	Problem is outside county
Demolition of bridge collapsed in Crutcho Creek	Funding not available
Enact a regulation to require a check for expansive soils and perform subsequent soil stabilization before construction of new buildings on county property.	Extent of problem does not appear to warrant this action.
Spencer Multi-Hazard Public Awareness Information. Develop a comprehensive, multi-hazard public education/awareness/mitigation brochure or document and distribute or make available for all citizens. Identify risks, combine with potential solutions, solicit funding for printing and disseminate at businesses and events. All-hazards public education efforts continue throughout Oklahoma County, including within Spencer. Severe weather threats continue to be high-risk factors within our region and public education, exercise, mitigation and response-related enhancements for dealing with these situations continue in all jurisdictions.	This jurisdiction specific project was added to the County annex in previous plan. The correction lead to abandoning this project in this annex and modifying it for the corrected jurisdiction.

C.) NATURAL HAZARD EVENT HISTORY SPECIFIC TO THE COUNTY

Please refer to the Previous Occurrences and Losses section of the appropriate hazard profiles in Section 5.3 of this Plan. A summary of losses within the County to major hazard events is provided below in the table below.

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
June 8-10, 1974	Severe Storms, Flooding	DR-441	Yes	The County had approximately $620 K in property damage and 14 injuries.
October 17-19, 1983	Severe Storms, Flooding	DR-693	Yes	The County had approximately $656 K in property damage and $2.1 M in crop damage.
September 29 – October 1, 1986	Severe Storms, Flooding	DR-778	Yes	The County had approximately $2 M in property damage and $892 K in crop damage.
May 2, 1990	Flooding, High Wind, Tornado	DR-866	Yes	The County had approximately $500 K in property damage and one fatality.
May 8, 1993	High Wind, Tornadoes	DR-991	Yes	Four fatalities; $50 M in property damage
June 9, 1993	Flash Flooding	N/A	N/A	Severe TSTMs moved across northern Oklahoma, causing lightning, large hail, damaging winds, flash flooding and three tornadoes. The three tornadoes were not in Oklahoma County. Oklahoma County had approximately $50 K in property damage.

Completed Initiatives from 2013 plan	Comments
NW 192nd Street Bridge Replacement	
Bridge Replacement - Soldier Creek Bridge	This project was co-sponsored with the City of Midwest City.
Council Flood Control	New bridge, RCB's installed to raise intersection at NW 178th.
Build or procure a structure to protect County EM assets (including vehicles and trailers) from hail and extreme temperature fluctuations that can damage interior, sensitive electronic equipment, emergency supplies on support vehicles	Acquired a garage which holds most, but not all of the assets.

July 26 – August 2, 1995	Tornado, Flooding	DR-1066	Yes	The County had approximately $268 K in property damage.
April 24-26, 1999	Flooding	N/A	N/A	Between five and seven inches of rain across portions of the State. Some areas had over 10 inches of rain. In Oklahoma County, the Town of Choctaw NE 23rd was closed due to flooding. Oklahoma County had approximately $932 K in property damage.
May 3-4, 1999	Tornadoes, Severe Storms and Flooding	DR-1272	Yes	The County had over $450 M in property damage, 234 injuries and 12 fatalities.
June 23, 1999	Flash Flooding	N/A	N/A	TSTMs formed across portions of central Oklahoma, causing widespread street flooding. In Oklahoma County, on West Reno in Oklahoma City was flooded. A pick-up truck

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
				was almost submerged. Water had to bed removed by pumps at NW 6th and Penn, which sections of SE 74th near Hiawassee Road caved in. Oklahoma County had approximately $50 K in property.
October 21-29, 2000	Severe Storms and Flooding	DR-1349	Yes	The County had approximately $670 K in property damage.
May 30, 2001	Flooding	N/A	N/A	Severe TSTMs formed over portions of northern and western Oklahoma. Strong winds and hail accompanied the TSTMs and flooding occurred in many areas. In Oklahoma County, portions of Interstate 35 were inundated with one foot of water in Oklahoma City. Cars were stalled in high water on the Interstate, near SW 89th. The North Deer Creek at SE 59th and Dobbs Road overflowed its banks. Oklahoma County had approximately $30 K in property damage.
September 7, 2001	Urban Flooding	N/A	N/A	In Oklahoma City, a car stalled in high water at the intersection of NE 18th and Walnut, and four vehicles stalled in high water at NW 79th and Broadway Ave. The County had approximately $25 K in property damage.
August 11-12, 2004	Flash Flood	N/A	N/A	Strong TSTMs brought heavy rainfall and flooding to the north central portion of Oklahoma, affecting Garfield, Logan, Oklahoma, and Pottawatomie Counties. Rainfall totals ranged between 2.5 inches and five inches. The heavy rain caused flash and riverine flooding in the affected counties. In Oklahoma County, there was minor flooding along the North Canadian River, which crested at 19.1 feet. Deer Creek overflowed its banks and flooded Meridian Avenue. Flash flooding was reported in Oklahoma City, which closed the underpass on NE 23rd Avenue at the junction of Interstate 235. Flood depths were up to six feet in some locations. In the City of Bethany, Eldon Lynn Park was inundated by flash flooding. Water had to be pumped out of the park. In the City of Edmond, flash flooding inundated the intersection of Western Avenue and NE 234th Street. In Midwest City, Soldier Creek overflowed its banks and flooded the intersection of NE 10th Street and Midwest Boulevard, and Woodside Drive and E. Reno Avenue. The flooding caused the City to close the NE 10th Street/Midwest Boulevard intersection. Approximately 50 apartment units were flooded in this area. Many residents were evacuated. Crutcho Creek overflowed its banks near the intersection of NE 23rd Street and Air Depot Boulevard. Interstate 40 was closed due to flooding. The County had approximately $500 K in property damage.

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
January 12-26, 2007	Severe Winter Storms	DR-1678	No	Yes
March 29, 2007	Severe Storms and Tornadoes	N/A	N/A	Yes
May 4-11, 2007	Severe Storms, Tornadoes, and Flooding	DR-1707	No	TSTMs brought large hail, high winds, tornadoes and heavy rain to the area. The heavy rains caused flooding in Oklahoma County. In Oklahoma City, there were reports of widespread flash flooding. One to two feet of water was on Morgan Road. Two feet of water was reported on Interstate 40. Ramps to the Interstate were closed. High water rescues were performed. Two vehicles were swept into the North Canadian River near Sooner Road. In the City of Harrah, NE 50th and Harrah Road were closed due to flooding. The County had over $45,000 in road and bridge repairs.
May 24, 2007 to June 1, 2007	Severe Storms, Flooding, and Tornadoes	DR-1723	No	May 30th - Oklahoma City - Several tree limbs were downed due to high winds, causing power outages to some parts of the City. Property damage was approximately $10 K.
June 10, 2007 to July 25, 2007	Severe Storms, Flooding, and Tornadoes	DR-1712	Yes	June 14th – Showers and TSTMs developed over the State, bringing heavy rains, hail and wind. The heavy rains caused flooding in many locations. In the City of Harrah, two of water was reported on the roadway at NE 50th and Harrah Road. June 26th – Intense showers and TSTMs moved through the eastern two-thirds of the State, bringing heavy rainfall and flash flooding. In the City of Bethany, high water covered the road at Ski Island. Water rescues were performed. The County had approximately $5 K in property damage. June 29th – Slow moving showers and TSTMs developed and moved northeast into the State. Flash flooding resulted over parts of southwest and central Oklahoma. In Oklahoma City, numerous roads were closed in the northern portion of the City due to flooding. July 10th – TSTMs brought hail, high winds and flash flooding to the area. In Oklahoma City, a bridge north of Danforth Road on Western Avenue was closed due to a creek overflowing its banks.
Aug. 18, 2007 to Sept. 12, 2007	Severe Storms, Tornadoes, and Flooding	DR-1718	Yes	Remnants of Tropical Storm Erin brought heavy rainfall to the area. Sustained wind speeds of 35 to 45 mph struck the area. The heavy rain caused flooding and rivers and creeks to overflow their banks. In Oklahoma City, several feet of water inundated the intersection of NW 36th and Broadway. Numerous City streets were closed due to

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
				flooding. The County had approximately $15 K in property damage.
Dec. 8, 2007 to Jan. 3, 2008	Severe Winter Storms	DR-1735	Yes	Heavy ice accumulations damaged trees and limbs, resulting in heavy vegetative debris and hanging limbs, blocking public access to walkways and entrances to the courthouse. Many roadways and right-of-ways were blocked due to downed trees. Heavy ice accumulations on roadways. Roadways were damaged. The County had over $2 M in expenses.
March 22, 2008	Wildfire	N/A	N/A	The County numerous, wide-spread evacuations. Roads were closed for approximately six days. Deer Creek schools had approximately $6,000 in damages. The County had $120,000 in expenses for assistance with road closures.
March 30-31, 2008	Severe Storms	N/A	N/A	City of Edmond - A tornado developed near the intersection of NW 178th Street and Pennsylvania Avenue. The tornado caused most of its damage in the Valencia neighborhood. Many homes sustained roof, window, garage door and fence damage. The tornado continued northeast towards the intersection of NW 192nd Street and Western Avenue where large utility poles were blown down. $450 K in property damage.
April 9-28, 2008	Severe Storms, Tornadoes, and Flooding	DR-1754	No	A cold front moved through the State, bringing strong TSTMs, heavy rain and hail. Numerous locations had up to several inches of rain, causing flash flooding. In Oklahoma City, several streets were closed due to flooded roadways. The County had approximately $5 K in property damage.
April 30, 2008	Hail/Damaging Winds	N/A	N/A	Yes
August 20, 2008	Flooding	N/A	N/A	Yes, Deer Creek flooding
April 9-12, 2009	Wildfires	DR-1846	Yes	The County had over three miles of road closures within three days. Expenses totaled over $32,000 for personnel assistance with road closures.
December 24-2285, 2009	Severe Winter Storm	DR-1876	No	The County had nine deaths and hundreds of injuries. 160 miles of roads were closed. Power outages were reported county-wide. The County had over $150,000 in expenses for personnel assistance with road closures.
May 10-13, 2010	Severe Storms, Tornadoes, and Straight-Line Winds	DR-1917	Yes	Yes
June 13-15, 2010	Severe Storms, Tornadoes, Straight-line Winds, and Flooding	DR-1926	Yes	Significant flooding occurred over parts of central Oklahoma. Many homes and cars were flooded. One person died, 136 injured. At the end of the storm, widespread rainfall totals ranged between five and nine inches. At

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
				Will Rogers Airport in Oklahoma City, the largest daily precipitation was reported, with 7.61 inches. In Oklahoma City, the heavy rain led to flash flooding. Several roadways were flooded and closed. The County had received almost a foot of rain after this event. This storm affected 122 homes – 52 with minor damage, 11 with major damage and one completely destroyed. Damages to Oklahoma County included a two-lane roadway and culvert washed out by floodwaters. In the City of Forest Park, floodwaters washed out a roadway and two culverts. Roadways throughout the County were flooded and damaged. The County had over $340,000 in expenses. Overall, the County had approximately $5.5 M in property damage.
Jan. 31, 2011 to Feb. 5, 2011	Severe Winter Storm and Snowstorm	DR-1985	No	In the County, snow had to be removed from roadways due to the snow storm. Businesses were closed, motorists were stranded, schools were closed and there were adverse effects for emergency vehicles. The County had over $97,000 in expenses.
March 11, 2011	Wildfire	N/A	N/A	Yes
November 6, 2011	Earthquake	N/A	N/A	Largest earthquake to hit the state in modern times. This 5.6 quake centered near Prague knocked pictures off walls and woke people and pets as it shook an area that stretched into Arkansas, Kansas, Missouri and Texas.
July 2012-April 2013	Drought	N/A	N/A	2011-2012 was the fourth driest two-year period on record and left water storage at reservoirs at an all-time low. August 4, 2012 fire near Luther consumed almost 60 homes and other structures.
May 18 to Jun. 2, 2013	Tornadoes, Severe Storms, Wind, Flooding	DR-4117	Yes	Major flooding, especially May 31-June 1. One of the worst in the metro's history. Damage includes property loss around NE 36/Triple X Rd. At NE 108/Dobbs, a tinhorn washed out resulting in a fatality accident.
May 5-10, 2015	Severe Storms, Flooding	DR-4222	Yes	Major flooding, especially May 6th. Damage includes property loss around NE 36/Triple X Rd. Dobbs Rd washed out between SE 15th & 29th. Crutcho Creek flooded around NE 23rd.
May 23rd 2015	Flooding	DR-4222	Yes	
November 27-30, 2015	Winter Storm	DR-4247	Yes	An ice storm warning was in effect that included Oklahoma County. Precipitation was measured at 2.2 inches during this time frame. Multiple power lines were downed and large swaths of the county were affected with power outages during this time.

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
December 27, 2015 - January 5, 2016	Winter Storm	DR-4256	No	Due to freezing temperatures and precipitation, Oklahoma County saw an ice storm move through its jurisdiction. Roads & bridges were icy with multiple incidents seeming from the event. At least one fatality was reportedly due to the severe weather.
April 26, 2016	Tornado	N/A	N/A	An EF1 tornado traveled from 4 NW Jones to 3 NNW Luther skirting the edge of the unincorporated county. An EF0 tornado started 3 N Arcadia and traveled to 7 SSW Meridian.

Notes: TSTM = Thunderstorm

Number of FEMA Identified Repetitive Flood Loss Properties: 4 residential

Number of FEMA Identified Severe Repetitive Flood Loss Properties: 1 residential

Source: Oklahoma Water Resources Board (OWRB)

Wildfire History for Unincorporated Oklahoma County, by Fire District

Northwest Oklahoma County Highway District 3

Deer Creek	Loss	Acres
2018	$500	21.3
2017	$0	204.0
2016	$400	711.0
2015	$0	688.5
2014	$41,000	124.1
2013	$0	176.0
2012	$30,000	97.0
2011	$0	235.0
2010	$0	420.0
2009	$0	8.0
2008	$0	31.0
2007	$0	12.0
2006	$0	63.0
2005	$0	51.0
2004	$0	0.0
TOTAL LOSS	**$71,900**	**2,841.9**

East-Central Oklahoma County Highway District 2

Hickory Hills	Loss	Acres
2018	N/A	11.0
2017	N/A	8.0
2016	N/A	90.0
2015	N/A	27.0
2014	N/A	111.0
2013	N/A	20.0
2012	N/A	8.0
2011	N/A	13.0
2010	N/A	20.0
2009	N/A	35.0
2008	N/A	160.0
2007	N/A	86.0
2006	N/A	6.0
2005	N/A	450.0
2004	N/A	25.0
TOTAL LOSS	**N/A**	**1,070.0**

Southeast Oklahoma County Highway District 2

Newalla	Loss	Acres
2018	N/A	N/A
2017	N/A	4.7
2016	N/A	0.0
2015	N/A	7.5
2014	N/A	19.6
2013	N/A	6.8
2012	N/A	11.1
2011	N/A	12.2
2010	N/A	21.2
2009	N/A	6.0
2008	N/A	45.0
2007	N/A	8.0
2006	N/A	64.0
2005	N/A	18.0
2004	N/A	3.0
TOTAL LOSS	**N/A**	**227.1**

Source: Oklahoma State Fire Marshal's office

Hickory Hills and Newalla do not report dollar loss. Acres may include loss from wildland, grass, brush, crop, orchard and nursery fires. Several jurisdictions cover smaller portions of the unincorporated County, especially in Highway District 1. In this dataset, it is not possible to separate unincorporated fires covered by incorporated municipal fire departments. These fires are not included here and are instead included in the overall report for each jurisdiction.

D.) CAPABILITY ASSESSMENT

This section identifies the following mitigation capabilities within Unincorporated Oklahoma County:

- Legal and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Community classification.

D.1) Legal and Regulatory Capability

Regulatory Tools (Codes, Ordinances., Plans)	Do you have this? (Y or N)	Code Citation (Section, Paragraph, Page Number, Date of adoption)	HM Plan integration into plan	Update cycle	Party(s) responsible for updating document
Building Code	Y	Regulated at local and state levels.			
Comprehensive / Master Plan	Y	Oklahoma County Master Plan (Sept. 2007) – 2018 under review	No	10 Years	Planning Commission with Commissioners
Zoning Ordinance	Y	Zoning Regulations (Dec. 2008)			
Subdivision Ordinance	Y	Subdivision Regulations (June 2008) – 2018 review			
Site Plan Review Requirements	Y				
NFIP Flood Damage Prevention Ordinance	Y	For unincorporated County.			
Floodplain Management Plan	Y	Integrated in OK All Hazard Mitigation Plan, not a stand-alone plan, only a regulation	Yes	Regulation – no schedule; HMP – 5 Years	Emergency Management, HM Committee
Stormwater Management Plan / Ordinance	Y	Stormwater Quality and Erosion Control Regulations	No	5-10 Years	Planning Dept, Floodplain Mgr.
Stream Corridor Management or Protection Plan	N				
Erosion Management Ordinance	Y	Stormwater Quality and Erosion Control Regulations			
Capital Improvements Plan	Y		No	No Scheduled Update	Each Highway District
Open Space Plan	N				
Economic Development Plan	N				

Regulatory Tools (Codes, Ordinances., Plans)	Do you have this? (Y or N)	Code Citation (Section, Paragraph, Page Number, Date of adoption)	HM Plan integration into plan	Update cycle	Party(s) responsible for updating document
Comprehensive Emergency Management Plan	Y		Yes	Annual Review	Emergency Managers
Emergency Response Plan	N				
Post Disaster Recovery Plan / Ordinance	N				
Real Estate Disclosure Requirements	N				
Highway Management Plan	Y	Pavement Condition Index (PCI) - 2016	No	No Scheduled Update	Each Highway District
COOP/COG Plan	N				
Other (Special Purpose Ordinances such as critical or sensitive areas)					

Additionally, any change in ordinances happen at the behest of local government bodies, state legislation or court actions and are not a reoccurring basis.

D.2) Administrative and Technical Capability

Staff/ Personnel Resources	Available (Y or N)	Department/ Agency/ Position
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Y	County Engineering (incl. County Planning)
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Y	County Engineering (incl. County Planning)
Planners or engineers with an understanding of natural hazards	Y	County Engineering (incl. County Planning)
NFIP Floodplain Administrator	Y	County Engineering; NFIP Floodplain Administrators are also local assignments
Surveyor(s)	Y	Highway Districts; Engineering
Personnel skilled or trained in “GIS” applications	Y	County Planning
Scientist(s) familiar with natural hazards in the County.	N	Numerous outside local resources available
Emergency Manager	Y	County Emergency Management
Grant Writer(s)	Y	Varies, multiple departments

Staff with expertise or training in benefit/cost analysis	Y	County Engineering (incl. County Planning)

D.3) Fiscal Capability

Financial Resources	Accessible or Eligible to use (Yes/No/Don't know)
Community Development Block Grants (CDBG)	Yes
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for specific purposes	Yes
User fees for water, sewer, gas or electric service	No
Impact Fees for homebuyers or developers of new development/homes	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	Yes
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	No
Other	Permit fees (building, stormwater)

D.4) Community Classifications

Program	Classification	Date Classified
Community Rating System (CRS)	NP	N/A
Building Code Effectiveness Grading Schedule (BCEGS)	No	N/A
Public Protection	9 or less	varies
Storm Ready	County	4/4/2017
Firewise	NP	N/A

N/A = Not applicable. NP = Not participating. - = Unavailable. TBD = To Be Determined

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at http://www.isomitigation.com/ppc/0000/ppc0001.html
- The National Weather Service Storm Ready website at http://www.weather.gov/stormready/howto.htm
- The National Firewise Communities website at http://firewise.org/

Expanding on and Improving Existing Policies and Programs

By adopting updated codes, including fire, building and NFIP ordinances Oklahoma County will continue to improve their mitigation practical approach. Also, by employing experts in land management and

construction practices, in coordination with planners and engineers with understanding of natural hazards, the overall stratagem will continue to advance.

By continuing training with jurisdictions within its boundaries, the County can better understand how to assist in times of response as well as understand the needs for mitigation. Working with public safety agencies within the county, in partnership the County Highway Districts, the County helps identity and procure funding for mitigation initiatives.

The County also enters in to Annual Equipment Agreements with many of the jurisdictions within the county. These agreements helps bolster the available response equipment that agencies have at their disposal while providing fire/response in the unincorporated areas of the county. Through annual audits the County is able to continuously track usage of such equipment.

The County understands the necessity for intrajurisdictional communication. Thus, the County works tirelessly to build an interoperability communication network including radio towers, frequencies, and repeaters to better serve the county agencies as a whole and individual subscriber units. Using tools such as these, jurisdictions get timely updates during disasters that increase safety to responding personnel while also reducing response times.

E.) PROPOSED HAZARD MITIGATION INITIATIVES

Note some of the identified mitigation initiatives in the table are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities.

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Status	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Crooked Oak Creek Drainage Improvement. Silt has built up in the creek from a neighboring landfill and shopping mall causing flooding problems within the Town of Valley Brook (not a plan participant).									
See Above.	N/A	Flood	Planned	Town of Valley Brook w/ County Engineer	Medium	Medium - $50,000	County funds would be used for this project.	Short	Low
North Canadian River Erosion Control Project - Erosion control and channelization at the North Canadian River bridge structure at NE 36th to NE 50th. This proposed project will control the erosion at the bridge structure and will prolong the life of the bridge. A combination of channelization and rip-rap would prove most effective.									
See Above.	Existing	Flood	Planned	OK Co. Hwy District #2	High	High - $5,000,000	To be identified.	Long term DOF. No current plans in place, seeking funding sources and evaluating overall prioritization.	Low
Earthquake Preparedness - Basic measures are included in addressing All-Hazards, and the necessity for personal planning and preparedness. Basic knowledge of personal safety, utility cut-off locations and capabilities, "Go-Kit" development, etc., are included. Commercial and industrial venues and operations may have additional factors such as pipelines, service provision and restoration, hazardous materials release and containment, etc.									
See Above	All- inclusive	Earthquake	Ongoing	Oklahoma County EM with other ESF support	Low	Low- $500	OK County funding comes from the OK County General Fund with additional sources and support from other partner organizations	Ongoing	Medium

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Status	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Northwest County Flood Control – Install tinhorns, CGMPs and raising multiple roadway segments to provide a "flood-resistant" access corridor in the Hwy Dist. #3 west of Hwy. 74 (Portland) between NW 248 (Waterloo Rd) & NW 220. (This is a combination of existing projects from previous the mitigation plan.)									
	Existing	Flood	New	OK Co. Hwy District #3	High	High - $5 Million	HMGP, County Funds	Long term - Waiting on the identification and provision of adequate funding.	Low
NW 234th Flood Control - Installation of CGMP's and raising roadway. OK County Hwy Dist. #3 plans to raise and install tinhorns near NW 234th and MacArthur. Currently planning to elevate one roadway segment, providing a "flood-resistant" access corridor. This is a multi-phase project with several key areas to be addressed.									
	Existing	Flood	New	OK Co. Hwy District #3	High	High - $250,000	Ok Co. Hwy District #3	Short (Continuous)	Medium
Crutcho Flood Control - Improve drainage of rainwater out of the Crutcho area during times of high volumes of rain within a short time. Install tinhorns and clean out bar ditches for better drainage.									
See Above.	Existing	Flood	Ongoing	OK Co. Hwy District #1	High	Medium	Primary funding from District 1, Oklahoma County. Additional grant opportunities and other funds as identified and available would be utilized.	Ongoing	High
Public Awareness of Building Codes - Building codes and related enforcement activities are routinely reviewed and implemented through the Oklahoma County Planning Commission, with recommendations made to the Oklahoma County Board of County Commissioners for final approval. Oklahoma County currently utilizes the 2015 edition of the International Building Code (in part to maintain continuity with the State of Oklahoma), and routinely receives input from in-house inspectors, contractors, builders, residents and other building officials, with subsequent review by the County Engineering and Planning Department. Our last update was initiated late in 2017 by obtaining input from the Oklahoma County Planning Commission, with final adoption in January of 2018.									
See Above.	New	Flood, Wind (incl. Tornado)	Ongoing	OK Co. Planning	High	Low - $500	The funding for this project is minimal and would come directly from county funds.	Ongoing (continuous)	High

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Status	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Public Education & Planning - Canton Dam Failure. Potential dam failure could arise from multiple impoundments, all of which are included in on-going public education efforts and All-Hazards planning. The US Army Corp of Engineers (USACE) provides periodically updated Emergency Action Plans for structures under their oversight, as well as exercise opportunities and expert consultation. Updated threat/risk analysis activities include high-risk dams and associated locations. The Canton Lake dam structure has recently undergone extensive updating and upgrading, including spillway and overflow modifications, and actual earthen reinforcement. On-going structural monitoring and early warning/notification measures are routinely reinforced. Jurisdictions and communities located in potential inundation areas are included in planning discussions, exercises and public education activities, should catastrophic dam failure occur.									
See above.	Existing	Dam Failure, Flood	Ongoing	OK Co. Emergency Management with support from Planning	High	Low - $2,000 (2006 cost)	Oklahoma County - Funding will likely come from Oklahoma County funds, although additional resources may be available from the Corp of Engineers, or through other funding sources.	Long term DOF	Medium
Severe Thunderstorm (flood, hail, high wind and tornado) Education in Oklahoma County - Severe Thunderstorm and "weather extremes" training and education are among the highest priority due to the frequency of weather-related events. Preparedness planning and related public education presentations routinely include severe thunderstorm-related information, including but not limited to tornadic threat/risk information. All-hazards public education efforts encourage recipients to consider all potential threats and to prepare for related challenges and difficulties. Severe weather-related threats continue to be high-risk factors in overall preparedness within our region, and are included in a wide range of informational deliveries.									
See above.	N/A	Hail, Lightning, Wind (incl. tornado), Flood	Ongoing	OK Co. Emergency Management	Medium - High	Low - $5,000 (2006 cost)	County funds and any possible grant opportunities or sponsorships from public or private sources as identified.	Ongoing (continuous)	Medium
Extreme Temperatures - Public Education. Distribute literature throughout the county (i.e., public library, city halls, local/county schools, etc.) informing the citizens on procedures to implement prior to onset of extreme temperatures. Continued All-Hazard public efforts are addressing the awareness side of this issue and they will									

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Status	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
continue indefinitely.									
See above.	N/A	Extreme Temperatures	Ongoing	OK Co. EM in cooperation with local jurisdictions	Medium	Low - $1,000 (2006 cost)	Oklahoma County	Ongoing (continuous)	Low
Drought Education. Education related to water conservation and avoidance of irresponsible use and subsequent waste. Additional factors include water contamination and storage considerations, landscaping, and plants that support reduced water use, conservation, etc.									
See above.	N/A	Drought	Ongoing	OK Co. Emergency Management	Medium	Low	County funds, HMGP	Short	Medium
Extreme Temperatures - Community Program. Significant weather-related factors for seasonal extremes, most-likely extreme heat or extreme cold. Common All-Hazards-related education factors include "awareness," sheltering, pet/animal considerations, utility services (electric, gas/LP, water), redundant sources of heating or cooling, personal preparedness strategies, care for those unable to care for themselves, etc.									
See above.	N/A	Extreme Temperatures	Ongoing	OK Co. EM	Medium	Low - $1,000 (2006 cost)	Oklahoma County	Ongoing (continuous)	High
Wildfire - Fire Awareness Program. Areas of Rural/Urban Interface within Oklahoma County are at significant risk from this threat. Previous experience, particularly during periods of extended drought and/or high winds have proven extremely problematic, presenting significant threats in regard to life safety and property protection. Oklahoma County EM cooperates with all jurisdictions in the provision of firefighting-related resources and the coordination of essential resources during wildfire events. Regionalized response planning and coordination are critical elements. Preparedness information is supported and provided during public education events and will continue indefinitely.									
See above.	N/A	Wildfire	Ongoing	OK Co. EM working with local fire departments	Medium	Low - $1,000 (2006 cost)	Oklahoma County	Ongoing (continuous)	High
Winter Storm Education in Oklahoma County – Winter storms pose threats from travel problems, hypothermia and death, to fires from heating sources. All-hazards public education efforts encourage recipients to consider all potential threats and to prepare for related challenges and difficulties. Winter weather-related threats are included in a wide range of informational deliveries.									
See above.	N/A	Winter Storm	Ongoing	OK Co. EM	Medium	Low	Oklahoma County	Ongoing (continuous)	Low
Identify, prioritize and implement fixed site and portable generator projects as funding is secured. Targeted facilities include county office building and courthouse, county	N/A	All hazards that result in power failure (Dam Failure, Earthquake, Extreme Temperatures, Flooding,	Ongoing	OK Co. EM, Facilities Management	Medium (continuity of operations and government)	Medium	Available grant programs (EMPG [SLA], HMPG 5% initiative), HMGP, County budget	Short - DOF	Medium

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Status	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
commissioner highway districts, social services, 911 centers, public safety facilities, designated shelters, etc. Install "shore connections" where necessary. .		Lightning, Hail Wind (incl. tornado), Severe Winter Storm), Wildfire, rolling blackouts							
Crutcho Creek – Ongoing acquisition program of properties in floodplains. This is an on-going, repetitive loss area with the most cost effective results to be obtained through property buy-out. Voluntary property acquisition continues under a Federal Hazard Mitigation Grant. Three phases have been completed, two phases still underway. As of 08-2-18, the program has removed sixty-nine (69) single family residences at a cost of approximately $7,105,442. Phase VI is still moving forward.									
See Above.	Existing	Flood	Ongoing	OK Co. Hwy District #1	High	High	County District #1 budget, FEMA HMGP, other grants	Ongoing	High
Retrofit roadway structures located in hazard-prone areas in Unincorporated Oklahoma County to protect structures from future damage, with repetitive loss and severe repetitive loss properties as priority. Phase 1: Identify appropriate candidates for retrofitting based on cost-effectiveness versus relocation. Phase 2: Where retrofitting is determined to be a viable option, take action based on available funding from FEMA and local match availability.									
See above.	Existing	Flood	Ongoing	County (via county engineer/NFIP Floodplain Administrator) with support from OEM, FEMA	High	High	FEMA HMGP, local budget (or property owner) for cost share	Long-term DOF	Medium-High*
Purchase, or relocate structures located in hazard-prone areas in Unincorporated Oklahoma County to protect structures from future damage, with repetitive loss and severe repetitive loss properties as priority. Phase 1: Identify appropriate candidates for relocation based on cost-effectiveness versus retrofitting. Phase 2: Where relocation is determined to be a viable option, work with property owners toward implementation of that action based on available funding from FEMA and local match availability.									
See above.	Existing	Flood	Ongoing	County (via county engineer/NFIP Floodplain Administrator) with support	High	High	FEMA Mitigation Grant Programs and local budget (or property	Long-term DOF	Medium-High*

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Status	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
				from OEM, FEMA			owner) for cost share		
North Canadian River Erosion Control Project – Erosion control and channelization at the North Canadian River bridge structure near NE 50th; stabilize a bend located NW of the river bridge; and stabilize the bank along the east side of Triple X Road. This proposed project will control the erosion at the bridge structure and will prolong the life of the bridge, Triple X road and eventually NE 36th. A combination of channelization with battered H-piles, rip-rap, Kellner Jetties; and or laying the bank to a flatter slope with rip-rap; and river training using some configuration of weirs or spur dikes is being considered. Reconstruct Triple X road in a safe location.									
See above.	Existing	Flooding	New	OK Co. Hwy District #1	High	High	HMGP, County budget	Short	High
Install extendable / expandable "road closed" barriers or gates to posts at roadway locations that frequently flood, especially in the NW part of Oklahoma County. These barriers will have accompanying reflective signage, possibly with flashing lights.		Flooding	Ongoing	OK Co Hwy District #3	High	Medium	HMGP, County Budget	Short	High
Adoption and enforcement of floodplain management requirements (e.g. regulating all new and substantially improved construction in Special Hazard Flood Areas), floodplain identification and mapping, and flood insurance outreach to the community.	New & Existing	(NFIP Compliance)	Ongoing	County (via County Engineer /NFIP Floodplain Administrator)	High	Low - Medium	County Budget	Ongoing	High
Conduct and facilitate community and public education and outreach for residents and businesses to include, but not be limited to, the following to promote and effect natural hazard risk reduction: • Provide and maintain links to the HMP website, and regularly post notices on the County/municipal homepage(s) referencing the HMP webpages. • Prepare and distribute informational letters to flood vulnerable property owners and neighborhood associations, explaining the availability of mitigation grant funding to mitigate their properties, and instructing them on how they can learn more and implement mitigation. • Use email notification systems and newsletters to better educate the public on flood insurance, the availability of mitigation grant funding, and personal natural hazard risk reduction measures.									

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Status	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
• Work with neighborhood associations, civic and business groups to disseminate information on flood insurance and the availability of mitigation grant funding.									
See above.	NA	Flood	Ongoing	OK Co. Planning Department	Low - Medium	Low - Medium	County Budget	Short	High
Participate in the Community Rating System (CRS) to further manage flood risk and reduce flood insurance premiums for NFIP policyholders. This shall start with the submission to FEMA-DHS of a Letter of Intent to join CRS, followed by the completion and submission of an application to the program.	NA	(NFIP Compliance)	Planned	NFIP Floodplain Administrator	Low	Low	County Budget	Long	Low
Archive elevation certificates	NA	(NFIP Compliance)	Ongoing	NFIP Floodplain Administrator	Low	Low	County Budget	Ongoing	High
Distribute NOAA All-hazard radios to multiple occupancy sites, including schools, nursing homes, assisted living centers and daycares.	N/A	Dam Failure, Drought, Earthquake, Extreme Temperatures, Flood, Hail, Lightning, Wildfire, Wind (incl. Tornado), Winter Storm	Ongoing	OK Co. EM	High	Low	HMGP Grant, County budget	Ongoing	Medium
Backup Generator at the Deer Creek Fire Protection District Station #2	Existing	Earthquake, Extreme Temperatures, Flood, Hail,	New	Deer Creek Fire Protection District	High	Medium	PDM, County budget, HMGP	Short	High

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Status	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
		Lightning, Wildfire, Wind (incl. Tornado), Winter Storm							
Upgrade outdoor warning devices	Existing	Wind	New	Deer Creek Fire Protection District	High	Medium	PDM, County budget, HMGP, OHS	Short	High
Wildland fuel reduction in WUI areas	Existing	Wildfire	New	Deer Creek Fire Protection District	High	Medium	PDM, County budget, HMGP	Long	Medium
Install a mass notification system for the unincorporated area and possibly in conjunction with incorporated municipalities	N/A	Dam Failure, Drought, Earthquake, Extreme Temperatures, Flood, Hail, Lightning, Wildfire, Wind (incl. Tornado), Winter Storm	Planned	OK Co. EM	High	Medium	HMGP Grant, EMPG (SLA) Grant, County budget	Short	Medium
Build or procure a structure to protect County EM assets (including vehicles and trailers) from hail and extreme temperature fluctuations that can damage interior, sensitive electronic equipment, emergency supplies on support vehicles	N/A	Hail, Extreme Temperatures	Complete	OK Co. EM	Medium	Low	County budget	Short	High
Install anti-shatter protective film on windows of County Courthouse and Annex buildings	Existing	Hail, Extreme Temperatures	New	OK Co. Engineering Dept.	Medium	Medium	HMGP, County budget	Short	High

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Status	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Research expansive soil data further to determine if problem exists on county property, and if it does, perform soil stabilization prior to any new building.	New	Expansive Soil	Ongoing	OK Co. Planning	Low	Low	County budget	Short	Low
Create an expansive soils public education mitigation page on the public County website to inform the public how to prevent expansive clay soil damage to their homes before a home is built and after. The county Engineer and Planning can refer citizens and builders to the page.		Expansive Soil	Planned	OK Co EM w/ OK County IT	Medium	Low	County budget	Short	Medium
Collect high hazard dam inundation maps from Oklahoma City if they are ever created.	Existing	Dam Failure	Ongoing	Oklahoma City EM	High	Low	(Free – Oklahoma City provides)	Long Term	Low
Mitigate property flooding and protect road access at SE 44th / West of Pott. County Line	Existing	Flooding	In Progress/New	Highway District 2	High	High – $1,200,000	County/HMPG	Long	Medium
Mitigate erosion of bank & possible bridge and road damage at Canadian River on Wilshire Blvd. west of Indian Meridian	Existing	Flooding	New	Highway District 1 w/ Planning & Eng	High	High	County/HMGP	Short	High
Create a Master Drainage Plan for the unincorporated County	New & Existing	Flooding & Dam Failure	New	Planning & Engineering	High	High	County/HMGP	Short	High

Notes:
*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (NA) is inserted if this does not apply.
Costs:
Where actual project costs have been reasonably estimated:
Low = < $10,000
Medium = $10,000 to $100,000
High = > $100,000
Where actual project costs cannot reasonably be established at this time:
Low = Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium = Could budget for under existing work-plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High = Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:
Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:
Low = < $10,000
Medium = $10,000 to $100,000
High = > $100,000
Where numerical project benefits cannot reasonably be established at this time:
Low = Long term benefits of the project are difficult to quantify in the short term.
Medium = Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High = Project will have an immediate impact on the reduction of risk exposure to life and property.

Potential FEMA HMA Funding Sources:
PDM = Pre-Disaster Mitigation Grant Program
FMA = Flood Mitigation Assistance Grant Program
RFC = Repetitive Flood Claims Grant Program
SRL = Severe Repetitive Loss Grant Program
HMGP = Hazard Mitigation Grant Program

Timeline:
Short = 1 to 5 years. Long Term= 5 years or greater. OG = On-going program.
DOF = Depending on funding.

Explanation of Priorities

- ***High Priority*** - A project that meets multiple objectives (i.e., multiple hazards), benefits exceeds cost, has funding secured or is an on-going project and project meets eligibility requirements for the Hazard Mitigation Grant Program (HMGP) or Pre-Disaster Mitigation Grant Program (PDM) programs. High priority projects can be completed in the short term (1 to 5 years).

- ***Medium Priority*** - A project that meets goals and objectives, benefits exceeds costs, funding has not been secured but project is grant eligible under, HMGP, PDM or other grant programs. Project can be completed in the short term, once funding is completed. Medium priority projects will become high priority projects once funding is secured.

- ***Low Priority*** - Any project that will mitigate the risk of a hazard, benefits do not exceed the costs or are difficult to quantify, funding has not been secured and project is not eligible for HMGP or PDM grant funding, and time line for completion is considered long term (1 to 10 years). Low priority projects may be eligible other sources of grant funding from other programs. A low priority project could become a high priority project once funding is secured as long as it could be completed in the short term.

Prioritization of initiatives was based on above definitions: Yes

Prioritization of initiatives was based on parameters other than stated above: Not applicable.

F.) FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

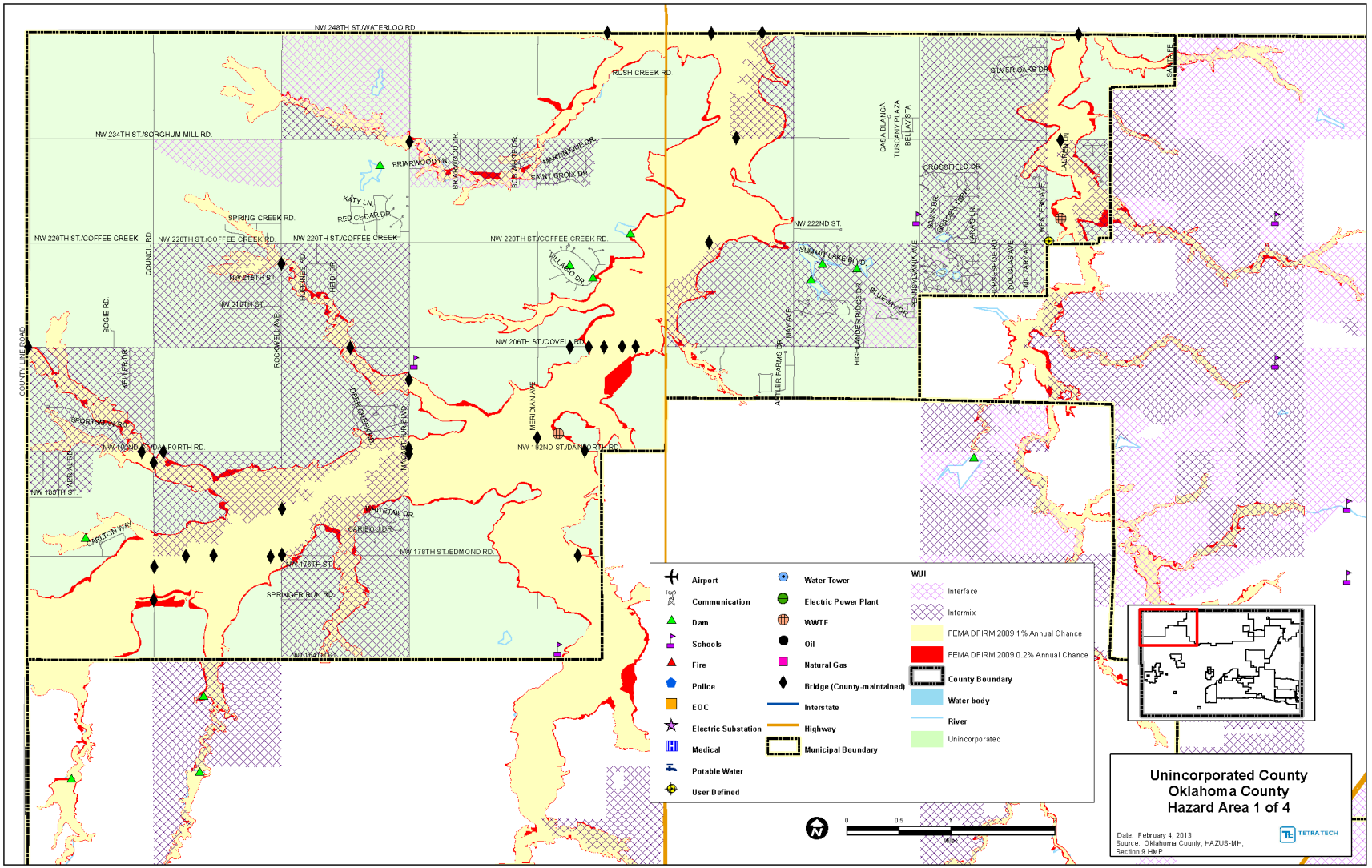
None at this time.

G.) HAZARD AREA EXTENT LOCATION

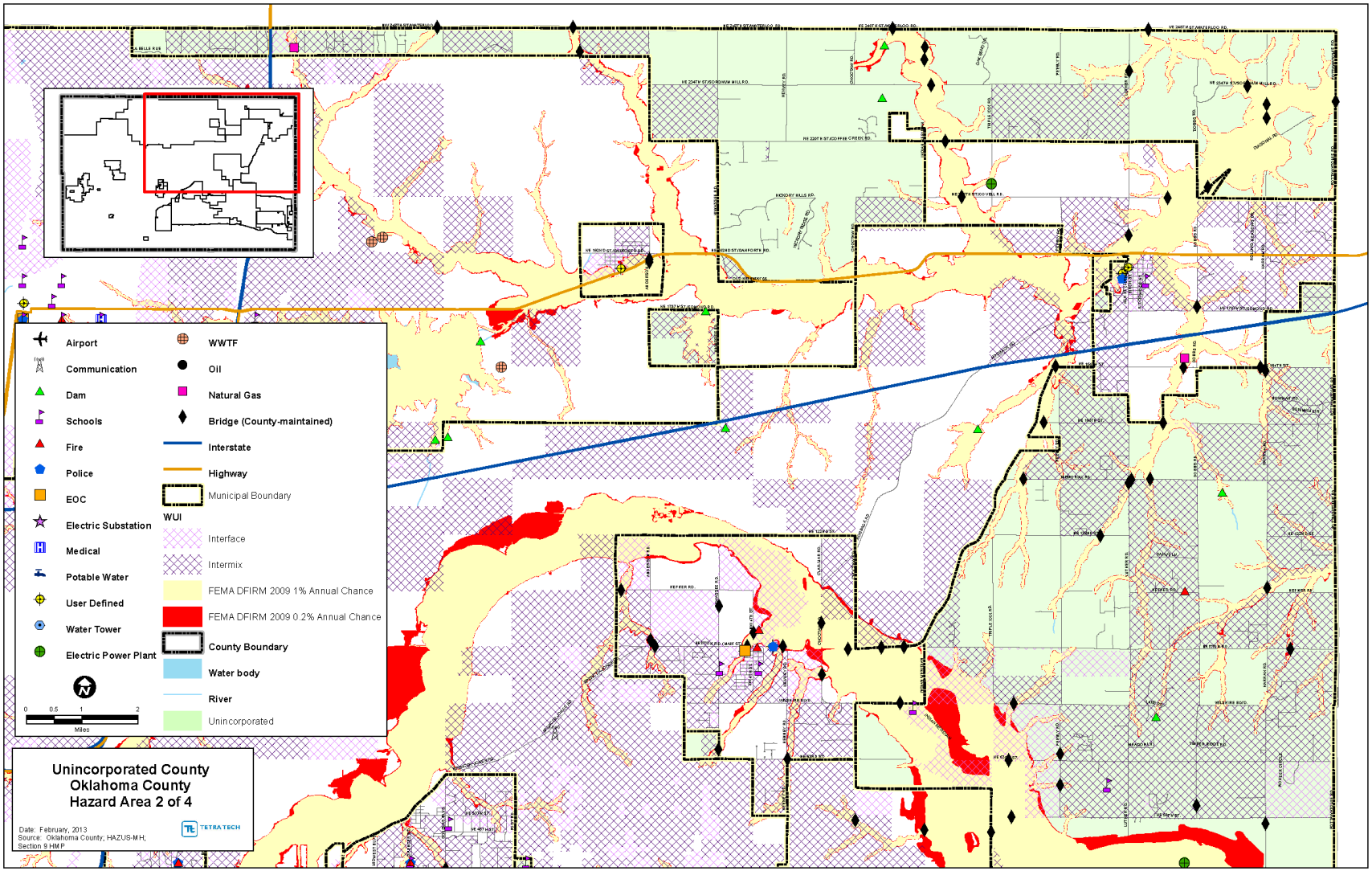
A hazard area extent and location map has been generated and is provided below for Oklahoma County to illustrate the probable areas impacted within the County. This map is based on the best available data at the time of the preparation of this Plan, and is considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the County has significant exposure.

H.) ADDITIONAL COMMENTS

No additional comments at this time.



Northwest Oklahoma County



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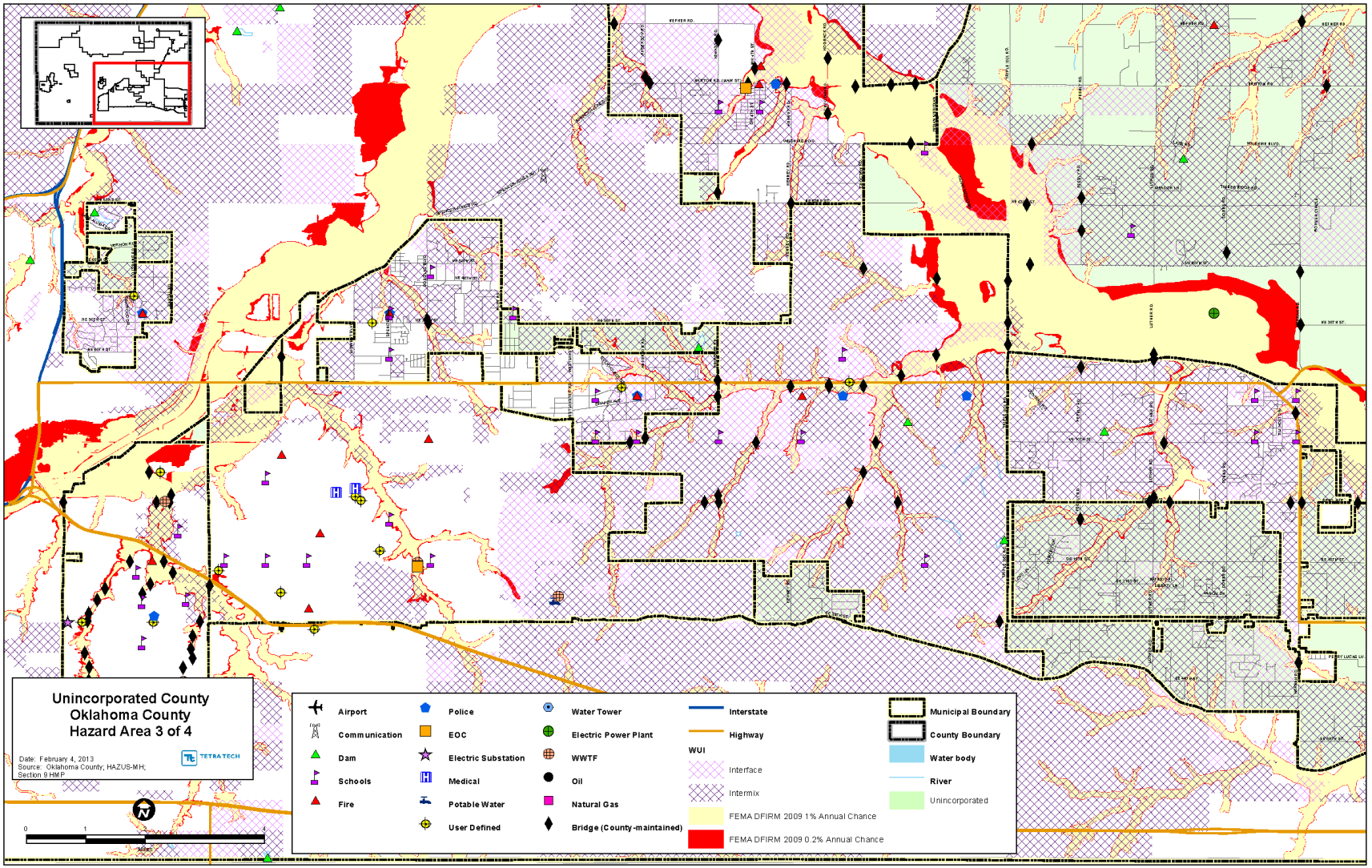
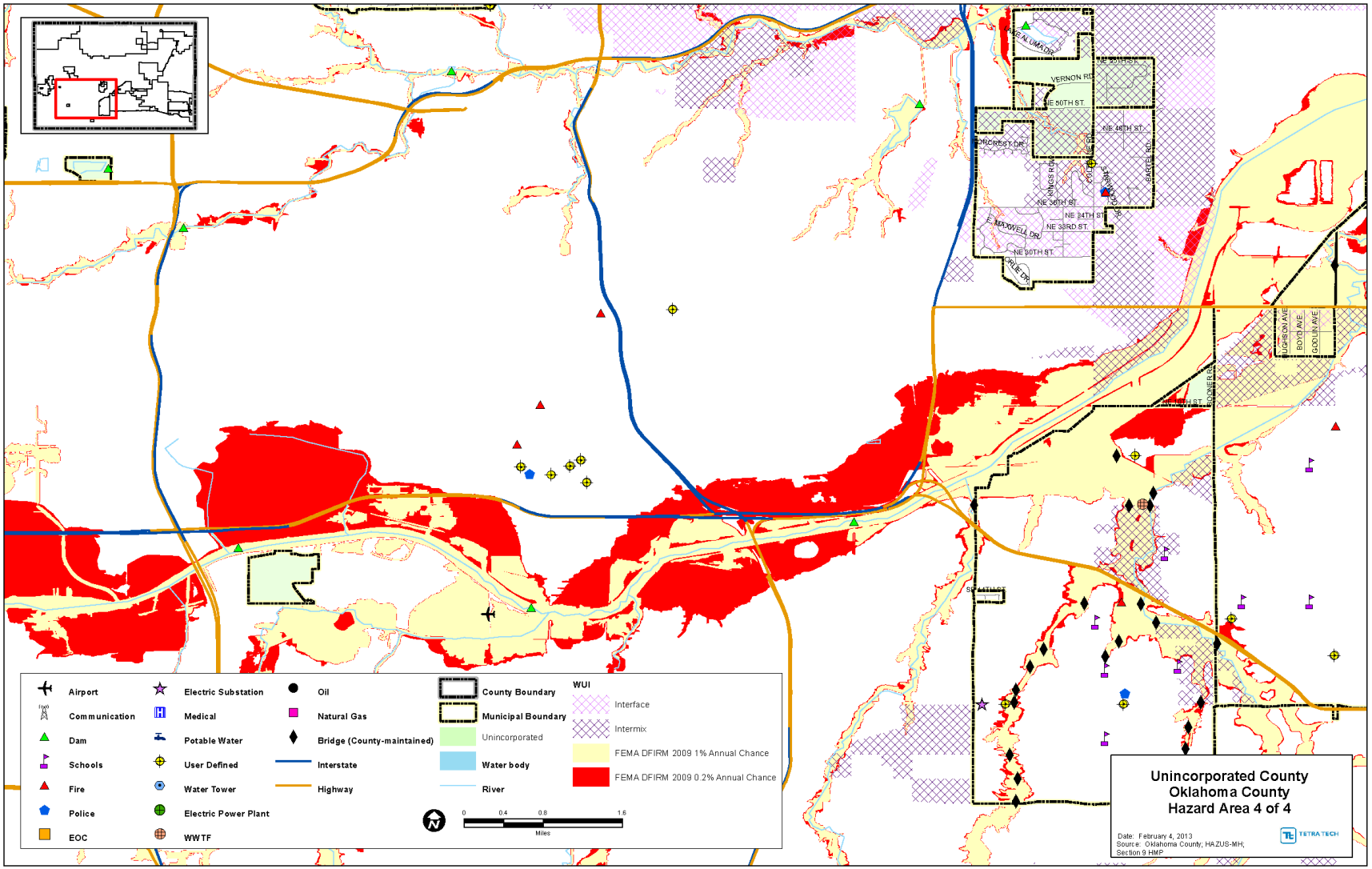


Southeast Oklahoma County



Southwest Oklahoma County

9.2 TOWN OF ARCADIA

This section presents the jurisdictional annex for the Town of Arcadia.

A.) HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact	Alternate Point of Contact
James Woodard, Mayor P.O. Box 15, Arcadia, OK 73007 (405) 570-3537 jwoodard@ionet.net	

B.) MUNICIPAL PROFILE

The Town of Arcadia is located in northern Oklahoma County. The Town is located along Route 66, 15 miles north of Oklahoma City. The Town of Arcadia has a total land area of 1.5 square miles, all of it land. The Town is governed by a mayor and two member Town Board. The 2010 U.S. Census population for the Town of Arcadia was 247.

Growth/Development Trends

No known or anticipated new development has been identified in the Town of Arcadia at this time.

Past Mitigation Activity/Efforts

Widened the storm drainage that runs along Route 66 between Odor St & Anderson Rd.

The previous mitigation actions are carried forward for this update. Lack of funding and manpower had precluded mitigation actions from being accomplished.

Hazard Vulnerabilities Identified

Hazard profiling, Section 5.3, has identified that the Town of Arcadia is vulnerable to the following hazards of concern:

Hazard	Local Vulnerability	Comments
Dam Failure	Yes	Arcadia Lake - See local hazard map end of section
Drought	Yes	
Earthquake	Yes	
Expansive Soils	No	
Extreme Temperatures	Yes	
Flooding	Yes	See local hazard map end of section
Hail	Yes	
Lightning	Yes	
Wildfire	Yes	See local hazard map end of section
Wind (incl. tornado)	Yes	
Severe Winter Storm	Yes	

According to the Town of Arcadia, the following have been identified as specific hazard vulnerabilities in the City:

A few businesses and few homes near the intersection of Highway 66 and S. Odor St. are shown to be in FEMA's 1% SFHA. A convenience store in the southwest part of town is on elevated ground but is in the Arcadia lake dam failure swash zone.

C.) NATURAL HAZARD EVENT HISTORY SPECIFIC TO THE TOWN

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
June 8-10, 1974	Flooding	DR-441	Yes	
November 26, 1974	Flooding	DR-453	Yes	
May 20, 1977	Tornado	N/A	N/A	
May 17, 1981	Tornado	N/A	N/A	
October 17-19, 1983	Flooding	DR-693	Yes	
September 29 – October 1, 1986	Flooding	DR-778	Yes	
May 2, 1990	Flooding, Severe Storm, Tornado	DR-866	Yes	
May 10, 1992	Tornado	N/A	N/A	
May 8, 1993	Severe Storm, Tornadoes	DR-991	Yes	
June 9, 1993	Flash Flooding	N/A	N/A	
July 26 – August 2, 1995	Tornado, Flooding	DR-1066	Yes	
April 24-26, 1999	Flooding	N/A	N/A	
May 3-4, 1999	Tornadoes, Flooding	DR-1272	Yes	
June 23, 1999	Flash Flooding	N/A	N/A	
October 21-29, 2000	Flooding	DR-1349	Yes	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
May 30, 2001	Flooding	N/A	N/A	
September 7, 2001	Urban Flooding	N/A	N/A	
August 11-12, 2004	Flash Flood	N/A	N/A	
March 12, 2006	Tornadoes	DR-1637	No	
December 28-30, 2006	Severe Winter Storm	DR-1677	No	
January 12-26, 2007	Severe Winter Storms	DR-1678	No	
March 29, 2007	Tornadoes	N/A	N/A	
May 4-11, 2007	Tornadoes, Flooding	DR-1707	No	
May 24, 2007 to June 1, 2007	Flooding, Tornadoes	DR-1723	No	
June 10, 2007 to July 25, 2007	Severe Storms, Flooding, Tornadoes	DR-1712	Yes	
Aug. 18, 2007 to Sept. 12, 2007	Tornadoes, Flooding	DR-1718	Yes	
Dec. 8, 2007 to Jan. 3, 2008	Severe Winter Storms	DR-1735	Yes	
March 17-23, 2008	Tornadoes, Flooding	DR-1752	No	
March 22, 2008	Wildfire	N/A	N/A	
March 30-31, 2008	Severe Storms	N/A	N/A	
April 9-28, 2008	Tornadoes, Flooding	DR-1754	No	
April 30, 2008	Hail/Damaging Winds	N/A	N/A	
May 9, 2008	Floods	DR-1754	No	
May 10-13, 2008	Tornadoes, Flooding	DR-1756	No	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
June 3-20, 2008	Flooding	DR-1775	No	
August 20, 2008	Flooding	N/A	N/A	
September 12-19, 2008	Tornadoes, Flooding	DR-1803	No	
February 10-11, 2009	Tornadoes	DR-1820	Yes	
March 24, 2009	Severe T-Storms	N/A	N/A	
March 26-27, 2009	Snow/Ice/Severe T-Storm	N/A	N/A	
March 30, 2009	Severe Storm	N/A	N/A	
April 9-12, 2009	Wildfires	DR-1846	Yes	
May 13, 2009	Severe Storm	N/A	N/A	
December 24-25, 2009	Severe Winter Storm	DR-1876	No	
January 26-28, 2009	Severe Winter Storm	DR-1823	No	
2010-2011	Severe Drought	N/A	N/A	
January 28-30, 2010	Severe Winter Storm	DR-1883	No	
Jan. 30-Feb. 9, 2010	Severe Winter Storm	N/A	N/A	
March 19, 2010	Severe Winter Storm	N/A	N/A	
2010-2011	Severe Drought	N/A	N/A	
May 10-13, 2010	Tornadoes, Straight-Line Winds	DR-1917	Yes	
May 16, 2010	Hail Storm	N/A	N/A	
May 19, 2010	Severe Storm	N/A	N/A	
June 13-15, 2010	Tornadoes, Straight-line Winds, and	DR-1926	Yes	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
	Flooding			
May 10-13, 2010	Tornadoes, and Straight-Line Winds	DR-1917	Yes	
July 7-8, 2010	Flooding	N/A	N/A	
Oct. 13, 2010	Earthquake	N/A	N/A	
Jan. 31, 2011 to Feb. 5, 2011	Severe Winter Storm and Snowstorm	DR-1985	No	
April 14, 2011	Tornadoes, Straight-Line Winds	DR-1970	No	
April 21-28, 2011	Flooding	DR-1988	No	
May 22-25, 2011	Tornadoes, Straight-line Winds, and Flooding	DR-1989	No	
June-August 2011	Extreme Heat	N/A	N/A	
November 6, 2011	Earthquake	N/A	N/A	5.6 magnitude earthquake near Prague; depth of 5.2 km
December 01, 2013	Earthquake	N/A	N/A	4.5 magnitude earthquake near Arcadia Lake; depth of 8.4 km.
June 16, 2014	Earthquake	N/A	N/A	4.3 magnitude earthquake near Spencer; depth of 5.0 km.
June 18, 2014	Earthquake	N/A	N/A	4.1 magnitude earthquake near Spencer; depth 5.0 km
May 2015	Flooding	N/A	N/A	Flooding accrued across the eastern side of the city. Multiple private residents sustained water damage during this time.
November 27-28, 2015	Winter Storm	DR-4247	Yes	Ice storm.
December 27-28, 2015	Winter Storm	DR-4256	No	Ice storm with widespread power outages, including the Arcadia area.
December 29, 2015	Earthquake	N/A	N/A	4.3 magnitude earthquake at Edmond; depth 6.5 km
January 01, 2016	Earthquake	N/A	N/A	4.2 magnitude Earthquake at Edmond; depth 5.8 km
April 07, 2016	Earthquake	N/A	N/A	4.2 magnitude earthquake at Luther; depth of 6.1 km

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
September 3, 2016	Earthquake	N/A	N/A	5.8 magnitude earthquake at Pawnee; depth of 5.4 km
August 03, 2017	Earthquake	N/A	N/A	4.2 magnitude earthquake at Edmond; depth of 5.0 km

Number of FEMA Identified Repetitive Flood Loss Properties: 0
Number of FEMA Identified Severe Repetitive Flood Loss Properties: 0

Source: Oklahoma Water Resources Board (OWRB)

Wildfire History for Arcadia
Acres may include loss from wildland, grass, brush, crop, orchard and nursery fires. The City of Edmond surrounds and provides mutual aid to the jurisdiction.

	Loss	Acres
2018	N/A	N/A
2017	$0	3.0
2016	$0	0.0
2015	$0	0.0
2014	$0	0.0
2013	$0	0.0
2012	$0	0.0
2011	$0	2.0
2010	$0	0.0
2009	$4,500	25.0
2008	$3,000	300.0
2007	$6,500	160.0
2006	$1,200	160.0
2005	$8,000	7.0
2004	$0	0.0
TOTAL LOSS	**$23,200**	**657.0**

Source: Oklahoma State Fire Marshal's office

D.) CAPABILITY ASSESSMENT

This section identifies the following mitigation capabilities within Unincorporated Oklahoma County:

- Legal and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Community classification.

D.1) Legal and Regulatory Capability

Regulatory Tools (Codes, Ordinances, Plans)	**Do you have this?** (Y or N)	**Code Citation** (Section, Paragraph, Page Number, Date of adoption)	**HM Plan integration into plan**	**Update cycle**	**Party(s) responsible for updating document**
Building Code	Y	2015 – Part 5, Chapter 1			
Comprehensive / Master Plan	N				
Zoning Management Ordinance	Y	1987 – Part 13, Chapter 15			
Subdivision Management Ordinance	N				
Site Plan Review Requirements	Y	1992 – Part 5, Chapter 1			
NFIP Flood Damage Prevention Ordinance (if you are in the NFIP, you must have this!)	Y	2005			
NFIP Elevation Certificates Maintained	Y				
Floodplain Management Plan	Y		Yes	Not Scheduled	County Floodplain Manager, Town Council
Stormwater Management Plan / Ordinance	N				
Stream Corridor Management or Protection Plan	N				
Erosion Management Ordinance	N				
Capital Improvements Plan	Y	2003	Yes	3 Month Review	Planning and Zoning Committee
Open Space Plan	N				
Economic Development Plan	N				

Regulatory Tools (Codes, Ordinances, Plans)	**Do you have this?** (Y or N)	**Code Citation** (Section, Paragraph, Page Number, Date of adoption)	**HM Plan integration into plan**	**Update cycle**	**Party(s) responsible for updating document**
Emergency Response Plan	Y		No		
Post Disaster Recovery Plan / Ordinance	N				
Real Estate Disclosure Requirements	N				
Highway Management Plan	N				
COOP/COG Plan	N				
Other (Special Purpose Ordinances such as critical or sensitive areas)	N				

Additionally, any change in ordinances happens at the behest of local government bodies, state legislation or court actions and are not on a scheduled reoccurring basis.

D.2) Administrative and Technical Capability

Staff/ Personnel Resources	**Available (Y or N)**	**Department/ Agency/ Position**
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Y	
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Y	
Planners or engineers with an understanding of natural hazards	N	
NFIP Floodplain Administrator	Y	
Surveyor(s)	N	
Personnel skilled or trained in “GIS” applications	N	
Scientist familiar with natural hazards	N	
Emergency Manager	Y	
Grant Writer(s)	Y	
Staff with expertise or training in benefit/cost analysis	Y	

D.3) Fiscal Capability

Financial Resources	Accessible or Eligible to use (Yes/No/Don't Know)
Community Development Block Grants (CDBG)	Yes
Capital Improvements Project Funding	
Authority to Levy Taxes for specific purposes	Yes
User fees for water, sewer, gas or electric service	
Impact Fees for homebuyers or developers of new development/homes	
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	
Incur debt through private activity bonds	
Withhold public expenditures in hazard-prone areas	
Other	

D.4) Community Classifications

Program	Classification	Date Classified
Community Rating System (CRS)	NP	N/A
Building Code Effectiveness Grading Schedule (BCEGS)	TBD	TBD
Public Protection	9	-
Storm Ready	County	TBD
Firewise	NP	N/A

N/A = Not applicable. NP = Not participating. - = Unavailable. TBD = To Be Determined

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at http://www.isomitigation.com/ppc/0000/ppc0001.html
- The National Weather Service Storm Ready website at http://www.weather.gov/stormready/howto.htm
- The National Firewise Communities website at http://firewise.org/

Expanding on and Improving Existing Policies and Programs

By adopting updated codes, including fire, building and NFIP ordinances this jurisdiction will continue to improve their mitigation approach. Furthermore, employing experts in land management and construction practices, in coordination with the NFIP flood plain manager, the overall stratagem will continue to advance.

E.) PROPOSED HAZARD MITIGATION INITIATIVES

Note some of the identified mitigation initiatives in the table are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities.

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Maintain compliance with and good-standing in the NFIP including adoption and enforcement of floodplain management requirements (e.g. regulating all new and substantially improved construction in Special Hazard Flood Areas), floodplain identification and mapping, and flood insurance outreach to the community.	New & Existing	NFIP Compliance	Ongoing	Municipality (via Municipal Engineer/NFIP Floodplain Administrator) with support from OEM, ISO FEMA	High	Low - Medium	Local Budget	Ongoing	High
Conduct and facilitate community and public education and outreach for residents and businesses to include, but not be limited to, the following to promote and effect natural hazard risk reduction: • Provide and maintain links to the HMP website, and regularly post notices on the County/municipal homepage(s) referencing the HMP webpages. • Prepare and distribute informational letters to flood vulnerable property owners and neighborhood associations, explaining the availability of mitigation grant funding to mitigate their properties, and instructing them on how they can learn more and implement mitigation. • Use email notification systems and newsletters to better educate the public on flood insurance, the availability of mitigation grant funding, and personal natural hazard risk reduction measures. • Work with neighborhood associations, civic and business groups to disseminate information on flood insurance and the availability of mitigation grant funding.									
See above.	NA	Flood	Ongoing	Municipality with support from Planning Partners, OEM, FEMA	Low - Medium	Low - Medium	Municipal Budget; HMA programs with local or county match	Short	High
Participate in the Community Rating System (CRS) to further manage	NA	NFIP Compliance	Planned	NFIP Floodplain Administrator	Low	Low	Municipal Budget	Short	Medium

flood risk and reduce flood insurance premiums for NFIP policyholders. This shall start with the submission to FEMA-DHS of a Letter of Intent to join CRS, followed by the completion and submission of an application to the program once the community's current compliance with the NFIP is established.				with support from OEM, FEMA					
Archive elevation certificates	NA	NFIP Compliance	Ongoing	NFIP Floodplain Administrator	Low	Low	Local Budget	On-going	High
Purchase Weather Radios to warn workers in city buildings		Dam Failure, Drought, Earthquake, Extreme Temperatures, Flood, Hail, Lightning, Wind (incl. Tornado), Wildfire, Winter Storm	Planned	Police w/ Fire Dept.	High	Low	HMGP	Short	Medium
Create mitigation education brochures and distribute to residents public city venues and through the town website.		Dam Failure, Drought, Earthquake, Extreme Temperatures, Flood, Hail, Lightning, Wildfire, Wind (incl. Tornado), Winter Storms	Ongoing	Town Admin. (Mayor)	High	Low	Town budget	Short	Medium
Install permanent backup generators at Town Hall and Fire Station. Generators can be used to power items after a dam failure takes down poles,	Existing	Dam Failure, Earthquake, Extreme Temperatures, Flood, Hail, Lightning,	Planned	Fire Dept.	High	Low	HMGP with town match	Short	High

an earthquake shakes lines down, rolling blackouts during extreme temps, outages caused by floods, lightning, hail destroying power insulators, wildfires burning up poles, and ice taking down lines in winter storms.		Wildfire, Wind (incl. Tornado), Winter Storms							

Notes:
*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (NA) is inserted if this does not apply.

Costs:
Where actual project costs have been reasonably estimated:
Low = < $10,000
Medium = $10,000 to $100,000
High = > $100,000
Where actual project costs cannot reasonably be established at this time:
Low = Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium = Could budget for under existing work-plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High = Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:
Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:
Low = < $10,000
Medium = $10,000 to $100,000
High = > $100,000
Where numerical project benefits cannot reasonably be established at this time:
Low = Long term benefits of the project are difficult to quantify in the short term.
Medium = Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High = Project will have an immediate impact on the reduction of risk exposure to life and property.

Potential FEMA HMA Funding Sources:
PDM = Pre-Disaster Mitigation Grant Program
FMA = Flood Mitigation Assistance Grant Program
RFC = Repetitive Flood Claims Grant Program
SRL = Severe Repetitive Loss Grant Program
HMGP = Hazard Mitigation Grant Program

Timeline:
Short = 1 to 5 years. Long Term= 5 years or greater. OG = On-going program.
DOF = Depending on funding.

Explanation of Priorities

- ***High Priority*** - A project that meets multiple objectives (i.e., multiple hazards), benefits exceeds cost, has funding secured or is an on-going project and project meets eligibility requirements for the Hazard Mitigation Grant Program (HMGP) or Pre-Disaster Mitigation Grant Program (PDM) programs. High priority projects can be completed in the short term (1 to 5 years).

- ***Medium Priority*** - A project that meets goals and objectives, benefits exceeds costs, funding has not been secured but project is grant eligible under, HMGP, PDM or other grant programs. Project can be completed in the short term, once funding is completed. Medium priority projects will become high priority projects once funding is secured.

- ***Low Priority*** - Any project that will mitigate the risk of a hazard, benefits do not exceed the costs or are difficult to quantify, funding has not been secured and project is not eligible for HMGP or PDM grant funding, and time line for completion is considered long term (1 to 10 years). Low priority projects may be eligible other sources of grant funding from other programs. A low priority project could become a high priority project once funding is secured as long as it could be completed in the short term.

Prioritization of initiatives was based on above definitions: Yes

Prioritization of initiatives was based on parameters other than stated above: Not applicable.

F.) FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

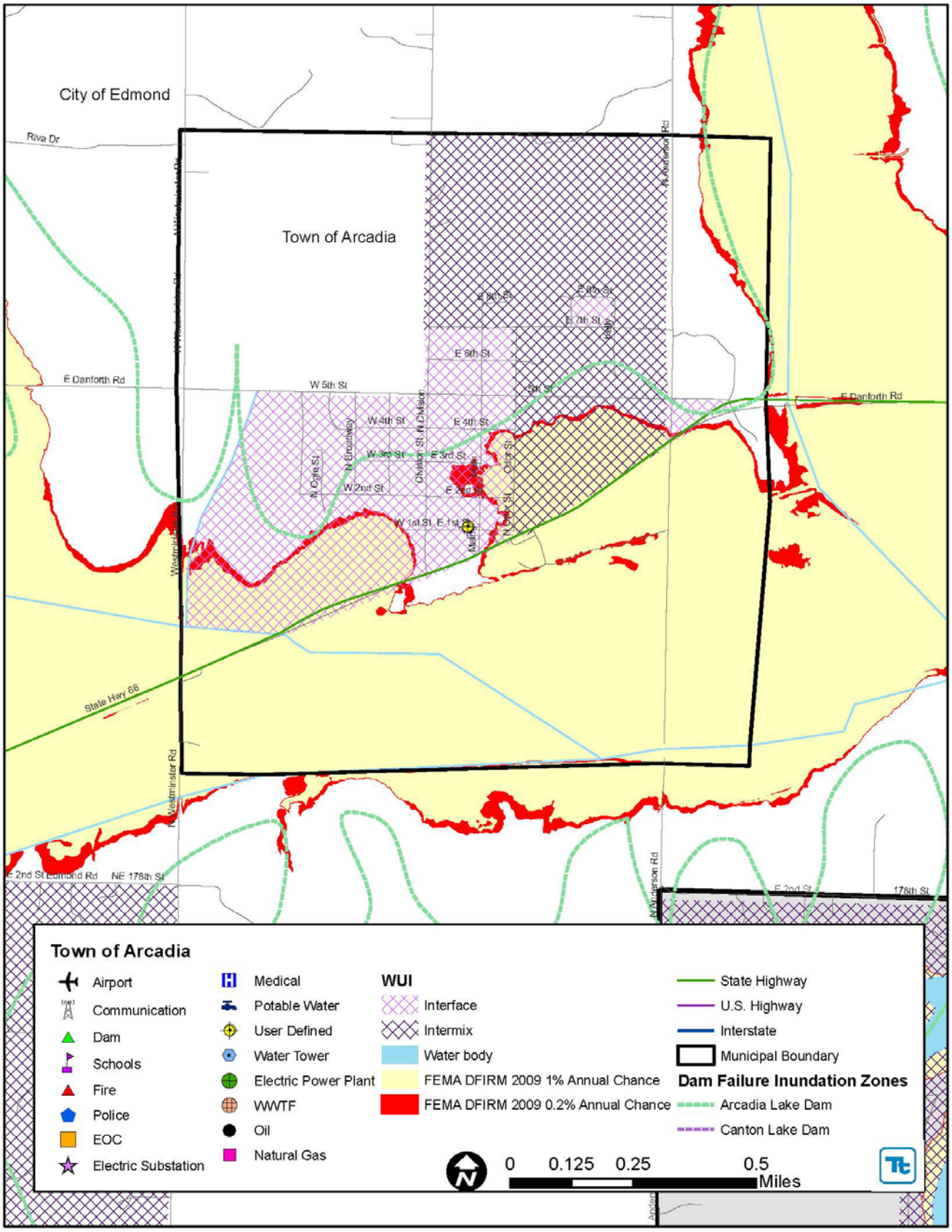
None at this time.

G.) HAZARD AREA EXTENT AND LOCATION

A hazard area extent and location map has been generated and is provided below for the Town of Arcadia to illustrate the probable areas impacted within the Town of Arcadia. This map is based on the best available data at the time of the preparation of this Plan, and is considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the Town of Arcadia has significant exposure.

H.) ADDITIONAL COMMENTS

No additional comments at this time.


City of Edmond
Town of Arcadia
Riva Dr
E Danforth Rd
W 5th St
E 6th St
W 4th St
E 4th St
W 3rd St
E 3rd St
W 2nd St
E 2nd St
W 1st St
E 1st St
N Ogle St
N Broadway
Division St
N Division
N Oak St
Main St
Westminster Rd
N Westminster Rd
N Anderson Rd
State Hwy 66
E 2nd St
Edmond Rd
NE 178th St
178th St
Kelly
Town of Arcadia
Airport
Communication
Dam
Schools
Fire
Police
EOC
Electric Substation
Medical
Potable Water
User Defined
Water Tower
Electric Power Plant
WWTF
Oil
Natural Gas
WUI
Interface
Intermix
Water body
FEMA DFIRM 2009 1% Annual Chance
FEMA DFIRM 2009 0.2% Annual Chance
State Highway
U.S. Highway
Interstate
Municipal Boundary
Dam Failure Inundation Zones
Arcadia Lake Dam
Canton Lake Dam
N
0
0.125
0.25
0.5
Miles

9.3 CITY OF BETHANY

This section presents the jurisdictional annex for the City of Bethany.

A.) HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact	Alternate Point of Contact
Danielle Barker, Assistant Community Development Director 6700 NW 36th St. Bethany, OK 73008 (405) 603-3466 danielle.barker@bethanok.org	Amanda McCellon, Director of Planning and Community Development 6700 NW 36th St., Bethany, OK 73008 (405) 789-6005 amanda.mccellon@bethanyok.org

B.) MUNICIPAL PROFILE

The City of Bethany is located in western Oklahoma County. The City is bordered to the north, south and west by Oklahoma City and to the east by City of Warr Acres. The City of Bethany has a total land area of about 5.2 square miles, all of it land. The City is governed by a Council – Manager form of government. The 2010 U.S. Census population for the City of Bethany was 19,051.

Growth/Development Trends

Commercial development is taking place at the 7200 blk. of NW 23rd where three lots are platted. One big box store has a building planned for this location.

Due to the above development being a redeveloped area, there has been no significant change to the hazard vulnerabilities and possibly a slight decrease in flood vulnerability due to increased code requirements.

Past Mitigation Activity/Efforts

Each initiative from the 2013 plan was reviewed going forward into this 2019 plan. Any initiatives that were completed or abandoned are stated below, while any new or ongoing initiatives will be found under the Proposed Hazard Mitigation Initiatives header of this section.

The following table summarizes progress on the mitigation strategy identified by the City of Bethany in the 2013 plan.

Completed Initiatives	Comments
Replaced 6 mechanical storm sirens with a new warning system comprising 8 electronic state of the art sirens.	

Abandoned Initiative	Comments
Increase the size of open channels to upgrade capacity at NW 39th St and Rockwell Ave. to eliminate the likelihood of impassable street after heavy rains.	Discovered project would negatively impact down stream
Revise a regulation to limit height of structures to reduce likelihood of neighboring structural damage in an earthquake.	Duplicate of existing regulations
Purchase trailer park located in the SFHA at NW 50th St and Peniel Ave. to ensure land becomes green space.	Acquisition not possible at this time.

Further details on mitigation activities completed or ongoing in the City include:

- Installed a steel gable roof on the fire department in 2012 to mitigate hail.
- The local electric company has temporarily mitigated ice storm concerns by trimming the trees in the area.
- Adopted an ordinance in 2009 increasing freeboard requirements. The change includes a requirement for a "no rise certificate" where the SFHA cannot be elevated where it may cause flooding elsewhere.

Hazard Vulnerabilities Identified

Hazard profiling, Section 5.3, has identified that the City of Bethany is vulnerable to the following hazards of concern:

Hazard	Local Vulnerability	Comments
Dam Failure	Yes	Canton Lake - See local hazard map end of section
Drought	Yes	
Earthquake	Yes	
Expansive Soils	Yes	
Extreme Temperatures	Yes	
Flooding	Yes	
Hail	Yes	
Lightning	Yes	
Wildfire	Yes	See local hazard map end of section
Wind (incl. tornado)	Yes	
Severe Winter Storm	Yes	

According to the City of Bethany, the following have been identified as specific hazard vulnerabilities in the City:

- Bethany has a dam failure risk from Canton Lake but not Overholser since it is upstream from the dam.
- A trailer park exists in a floodplain north of 50th St. and Peniel Ave. It is privately owned. This area is identified as being in the FEMA 1% annual chance SFHA.
- Road flooding occurs north of 25th St. and Peniel Ave. after heavy rains. No notable road damage has occurred.
- NW 39th St. and Rockwell is impassable at times after heavy rains.
- A wildfire risk exists in the McMillian Park and Riverside Park areas north of NW 39th near Council Rd where numerous trees exist.
- The water plant has vulnerability to wildfire due to trees that are on nearby private property, however there is a water canal between the trees and the facility so the vulnerability is low.

Vulnerability assessment modeling has identified the following flood vulnerabilities (see Flood Hazard Profile in Section 5.3):

Critical Facilities Located in the DFIRM Flood Boundaries and Estimated Potential Damage from the 100- and 500-Year MRP Events

Name	Municipality	Type	Exposure		Potential Loss			
			100-Yr	500-Yr	100-Yr Structure Damage %	100-Yr Content Damage %	500-Yr Structure Damage %	500-Yr Content Damage %
APOLLO ES	Bethany (C)	School			9.0	62.9	10.1	68.1
BETHANY CHRISTIAN ACADEMY	Bethany (C)	School			9.0	62.9	10.1	68.1

Source: FEMA, 2009;

Utilities Located in the Preliminary DFIRM Flood Boundaries and Estimated Potential Damage from the 100- and 500-Year MRP Events

Name	Municipality	Type	Exposure		Potential Loss	
			100 Year	500 Year	100 Year Damage %	500 Year Damage %
Bethany Water Plant	Bethany (C)	Potable Water			40.0	40.0

Source: FEMA, 2009;

Notes:

(1) 'X' indicates the facility location as provided by Oklahoma County's Planning Committee is located in the DFIRM flood zone.

C.) NATURAL HAZARD EVENT HISTORY SPECIFIC TO THE CITY

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
June 8-10, 1974	Flooding	DR-441	Yes	
November 26, 1974	Flooding	DR-453	Yes	
October 17-19, 1983	Flooding	DR-693	Yes	
September 29 – October 1, 1986	Flooding	DR-778	Yes	
May 2, 1990	Flooding, Tornado	DR-866	Yes	
May 8, 1993	Tornadoes	DR-991	Yes	
June 9, 1993	Flash Flooding	N/A	N/A	
July 26 – August 2, 1995	Tornado, Flooding	DR-1066	Yes	
April 24-26, 1999	Flooding	N/A	N/A	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
May 3-4, 1999	Tornadoes, Flooding	DR-1272	Yes	
June 23, 1999	Flash Flooding	N/A	N/A	
October 21-29, 2000	Flooding	DR-1349	Yes	
May 30, 2001	Flooding	N/A	N/A	
September 7, 2001	Urban Flooding	N/A	N/A	
May 9, 2003	Tornado	N/A	N/A	Eight injuries, tornado affected Warr Acres as well.
August 11-12, 2004	Flash Flood	N/A	N/A	In the City of Bethany, Eldon Lyon Park was inundated by flash flooding. Water had to be pumped out of the park.
March 12, 2006	Tornadoes	DR-1637	No	
December 28-30, 2006	Severe Winter Storm	DR-1677	No	
January 12-26, 2007	Severe Winter Storms	DR-1678	No	Extensive power line damage from ice and downed trees. House fires resulted in Bethany.
March 29, 2007	Tornadoes	N/A	N/A	
May 4-11, 2007	Tornadoes, Flooding	DR-1707	No	
May 24, 2007 to June 1, 2007	Flooding, Tornadoes	DR-1723	No	
June 10, 2007 to July 25, 2007	Flooding, Tornadoes	DR-1712	Yes	
Aug. 18, 2007 to Sept. 12, 2007	Tornadoes, Flooding	DR-1718	Yes	
Dec. 8, 2007 to Jan. 3, 2008	Severe Winter Storms	DR-1735	Yes	
March 17-23, 2008	Tornadoes, Flooding	DR-1752	No	
March 22, 2008	Wildfire	N/A	N/A	
March 30-31, 2008	Severe Storms	N/A	N/A	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
April 9-28, 2008	Tornadoes, Flooding	DR-1754	No	
April 30, 2008	Hail/Damaging Winds	N/A	N/A	
May 9, 2008	Flooding	DR-1754	No	
May 10-13, 2008	Tornadoes, Flooding	DR-1756	No	
June 3-20, 2008	Flooding	DR-1775	No	
August 20, 2008	Flooding	N/A	N/A	
September 12-19, 2008	Tornadoes, Flooding	DR-1803	No	
February 10-11, 2009	Tornadoes	DR-1820	Yes	
March 24, 2009	Severe Storms	N/A	N/A	
March 26-27, 2009	Snow/Ice/Severe Storm	N/A	N/A	
March 30, 2009	Severe Storm	N/A	N/A	
April 9-12, 2009	Wildfires	DR-1846	Yes	
May 13, 2009	Severe Storms	N/A	N/A	
December 24-25, 2009	Severe Winter Storm	DR-1876	No	
January 26-28, 2009	Severe Winter Storm	DR-1823	No	
2010-2011	Severe Drought	N/A	N/A	
January 28-30, 2010	Severe Winter Storm	DR-1883	No	
Jan. 30-Feb. 9, 2010	Severe Winter Storm	N/A	N/A	
March 19, 2010	Severe Winter Storm	N/A	N/A	
2010-2011	Severe Drought	N/A	N/A	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
May 10-13, 2010	Tornadoes, Straight-Line Winds	DR-1917	Yes	
May 16, 2010	Hail Storm	N/A	N/A	
May 19, 2010	Severe Storm	N/A	N/A	
June 13-15, 2010	Tornadoes, Straight-line Winds, and Flooding	DR-1926	Yes	
May 10-13, 2010	Tornadoes, and Straight-Line Winds	DR-1917	Yes	
July 7-8, 2010	Flooding	N/A	N/A	
Oct. 13, 2010	Earthquake	N/A	N/A	
Jan. 31, 2011 to Feb. 5, 2011	Severe Winter Storm and Snowstorm	DR-1985	No	Between eight and ten inches fell near Edmond and Bethany. Wind gusts of over 50 mph were also reported.
April 14, 2011	Tornadoes, Straight-Line Winds	DR-1970	No	
April 21-28, 2011	Flooding	DR-1988	No	
May 22-25, 2011	Tornadoes, Straight-line Winds, and Flooding	DR-1989	No	
June-August 2011	Severe Heat	N/A	N/A	
November 6, 2011	Earthquake	N/A	N/A	5.6 magnitude earthquake near Prague; depth of 5.2 km
March 25, 2015	Tornado	N/A	N/A	A tornado was spotted in Bethany with multiple buildings sustaining severe damage.
November 27-28, 2015	Winter Storm	DR-4247	Yes	Multiple power lines were downed and large swaths of the county were affected with power outages during this time. This ice storm created approx. ¾" of ice in the west metro.
December 27-28, 2015	Winter Storm	DR-4256	No	Ice Storm.
September 3, 2016	Earthquake	N/A	N/A	5.8 magnitude earthquake at Pawnee; depth of 5.4 km

Number of FEMA Identified Repetitive Flood Loss Properties: 1 residential*
Number of FEMA Identified Severe Repetitive Flood Loss Properties: 0

Source: Oklahoma Water Resources Board (OWRB), Bethany Floodplain Manager
*Note: The Bethany Floodplain manager indicates that this property flooded in the 1980s from clogged drainage that has been consistently maintained since then.

Wildfire History for Bethany

	Loss	Acres
2018	$100	0.1
2017	$0	0.5
2016	$2,150	3.0
2015	$0	0.0
2014	$0	1.5
2013	$0	1.0
2012	$0	0.0
2011	$4,500	2.3
2010	$0	0.0
2009	$0	2.1
2008	$0	1.0
2007	$600	1.0
2006	$0	1.0
2005	$0	3.0
2004	$0	4.0
TOTAL LOSS	**$7,350**	**20.6**

Acres may include loss from wildland, grass, brush, crop, orchard and nursery fires.

Source: Oklahoma State Fire Marshal's office

D.) CAPABILITY ASSESSMENT

This section identifies the following mitigation capabilities within Unincorporated Oklahoma County:

- Legal and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Community classification.

D.1) Legal and Regulatory Capability

Regulatory Tools (Codes, Ordinances, Plans)	**Do you have this?** (Y or N)	**Code Citation** (Section, Paragraph, Page Number, Date of adoption)	**HM Plan integration into plan**	**Update cycle**	**Party(s) responsible for updating document**
Building Code	Y	2009 IBC			
Comprehensive / Master Plan	Y	New plan in budget	No	2 Year Cycle	Community Development and Zoning Commission
Zoning Management Ordinance	Y				
Subdivision Management Ordinance	Y				
Site Plan Review Requirements	Y				
NFIP Flood Damage Prevention Ordinance (if you are in the NFIP, you must have this!)	Y	Title XV, Chapter 156			
NFIP Elevation Certificates Maintained	Y				
Floodplain Management Plan	N				
Stormwater Management Plan / Ordinance	Y		No	5 Year Cycle	Stormwater Program Manager
Stream Corridor Management or Protection Plan	N				
Erosion Management Ordinance	Y				
Capital Improvements Plan	Y		No	No Update Scheduled	City Engineer/Public Works Dept.
Open Space Plan	N				
Economic Development Plan	N				

Regulatory Tools (Codes, Ordinances, Plans)	Do you have this? (Y or N)	Code Citation (Section, Paragraph, Page Number, Date of adoption)	HM Plan integration into plan	Update cycle	Party(s) responsible for updating document
Emergency Response Plan	Y		No	No Update Schedule	Emergency Manager
Post Disaster Recovery Plan / Ordinance					
Real Estate Disclosure Requirements					
Highway Management Plan	N				
COOP/COG Plan					
Other (Special Purpose Ordinances such as critical or sensitive areas)					

Additionally, any change in ordinances happens at the behest of local government bodies, state legislation or court actions and are not on a scheduled reoccurring basis.

D.2) Administrative and Technical Capability

Staff/ Personnel Resources	Available (Y or N)	Department/ Agency/ Position
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Y	
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Y	
Planners or engineers with an understanding of natural hazards	Y	
NFIP Floodplain Administrator	Y	Appointed by City Council
Surveyor(s)	N	
Personnel skilled or trained in “GIS” applications	N	
Scientist familiar with natural hazards	N	
Emergency Manager	Y	
Grant Writer(s)	Y	
Staff with expertise or training in benefit/cost analysis	Y	

D.3) Fiscal Capability

Financial Resources	Accessible or Eligible to use (Yes/No/Don't know)
Community Development Block Grants (CDBG)	Yes
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for specific purposes	Yes
User fees for water, sewer, gas or electric service	Yes
Impact Fees for homebuyers or developers of new development/homes	Yes (for utilities for new construction)
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	Yes
Incur debt through private activity bonds	
Withhold public expenditures in hazard-prone areas	
Other	

D.4) Community Classifications

Program	Classification	Date Classified
Community Rating System (CRS)	NP	N/A
Building Code Effectiveness Grading Schedule (BCEGS)	TBD	TBD
Public Protection	ICS 3	2015
Storm Ready	County	TBD
Firewise	NP	N/A

N/A = Not applicable. NP = Not participating. - = Unavailable. TBD = To Be Determined

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at http://www.isomitigation.com/ppc/0000/ppc0001.html
- The National Weather Service Storm Ready website at http://www.weather.gov/stormready/howto.htm
- The National Firewise Communities website at http://firewise.org/

Expanding on and Improving Existing Policies and Programs

By adopting updated codes, including fire, building and NFIP ordinances this jurisdiction will continue to improve their mitigation strategy. Furthermore, employing experts in land management and construction practices, in coordination with planners and engineers with understanding of natural hazards, the overall stratagem will continue to advance.

In addition, by participating in multi-jurisdictional training and radio interoperability, public safety agencies bolster their response capabilities. This, along with reinforcement from Annual Equipment Agreements with Oklahoma County, ensures continued improvement within the jurisdiction.

E.) PROPOSED HAZARD MITIGATION INITIATIVES

Note some of the identified mitigation initiatives in the table are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities.

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Maintain compliance with and good-standing in the NFIP including adoption and enforcement of floodplain management requirements (e.g. regulating all new and substantially improved construction in Special Hazard Flood Areas), floodplain identification and mapping, and flood insurance outreach to the community.	New & Existing	NFIP Compliance	Ongoing	Municipality (via Municipal Engineer/NFIP Floodplain Administrator) with support from OEM, ISO FEMA	High	Low - Medium	Local Budget	Ongoing	High
Conduct and facilitate community and public education and outreach for residents and businesses to include, but not be limited to, the following to promote and effect natural hazard risk reduction: • Provide and maintain links to the HMP website, and regularly post notices on the County/municipal homepage(s) referencing the HMP webpages. • Prepare and distribute informational letters to flood vulnerable property owners and neighborhood associations, explaining the availability of mitigation grant funding to mitigate their properties, and instructing them on how they can learn more and implement mitigation. • Use email notification systems and newsletters to better educate the public on flood insurance, the availability of mitigation grant funding, and personal natural hazard risk reduction measures. • Work with neighborhood associations, civic and business groups to disseminate information on flood insurance and the availability of mitigation grant funding.									

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
See above.	NA	Flood	Ongoing	Municipality with support from Planning Partners, OEM, FEMA	Low - Medium	Low - Medium	Municipal Budget; HMA programs with local or county match	Short	High
Archive elevation certificates	NA	NFIP Compliance	Ongoing	NFIP Floodplain Administrator	Low	Low	Local Budget	On-going	High
Increase the size of open channels to upgrade capacity at NW 39th St. and Rockwell Ave. to eliminate the likelihood of impassable streets after heavy rains		Flood	Planned	Community Development	High	High	HMGP, Bonds	Long term DOF	Medium
Revise a regulation to limit height of structures to reduce likelihood of neighboring structural damage in an earthquake		Earthquake	Planned	Community Development	High	Low	City Budget	Short	Medium
Install generators where critical city communication infrastructure exists (i.e. Police and Fire Dept.).		Dam Failure, Earthquake, Extreme Temps, Flood, Hail, Lightning, Wildfire, Wind (incl.	Planned	Police Dept.	High	Low	HMGP	Short	High

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Generators can be used to power items after a dam failure takes down poles, an earthquake shakes lines down, rolling blackouts during extreme temps, outages caused by floods, lightning, hail destroying power insulators, wildfires burning up poles, and ice taking down lines in winter storms.		Tornado), Winter Storm							
Purchase trailer park located in the SFHA at NW 50th St. and Peniel Ave. to ensure land becomes green space.		Flood	Planned	Community Development	High	High	Bond, City Budget	Short	Medium
Create and distribute dam failure, flood, drought, earthquake, expansive soil, extreme temperature, hail, lightning,		Dam Failure, Drought, Earthquake, Expansive Soil, Extreme Temps, Flood, Hail, Lightning, Wildfire, Wind	Ongoing	Community Development Director	High	Low	Storm water Mgmt. Fee	Ongoing	High

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
wildfire, winter storm mitigation educational newsletters to include in resident utility bills, on city website and public access TV graphics.		(incl. Tornado), Winter Storm							
Obtain a mass notification system with text message, phone and email capability to warn residents prior to hazards and actions to take/avoid after an incident.		Dam Failure, Drought, Earthquake, Extreme Temps, Flood, Hail, Lightning, Wildfire, Wind (incl. Tornado), Winter Storm	Planned	Fire Dept.	High	Medium (Annual renewal)	Utility Fee	Short	High
Enact a water rationing regulation for use during periods of drought.		Drought	Planned	Public Works	High	Low	City Budget	Short	High
Establish an agreement with OKC and establish connections to obtain water during drought		Drought	Planned	Public Works	High	High	City Budget	Short	Medium
Enact a regulation to require a check for expansive soils prior to		Expansive Soil	Planned	City Engineer	High	Medium	City Budget	Long	Low

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
building a city building and perform soil stabilization if expansive soils are found.									
Archive elevation certificates	N/A	NFIP Compliance	Ongoing	NFIP Floodplain Administrator	Low	Low	Local Budget	Ongoing	High
Install and/or Provide alternate fuel source for generators where critical city communication infrastructure exists (i.e. Police and Fire Dept.)		Earthquake, Extreme Temps, Flood, Hail, Lightning Wildfire, Wind (incl. Tornado), Winter Storm	New	Police Dept., Fire Dept, Public Works	High	Low	HMGP	Short	High
Purchase trailered generator that can be used as needed at critical city facilities		Earthquake, Extreme Temps, Flood, Hail, Lightning Wildfire, Wind (incl. Tornado), Winter Storm	New	Police Dept., Fire Dept, Public Works	High	Low	HMGP	Short	High
Maintain a water rationing regulation for use during periods of drought.		Drought	New	Public Works	High	Low	City Budget	Long	High
Maintain an agreement with OKC and maintain connections to		Drought	New	Public Works	High	High	City Budget	Long	Medium

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
obtain water during drought as needed									

Notes:
*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (NA) is inserted if this does not apply.

Costs:
Where actual project costs have been reasonably estimated:
Low = < $10,000
Medium = $10,000 to $100,000
High = > $100,000
Where actual project costs cannot reasonably be established at this time:
Low = Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium = Could budget for under existing work-plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High = Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:
Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:
Low = < $10,000
Medium = $10,000 to $100,000
High = > $100,000
Where numerical project benefits cannot reasonably be established at this time:
Low = Long term benefits of the project are difficult to quantify in the short term.
Medium = Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High = Project will have an immediate impact on the reduction of risk exposure to life and property.

Potential FEMA HMA Funding Sources:
PDM = Pre-Disaster Mitigation Grant Program
FMA = Flood Mitigation Assistance Grant Program
RFC = Repetitive Flood Claims Grant Program
SRL = Severe Repetitive Loss Grant Program
HMGP = Hazard Mitigation Grant Program

Timeline:
Short = 1 to 5 years. Long Term= 5 years or greater. OG = On-going program.
DOF = Depending on funding.

Explanation of Priorities

- ***High Priority*** - A project that meets multiple objectives (i.e., multiple hazards), benefits exceeds cost, has funding secured or is an on-going project and project meets eligibility requirements for the Hazard Mitigation Grant Program (HMGP) or Pre-Disaster Mitigation Grant Program (PDM) programs. High priority projects can be completed in the short term (1 to 5 years).

- ***Medium Priority*** - A project that meets goals and objectives, benefits exceeds costs, funding has not been secured but project is grant eligible under, HMGP, PDM or other grant programs. Project can be completed in the short term, once funding is completed. Medium priority projects will become high priority projects once funding is secured.

- ***Low Priority*** - Any project that will mitigate the risk of a hazard, benefits do not exceed the costs or are difficult to quantify, funding has not been secured and project is not eligible for HMGP or PDM grant funding, and time line for completion is considered long term (1 to 10 years). Low priority projects may be eligible other sources of grant funding from other programs. A low priority project could become a high priority project once funding is secured as long as it could be completed in the short term.

Prioritization of initiatives was based on above definitions: Yes

Prioritization of initiatives was based on parameters other than stated above: Not applicable.

F.) FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

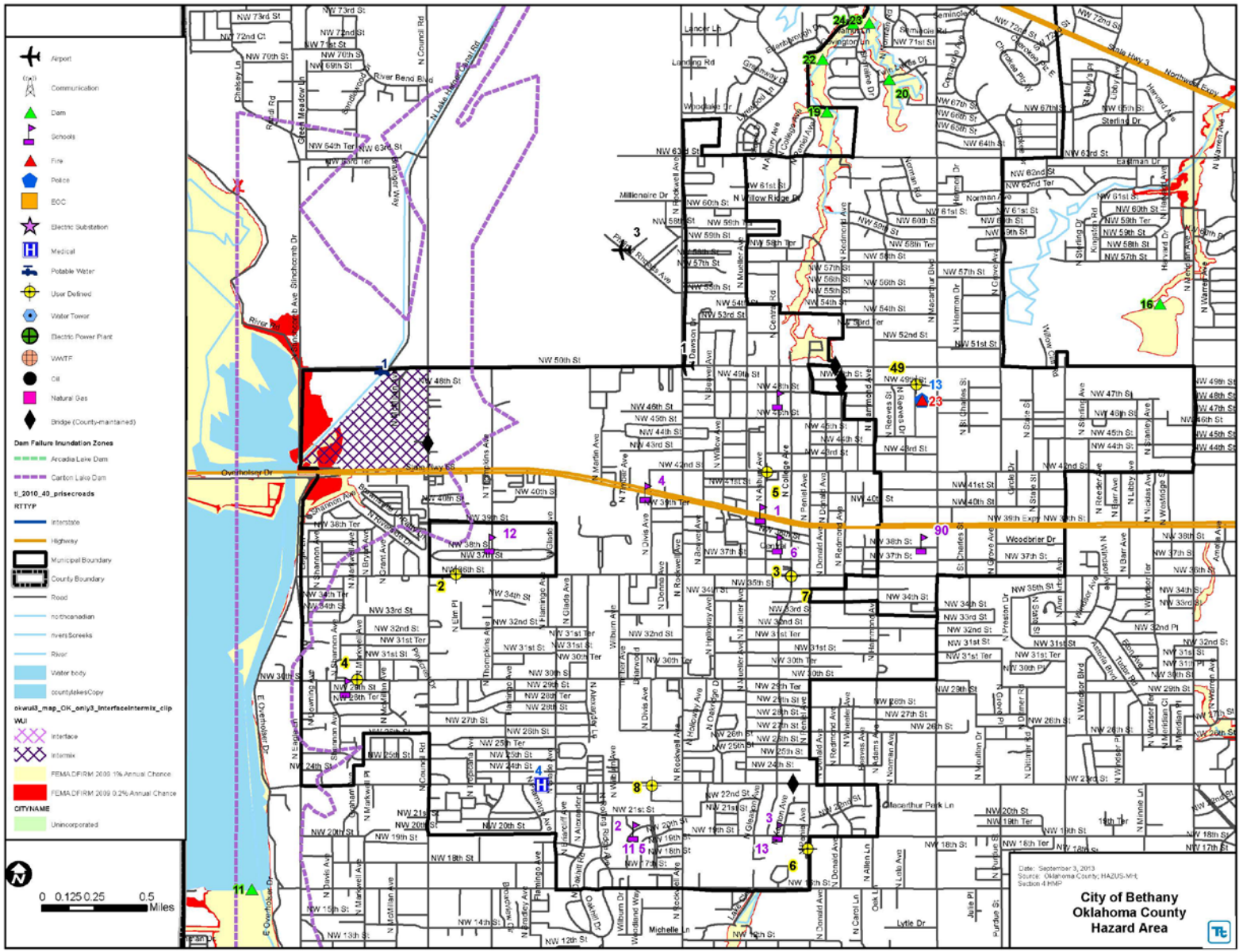
None at this time.

G.) HAZARD AREA EXTENT AND LOCATION

A hazard area extent and location map has been generated and is provided below for the City of Bethany to illustrate the probable areas impacted within the City of Bethany. This map is based on the best available data at the time of the preparation of this Plan, and is considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the City of Bethany has significant exposure.

H.) ADDITIONAL COMMENTS

No additional comments at this time.


Airport
Communication
Dam
Schools
Fire
Police
EOC
Electric Substation
Medical
Potable Water
User Defined
Water Tower
Electric Power Plant
WWTF
Oil
Natural Gas
Bridge (County-maintained)
Dam Failure Inundation Zones
Arcadia Lake Dam
Canton Lake Dam
ti_2010_40_prisecroads
RTTYP
Interstate
Highway
Municipal Boundary
County Boundary
Road
northcanadian
riverStreeks
River
Water body
countylakesCopy
okwui3_map_OK_only3_interfaceIntermix_clip
WUI
Interface
Intermix
FEMA DFIRM 2009 1% Annual Chance
FEMA DFIRM 2009 0.2% Annual Chance
CITYNAME
Unincorporated
0 0.125 0.25 0.5 Miles
City of Bethany
Oklahoma County
Hazard Area

9.4 CITY OF CHOCTAW

This section presents the jurisdictional annex for the City of Choctaw.

A.) HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact	Alternate Point of Contact
Loren Bumgarner, Fire Chief P.O. Box 567, Choctaw, OK 73020 (405) 390-8300 lbumgarner@choctawcity.org	Ed Brown, City Manager PO Box 567, Choctaw, OK 73020 (405) 390-8918 ebrown@choctawcity.org

B.) MUNICIPAL PROFILE

The City of Choctaw is located in the southeastern section of Oklahoma County. The City of Oklahoma City and the Town of Jones border the City to the north; the City of Harrah to the east; the City of Oklahoma City to the south; and the City of Midwest City to the west. The City of Choctaw has a total land area of 27.1 square miles, of which, 27.1 square miles is land and 0.04 square miles is water. The City is governed by a mayor and six member City Council. The 2010 U.S. Census population for the City of Choctaw was 11,146.

The City has low-lying areas that are subject to periodic flooding caused by overflow of the Choctaw Creek and its tributaries, along with the North Canadian River. The most severe flooding occurs upstream from roadways that restrict the flow. Flooding along the Creek has not caused extensive property damage; however, future development could increase the threat of flood problems.

Growth/Development Trends

Property Name	Type (Residential or Commercial)	Number of Structures	Address	Known Hazard Zone	Description/Status
	Residential	400	10th & Hiwassee	Flood, Fire	Plotted 400 Residential Addition
	Residential	800	36th & Choctaw Rd	Flood, Fire	Plotted 800 Residential Addition
Best Western	Commercial	1	Market & Dale Sterns	Flood, Fire	72 room hotel & Conference

Due to up-to-date NFIP, floodplain and building code enforcement, all developments within known hazard zones will bolster infrastructure to negate any additional flooding impacts to the City of Choctaw. A minor increase to the WUI wildfire risk is anticipated.

Past Mitigation Activity/Efforts

The following table summarizes progress on the mitigation strategy identified by the City of Choctaw in the 2013 plan.

Several projects from the 2013 Mitigation plan have been eradicated due to projects that did not use mitigation funds.

Abandoned Initiatives	Comments
Enact a regulation to require a check for expansive soils prior to building a city building and perform soil stabilization if expansive soils are found.	Per NRCS, no expansive soils are in the area.

Each initiative from the 2013 plan was reviewed going forward into this 2019 plan. Any initiatives that were completed or abandoned are stated below, while any new or ongoing initiatives will be found under the Proposed Hazard Mitigation Initiatives header of this section.

Further details on mitigation activities completed or ongoing in the City include:

- The City has taken advantage of the State Residential Safe Room (Sooner Safe) Rebate Program retrofit residences with safe rooms throughout the City

Hazard Vulnerabilities Identified

Hazard profiling, Section 5.3, has identified that the City of Choctaw is vulnerable to the following hazards of concern:

Hazard	Local Vulnerability	Comments
Dam Failure	Yes	Canton Lake, Overholser - See local hazard map end of section
Drought	Yes	
Earthquake	Yes	
Expansive Soils	No	Per NRCS map, no expansive soils present in this jurisdiction
Extreme Temperatures	Yes	
Flooding	Yes	See local hazard map end of section
Hail	Yes	
Lightning	Yes	
Wildfire	Yes	See local hazard map end of section
Wind (incl. tornado)	Yes	
Severe Winter Storm	Yes	

According to the City of Choctaw, the following have been identified as specific hazards:

- Choctaw Creek runs through a major area of the City. State Highway 62, or NE 23rd, is a four lane highway with commercial and residential areas that runs along the Creek. Choctaw Creek floods two to three times in a year, which the highway has to be shut down and some occupants have to be evacuated. The cause is the Creek fills with debris such as trees, brush, and sediment from other areas.

Vulnerability assessment modeling has identified the following flood vulnerabilities (see Flood Hazard Profile in Section 5.3):

Critical Facilities Located in the DFIRM Flood Boundaries and Estimated Potential Damage from the 100- and 500-Year MRP Events

Name	Municipality	Type	Exposure		Potential Loss			
			100-Yr	500-Yr	100-Yr Structure Damage %	100-Yr Content Damage %	500-Yr Structure Damage %	500-Yr Content Damage %
Choctaw City Hall	Choctaw (C)	User Defined		X	14.0	83.5	13.1	74.9

Source: FEMA, 2009;
Notes:
(1) 'X' indicates the facility location as provided by Oklahoma County's Planning Committee is located in the DFIRM flood zone.

C.) NATURAL HAZARD EVENT HISTORY SPECIFIC TO THE TOWN

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
June 8-10, 1974	Flooding	DR-441	Yes	
November 26, 1974	Flooding	DR-453	Yes	
October 17-19, 1983	Flooding	DR-693	Yes	
September 29 – October 1, 1986	Flooding	DR-778	Yes	
May 2, 1990	Flooding, Tornado	DR-866	Yes	
May 8, 1993	Tornadoes	DR-991	Yes	
June 9, 1993	Flash Flooding	N/A	N/A	
July 26 – August 2, 1995	Tornado, Flooding	DR-1066	Yes	
April 24-26, 1999	Flooding	N/A	N/A	NE 23rd Street was closed due to flooding.
May 3-4, 1999	Tornadoes, Flooding	DR-1272	Yes	
June 23, 1999	Flash Flooding	N/A	N/A	
October 21-29, 2000	Flooding	DR-1349	Yes	
May 30, 2001	Flooding	N/A	N/A	
September 7, 2001	Urban Flooding	N/A	N/A	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
August 11-12, 2004	Flash Flood	N/A	N/A	
January 1, 2006	Wildfires	DR-1623	No	All residents in the path of the wildfire were evacuated. Road within the affected area were closed. Sixty-eight homes were lost due to this wildfire.
March 12, 2006	Tornadoes	DR-1637	No	
December 28-30, 2006	Severe Winter Storm	DR-1677	No	
January 12-26, 2007	Severe Winter Storms	DR-1678	No	
March 29, 2007	Tornadoes	N/A	N/A	
May 4-11, 2007	Tornadoes, Flooding	DR-1707	No	
May 24, 2007 to June 1, 2007	Flooding, and Tornadoes	DR-1723	No	
June 10, 2007 to July 25, 2007	Flooding, and Tornadoes	DR-1712	Yes	
Aug. 18, 2007 to Sept. 12, 2007	Tornadoes, and Flooding	DR-1718	Yes	
Dec. 8, 2007 to Jan. 3, 2008	Severe Winter Storms	DR-1735	Yes	Snow plowing, salting and sanding of all main roads in the City; removal of large amount of debris
March 17-23, 2008	Tornadoes, Flooding	DR-1752	No	
March 22, 2008	Wildfire	N/A	N/A	
March 30-31, 2008	Severe Storms	N/A	N/A	
April 9-28, 2008	Tornadoes, Flooding	DR-1754	No	
April 30, 2008	Hail/Damaging Winds	N/A	N/A	
May 9, 2008	Flooding	DR-1754	No	
May 10-13, 2008	Tornadoes, Flooding	DR-1756	No	
June 3-20, 2008	Flooding	DR-1775	No	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
August 20, 2008	Flooding	N/A	N/A	
September 12-19, 2008	Tornadoes, Flooding	DR-1803	No	
February 10-11, 2009	Tornadoes	DR-1820	Yes	
March 24, 2009	Severe Storms	N/A	N/A	
March 26-27, 2009	Snow/Ice/Severe Storm	N/A	N/A	
March 30, 2009	Severe Storm	N/A	N/A	
April 9-12, 2009	Wildfires	DR-1846	Yes	All residents in the path of the wildfire were evacuated. Road within the affected area were closed. Eight homes were lost due to this wildfire.
May 13, 2009	Severe Storms	N/A	N/A	
December 24-25, 2009	Severe Winter Storm	DR-1876	No	Snow plowing, salting, and sanding of all main roads in the City
January 26-28, 2009	Severe Winter Storm	DR-1823	No	Yes
2010-2011	Severe Drought	N/A	N/A	
January 28-30, 2010	Severe Winter Storm	DR-1883	No	Snow plowing, salting, and sanding of all main roads in the City
Jan. 30-Feb. 9, 2010	Severe Winter Storm	N/A	N/A	
March 19, 2010	Severe Winter Storm	N/A	N/A	
2010-2011	Severe Drought	N/A	N/A	
May 10-13, 2010	Tornadoes, Straight-Line Winds	DR-1917	Yes	
May 16, 2010	Hail Storm	N/A	N/A	
May 19, 2010	Severe Storm	N/A	N/A	
June 13-15, 2010	Tornadoes, Straight-line Winds, and Flooding	DR-1926	Yes	Roads were barricaded due to flooding in the City; bridges and culverts had to be repaired as a result of this event

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
July 7-8, 2010	Flooding	N/A	N/A	
Oct. 13, 2010	Earthquake	N/A	N/A	
Jan. 31, 2011 to Feb. 5, 2011	Severe Winter Storm and Snowstorm	DR-1985	No	Snow Plowing, Salting, Sanding of all main roads in the City
March 11, 2011	Wildfires	N/A	N/A	Yes
April 14, 2011	Tornadoes, Straight-Line Winds	DR-1970	No	
April 21-28, 2011	Flooding	DR-1988	No	
May 22-25, 2011	Tornadoes, Straight-line Winds, and Flooding	DR-1989	No	
June-August 2011	Severe Heat	N/A	N/A	
November 6, 2011	Earthquake	N/A	N/A	5.6 magnitude earthquake near Prague; depth of 5.2 km
May 18 to Jun. 2, 2013	Severe Storms, Flooding	DR-4117	Yes	Major flooding, especially May 31-June 1. One of the worst in the metro's history.
December 01, 2013	Earthquake	N/A	N/A	4.5 magnitude earthquake near Arcadia Lake; depth of 8.4 km.
June 16, 2014	Earthquake	N/A	N/A	4.3 magnitude earthquake near Spencer; depth of 5.0 km.
June 18, 2014	Earthquake	N/A	N/A	4.1 magnitude earthquake near Spencer; depth 5.0 km
November 27-28, 2015	Winter Storm	DR-4247	Yes	Ice storm.
December 27-28, 2015	Winter Storm	DR-4256	No	Ice storm.
September 3, 2016	Earthquake	N/A	N/A	5.8 magnitude earthquake at Pawnee; depth of 5.4 km

Number of FEMA Identified Repetitive Flood Loss Properties: 0
Number of FEMA Identified Severe Repetitive Flood Loss Properties: 0

Source: Oklahoma Water Resources Board (OWRB)

Wildfire History for Choctaw
Acres may include loss from wildland, grass, brush, crop, orchard and nursery fires.

	Loss	Acres
2018	$1,700	10.2
2017	$322,500	14.8
2016	$0	15.5
2015	$0	34.3
2014	$0	28.7
2013	$0	1.1
2012	$0	18.0
2011	$0	268.1
2010	$0	2412.0
2009	$0	84.3
2008	$15,000	116.0
2007	$0	30.0
2006	$0	61.0
2005	$0	5562.0
2004	$0	5.0
TOTAL LOSS	**$339,200**	**8,660.9**

Source: Oklahoma State Fire Marshal's office

D.) CAPABILITY ASSESSMENT

This section identifies the following mitigation capabilities within Unincorporated Oklahoma County:

- Legal and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Community classification.

D.1) Legal and Regulatory Capability

Regulatory Tools (Codes, Ordinances., Plans)	Do you have this? (Y or N)	Code Citation (Section, Paragraph, Page Number, Date of adoption)	HM Plan integration into plan	Update cycle	Party(s) responsible for updating document
Building Code	Y	Adopted 2015 IBC			
Comprehensive / Master Plan	Y	Approved by council 2015	Yes	Annual	City Council/Manager
Zoning Management Ordinance	Y	Section 12, Chapters 2 and 3			

Regulatory Tools (Codes, Ordinances., Plans)	Do you have this? (Y or N)	Code Citation (Section, Paragraph, Page Number, Date of adoption)	HM Plan integration into plan	Update cycle	Party(s) responsible for updating document
Subdivision Management Ordinance	Y	Section 19, Ordinance 19-103			
Site Plan Review Requirements	Y	Section 5, Ordinance 5-107			
NFIP Flood Damage Prevention Ordinance	Y	Section 18, Chapter 2, Ordinance 18-101			
NFIP Elevation Certificates Maintained	Y	Section 18, Ordinance 18-222			
Floodplain Management Plan	Y		Yes	Not scheduled	Flood Plain Admin/City Manager
Stormwater Management Plan / Ordinance	Y	Section 17, Chapter 3			
Stream Corridor Management or Protection Plan	N				
Erosion Management Ordinance	Y	Section 18, Ordinance 18-414			
Capital Improvements Plan	Y				
Open Space Plan	N				
Economic Development Plan	Y	CEDP	Yes	Not scheduled	Development services committee
Emergency Response Plan	Y	County Plan		Not scheduled	
Post Disaster Recovery Plan / Ordinance	N				
Real Estate Disclosure Requirements	N				
Highway Management Plan	N				
COOP/COG Plan	Y	Members of ACOG	No	Not scheduled	City Manager & City Council
Other (Special Purpose Ordinances such as critical or sensitive areas)					

Additionally, any change in ordinances happens at the behest of local government bodies, state legislation or court actions and are not on a scheduled reoccurring basis.

D.2) Administrative and Technical Capability

Staff/ Personnel Resources	Available (Y or N)	Department/ Agency/ Position
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Y	1 City Engineer, 1 City Planner
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Y	1 City Engineer
Planners or engineers with an understanding of natural hazards	Y	1 City Engineer, 1 City Planner
NFIP Floodplain Administrator	Y	1 City Engineer
Surveyor(s)	N	
Personnel skilled or trained in “GIS” applications	Y	1 City Engineer, 1 City Planner
Scientist(s) familiar with natural hazards in the County.	N	
Emergency Manager	Y	1 Emergency Director
Grant Writer(s)	Y	
Staff with expertise or training in benefit/cost analysis	N	

D.3) Fiscal Capability

Financial Resources	Accessible or Eligible to use (Yes/No/Don’t know)
Community Development Block Grants (CDBG)	Yes
Capital Improvements Project Funding	Yes (one cent sales tax)
Authority to Levy Taxes for specific purposes	Yes (City Council)
User fees for water, sewer, gas or electric service	Yes (Water and Sewer)
Impact Fees for homebuyers or developers of new development/homes	Yes
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	Yes
Incur debt through private activity bonds	Yes
Withhold public expenditures in hazard-prone areas	No
Other	

D.4) Community Classifications

Program	Classification	Date Classified
Community Rating System (CRS)	NP	N/A
Building Code Effectiveness Grading Schedule (BCEGS)	TBD	TBD
Public Protection	TBD	TBD
Storm Ready	County	TBD
Firewise	Y	N/A

N/A = Not applicable. NP = Not participating. - = Unavailable. TBD = To Be Determined

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at http://www.isomitigation.com/ppc/0000/ppc0001.html
- The National Weather Service Storm Ready website at http://www.weather.gov/stormready/howto.htm
- The National Firewise Communities website at http://firewise.org/

Expanding on and Improving Existing Policies and Programs

By adopting updated codes, including fire, building and NFIP ordinances this jurisdiction will continue to improve their mitigation approach. Furthermore, employing experts in land management and construction practices, in coordination with planners and engineers with understanding of natural hazards, the overall stratagem will continue to advance.

In addition, by participating in multi-jurisdictional training and radio interoperability, public safety agencies bolster their response capabilities. This, along with reinforcement from Annual Equipment Agreements with Oklahoma County, ensures continued improvement within the jurisdiction.

Moreover, this jurisdiction participates in Wildland Automatic Response (or WAR – an automatic mutual aid agreement during high wildland hazard days). This ensures a greater response to wildland fires.

E.) PROPOSED HAZARD MITIGATION INITIATIVES

Note some of the identified mitigation initiatives in the table are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities.

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Removal of debris (trees, brush, trash and sediment) from miles of Choctaw Creek. This will allow the Creek to flow better. This project will be implemented as part of anticipated commercial development plans. This project may be done in conjunction with Oklahoma County to reduce or eliminate flooding over a larger area.	N/A	(Non Mitigation)	Ongoing	DPW, with County Support	Medium (reduced or eliminated local flooding)	High	Local Budgets, HMGP	Short	High
Conduct and facilitate community and public education and outreach for residents and businesses to include, but not be limited to, the following to promote and effect natural hazard risk reduction: • Provide and maintain links to the HMP website, and regularly post notices on the County/municipal homepage(s) referencing the HMP webpages. • Prepare and distribute informational letters to flood vulnerable property owners and neighborhood associations, explaining the availability of mitigation grant funding to mitigate their properties, and instructing them on how they can learn more and implement mitigation. • Use email notification systems and newsletters to better educate the public on flood insurance, the availability of mitigation grant funding, and personal natural hazard risk reduction measures. • Work with neighborhood associations, civic and business groups to disseminate information on flood insurance and the availability of mitigation grant funding.									

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
See above.	NA	Flood	Ongoing	Municipality with support from Planning Partners, OEM, FEMA	Low - Medium	Low - Medium	Municipal Budget; HMA programs with local or county match	Short	High
Archive elevation certificates	NA	NFIP Compliance	Ongoing	NFIP Floodplain Administrator	Low	Low	Local Budget	On-going	High
Working with MWC to mitigate the flooding at SE 15th & Hiwassee. The culvert needs to be replaced and enlarged. Areas downstream will need to be address.	Existing	Flood	New	City Engineering, ODOT, Storm Water Management	High	High	HMGP	Long	Medium
Choctaw Creek from Hiwassee to Triple X floods (including Hwy 62) and needs to be maintained to include cleaning of debris, rip-rap put in place on bridges and wash out areas. Recent commercial development in the area may add to the problems.	Existing	Flood	New	City Engineering, ODOT, Storm Water Management, Army Corps.	High	High	City Budget, HMGP	Short	High

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Replacement of culvert at 400 block of Choctaw Rd. with concrete box type culvert due to weight limits and to reduce local flooding	Existing	Flood	New	City Engineering, ODOT, Storm Water Management	High	Medium	City, HMGP	Long	Low
Distribute All-Hazard Weather Radios to senior centers, and high risk residents		Dam Failure, Drought, Earthquake, Extreme Temperatures, Flood, Hail, Lightning, Wildfire, Wind (incl. Tornado), Winter Storms	Ongoing	Emergency Management	High	Low	HMGP, City budget	Long	Low
Create mitigation education pamphlets and distribute at booths during large public events and at public city venues.		Dam Failure, Drought, Earthquake, Extreme Temperatures, Flood, Hail, Lightning, Wildfire, Wind (incl. Tornado), Winter Storms	Ongoing	Emergency Management	High	Low	HMGP, City budget	Long	Low
Educate students at schools on how to mitigate against flooding, hail, high winds (including tornadoes) and lightning and be better prepared		Flood, Hail, Lightning, Wind (incl. Tornado)	Ongoing	Emergency Management	Medium	Low	City budget	Long	Low

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
for storm season.									

Notes:
*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (NA) is inserted if this does not apply.

Costs:
Where actual project costs have been reasonably estimated:
Low = < $10,000
Medium = $10,000 to $100,000
High = > $100,000
Where actual project costs cannot reasonably be established at this time:
Low = Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium = Could budget for under existing work-plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High = Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:
Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:
Low = < $10,000
Medium = $10,000 to $100,000
High = > $100,000
Where numerical project benefits cannot reasonably be established at this time:
Low = Long term benefits of the project are difficult to quantify in the short term.
Medium = Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High = Project will have an immediate impact on the reduction of risk exposure to life and property.

Potential FEMA HMA Funding Sources:
PDM = Pre-Disaster Mitigation Grant Program
FMA = Flood Mitigation Assistance Grant Program
RFC = Repetitive Flood Claims Grant Program
SRL = Severe Repetitive Loss Grant Program
HMGP = Hazard Mitigation Grant Program

Timeline:
Short = 1 to 5 years. Long Term= 5 years or greater. OG = On-going program.
DOF = Depending on funding.

Explanation of Priorities

- ***High Priority*** - A project that meets multiple objectives (i.e., multiple hazards), benefits exceeds cost, has funding secured or is an on-going project and project meets eligibility requirements for the Hazard Mitigation Grant Program (HMGP) or Pre-Disaster Mitigation Grant Program (PDM) programs. High priority projects can be completed in the short term (1 to 5 years).

- ***Medium Priority*** - A project that meets goals and objectives, benefits exceeds costs, funding has not been secured but project is grant eligible under, HMGP, PDM or other grant programs. Project can be completed in the short term, once funding is completed. Medium priority projects will become high priority projects once funding is secured.

- ***Low Priority*** - Any project that will mitigate the risk of a hazard, benefits do not exceed the costs or are difficult to quantify, funding has not been secured and project is not eligible for HMGP or PDM grant funding, and time line for completion is considered long term (1 to 10 years). Low priority projects may be eligible other sources of grant funding from other programs. A low priority project could become a high priority project once funding is secured as long as it could be completed in the short term.

Prioritization of initiatives was based on above definitions: Yes

Prioritization of initiatives was based on parameters other than stated above: Not applicable.

F.) FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

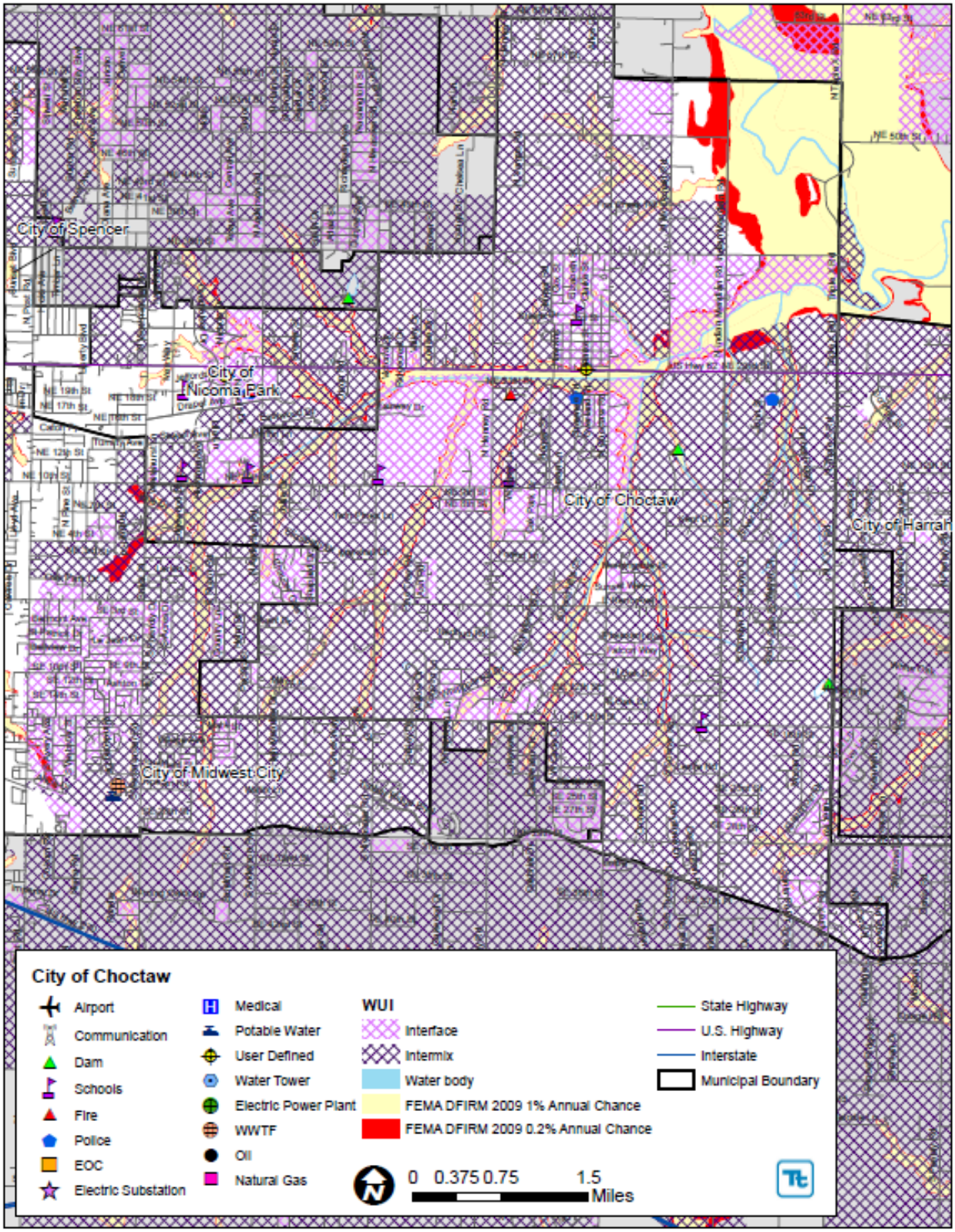
None at this time.

G.) HAZARD AREA EXTENT AND LOCATION

A hazard area extent and location map has been generated and is provided below for the City of Choctaw to illustrate the probable areas impacted within the City of Choctaw. This map is based on the best available data at the time of the preparation of this Plan, and is considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the City of Choctaw has significant exposure.

H.) ADDITIONAL COMMENTS

No additional comments at this time.


City of Spencer
City of Nicoma Park
City of Choctaw
City of Harrah
City of Midwest City
City of Choctaw
Airport
Communication
Dam
Schools
Fire
Police
EOC
Electric Substation
Medical
Potable Water
User Defined
Water Tower
Electric Power Plant
WWTF
Oil
Natural Gas
WUI
Interface
Intermix
Water body
FEMA DFIRM 2009 1% Annual Chance
FEMA DFIRM 2009 0.2% Annual Chance
State Highway
U.S. Highway
Interstate
Municipal Boundary
0 0.375 0.75 1.5
Miles

9.5 CITY OF DEL CITY

This section presents the jurisdictional annex for the City of Del City.

A.) HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact	Alternate Point of Contact
Brandon Pursell, Fire Chief Del City Fire Department 2800 Epperly Dr., Del City, OK 73115 (405) 671-2891 dcfd103@sbcglobal.net bpursell@cityofdelcity.org	Monica Cardin City Planner/Community Services Department 3701 SE 15th Street, Del City, OK 73115 (405) 671-2815 mcardin@cityofdelcity.org

B.) MUNICIPAL PROFILE

The City of Del City is located in the southwestern section of Oklahoma County and is part of the Oklahoma City metropolitan area. The City is bordered to the north, south and west by Oklahoma City, and to the east Midwest City. The City of Del City has a total land area of 7.5 square miles, all of it land. The City is governed by a mayor and a four member City Council. The 2010 U.S. Census population for the City of Del City was 21,332.

Del City is situated at the bottom of two major drainage basins. A large amount of stormwater conveyed through the City originates in areas outside of the City's control. The City has 1,354 parcels in the NFIP Special Flood Hazard Area, with 2 NFIP Repetitive Loss properties. Flooding in the City is mainly caused by the Crutcho and Cherry Creeks. Areas where natural and man-made obstructions in the floodplains have an increased severity of flooding. (FEMA FIS - 2009)

Known or Anticipated Future Development

The following table summarizes major residential/commercial development and major infrastructure development that are identified for the next five (5) years in the City. Refer to the map at the end of this annex which illustrates the hazard areas along with the location of potential new development.

Property Name	Type (Residential or Commercial)	Number of Structures	Address	Known Hazard Zone	Description/Status
I-40 and Sooner	Commercial	12-20	5300-5500 Main Street	Flooding	Crutcho Creek and Crutcho Creek Tributary B: Remediated Using Public Funding and LOMR Approved
Metropolitan Library	Public Library	1	15th & Sunny Ln		Preliminary stages
John Smith Sports Complex	Public	Unknown	4500 Reno		Adding to Ray Tent Park
I-40 and Scott	Commercial	Unknown	Tinker Diagonal St & S. Scott Street	Flooding	Crooked Oak Creek: Public Funding Approved for Remediation as part of TIF District

Property Name	Type (Residential or Commercial)	Number of Structures	Address	Known Hazard Zone	Description/Status
Large Home Residential	Residential	900	South of SE 29th Street between S Sunnylane Rd and Bryant Ave.	Flooding	Cherry Creek

Though some of these future development sites are being developed within known hazard zones, due to infrastructure augmentation and up-to-date NFIP & floodplain code enforcement, these developments do not impact the overall flooding potential within Del City. A slight decrease to the WUI is expected as it will cover an undeveloped urban area.

Past Mitigation Activity/Efforts

Each initiative from the 2013 plan was reviewed going forward into this 2019 plan. Any initiatives that were completed or abandoned are stated below, while any new or ongoing initiatives will be found under the Proposed Hazard Mitigation Initiatives header of this section.
The following table summarizes progress on the mitigation strategy identified by the City of Del City in the 2013 plan.

Completed 2013 Initiative Description	Status
Brookdale Channel – Repair channel north of SE 15th (carried over from 2006 plan)	Completed
Oakbrook I – Rehabilitate Oakbrook Channel from Woodview to SE 29th Street (carried over from 2006 plan)	Completed
Lariet Lane Flood Remediation – a) capture storm water coming off Cemetery property south of SE 29th Street and divert to detention then to Cherry Creek, b) install storm sewer along Lariet Lane to capture remaining storm water and conduct to Cherry Creek.	Completed
Judy/Howard/Leslie Storm Sewer Project – Install and upgrade storm sewers in the areas of these three roads.	Completed
Adopt 2013 building code and enforce through city inspector	Completed
Expand current city siren system with private and public mass notification system.	Completed
Construct new public works administration building to address flood vulnerability by relocation.	Completed
Implement property maintenance codes to require residential supplemental grounding.	Completed
Adopt and implement the 2012 Urban Wildland Interface code, including updated Urban Wildland Interface maps.	Completed
Install generator for backup power systems for POTW wells and system. Generators can be used to power items after a dam failure takes down poles, an earthquake shakes lines down, rolling blackouts during extreme temps, outages caused by floods, lightning, hail destroying power insulators, wildfires burning up poles, and ice taking down lines in winter storms.	Completed

Completed 2013 Initiative Description	Status
Adopted higher regulatory standards to manage flood risk (i.e. increased freeboard, cumulative substantial damage/improvements)	Completed

Hazard Vulnerabilities Identified

Hazard profiling, Section 5.3, has identified that the City of Del City is vulnerable to the following hazards of concern:

Hazard	Local Vulnerability	Comments
Dam Failure	Yes	Canton Lake, Overholser - See local hazard map end of section
Drought	Yes	
Earthquake	Yes	
Expansive Soils	Yes	
Extreme Temperatures	Yes	
Flooding	Yes	See local hazard map end of section
Hail	Yes	
Lightning	Yes	
Wildfire	Yes	See local hazard map end of section
Wind (incl. tornado)	Yes	
Severe Winter Storm	Yes	

According to the City of Del City, the following have been identified as specific hazard vulnerabilities in the City:

Repetitive street flooding on Del View Drive and Hampton Drive.
The Oakbrook channel can flood from Woodview to SE 29th.
The Brookdale channel can flood north of SE 15th St.
The Cherry Creek channel in the Hartsdel Addition is subject to backup and flooding after heavy rain.
Flooding on Lariet Lane occurs due to lack of sufficient drainage.
Crutcho Creek appears to have a faulty gate under SW 29th St.
Street and residential flooding can occur at NE 10th and Sunnylane after heavy rains.
A few residents and businesses are in the SFHA near the North Canadian River.

Vulnerability assessment modeling has identified the following flood vulnerabilities (see Flood Hazard Profile in Section 5.3.6):

Critical Facilities Located in the DFIRM Flood Boundaries and Estimated Potential Damage from the 100- and 500-Year MRP Events

Name	Municipality	Type	Exposure		Potential Loss			
			100-Yr	500-Yr	100-Yr Structure Damage %	100-Yr Content Damage %	500-Yr Structure Damage %	500-Yr Content Damage %
Del City Fire Department #2	Del City (C)	Fire	X	X	-	-	0.1	0.1

Source: FEMA, 2009

Utilities Located in the Preliminary DFIRM Flood Boundaries and Estimated Potential Damage from the 100- and 500-Year MRP Events

Name	Municipality	Type	Exposure		Potential Loss	
			100 Year	500 Year	100 Year Damage %	500 Year Damage %
Wastewater Treatment Complex*	Del City (C)	WWTF	X	X	23.2	29.9

*Facility has no history of flooding.
Source: FEMA, 2009;
Notes:

(1) 'X' indicates the facility location as provided by Oklahoma County's Planning Committee is located in the DFIRM flood zone.

C.) NATURAL HAZARD EVENT HISTORY SPECIFIC TO THE CITY

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
June 8-10, 1974	Flooding	DR-441	Yes	
November 26, 1974	Flooding	DR-453	Yes	
October 17-19, 1983	Flooding	DR-693	Yes	
September 29 – October 1, 1986	Flooding	DR-778	Yes	
May 2, 1990	Flooding, Tornado	DR-866	Yes	
May 8, 1993	Tornadoes	DR-991	Yes	
June 9, 1993	Flash Flooding	N/A	N/A	
July 26 – August 2, 1995	Tornado, Flooding	DR-1066	Yes	
April 24-26, 1999	Flooding	N/A	N/A	
May 3-4, 1999	Tornadoes, Flooding	DR-1272	Yes	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
June 23, 1999	Flash Flooding	N/A	N/A	
October 21-29, 2000	Flooding	DR-1349	Yes	
May 30, 2001	Flooding	N/A	N/A	
September 7, 2001	Urban Flooding	N/A	N/A	
August 11-12, 2004	Flash Flood	N/A	N/A	
January 1, 2006	Wildfires	DR-1623	No	
March 12, 2006	Tornadoes	DR-1637	No	
December 28-30, 2006	Severe Winter Storm	DR-1677	No	
January 12-26, 2007	Severe Winter Storms	DR-1678	No	
March 29, 2007	Tornadoes	N/A	N/A	
May 4-11, 2007	Tornadoes, Flooding	DR-1707	No	
May 24, 2007 to June 1, 2007	Flooding, Tornadoes	DR-1723	No	
June 10, 2007 to July 25, 2007	Flooding, and Tornadoes	DR-1712	Yes	
Aug. 18, 2007 to Sept. 12, 2007	Tornadoes, and Flooding	DR-1718	Yes	
Dec. 8, 2007 to Jan. 3, 2008	Severe Winter Storms	DR-1735	Yes	There were 446 fire responses associated with this event; over 458 hours in overtime for fire department personnel; total of $22,299 associated with life safety efforts; many residents without power; downed power lines; many homes and public property experienced damages; roadways required plowing, sanding and salting. The City maintains detailed records of damages, outages and municipal costs from this event.
March 17-23, 2008	Tornadoes, and Flooding	DR-1752	No	
March 22, 2008	Wildfire	N/A	N/A	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
March 30-31, 2008	Severe Storms	N/A	N/A	
April 9-28, 2008	Tornadoes, and Flooding	DR-1754	No	
April 30, 2008	Hail/Damaging Winds	N/A	N/A	
May 9, 2008	Floods	DR-1754	No	
May 10-13, 2008	Tornadoes, and Flooding	DR-1756	No	
June 3-20, 2008	Flooding	DR-1775	No	
August 20, 2008	Flooding	N/A	N/A	
September 12-19, 2008	Tornadoes, and Flooding	DR-1803	No	
January 26-28, 2009	Severe Winter Storm	DR-1823	No	
February 10-11, 2009	Tornadoes	DR-1820	Yes	
March 24, 2009	Severe Storms	N/A	N/A	
March 26-27, 2009	Snow/Ice/Severe Storm	N/A	N/A	
March 30, 2009	Severe Storm	N/A	N/A	
April 9-11, 2009	Wildfires	DR-1846	Yes	Fire personnel and equipment were used to contain and extinguish wildfires The City has detailed records documenting impacts and over $10,000 in municipal expenses.
May 13, 2009	Severe Storms	N/A	N/A	
December 24-29, 2009	Severe Winter Storm	DR-1876	No	Downed power lines and trees, causing power outages and road closures; roadways required plowing, salting and sanding The City has detailed records documenting impacts and over $28,000 in municipal expenses.
2010-2011	Severe Drought	N/A	N/A	
January 28-30, 2010	Severe Winter Storm	DR-1883	No	
Jan. 30-Feb. 9, 2010	Severe Winter Storm	N/A	N/A	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
March 19, 2010	Severe Winter Storm	N/A	N/A	
May 10-13, 2010	Tornadoes, and Straight-Line Winds	DR-1917	Yes	
May 16, 2010	Hail Storm	N/A	N/A	
May 19, 2010	Severe Storm	N/A	N/A	
June 13-15, 2010	Tornadoes, Straight-line Winds, and Flooding	DR-1926	Yes	Roads and intersections were closed due to flooding; residential and commercial properties had damage due to flooding; debris removal from roadways and culverts. The City has detailed records documenting impacts and over $27,000 in municipal expenses.
July 7-8, 2010	Flooding	N/A	N/A	
Oct. 13, 2010	Earthquake	N/A	N/A	
Jan. 31, 2011 to Feb. 5, 2011	Severe Winter Storm and Snowstorm	DR-1985	No	Road closures and power outages; roadways required plowing, sanding and salting; schools, businesses and public offices were closed. The City has detailed records documenting impacts and over $37,000 in municipal expenses.
April 14, 2011	Tornadoes, and Straight-Line Winds	DR-1970	No	
April 21-28, 2011	Flooding	DR-1988	No	
May 22-25, 2011	Tornadoes, Straight-line Winds, and Flooding	DR-1989	No	
June-August 2011	Severe Heat	N/A	N/A	
November 6, 2011	Earthquake	N/A	N/A	5.6 magnitude earthquake near Prague; depth of 5.2 km
May 31, 2013	Wind/Flood	DR-4117	Yes	Minor flooding to residential and apartment buildings. Tributary backed up into private property causing minor damage.
May 5-10, 2015	Flood	DR-4222	Yes	Over this time, a total of 11.61" rain reported at Will Rogers Airport. Southern parts of Oklahoma County saw the greatest rainfall. Del City experienced flooded roadways.
November 27-28, 2015	Winter Storm	DR-4247	Yes	Ice storm.
December 27-28, 2015	Winter Storm	DR-4256	No	Ice Storm with widespread power outages, including the Del City area.

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
September 3, 2016	Earthquake	N/A	N/A	5.8 magnitude earthquake at Pawnee; depth of 5.4 km

Number of FEMA Identified Repetitive Flood Loss Properties: 2 residential
Number of FEMA Identified Severe Repetitive Flood Loss Properties: 0
Source: Repetitive Loss info from City of Del City Community Services

Wildfire History for Del City

Acres may include loss from wildland, grass, brush, crop, orchard and nursery fires.
*A significant fire occurred in neighboring Midwest City in 2009, with mutual aid costs not listed here.

	Loss	Acres
2018	N/A	N/A
2017	$20	2.6
2016	$85	1.1
2015	$0	1.0
2014	$257	101.1
2013	$0	0.0
2012	$1,154	5.1
2011	$1,210	30.0
2010	$0	0.0
2009	$0*	0.0*
2008	$7,796	3.0
2007	$1,183	0.0
2006	$514	0.0
2005	$2,295	9.0
2004	$269	0.0
TOTAL LOSS	**$14,783**	**152.9**

Source: Oklahoma State Fire Marshal's office

D.) CAPABILITY ASSESSMENT

This section identifies the following mitigation capabilities within Unincorporated Oklahoma County:

- Legal and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Community classification.

D.1) Legal and Regulatory Capability

Regulatory Tools (Codes, Ordinances., Plans)	Do you have this? (Y or N)	Code Citation (Section, Paragraph, Page Number, Date of adoption)
Building Code	Yes	2015
Comprehensive / Master Plan	Yes	Currently Under Revision
Zoning Management Ordinance	Yes	Appendix A- Del City Code
Subdivision Management Ordinance	Yes	Included in the Zoning Ordinance
Site Plan Review Requirements	Yes	Included in the Zoning Ordinance
NFIP Flood Damage Prevention Ordinance	Yes	Higher Standards Ordinance 2009
NFIP Elevation Certificates Maintained	Yes	
Floodplain Management Plan	Yes	
Stormwater Management Plan / Ordinance	Yes	2011 - Ordinance 1344
Stream Corridor Management or Protection Plan	No	
Erosion Management Ordinance	Yes	2011 - Ordinance 1344
Capital Improvements Plan	Yes	Yes
Open Space Plan	No	
Economic Development Plan	No	
Emergency Response Plan	Yes	
Post Disaster Recovery Plan / Ordinance	Yes	
Real Estate Disclosure Requirements	Yes	State Requirements
Highway Management Plan	No	
COOP/COG Plan	Yes	Included in Disaster Plan
Other (Special Purpose Ordinances such as critical or sensitive areas)	Yes	Drainage/Detention Ordinance/Airport Overlays/Accident Protection Zones

Del City has reports no integration of the HM Plan with the above documents. Additionally, any change in ordinances happens at the behest of local government bodies, state legislation or court actions and are not on a scheduled reoccurring basis.

D.2) Administrative and Technical Capability

Staff/ Personnel Resources	Available (Y or N)	Department/ Agency/ Position
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Yes	Community Services/Del City/Director, Planner
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Yes	Community Services/Del City/Director, Chief Building Inspector, Building Inspector
Planners or engineers with an understanding of natural hazards	Yes	Community Services/Del City/Director and Planner
NFIP Floodplain Administrator	Yes	Monica Kynaston, City Planner
Surveyor(s)	No	
Personnel skilled or trained in "GIS" applications	Yes	Community Services/Del City/Director and Planner
Scientist(s) familiar with natural hazards in the County.	No	
Emergency Manager	Yes	Fire Chief Pursell
Grant Writer(s)	No	Fire Department/ Police Department/Community Service Staff
Staff with expertise or training in benefit/cost analysis	Yes	Community Services/Del City/Director, Planner

D.3) Fiscal Capability

Financial Resources	Accessible or Eligible to use (Yes/No/Don't know)
Community Development Block Grants (CDBG)	Not Generally
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for specific purposes	Yes
User fees for water, sewer, gas or electric service	Yes, Stormwater Utility
Impact Fees for homebuyers or developers of new development/homes	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	Yes
Incur debt through private activity bonds	Yes - TIF
Withhold public expenditures in hazard-prone areas	No
Other	Development Grants

D.4) Community Classifications

Program	Classification	Date Classified
Community Rating System (CRS)	6	5/1/2017
Building Code Effectiveness Grading Schedule (BCEGS)	4	2016
Public Protection	4	12-10-10
Storm Ready	City and County	12-17-09
Firewise	TBD	TBD

N/A = Not applicable. NP = Not participating. - = Unavailable. TBD = To Be Determined

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at http://www.isomitigation.com/ppc/0000/ppc0001.html
- The National Weather Service Storm Ready website at http://www.weather.gov/stormready/howto.htm
- The National Firewise Communities website at http://firewise.org/

Expanding on and Improving Existing Policies and Programs

By adopting updated codes, including fire, building and NFIP ordinances this jurisdiction will continue to improve their mitigation approach. Furthermore, employing experts in land management and construction practices, in coordination with planners and engineers with understanding of natural hazards, the overall stratagem will continue to advance.

In addition, by participating in multi-jurisdictional training and radio interoperability, public safety agencies bolster their response capabilities. This, along with reinforcement from Annual Equipment Agreements with Oklahoma County, ensures continued improvement within the jurisdiction.

E.) PROPOSED HAZARD MITIGATION INITIATIVES

Note some of the identified mitigation initiatives in Table F are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities.

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Brookdale Channel – Repair channel north of SE 15th	Existing	Flood	Planned	Community Services	High – reduced local flooding due to improved conveyance	High (est. $225,00)	TBD, some local funds available	Ongoing	Medium
City Wide Flood Prevention – Replace broken drop boxes and channel lining city wide	Existing	Flood	Planned	Community Services	High – reduced local flooding due to improved conveyance	High (est. $450,00)	Local Funding	Ongoing	High (critical)
Oakbrook Channel – Streambank Stabilization		Flood	Planned	Community Services		High	HMGP or city funds	Long	Medium
Install lightning protection at WWTP.	Existing	Lightning	Planned	Public Works	Medium – continuity of operations	Medium	City Budget	Short	High
Remove an apparently faulty flap gate on Crutcho Creek under SW 29th Street.	Existing	Flood	Planned	Community Services	Medium – High May reduce local flooding and risk of undermining of SW 29th Street Bridge	Low-Medium	FEMA (through Risk Map)	Short	High
Address flooding issues in the area of NE 10th and Sunnylane, which may involve acquisition.	Existing	Dam Failure, Flood	Planned	Community Services	High – reduced local flooding to structures and infrastructure	High - ~$1.5MM	HMGP funding; EPA 206 funding	Long	Low
Address flooding issues in the area of NE 10th and Sunnylane, which	New and Existing	Dam Failure, Flood	Planned	Community Services	High – reduced local flooding to	High - ~$1.5MM	HMGP funding; EPA 206	Long	Low

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
may involve construction of stormwater detention.					structures and infrastructure		funding		
Create a Residential Safe Room Rebate Program	Existing	Wind (incl. Tornado)	Planned	City EM with County and State OEM support	High – Public Safety, reduced reliance on public storm shelters	Medium	HMGP	Long	Low
Install backup generators at the following facilities: • Police Department • City Hall with EOC inside • New Fire Station • Wells (portable) • Fire Department 1/Community Center	Existing	Flooding, Earthquake, Extreme Temps, Flooding, Hail, Lightning, Wildfire, Wind (incl. Tornado), Winter Storm	Ongoing	City EM / Fire Department	Essential City Functions maintained	High	HMGP and Local Budget	Ongoing	High
Purchase, or relocate structures located in hazard-prone areas to protect structures from future damage, with repetitive loss and severe repetitive loss properties as priority. Specifically identified are the following: Properties along the North Canadian River Phase 1: Identify appropriate candidates for relocation based on cost-effectiveness versus retrofitting.	Existing	Flood	Ongoing	Municipality (via Municipal Engineer/NFIP Floodplain Administrator) with support from OEM, FEMA	High	High	FEMA Mitigation Grant Programs and local budget (or property owner) for cost share	Long-term DOF	Medium-High*

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Phase 2: Where relocation is determined to be a viable option, work with property owners toward implementation of that action based on available funding from FEMA and local match availability.									
Maintain compliance with and good-standing in the NFIP including adoption and enforcement of floodplain management requirements (e.g. regulating all new and substantially improved construction in Special Hazard Flood Areas), floodplain identification and mapping, and flood insurance outreach to the community.	New & Existing	NFIP Compliance	Ongoing	Municipality (via Municipal Engineer/NFIP Floodplain Administrator) with support from OEM, ISO FEMA	High	Low - Medium	Local Budget	Ongoing	High
Enact a city code to perform soil stabilization when expansive soils are found during engineering studies and compaction tests on fill land.	New	Expansive Soil	Planned	Community Services	Medium	Medium	Local budget	Short	High
When citizens apply for building and remodel permits, provide a pamphlet with expansive soil mitigation information.	New & Existing	Expansive Soil	Planned	Community Services	Medium	Low	Local budget	Long	Low
Drill additional water		Drought,	Planned	Public	Ensure	High	City	Short	High

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
wells to insure adequate water supply is available		Wildfire		Works	adequate water supply maintained		budget		
Conduct a public education to educate citizens on water conservation		Drought	Ongoing	Community Services	Reduce water use in city	Low	City budget	Short	Medium
Increase earthquake risk awareness – through public education pamphlets distributed at community gatherings (fire dept. open house, police dept. open house, pool safety day, etc.)		Earthquake	Ongoing	EM / Fire Department	Reduce loss of life through education – residents should have a plan - and reduce damage to buildings	Low	City budget	Short	Medium
Public education on the dangers associated with extreme temperature events prior to the onset of extremes		Extreme Temps	Ongoing	EM / Fire Department	Reduce loss of life	Low	City budget	Short	Medium
Establish heating and cooling stations to protect citizens from extreme temperatures, and provide a location with electricity and water during winter storms and after high winds		Extreme Temps, Wind (incl. Tornado), Winter Storm	Ongoing	EM / Fire Departments	Reduce loss of life	Medium	City budget	Ongoing	Low
Provide shelters for jurisdiction owned emergency vehicles to protect from hail damage		Hail	Ongoing	Fire w/ Public Works	Reduction in losses of vehicles	High	HMGP or City Budget	Ongoing	High
Install lightning protection and suppression systems	Existing	Lightning	Ongoing	Community Services	Reduction in loss of electronic	High	City Budget	Ongoing	High

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
protecting radios, computers, and other essential equipment at critical facilities throughout the jurisdiction					equipment				
Public education on the dangers associated with lightning and how to increase resiliency in the home and office	Existing	Lightning	New	EM / Fire Department	Reduce loss of life	Low	City budget	Short	Medium
Public education on finding the best nearby shelter	Existing	Wind (incl. Tornadoes)	New	EM / Fire Department	Reduce loss of life	Low	City budget	Short	Medium
Create fire breaks along fence rows to thwart road jumping of wildland fires	Existing	Wildfire	Ongoing	Fire Department	Reduced structure loss	Low	City Budget	Ongoing	High
Public education on creating fire breaks around the home and reducing wildfire risk	Existing	Wildfire	New	EM / Fire Department	Reduce loss of life	Low	City budget	Short	Medium
Purchase All Hazard Weather Radios for schools and other public facilities		Dam Failure, Drought, Earthquake, Extreme Temp, Flood, Hail, Lightning, Wildfire, Wind (incl. Tornado), Winter Storm	Ongoing	EM / Fire Department	Reduced loss of life	Low	HMGP or City Budget	Ongoing	High

Notes:
*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (NA) is inserted if this does not apply.
Costs:
Where actual project costs have been reasonably estimated:
Low = < $10,000
Medium = $10,000 to $100,000

High = > $100,000
Where actual project costs cannot reasonably be established at this time:
Low = Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium = Could budget for under existing work-plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High = Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:
Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:
Low = < $10,000
Medium = $10,000 to $100,000
High = > $100,000
Where numerical project benefits cannot reasonably be established at this time:
Low = Long term benefits of the project are difficult to quantify in the short term.
Medium = Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High = Project will have an immediate impact on the reduction of risk exposure to life and property.

Potential FEMA HMA Funding Sources:
PDM = Pre-Disaster Mitigation Grant Program
FMA = Flood Mitigation Assistance Grant Program
RFC = Repetitive Flood Claims Grant Program
SRL = Severe Repetitive Loss Grant Program
HMGP = Hazard Mitigation Grant Program

Timeline:
Short = 1 to 5 years. Long Term= 5 years or greater. OG = On-going program.
DOF = Depending on funding.

Explanation of Priorities

- ***High Priority*** - A project that meets multiple objectives (i.e., multiple hazards), benefits exceeds cost, has funding secured or is an on-going project and project meets eligibility requirements for the Hazard Mitigation Grant Program (HMGP) or Pre-Disaster Mitigation Grant Program (PDM) programs. High priority projects can be completed in the short term (1 to 5 years).

- ***Medium Priority*** - A project that meets goals and objectives, benefits exceeds costs, funding has not been secured but project is grant eligible under, HMGP, PDM or other grant programs. Project can be completed in the short term, once funding is completed. Medium priority projects will become high priority projects once funding is secured.

- ***Low Priority*** - Any project that will mitigate the risk of a hazard, benefits do not exceed the costs or are difficult to quantify, funding has not been secured and project is not eligible for HMGP or PDM grant funding, and time line for completion is considered long term (1 to 10 years). Low priority projects may be eligible other sources of grant funding from other programs. A low priority project could become a high priority project once funding is secured as long as it could be completed in the short term.

Prioritization of initiatives was based on above definitions: Yes

Prioritization of initiatives was based on parameters other than stated above: Not applicable.

I.) FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

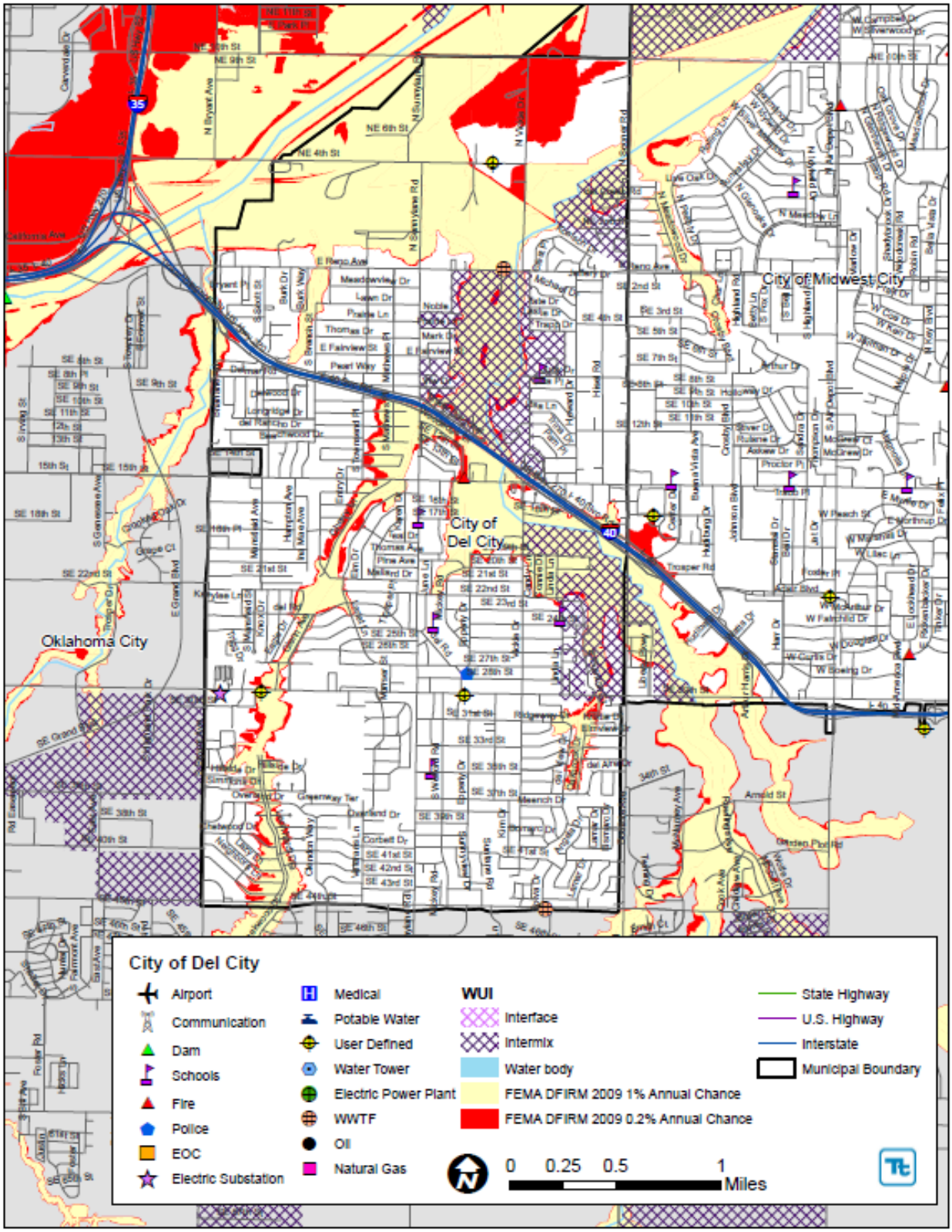
None at this time.

J.) HAZARD AREA EXTENT AND LOCATION

A hazard area extent and location map has been generated and is provided below for the City of Del City to illustrate the probable areas impacted within the City of Del City. This map is based on the best available data at the time of the preparation of this Plan, and is considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the City of Del City has significant exposure.

K.) ADDITIONAL COMMENTS

No additional comments at this time.


City of Midwest City
City of Del City
Oklahoma City
City of Del City
Airport
Communication
Dam
Schools
Fire
Police
EOC
Electric Substation
Medical
Potable Water
User Defined
Water Tower
Electric Power Plant
WWTF
Oil
Natural Gas
WUI
Interface
Intermix
Water body
FEMA DFIRM 2009 1% Annual Chance
FEMA DFIRM 2009 0.2% Annual Chance
State Highway
U.S. Highway
Interstate
Municipal Boundary
0 0.25 0.5 1
Miles

9.6 CITY OF EDMOND

This section presents the jurisdictional annex for the City of Edmond.

A.) HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact	Alternate Point of Contact
Brook Pintens, Emergency Management Coordinator P.O. Box 2970, Edmond, OK 73083 (405) 359-4378 brook.pintens@edmondok.com	

B.) MUNICIPAL PROFILE

The City of Edmond is located in the northcentral section of Oklahoma County and is part of the Oklahoma City metropolitan area. The City is bordered to the south, east and west by Oklahoma City. The City has a total land area of 87.9 square miles; with 85.1 square miles of it is land and 2.8 square miles of water. The City is governed by a mayor and a five member City Council. The 2010 U.S. Census population for the City of Edmond was 81,405.

Flooding in the City typically results from intense thunderstorms associated with squall line activity. The greatest potential for flood damage in the City exists along the upper portion of Spring Creek, west of Bryant Avenue. The main reasons why this area floods is due to increased urbanization, residential development along the floodplain, and inadequate bridge and culvert openings. (FEMA FIS – 2009)

Past Mitigation Activity/Efforts

Each initiative from the 2013 plan was reviewed going forward into this 2019 plan. Any initiatives that were completed or abandoned are stated below, while any new or ongoing initiatives will be found under the Proposed Hazard Mitigation Initiatives header of this section.

Completed 2013 Initiatives	Comments
Complete the Willowood Addition Flood Mitigation Project - Repeated flooding events of numerous homes in the floodplain and floodway. Acquisitions of flood-prone properties and construction of improvements. (HMGP DR-1678-OK Project #52)	
Willowood Addition Flood Mitigation Project - Repeated flooding events of numerous homes in the floodplain and floodway. Acquisitions of flood-prone properties and construction of improvements.	Complete 2014

Further details on mitigation activities completed or ongoing in the City include:

- City ordinances require 2' freeboard, and do not allow any building in the floodplain (Title 23).
- City site plan review requires that all new construction projects identify floodplains and inundated areas and designate such as open space.

Abandoned Initiatives	Comments
Underground Electric Service - Replace overhead power transmission lines with buried cables, thus virtually eliminating the issue of severe weather-related interruptions for a primary business district within the City. Bury underground feeder and sub-feeder lines to the business district south of 15th Street to the City limits, primarily along South Broadway. (2006 Plan)	Transmission lines belong to OG&E and completed south of 33rd Street south of Edmond city limits
Create defensible space / buffer zones around electrical grid support equipment.	Duplicate with another initiative.

Hazard Vulnerabilities Identified

Hazard profiling, Section 5.3, has identified that the City of Edmond is vulnerable to the following hazards of concern:

Hazard	Local Vulnerability	Comments
Dam Failure	Yes	Arcadia Lake - See local hazard map end of section
Drought	Yes	
Earthquake	Yes	
Expansive Soils	Yes	
Extreme Temperatures	Yes	
Flooding	Yes	See local hazard map end of section
Hail	Yes	
Lightning	Yes	
Wildfire	Yes	See local hazard map end of section
Wind (incl. tornado)	Yes	
Severe Winter Storm	Yes	

According to the City of Edmond, the following have been identified as specific hazard vulnerabilities in the City:

- Flooding has damaged public infrastructure, such as waterlines, sanitary sewers, buildings, streets and bridges
- Drought increases the threat of wildfires
- Hail has damaged City vehicles and roofs
- High winds have damaged street signs and lights, as well as interrupting power when trees damage electrical lines
- Severe thunderstorms produce high winds, hail and sudden rain; all causing damage to City property
- Tornadoes have impacted the City many times, causing significant damage to private and public property
- Wildfires have significantly impacted the City, causing significant damage to private and public property, as well as impacting the City's operations and provision of services, including emergency services

- Winter storms have caused the City to 'shut down', closing roads, stranded motorists, opening of shelters, interruption of services and closing businesses
- The City notes that an average of 45 trains/day move through Edmond on the Burlington Northern with unknown and potentially hazardous materials

Vulnerability assessment modeling has identified the following flood vulnerabilities (see Flood Hazard Profile in Section 5.3.6):

Utilities Located in the Preliminary DFIRM Flood Boundaries and Estimated Potential Damage from the 100- and 500-Year MRP Events

Name	Municipality	Type	Exposure		Potential Loss	
			100 Year	500 Year	100 Year Damage %	500 Year Damage %
Oak Tree Lift Station	Edmond (C)	WW Pump	X	X	40.0	40.0
Well #34	Edmond (C)	Potable Water	X	X	5.2	40.0
Well #30	Edmond (C)	Potable Water	X	X	-	0.7
Well #56	Edmond (C)	Potable Water	X	X	40.0	40.0
Well #44	Edmond (C)	Potable Water	X	X	2.8	30.3
Williams Gas Pipeline / Compressor Station	Edmond (C)	Natural Gas	X	X	-	40.0
Garber Substation	Edmond (C)	Electric Substation		X	-	-
Fairfield Substation*	Edmond (C)	Electric Substation	X	X	-	-

Source: FEMA, 2009;
Notes:
(1) 'X' indicates the facility location as provided by Oklahoma County's Planning Committee is located in the DFIRM flood zone.

Growth/Development Trends

The following major residential/commercial development and major infrastructure development are currently known or anticipated in the City of Edmond.

New Development/Potential Development in Municipality			
Property Name	Type Residential or Commercial	Number of Structures	Address
Banc First	Commercial	1	1100 S. Bryant
Oklahoma Municipal Assurance	Commercial	1	3650 S. Boulevard
Oakview Professional Offices	Commercial	2	Memorial and I-35
Uptown Grocery Company	Commercial	3	1200, 1230 and 1260 W. Covell
Chicken Express	Commercial	1	SW side of Danforth and Kelly
Mercy Health	Commercial	1	South of 15th, West of I-35
Ranken Energy	Commercial	1	457 W. 18th Street
Arbor Creek Retail West	Commercial	1	West of Saints Blvd., North of 2nd
Fisher Hall – OK Cataract Institute	Commercial	1	3840 S. Boulevard
Hidden Prairie at Kelley Pointe Retail	Commercial	1	North of 33rd and west of Kelley

Recent and anticipated growth is in existing urban areas, with only small increases to the WUI and flood risk.

C.) NATURAL HAZARD EVENT HISTORY SPECIFIC TO THE CITY

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
June 8-10, 1974	Flooding	DR-441	Yes	
November 26, 1974	Flooding	DR-453	Yes	
October 17-19, 1983	Flooding	DR-693	Yes	
September 29 – October 1, 1986	Flooding	DR-778	Yes	
May 2, 1990	Flooding, Tornado	DR-866	Yes	
May 8, 1993	Tornadoes	DR-991	Yes	
June 9, 1993	Flash Flooding	N/A	N/A	
July 26 – August 2, 1995	Tornado, Flooding	DR-1066	Yes	
April 24-26, 1999	Flooding	N/A	N/A	
May 3-4, 1999	Tornadoes, Flooding	DR-1272	Yes	
June 23, 1999	Flash Flooding	N/A	N/A	
October 21-29, 2000	Flooding	DR-1349	Yes	
May 30, 2001	Flooding	N/A	N/A	
September 7, 2001	Urban Flooding	N/A	N/A	
August 11-12, 2004	Flash Flood	N/A	N/A	In Oklahoma County, flash flooding inundated the intersection of Western Avenue and NE 234th Street.
March 12, 2006	Tornadoes	DR-1637	No	
December 28-30, 2006	Severe Winter Storm	DR-1677	No	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
January 12-26, 2007	Severe Winter Storms	DR-1678	No	Yes
March 29, 2007	Tornadoes	N/A	N/A	Yes
May 4-11, 2007	Tornadoes, Flooding	DR-1707	No	
May 24, 2007 to June 1, 2007	Flooding, Tornadoes	DR-1723	No	
June 10, 2007 to July 25, 2007	Flooding, Tornadoes	DR-1712	Yes	
Aug. 18, 2007 to Sept. 12, 2007	Tornadoes, Flooding	DR-1718	Yes	
Dec. 8, 2007 to Jan. 3, 2008	Severe Winter Storms	DR-1735	Yes	Yes
March 17-23, 2008	Tornadoes, Flooding	DR-1752	No	
March 22, 2008	Wildfire	N/A	N/A	Yes
March 30-31, 2008	Tornado	N/A	N/A	City of Edmond - A tornado developed near the intersection of NW 178th Street and Pennsylvania Avenue. The tornado caused most of its damage in the Valencia neighborhood. Many homes sustained roof, window, garage door and fence damage. The tornado continued northeast towards the intersection of NW 192nd Street and Western Avenue where large utility poles were blown down. $450 K in property damage.
April 9-28, 2008	Tornadoes, Flooding	DR-1754	No	
April 30, 2008	Hail/Damaging Winds	N/A	N/A	Yes
May 9, 2008	Floods	DR-1754	No	
May 10-13, 2008	Tornadoes, Flooding	DR-1756	No	
June 3-20, 2008	Flooding	DR-1775	No	
August 20, 2008	Flooding	N/A	N/A	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
September 12-19, 2008	Tornadoes, Flooding	DR-1803	No	
January 26-28, 2009	Severe Winter Storm	DR-1823	No	
February 10-11, 2009	Tornadoes	DR-1820	Yes	
March 24, 2009	Severe Storms	N/A	N/A	
March 26-27, 2009	Snow/Ice/Severe Storm	N/A	N/A	
March 30, 2009	Severe Storm	N/A	N/A	
April 9-12, 2009	Wildfires	DR-1846	Yes	
May 13, 2009	Severe Storms	N/A	N/A	
December 24-25, 2009	Severe Winter Storm	DR-1876	No	
2010-2011	Severe Drought	N/A	N/A	
January 28-30, 2010	Severe Winter Storm	DR-1883	No	
Jan. 30-Feb. 9, 2010	Severe Winter Storm	N/A	N/A	
March 19, 2010	Severe Winter Storm	N/A	N/A	
May 10-13, 2010	Tornadoes, and Straight-Line Winds	DR-1917	Yes	Yes
May 16, 2010	Hail Storm	N/A	N/A	
May 19, 2010	Severe Storm	N/A	N/A	
June 13-15, 2010	Tornadoes, Straight-line Winds, and Flooding	DR-1926	Yes	
July 7-8, 2010	Flooding	N/A	N/A	
Oct. 13, 2010	Earthquake	N/A	N/A	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
Jan. 31, 2011 to Feb. 5, 2011	Severe Winter Storm and Snowstorm	DR-1985	No	
March 11, 2011	Wildfire	N/A	N/A	Yes
April 14, 2011	Tornadoes, And Straight-Line Winds	DR-1970	No	
April 21-28, 2011	Flooding	DR-1988	No	
May 22-25, 2011	Tornadoes, Straight-line Winds, and Flooding	DR-1989	No	
June-August 2011	Severe Heat	N/A	N/A	
July 15-18, 2011	Drought, Wildfire	FM-2938	Yes	Prolonged drought, along with periods of extreme heat and gusty winds, created conditions that caused a series of wildfires across Oklahoma. Burn bans were ordered for counties in June, July and August. Overall, the Oklahoma Forestry Services battled 1,745 fires that burned over 132,000 acres. Water rationing in effect.
November 6, 2011	Earthquake	N/A	N/A	5.6 magnitude earthquake near Prague; depth of 5.2 km
May 29, 2012	Hail			Significant damage occurred across the Oklahoma County area due to very large hail. Edmond saw hail ranging between 2.50 to 3.00 inches. Total damages of $400M to $500M were estimated across the Oklahoma County area.
February 20, 2012	Wind			A potent, quick-moving storm system affected Oklahoma during the afternoon of the 22nd, with strong winds. The main concern with the thunderstorms was the wind. Strong winds up to 61 MPH caused isolated areas of damage in Edmond.
May 29, 2012	Wind			Significant damage occurred across the Oklahoma City Metropolitan area due to very large hail and severe winds. Edmond received an estimated $100.00K in damages with total estimated damages ranging from $400M to $500M across the Oklahoma City Metropolitan area.
April 26, 2013	Hail			Very large hail up to 2.50 inches was reported. Property Damage estimated grew to $400K.
July 2012-April 2013	Drought	N/A	N/A	2011-2012 was the fourth driest two-year period on record and left water storage at reservoirs at an all-time low. Oklahoma City implemented mandatory outdoor water rationing starting July 31, 2012 including cities that buy water from OKC. This includes Deer Creek Rural Water District (unincorporated

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
				county), Edmond, The Village and Warr Acres. January 17, 2013 odd/evening outdoor watering was re-implemented and by spring became a permanent program.
May 19, 2013	Tornado, Hail			A tornado touched down in Edmond, that was rated up to EF1 that created damage to buildings. An estimate of damages was not available. Hail up to 2.6" was reported near Coffee Creek & I-35.
December 01, 2013	Earthquake	N/A	N/A	This earthquake was 8.4km in depth and was felt throughout the Oklahoma County area. There was reports of strong shaking and light damage reported. This originated in Edmond at a magnitude of 4.5
June 16, 2014	Earthquake	N/A	N/A	4.3 magnitude earthquake near Spencer; depth of 5.0 km.
June 18, 2014	Earthquake	N/A	N/A	4.1 magnitude earthquake near Spencer; depth 5.0 km
December 14, 2014	Tornado	N/A	N/A	One very brief EF0 tornado was videoed by KWTV over northeastern Oklahoma County south of Lake Arcadia in Edmond. No damage occurred.
July 2, 2015	Flood	N/A	N/A	This was the largest rain event damage recorded locally. Multiple residential and commercial flooding occurred, no substantial damage reported. Some street repair was necessary on Santa Fe Ave.
November 27, 2015	Ice Storm	DR-4247	Yes	Edmond sustained significant tree damage that necessitated debris pickup. Edmond Electric suffered infrastructure damage, too. Edmond's total cost was $1.2M
December 29, 2015	Earthquake	N/A	N/A	In the county, this earthquake, at a depth of 6.5km, there were multiple reports of light to moderate shaking with very light damage. This earthquake originated in Edmond and was measured at 4.3.
January 01, 2016	Earthquake	N/A	N/A	At a depth of 5.8 feet, there were multiple reports of light to strong shaking with light damage reported with this quake.
April 07, 2016	Earthquake	N/A	N/A	4.2 magnitude earthquake at Luther; depth of 6.1 km
April 26, 2016	Tornado	N/A	N/A	An EF0 tornado was spotted just south of Lake Arcadia in Edmond that caused an estimated 4.00K damage. An EF0 also began in the city limits 3 N of Arcadia and moved NE.
September 3, 2016	Earthquake	N/A	N/A	5.8 magnitude earthquake at Pawnee; depth of 5.4 km
August 03, 2017	Earthquake	N/A	N/A	All regions of the county felt this quake, per the USGS. Most areas were light with a few areas experiencing moderate shaking. Very light damage was also reported.
June 7, 2018	Flood	N/A	N/A	Widespread flooding across the north Metro. Reports of flooding including NW 234th and Rockwell, parts of The Village, Edmond and Nichols Hills stranding multiple cars and

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
				closing roads. 2-2.5" of rain fell over 2-3 hours.

Number of FEMA Identified Repetitive Flood Loss Properties: 3 residential, 1 commercial
Number of FEMA Identified Severe Repetitive Flood Loss Properties: 2 residential

Source: Edmond Emergency Management

Wildfire History for Edmond
Acres may include loss from wildland, grass, brush, crop, orchard and nursery fires.

	Loss	Acres
2018	$0	242.1
2017	$0	302.3
2016	$3,800	116.1
2015	$0	25.4
2014	$3,000	54.5
2013	$500	13.8
2012	$38,450	23.8
2011	$13,975	5,582.1
2010	$6,500	64.6
2009	$3,430	130.6
2008	$13,820	86.0
2007	$175	72.0
2006	$6,420	898.0
2005	$11,800	306.0
2004	$8,650	62.0
TOTAL LOSS	**$110,520**	**7,979.3**

Source: Oklahoma State Fire Marshal's office

D.) CAPABILITY ASSESSMENT

This section identifies the following mitigation capabilities within Unincorporated Oklahoma County:

- Legal and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Community classification.

D.1) Legal and Regulatory Capability

Regulatory Tools (Codes, Ordinances., Plans)	Do you have this? (Y or N)	Code Citation (Section, Paragraph, Page Number, Date of adoption)	HM Plan integration into plan	Update cycle	Party(s) responsible for updating document
Building Code	Y	Title 16 & 17, latest revision 2009			
Comprehensive / Master Plan	Y	April 2007	No		
Zoning Management Ordinance	Y	March 1, 2007			
Subdivision Management Ordinance	Y	Title 21, latest revision June 24, 2002			
Site Plan Review Requirements	Y	March 1, 2007			
NFIP Flood Damage Prevention Ordinance	Y	Title 23 Stormwater Drainage Latest Revision 09/21/16 The City requires 2' freeboard. The City does not allow any building in the floodplain, and requires that all new construction projects identify floodplains and inundated areas and designate such as open space.			
NFIP Elevation Certificates Maintained	Y	Title 23 Stormwater Drainage Latest Revision			
Floodplain Management Plan and Additional Master Floodplain Studies	Y	Title 23 Stormwater Drainage Latest Revision	No		
Stormwater Management Plan / Ordinance	Y	Title 23 Stormwater Drainage Latest Revision	No		
Stream Corridor Management or Protection Plan	Y	Title 23 Stormwater Drainage Latest Revision	No		
Erosion Management Ordinance	Y	Title 23 Stormwater Drainage Latest Revision			
Capital Improvements Plan	Y		No		
Open Space Plan	N	Title 25 and STD-400 (12-18-09); For			

Regulatory Tools (Codes, Ordinances., Plans)	Do you have this? (Y or N)	Code Citation (Section, Paragraph, Page Number, Date of adoption)	HM Plan integration into plan	Update cycle	Party(s) responsible for updating document
		development regulations – All areas lying below 100 year WSL must be in HOA common area.			
Economic Development Plan	N				
Emergency Response Plan	Y	EOP update August 2013	Yes	Quarterly	Emergency Management w/ City Departments
Post Disaster Recovery Plan / Ordinance	N				
Real Estate Disclosure Requirements	N				
Highway Management Plan	Y	Edmond Transportation Plan 6/28/07			
COOP/COG Plan	N				
Other (Special Purpose Ordinances such as critical or sensitive areas)					

Additionally, any change in ordinances happens at the behest of local government bodies, state legislation or court actions and are not on a scheduled reoccurring basis.

D.2) Administrative and Technical Capability

Staff/ Personnel Resources	Available (Y or N)	Department/ Agency/ Position
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Y	Engineering/Public Works Engineer Engineering/Director of Engineering Engineering/Stormwater Engineer Planning Director
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Y	Engineering/Public Works Engineer Engineering/Director of Engineering Engineering/Capital Projects Engineer Engineering/Stormwater Engineer Building Inspector Emergency Management – Public Works Department
Planners or engineers with an understanding of natural hazards	Y	Engineering/Stormwater Engineer Hydrologist, Floodplain Administrator

NFIP Floodplain Administrator	Y	Engineering/Hydrologist
Surveyor(s)	Y	Engineering/Stormwater Engineer
Personnel skilled or trained in "GIS" applications	Y	
Scientist(s) familiar with natural hazards in the County.	N	
Emergency Manager	Y	
Grant Writer(s)	Y	
Staff with expertise or training in benefit/cost analysis	N	

D.3) Fiscal Capability

Financial Resources	Accessible or Eligible to use (Yes/No/Don't know)
Community Development Block Grants (CDBG)	Yes
Capital Improvements Project Funding	Yes. Had a capital improvements project committee, and a sales tax for funding.
Authority to Levy Taxes for specific purposes	Yes, had a sales tax to fund capital improvements
User fees for water, sewer, electric service, sanitation, stormwater	Yes, including Edmond Electric
Impact fees for builders and commercial structures	TBD
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	TBD
Incur debt through private activity bonds	TBD
Withhold public expenditures in hazard-prone areas	TBD
Other	

D.4) Community Classifications

Program	Classification	Date Classified
Community Rating System (CRS)	Class 7	10-01-2008
Building Code Effectiveness Grading Schedule (BCEGS)	TBD	TBD
Public Protection	TBD	TBD
Storm Ready	County and City	03-04-2011
Firewise	NP	N/A

N/A = Not applicable. NP = Not participating. - = Unavailable. TBD = To Be Determined

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at http://www.isomitigation.com/ppc/0000/ppc0001.html

- The National Weather Service Storm Ready website at http://www.weather.gov/stormready/howto.htm
- The National Firewise Communities website at http://firewise.org/

Expanding on and Improving Existing Policies and Programs

By adopting updated codes, including fire, building and NFIP ordinances this jurisdiction will continue to improve their mitigation approach. Furthermore, employing experts in land management and construction practices, in coordination with planners and engineers with understanding of natural hazards, the overall stratagem will continue to advance.

In addition, by participating in multi-jurisdictional training and radio interoperability, public safety agencies bolster their response capabilities.

E.) PROPOSED HAZARD MITIGATION INITIATIVES

Note some of the identified mitigation initiatives in Table F are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Changes from the 2013 plan projects include status updates, combination of projects and minor description clarifications.

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Maintain a four-year cycle for tree maintenance to reduce vulnerability to power outages.	Existing and New	Wind (incl. Tornado), Lightning, Severe Winter Storms	Ongoing	Edmond Electric	Reduced power outages	Medium - High	Edmond Electric Budget	Ongoing	High
Continue to enforce local requirements that all new roadway construction must manage the 100-year flood	New	NFIP Continued Compliance	Ongoing	Engineering / Plan Review	Reduced roadway closures and road infrastructure damage	Medium	City Budget	Ongoing	medium
Continue to manage and implement the City's storm water improvement / retrofit program – providing periodic review and prioritization of drainage problem area for mitigation	Existing	NFIP Continued Compliance	Ongoing	Drainage Utility	Reduced risk to structures and roadway	Medium - High	Storm Water Fees, CDGB grant or HMGP	Ongoing	Medium
Maintain enforcement of Title 23 which incorporates specific higher regulatory	New & Existing	NFIP Continued Compliance	Ongoing	Municipality (via Municipal Engineer/NFIP Floodplain Administrator) with support	High	Low	Municipal Budget	Short	High

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
standards for managing flood risk, including no new development in the SFHA, 2' freeboard.				from OWRB, FEMA					
Provide dam failure risk information with inundation depth and times for residents downstream of Lake Arcadia.	NA	Dam Failure	Ongoing	Municipality with support from Planning Partners, OEM, FEMA	High	Low - Medium	Municipal Budget; HMGP	Short	Low
Purchase All-Hazard (NOAA) Weather Radios	(Neither)	Dam Failure, Drought, Earthquake, Extreme Temperatures, Floods, Hail, Lightning, Wildfire, Wind (incl. Tornado), Winter Storm	Ongoing	Emergency Management	Alert citizens before disaster to save lives and after earthquakes to advise of life protective measures	Low	City Funds and FEMA HM Grant funds	Short (1 year)	High
Drill Additional Water Wells	Neither	Drought	Planned	Water Resources	Drill additional water wells ensuring that an adequate water supply is available.	High	FEMA HM Grant	Short	Medium
Conduct a public education campaign to increase efficiency of outdoor watering devices.	Neither	Drought	Planned	Water Resources	Conserves water	Low	FEMA HM Grant	Short	Low

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Enhance local water supply through treatment plant upgrades and indirect potable reuse for Arcadia Lake.	Neither	Drought	Ongoing	Water Resources	Conserves water	High	Capital Improvement Funds	Long	High
Bury overhead power lines in areas of older infrastructure where the system is vulnerable to adverse weather conditions.	New and Existing	Earthquake, Hail, Lightning, Winter Storm, Wildfire, Wind (incl. Tornado)	Planned	Edmond Electric	Decrease or eliminate threat of downed lines from high winds, ice loading, insulators destroyed by hail, lightning damage, and wildfires burning poles	High	Edmond Electric Budget	Long	Low
Conduct a public education campaign; advise citizens regarding protecting their homes and private property against the consequences of earthquakes.	New and Existing	Earthquake	Ongoing	Emergency Management	Decreases the damage caused by earthquakes.	Low	FEMA HM Grant	Short	Low
Research expansive soil data further to determine if problem exists on municipal property and stabilize soil prior	New	Expansive Soil	Planned		Low	Low		Short	Low

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
to new building.									
Educate citizens and developers regarding how to mitigate Expansive Soil risks.	Existing	Expansive Soils	Ongoing	Engineering	Decreases property damage.	Low	FEMA HM Grant	Short	Low
Provide public education on the dangers associated with extreme temperature events.	Neither	Extreme Temperatures	Ongoing	Emergency Management	Causes people to take personal responsibility and take appropriate actions.	Low	FEMA HM Grant	Short	Low
Establish cooling and heating (warming) stations to protect the public from extreme temperatures.	New and Existing	Extreme Temperatures	Ongoing	Emergency Management	Allows citizens to escape extreme temperature conditions.	Medium	FEMA HM Grant	Medium	High
Spring Creek Tributary 2 - From E 33rd St. to S Coltrane Rd. - existing Earthen Lined channel removed deposited sediments to restore flow capacity	Existing	Flood	New	Drainage Utility	Reduce risk to structures and roadway	High	Stormwater Fees	Short	High
Conduct and facilitate community and public education and outreach for residents and		Flood	New/Ongoing	Drainage Utility with other city departments assisting	Low - Medium	High	Stormwater Fees, HM Grant	Ongoing	High

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
businesses to promote and effect flood risk reduction									
Update the City of Edmond's Chisholm Creek Basin Drainage Study	New and Existing	Flood	New	Drainage Utility	Medium	High	Stormwater Fees, HM Grant	Long	Low
Construct shelters for city owned vehicles to protect those vehicles from damaging hail.	New	Hail	Ongoing	Facility Maintenance	Protect vehicles and people from hail.	Medium	FEMA HM Grant	Medium	Medium
Post warning signs at parks and other outdoor public areas warning people of the hazards of hail and other severe weather threats.	New	Hail	Ongoing	Parks	Educate citizens about the threats of hail.	Low	City budget, FEMA HM Grant	Low	Low
Purchase lightning prediction/warning system for Mitch and Hafer city parks.	New	Lightning	Planned	Parks	Will warn people of impending lightning in recreation areas allowing them to seek shelter.	Medium	FEMA HM Grant	Short	High
Purchase lightning suppressions systems for city real property.	New and Existing	Lightning	Planned	Parks	Will minimize the destructive effects of lightning strikes.	Medium	FEMA HM Grant	Medium	Medium

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Create wildfire buffers around public buildings	New and Existing	Wildfire	Ongoing	Parks	Will minimize the destructive effects of wildfires.	Medium	FEMA HM Grant	Medium	High
Bury overhead power lines around electrical grid support equipment	N/A	Wildfire	Ongoing	Edmond Electric	Will minimize the destructive effects of wildfires on the power grid.	Medium	FEMA HM Grant	Medium	High
Acquire and install high-powered voice warning devices for city parks and high density public areas.	Neither	Wind (incl. Tornado)	Ongoing	Emergency Management	Will allow warnings to be made to the public so citizens can take protective measures and seek shelter.	Medium	FEMA HM Grant	Medium	High
Install hail and wind shelters in public parks and other outdoor areas.	Neither	Hail, Wind (incl. Tornado)	Ongoing	Parks	This will provide shelter to the public during these types of events.	High	FEMA HM Grant	High	Medium
Acquire and install carbon monoxide monitors and alarms in concert with a public education campaign.	New and Existing	Winter Storms	Ongoing	Emergency Management	This will provide warnings to citizens during times they use alternative heating sources.	Low	FEMA HM Grant	Low	Low

Notes:
*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (NA) is inserted if this does not apply.

Costs:
Where actual project costs have been reasonably estimated:
Low = < $10,000
Medium = $10,000 to $100,000
High = > $100,000
Where actual project costs cannot reasonably be established at this time:
Low = Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium = Could budget for under existing work-plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High = Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:
Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:
Low = < $10,000
Medium = $10,000 to $100,000
High = > $100,000
Where numerical project benefits cannot reasonably be established at this time:
Low = Long term benefits of the project are difficult to quantify in the short term.
Medium = Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High = Project will have an immediate impact on the reduction of risk exposure to life and property.

Potential FEMA HMA Funding Sources:
PDM = Pre-Disaster Mitigation Grant Program
FMA = Flood Mitigation Assistance Grant Program
RFC = Repetitive Flood Claims Grant Program
SRL = Severe Repetitive Loss Grant Program
HMGP = Hazard Mitigation Grant Program

Timeline:
Short = 1 to 5 years. Long Term= 5 years or greater. OG = On-going program.
DOF = Depending on funding.

Explanation of Priorities

- ***High Priority*** - A project that meets multiple objectives (i.e., multiple hazards), benefits exceeds cost, has funding secured or is an on-going project and project meets eligibility requirements for the Hazard Mitigation Grant Program (HMGP) or Pre-Disaster Mitigation Grant Program (PDM) programs. High priority projects can be completed in the short term (1 to 5 years).

- ***Medium Priority*** - A project that meets goals and objectives, benefits exceeds costs, funding has not been secured but project is grant eligible under, HMGP, PDM or other grant programs. Project can be completed in the short term, once funding is completed. Medium priority projects will become high priority projects once funding is secured.

- ***Low Priority*** - Any project that will mitigate the risk of a hazard, benefits do not exceed the costs or are difficult to quantify, funding has not been secured and project is not eligible for HMGP or PDM grant funding, and time line for completion is considered long term (1 to 10 years). Low priority projects may be eligible other sources of grant funding from other programs. A low priority project could become a high priority project once funding is secured as long as it could be completed in the short term.

Prioritization of initiatives was based on above definitions: Yes

Prioritization of initiatives was based on parameters other than stated above: Not applicable.

F.) FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

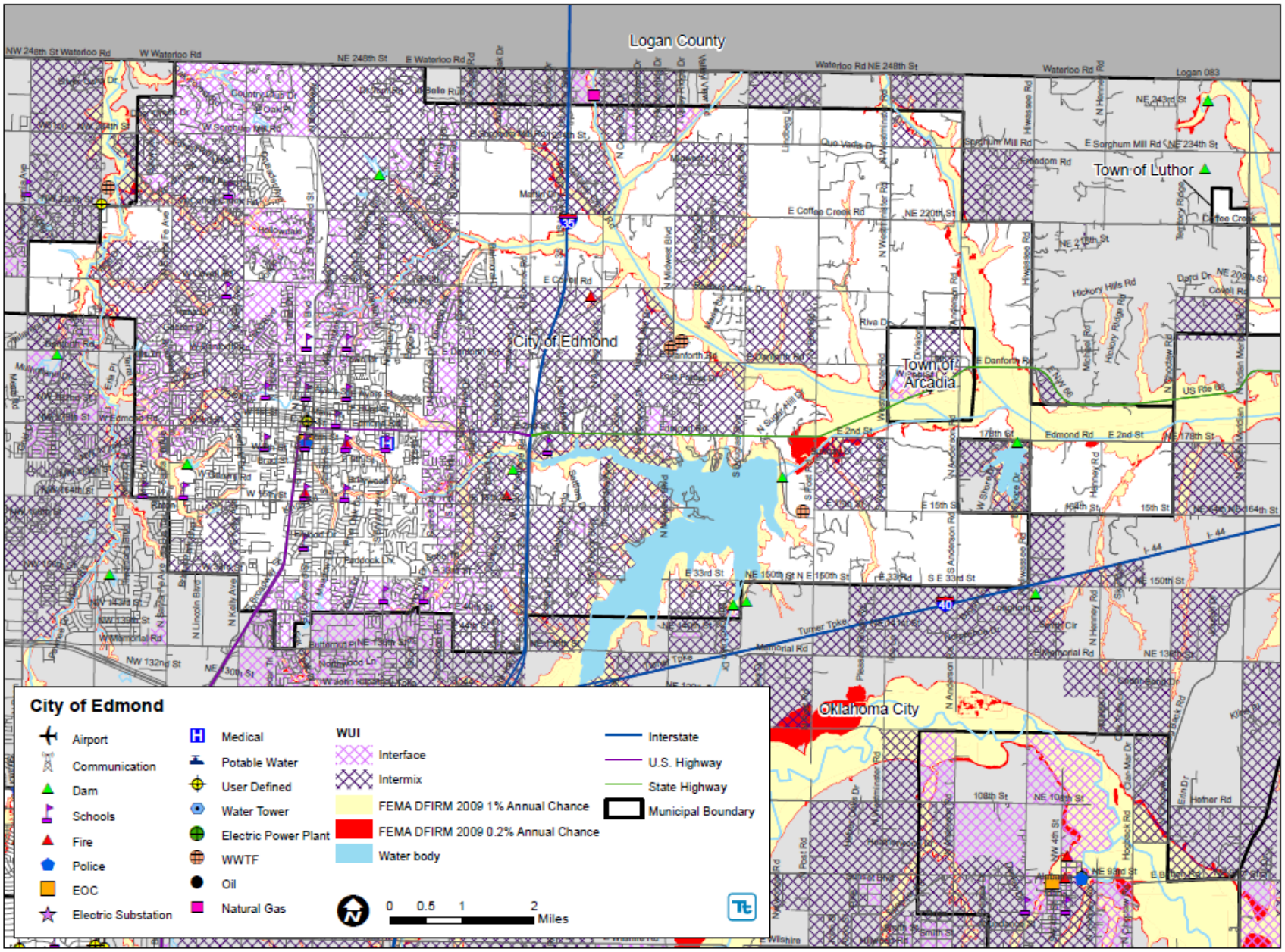
None at this time.

G.) HAZARD AREA EXTENT AND LOCATION

A hazard area extent and location map has been generated and is provided below for the City of Edmond to illustrate the probable areas impacted within the City of Edmond. This map is based on the best available data at the time of the preparation of this Plan, and is considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the City of Edmond has significant exposure.

H.) ADDITIONAL COMMENTS

No additional comments at this time.


Logan County
City of Edmond
Town of Arcadia
Town of Luthor
Oklahoma City
City of Edmond
Airport
Communication
Dam
Schools
Fire
Police
EOC
Electric Substation
Medical
Potable Water
User Defined
Water Tower
Electric Power Plant
WWTF
Oil
Natural Gas
WUI
Interface
Intermix
FEMA DFIRM 2009 1% Annual Chance
FEMA DFIRM 2009 0.2% Annual Chance
Water body
Interstate
U.S. Highway
State Highway
Municipal Boundary
0 0.5 1 2
Miles

9.7 TOWN OF FOREST PARK

This section presents the jurisdictional annex for the Town of Forest Park.

A.) HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact	Alternate Point of Contact
Wesley "Chuck" Blair Fire Chief / Emergency Manager Town of Forest Park 4203 N. Coltrane, Forest Park, OK 73121 (405) 424-1212 webgbs@aol.com	

B.) MUNICIPAL PROFILE

The Town of Forest Park is located in central Oklahoma County. The Town is bordered to the north by the Town of Lake Alma, to the south, east and west by Oklahoma City. The Town of Forest Park has a total land area of 2.1 square miles, all of it land. The 2010 U.S. Census population for the Town of Forest Park was 998.

Growth/Development Trends

No known or anticipated new development has been identified in the Town of Forest Park at this time.

Past Mitigation Activity/Efforts

The past five years have been economically difficult and spending mitigation efforts have been upset. As such, this jurisdiction has not completed any of the efforts outlined in the 2013 plan. However, none of the efforts have been abandoned and expectations on completing some of the objectives in this cycle are high.
Each initiative from the 2013 plan was reviewed going forward into this 2019 plan. Any new or ongoing initiatives will be found under the Proposed Hazard Mitigation Initiatives header of this section.

Hazard Vulnerabilities Identified

Hazard profiling, Section 5.3, has identified that the Town of Forest Park is vulnerable to the following hazards of concern:

Hazard	Local Vulnerability	Comments
Dam Failure	No	
Drought	Yes	
Earthquake	Yes	
Expansive Soils	Yes	
Extreme Temperatures	Yes	
Flooding	Yes	See local hazard map end of section
Hail	Yes	
Lightning	Yes	

Hazard	Local Vulnerability	Comments
Wildfire	Yes	See local hazard map end of section
Wind (incl. tornado)	Yes	
Severe Winter Storm	Yes	

According to the Town of Forest Park, the following have been identified as specific hazard vulnerabilities in the City:

- Forest Park is a moderately wooded community; as such ice accumulations on trees can cause considerable damage disruption of essential services and monetary losses.
- The large quantity of old growth trees, egress issues and lack of fire hydrants make the town vulnerable to devastating wild fires. Large fast moving fires have threatened the town.
- During periods of heavy rain low areas of the town flood disrupting emergency response and causing infrastructural damage.
- Forest Park has high-impact occupancy that poses a mass casualty threat in the event of a significant weather event (tornado in particular). We have a public school and a highly populated golf course. High winds, hail and lightning have caused damage in forest park.
- There are 2 NFIP policies in the community. Forest Park currently has no Repetitive Loss (RL) or Severe Repetitive Loss (SRL) properties.

C.) NATURAL HAZARD EVENT HISTORY SPECIFIC TO THE TOWN

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
March 8, 1974	Tornado	N/A	N/A	One injury occurred as a result of this F1 tornado.
June 8-10, 1974	Flooding	DR-441	Yes	
November 26, 1974	Flooding	DR-453	Yes	
October 17-19, 1983	Flooding	DR-693	Yes	
September 29 – October 1, 1986	Flooding	DR-778	Yes	
May 2, 1990	Flooding, Tornado	DR-866	Yes	
May 8, 1993	Tornadoes	DR-991	Yes	
June 9, 1993	Flash Flooding	N/A	N/A	
July 26 – August 2, 1995	Tornado, Flooding	DR-1066	Yes	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
April 24-26, 1999	Flooding	N/A	N/A	
May 3-4, 1999	Tornadoes, Flooding	DR-1272	Yes	
June 23, 1999	Flash Flooding	N/A	N/A	
October 21-29, 2000	Flooding	DR-1349	Yes	
May 30, 2001	Flooding	N/A	N/A	
September 7, 2001	Urban Flooding	N/A	N/A	
August 11-12, 2004	Flash Flood	N/A	N/A	
March 12, 2006	Tornadoes	DR-1637	No	
December 28-30, 2006	Severe Winter Storm	DR-1677	No	
January 12-26, 2007	Severe Winter Storms	DR-1678	No	
March 29, 2007	Tornadoes	N/A	N/A	
May 4-11, 2007	Tornadoes, Flooding	DR-1707	No	
May 24, 2007 to June 1, 2007	Flooding, Tornadoes	DR-1723	No	
June 10, 2007 to July 25, 2007	Flooding, Tornadoes	DR-1712	Yes	
Aug. 18, 2007 to Sept. 12, 2007	Tornadoes, Flooding	DR-1718	Yes	
Dec. 8, 2007 to Jan. 3, 2008	Severe Winter Storms	DR-1735	Yes	Yes
March 17-23, 2008	Tornadoes, Flooding	DR-1752	No	
March 22, 2008	Wildfire	N/A	N/A	
March 30-31, 2008	Severe Storms	N/A	N/A	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
April 9-28, 2008	Tornadoes, Flooding	DR-1754	No	
April 30, 2008	Hail/Damaging Winds	N/A	N/A	
May 9, 2008	Floods	DR-1754	No	
May 10-13, 2008	Tornadoes, Flooding	DR-1756	No	
June 3-20, 2008	Flooding	DR-1775	No	
August 20, 2008	Flooding	N/A	N/A	
September 12-19, 2008	Tornadoes, Flooding	DR-1803	No	
January 26-28, 2009	Severe Winter Storm	DR-1823	No	
February 10-11, 2009	Tornadoes	DR-1820	Yes	
March 24, 2009	Severe Storms	N/A	N/A	
March 26-27, 2009	Snow/Ice/Severe Storm	N/A	N/A	
March 30, 2009	Severe Storm	N/A	N/A	
April 9-12, 2009	Wildfires	DR-1846	Yes	Mutual aid expenses for fires in neighboring jurisdictions.
May 13, 2009	Severe Storms	N/A	N/A	
December 24-25, 2009	Severe Winter Storm	DR-1876	No	
2010-2011	Severe Drought	N/A	N/A	
January 28-30, 2010	Severe Winter Storm	DR-1883	No	
Jan. 30-Feb. 9, 2010	Severe Winter Storm	N/A	N/A	
March 19, 2010	Severe Winter Storm	N/A	N/A	
May 10-13, 2010	Tornadoes, Straight-Line Winds	DR-1917	Yes	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
May 16, 2010	Hail Storm	N/A	N/A	
May 19, 2010	Severe Storm	N/A	N/A	
June 13-15, 2010	Tornadoes, Straight-line Winds, and Flooding	DR-1926	Yes	
July 7-8, 2010	Flooding	N/A	N/A	
Oct. 13, 2010	Earthquake	N/A	N/A	
Jan. 31, 2011 to Feb. 5, 2011	Severe Winter Storm and Snowstorm	DR-1985	No	
April 14, 2011	Tornadoes, Straight-Line Winds	DR-1970	No	
April 21-28, 2011	Flooding	DR-1988	No	
May 22-25, 2011	Tornadoes, Straight-line Winds, and Flooding	DR-1989	No	
June-August 2011	Severe Heat	N/A	N/A	
November 6, 2011	Earthquake	N/A	N/A	5.6 magnitude earthquake near Prague; depth of 5.2 km
May 31-June 1st, 2013	Severe Storms, Flooding	DR-4117	Yes	Much of the County received 5-8" of rain.
December 01, 2013	Earthquake	N/A	N/A	4.5 magnitude earthquake near Arcadia Lake; depth of 8.4 km.
June 16, 2014	Earthquake	N/A	N/A	4.3 magnitude earthquake near Spencer; depth of 5.0 km.
June 18, 2014	Earthquake	N/A	N/A	4.1 magnitude earthquake near Spencer; depth 5.0 km
November 27-28, 2015	Winter Storm	DR-4247	Yes	Ice storm.
December 27-28, 2015	Winter Storm	DR-4256	No	Ice storm with widespread power outages in the Forest Park area.
September 3, 2016	Earthquake	N/A	N/A	5.8 magnitude earthquake at Pawnee; depth of 5.4 km

Number of FEMA Identified Repetitive Flood Loss Properties: 0
Number of FEMA Identified Severe Repetitive Flood Loss Properties: 0
Source: Oklahoma Water Resources Board (OWRB)

Wildfire History for Forest Park
Acres may include loss from wildland, grass, brush, crop, orchard and nursery fires.

	Loss	Acres
2018	$0	0.0
2017	$0	0.0
2016	$0	3.0
2015	$0	20.0
2014	$0	0.0
2013	$0	0.0
2012	$0	0.0
2011	$0	2.0
2010	$0	46.0
2009	$0	0.2
2008	$5,000	150.0
2007	$0	1.0
2006	$0	0.0
2005	$0	10.0
2004	$0	0.0
TOTAL LOSS	**$5,000**	**232.2**

Source: Oklahoma State Fire Marshal's office

D.) CAPABILITY ASSESSMENT

This section identifies the following mitigation capabilities within Unincorporated Oklahoma County:

- Legal and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Community classification.

D.1) Legal and Regulatory Capability

Regulatory Tools (Codes, Ordinances., Plans)	Do you have this? (Y or N)	Code Citation (Section, Paragraph, Page Number, Date of adoption)	HM Plan integration into plan	Update Cycle	Party(s) responsible for updating document
Building Code	Y				
Comprehensive / Master Plan	Y		Yes	Not Scheduled	Emergency Manager and Mayor
Zoning Management Ordinance	Y				

Regulatory Tools (Codes, Ordinances., Plans)	Do you have this? (Y or N)	Code Citation (Section, Paragraph, Page Number, Date of adoption)	HM Plan integration into plan	Update Cycle	Party(s) responsible for updating document
Subdivision Management Ordinance	Y				
Site Plan Review Requirements	Y				
NFIP Flood Damage Prevention Ordinance	?				
NFIP Elevation Certificates Maintained	Y				
Floodplain Management Plan	Y		Yes	Not Scheduled	Floodplain Manager
Stormwater Management Plan / Ordinance	N				
Stream Corridor Management or Protection Plan	N				
Erosion Management Ordinance	N				
Capital Improvements Plan	N				
Open Space Plan	N				
Economic Development Plan	N				
Emergency Response Plan	Y		No		
Post Disaster Recovery Plan / Ordinance	N				
Real Estate Disclosure Requirements	N				
Highway Management Plan	N/A				
COOP/COG Plan	N				
Other (Special Purpose Ordinances such as critical or sensitive areas)	?				

Additionally, any change in ordinances happens at the behest of local government bodies, state legislation or court actions and are not on a scheduled reoccurring basis.

D.2) Administrative and Technical Capability

Staff/ Personnel Resources	Available (Y or N)	Department/ Agency/ Position
Planner(s) or Engineer(s) with knowledge of land development and land management practices	N	
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	N	
Planners or engineers with an understanding of natural hazards	N	
NFIP Floodplain Administrator	Y	
Surveyor(s)	N	
Personnel skilled or trained in “GIS” applications	N	
Scientist(s) familiar with natural hazards in the County.	N	
Emergency Manager	Y	
Grant Writer(s)	Y	
Staff with expertise or training in benefit/cost analysis	N	

D.3) Fiscal Capability

Financial Resources	Accessible or Eligible to use (Yes/No/Don’t know)
Community Development Block Grants (CDBG)	TBD
Capital Improvements Project Funding	Working on a plan
Authority to Levy Taxes for specific purposes	Yes
User fees for water, sewer, gas or electric service	No
Impact Fees for homebuyers or developers of new development/homes	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	TBD
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	Yes
Other	

D.4) Community Classifications

Program	Classification	Date Classified
Community Rating System (CRS)	NP	N/A
Building Code Effectiveness Grading Schedule (BCEGS)	TBD	TBD
Public Protection	TBD	TBD
Storm Ready	County	TBD
Firewise	NP	N/A

N/A = Not applicable. NP = Not participating. - = Unavailable. TBD = To Be Determined

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at http://www.isomitigation.com/ppc/0000/ppc0001.html
- The National Weather Service Storm Ready website at http://www.weather.gov/stormready/howto.htm
- The National Firewise Communities website at http://firewise.org/

Expanding on and Improving Existing Policies and Programs

By adopting updated codes, including fire, building and NFIP ordinances this jurisdiction will continue to improve their mitigation approach. Also, by employing a grant writer, leveraging available monies will continue to improve mitigation program capabilities.

In addition, by participating in multi-jurisdictional training and radio interoperability, public safety agencies bolster their response capabilities. This, along with reinforcement from Annual Equipment Agreements with Oklahoma County, ensures continued improvement within the jurisdiction.

Moreover, this jurisdiction participates in Wildland Automatic Response (or WAR – an automatic mutual aid agreement during high wildland hazard days). This ensures a greater response to wildland fires.

E.) PROPOSED HAZARD MITIGATION INITIATIVES

Note some of the identified mitigation initiatives in Table F are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities.

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Expand the existing outdoor warning system with additional devices to improve public threat warnings / notifications.		Wind (incl. Tornado)	Planned	Forest Park Emergency Management working with Town DPW	High (life safety)	Medium-High	Federal and State Emergency Preparedness Grants; Local Budgets	Short	Medium
Maintain compliance with and good-standing in the NFIP including adoption and enforcement of floodplain management requirements (e.g. regulating all new and substantially improved construction in Special Hazard Flood Areas), floodplain identification and mapping, and flood insurance outreach to the community.	New & Existing	NFIP Compliance	Ongoing	Municipality (via Municipal Engineer/NFIP Floodplain Administrator) with support from OEM, ISO FEMA	High	Low - Medium	Local Budget	Ongoing	High
Begin the process to adopt higher regulatory standards to manage flood risk (i.e. increased freeboard, cumulative substantial	New & Existing	NFIP Compliance	Ongoing	Municipality (via Municipal Engineer/NFIP Floodplain Administrator) with support from OEM,	Low	Low	Municipal Budget	Short	Low

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
damage/improvements).				FEMA					
Conduct and facilitate community and public education and outreach for residents and businesses to include, but not be limited to, the following to promote and effect natural hazard risk reduction: • Provide and maintain links to the HMP website, and regularly post notices on the County/municipal homepage(s) referencing the HMP webpages. • Prepare and distribute informational letters to flood vulnerable property owners and neighborhood associations, explaining the availability of mitigation grant funding to mitigate their properties, and instructing them on how they can learn more and implement mitigation. • Use email notification systems and newsletters to better educate the public on flood insurance, the availability of mitigation grant funding, and personal natural hazard risk reduction measures. • Work with neighborhood associations, civic and business groups to disseminate information on flood insurance and the availability of mitigation grant funding.									
See above.	NA	Flood	Ongoing	Municipality with support from Planning Partners, OEM, FEMA	Low - Medium	Low - Medium	Municipal Budget; HMA programs with local or county match	Short	High
Archive elevation certificates	NA	NFIP Compliance	Ongoing	NFIP Floodplain Administrator	Low	Low	Local Budget	On-going	High
Widen the drainage ditches at NE 36th and NE 50th between Bryant and Coltrane to prevent road damage		Flood	Planned	EM	High	Medium	HMGP	Short	Medium
Distribute All-Hazards Weather Radios to elderly and special needs citizens and others		Drought, Flood, Earthquake, Extreme Temps, Hail, Lightning, Wind (incl. Tornado), Wildfire, Winter Storm	Ongoing	EM	High	Low	HMGP	Short	High
Distribute mitigation information materials at schools to students		Drought, Earthquake, Expansive	Ongoing	EM	High	Low	Local budget	Short	Medium

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
		Soil, Extreme Temps, Flood, Hail, Lightning, Wind (incl. Tornado), Wildfire, Winter Storm							
Enact a regulation to require a check for expansive soils prior to building a city building and perform soil stabilization if expansive soils are found.	New	Expansive Soil	Planned	City Inspector	High	Low	Local budget	Short	Medium
Enact a building code requiring hail resistant materials for roofing and siding on residential and commercial structures	New & Existing	Hail	Planned	City Inspector	Medium	Low	Local budget	Short	Low
Install lightning protection and suppression systems protecting radios, computers, and other essential equipment at critical facilities	Existing	Lightning	Planned	City Inspector	High	Low	Local budget	Short	Low
Manage a residential safe room installation program to reduce the risk of injury and/or loss of life	New & Existing	Wind (incl. Tornado)	Planned	EM, with City Inspector	High	High	HMGP	Short	Medium
Install dry hydrant in city pond for additional wildfire suppression support	Existing	Wildfire	Planned	Fire Chief	High	Medium	HMGP or Local budget	Short	High
Adopt ordinances	New and	Wildfire	Planned	Code Officer	High	Low	Local budget	Short	Medium

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
regulating defensible space around structures in the Wildland-Urban Interface zone	Existing								

Notes:
*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (NA) is inserted if this does not apply.

Costs:
Where actual project costs have been reasonably estimated:
Low = < $10,000
Medium = $10,000 to $100,000
High = > $100,000
Where actual project costs cannot reasonably be established at this time:
Low = Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium = Could budget for under existing work-plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High = Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:
Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:
Low = < $10,000
Medium = $10,000 to $100,000
High = > $100,000
Where numerical project benefits cannot reasonably be established at this time:
Low = Long term benefits of the project are difficult to quantify in the short term.
Medium = Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High = Project will have an immediate impact on the reduction of risk exposure to life and property.

Potential FEMA HMA Funding Sources:
PDM = Pre-Disaster Mitigation Grant Program
FMA = Flood Mitigation Assistance Grant Program
RFC = Repetitive Flood Claims Grant Program
SRL = Severe Repetitive Loss Grant Program
HMGP = Hazard Mitigation Grant Program

Timeline:
Short = 1 to 5 years. Long Term= 5 years or greater. OG = On-going program. DOF = Depending on funding.

Explanation of Priorities

- ***High Priority*** - A project that meets multiple objectives (i.e., multiple hazards), benefits exceeds cost, has funding secured or is an on-going project and project meets eligibility requirements for the Hazard Mitigation Grant Program (HMGP) or Pre-Disaster Mitigation Grant Program (PDM) programs. High priority projects can be completed in the short term (1 to 5 years).

- ***Medium Priority*** - A project that meets goals and objectives, benefits exceeds costs, funding has not been secured but project is grant eligible under, HMGP, PDM or other grant programs. Project can be completed in the short term, once funding is completed. Medium priority projects will become high priority projects once funding is secured.

- ***Low Priority*** - Any project that will mitigate the risk of a hazard, benefits do not exceed the costs or are difficult to quantify, funding has not been secured and project is not eligible for HMGP or PDM grant funding, and time line for completion is considered long term (1 to 10 years). Low priority projects may be eligible other sources of grant funding from other programs. A low priority project could become a high priority project once funding is secured as long as it could be completed in the short term.

Prioritization of initiatives was based on above definitions: Yes

Prioritization of initiatives was based on parameters other than stated above: Not applicable.

F.) FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

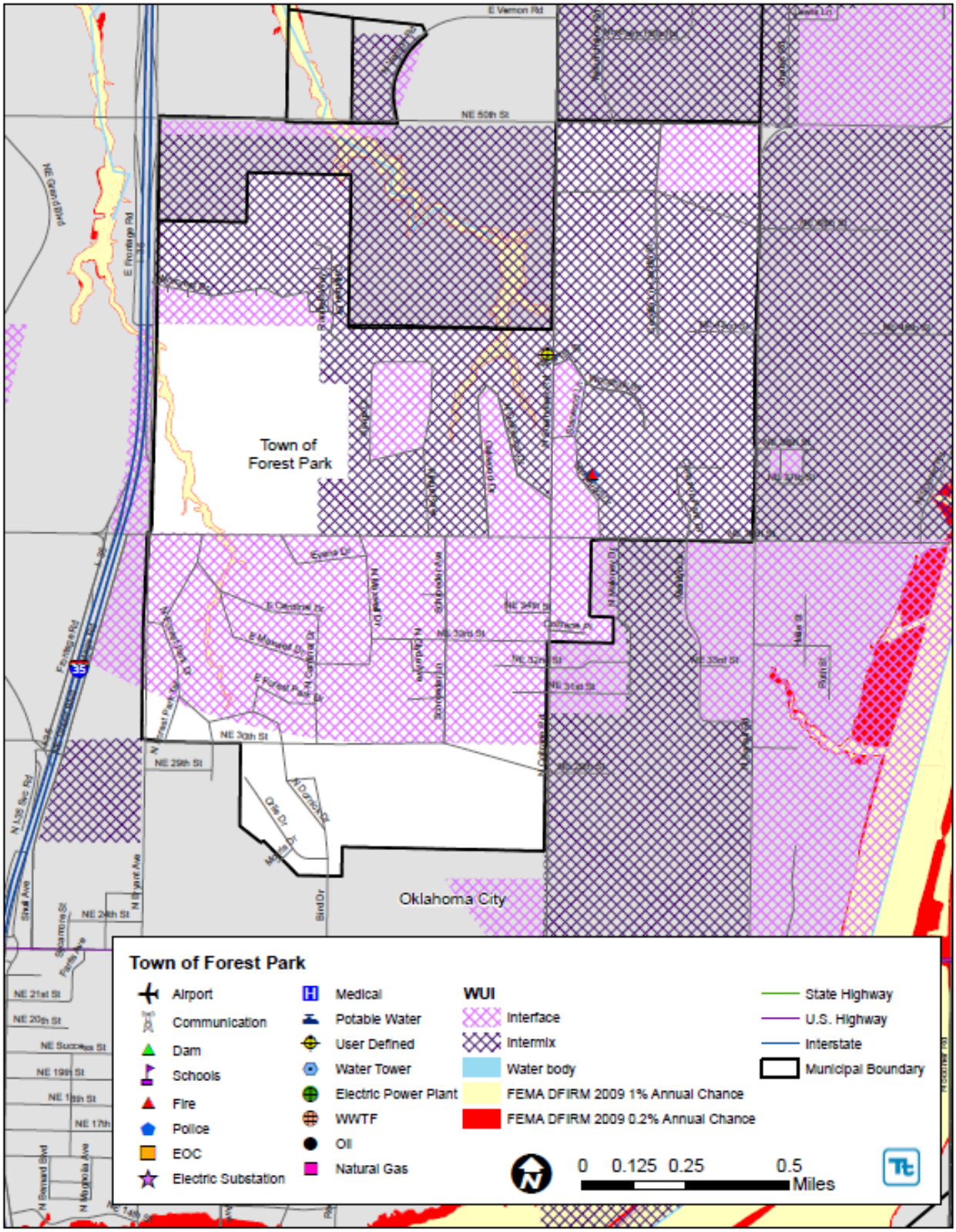
None at this time.

G.) HAZARD AREA EXTENT AND LOCATION

A hazard area extent and location map has been generated and is provided below for the Town of Forest Park to illustrate the probable areas impacted within the Town of Forest Park. This map is based on the best available data at the time of the preparation of this Plan, and is considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the Town of Forest Park has significant exposure.

H.) ADDITIONAL COMMENTS

No additional comments at this time.


Town of Forest Park
Oklahoma City
Town of Forest Park
Airport
Communication
Dam
Schools
Fire
Police
EOC
Electric Substation
Medical
Potable Water
User Defined
Water Tower
Electric Power Plant
WWTF
Oil
Natural Gas
WUI
Interface
Intermix
Water body
FEMA DFIRM 2009 1% Annual Chance
FEMA DFIRM 2009 0.2% Annual Chance
State Highway
U.S. Highway
Interstate
Municipal Boundary
0 0.125 0.25 0.5
Miles

9.8 CITY OF HARRAH

This section presents the jurisdictional annex for the City of Harrah.

A.) HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact	Alternate Point of Contact
Robert Young, Fire Chief 19625 NE 23rd, P.O. Box 636, Harrah, OK 73045 (405) 454-2111 robert.young@cityofharrah.com	Dewayne Jenkins, Fire Capt 19625 NE 23rd, P.O. Box 636, Harrah, OK 73045 (405) 454-2111 maddawgd@yahoo.com

B.) MUNICIPAL PROFILE

The City of Harrah is located in the southeast corner Oklahoma County. The City is bordered to the north by Oklahoma City, to the south by Oklahoma City, to the east by Lincoln County and to the west by the City of Choctaw. The City of Harrah has a total land area of 11.9 square miles, all of it land. The City is governed by a mayor and four member city council. The 2010 U.S. Census population for the City of Harrah was 5,095.

Past Mitigation Activity/Efforts

Each initiative from the 2013 plan was reviewed going forward into this 2019 plan. Any initiatives that were completed or abandoned are stated below, while any new or ongoing initiatives will be found under the Proposed Hazard Mitigation Initiatives header of this section.
The following table summarizes progress on the mitigation strategy identified by the City of Harrah in the 2013 plan.

Abandoned Initiatives	Comments
Distribute All Hazard Weather radios to senior centers and other high risk residents	Abandoned due to lack of funding.
Enact a regulation to require a check for expansive soils prior to building a city building and perform soil stabilization if expansive soils are found.	This initiative was abandoned due to no expansive soils in the jurisdiction.

Further details on mitigation activities completed or ongoing in the City of Harrah include:

- Straight Street flooding – completed
- Drainage improvement, building elevation – on-going

Hazard Vulnerabilities Identified

Hazard profiling, Section 5.3, has identified that the City of Harrah is vulnerable to the following hazards of concern:

Hazard	Local Vulnerability	Comments
Dam Failure	Yes	Canton Lake, Overholser - See local hazard map end of section
Drought	Yes	
Earthquake	Yes	
Expansive Soils	No	
Extreme Temperatures	Yes	
Flooding	Yes	See local hazard map end of section
Hail	Yes	
Lightning	Yes	
Wildfire	Yes	See local hazard map end of section
Wind (incl. tornado)	Yes	
Severe Winter Storm	Yes	

According to the City of Harrah, the following have been identified as specific hazard vulnerabilities in the City:

- Flood Zone Areas around North Canadian River

Vulnerability assessment modeling has identified the following flood vulnerabilities (see Flood Hazard Profile in Section 5.3.6):

Critical Facilities Located in the DFIRM Flood Boundaries and Estimated Potential Damage from the 100- and 500-Year MRP Events

Name	Municipality	Type	Exposure		Potential Loss			
			100-Yr	500-Yr	100-Yr Structure Damage %	100-Yr Content Damage %	500-Yr Structure Damage %	500-Yr Content Damage %
HARRAH MS	Harrah (C)	School	X	X	-	-	-	-
VIRGINIA SMITH ES	Harrah (C)	School	X	X	-	-	-	-
CLARA REYNOLDS ES	Harrah (C)	School	X	X	-	-	-	-
HARRAH JHS	Harrah (C)	School	X	X	-	-	-	-

Source: FEMA, 2009;
Notes: 'X' indicates the facility location as provided by Oklahoma County's Planning Committee is located in the DFIRM flood zone.

Growth/Development Trends

The following major residential/commercial development and major infrastructure development are currently known or anticipated in the City of Harrah:						
Property Name	**Type Residential or Commercial**	**Number of Structures**	**Address**	**Block and Lot**	**Known Hazard Zone**	**Description/Status**
Fall Creek	Residential	250	Reno & S. Harrah Road			196 completed to date.
Padre Pio	Residential	270	½ mile south of SE 29th-East Side of Harrah Road			In Progress
Piper Glenn	Residential	18	¼ mile north of Reno and Peebly			In Progress
Legacy Point	Residential	52	¾ mile south of Reno & XXX			In Progress

Development in the City of Harrah has resulted in a slight increase in WUI fire risk. Flood risk has been slightly reduced by improved drainage in the areas of development due to floodplain and building code enforcement.

C.) NATURAL HAZARD EVENT HISTORY SPECIFIC TO THE CITY

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
June 8-10, 1974	Flooding	DR-441	Yes	
November 26, 1974	Flooding	DR-453	Yes	
October 17-19, 1983	Flooding	DR-693	Yes	
September 29 – October 1, 1986	Flooding	DR-778	Yes	
May 2, 1990	Flooding, Tornado	DR-866	Yes	
May 8, 1993	Tornadoes	DR-991	Yes	
June 9, 1993	Flash Flooding	N/A	N/A	
July 26 – August 2, 1995	Tornado, Flooding	DR-1066	Yes	
April 24-26, 1999	Flooding	N/A	N/A	
May 3-4, 1999	Tornadoes, Flooding	DR-1272	Yes	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
June 23, 1999	Flash Flooding	N/A	N/A	
October 21-29, 2000	Flooding	DR-1349	Yes	
May 30, 2001	Flooding	N/A	N/A	
September 7, 2001	Urban Flooding	N/A	N/A	
August 11-12, 2004	Flash Flood	N/A	N/A	
March 12, 2006	Tornadoes	DR-1637	No	
December 28-30, 2006	Severe Winter Storm	DR-1677	No	
January 12-26, 2007	Severe Winter Storms	DR-1678	No	
March 29, 2007	Tornadoes	N/A	N/A	
May 4-11, 2007	Tornadoes, Flooding	DR-1707	No	NE 50th and Harrah Road were closed due to flooding.
May 24, 2007 to June 1, 2007	Flooding, Tornadoes	DR-1723	No	
June 10, 2007 to July 25, 2007	Flooding, Tornadoes	DR-1712	Yes	Two feet of water was reported on the roadway at NE 50th and Harrah Road.
Aug. 18, 2007 to Sept. 12, 2007	Tornadoes, Flooding	DR-1718	Yes	
Dec. 8, 2007 to Jan. 3, 2008	Severe Winter Storms	DR-1735	Yes	Multiple power outages/lines down due to ice. Inaccessible roadways due to down trees/power lines. Areas w/o power 10 days.
March 17-23, 2008	Tornadoes, Flooding	DR-1752	No	
March 22, 2008	Wildfire	N/A	N/A	
March 30-31, 2008	Severe Storms	N/A	N/A	
April 9-28, 2008	Tornadoes, Flooding	DR-1754	No	
April 30, 2008	Hail/Damaging Winds	N/A	N/A	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
May 9, 2008	Floods	DR-1754	No	
May 10-13, 2008	Tornadoes, Flooding	DR-1756	No	
June 3-20, 2008	Flooding	DR-1775	No	
August 20, 2008	Flooding	N/A	N/A	
September 12-19, 2008	Tornadoes, Flooding	DR-1803	No	
February 10-11, 2009	Tornadoes	DR-1820	Yes	
March 24, 2009	Severe Storms	N/A	N/A	
March 26-27, 2009	Snow/Ice/Severe Storm	N/A	N/A	
March 30, 2009	Severe T-Storm	N/A	N/A	
April 9-12, 2009	Wildfires	DR-1846	Yes	
May 13, 2009	Severe Storms	N/A	N/A	
December 24-25, 2009	Severe Winter Storm	DR-1876	No	
January 26-28, 2009	Severe Winter Storm	DR-1823	No	
2010-2011	Severe Drought	N/A	N/A	
January 28-30, 2010	Severe Winter Storm	DR-1883	No	
Jan. 30-Feb. 9, 2010	Severe Winter Storm	N/A	N/A	
March 19, 2010	Severe Winter Storm	N/A	N/A	
May 10-13, 2010	Tornadoes, Straight-Line Winds	DR-1917	Yes	Multiple structures damaged/destroyed. Search/Rescue efforts. Power outages. Lights set up in heavily damaged areas. Inaccessible roadways due to debris. 1 fatality reported as a result of the storm.
May 16, 2010	Hail Storm	N/A	N/A	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
May 19, 2010	Severe Storm	N/A	N/A	
June 13-15, 2010	Tornadoes, Straight-line Winds, and Flooding	DR-1926	Yes	
July 7-8, 2010	Flooding	N/A	N/A	
Oct. 13, 2010	Earthquake	N/A	N/A	
Jan. 31, 2011 to Feb. 5, 2011	Severe Winter Storm and Snowstorm	DR-1985	No	
March 11, 2011	Wildfires	N/A	N/A	29 residential and commercial buildings were lost or heavily damaged in the City; electrical, gas and cable services were out; roads were closed; shelters were open and several facilities were evacuated.
April 14, 2011	Tornadoes, Straight-Line Winds	DR-1970	No	
April 21-28, 2011	Flooding	DR-1988	No	
May 22-25, 2011	Tornadoes, Straight-line Winds, and Flooding	DR-1989	No	
June-August 2011	Severe Heat	N/A	N/A	
November 6, 2011	Earthquake	N/A	N/A	5.6 magnitude earthquake near Prague; depth of 5.2 km
May 31-June 1st, 2013	Severe Storms, Flooding	DR-4117	Yes	The area received 7-8" of rain.
November 27-28, 2015	Winter Storm	DR-4247	Yes	Ice storm.
December 27-28, 2015	Winter Storm	DR-4256	No	Ice storm with widespread power outages.
September 3, 2016	Earthquake	N/A	N/A	5.8 magnitude earthquake at Pawnee; depth of 5.4 km

Number of FEMA Identified Repetitive Flood Loss Properties: 0
Number of FEMA Identified Severe Repetitive Flood Loss Properties: 0

Source: Oklahoma Water Resources Board (OWRB)

Wildfire History for Harrah

	Loss	Acres
2018	$0	14.0
2017	$0	5.0
2016	$200	135.0
2015	$38,400	180.0
2014	$300	10.0
2013	$500	17.0
2012	$0	11.0
2011	$297,960	1,936.0
2010	$0	23.0
2009	$1,200	47.0
2008	$0	74.0
2007	$0	13.0
2006	$1,000	146.0
2005	$0	11.0
2004	$0	33.0
TOTAL LOSS	**$339,560**	**2,655.0**

Acres may include loss from wildland, grass, brush, crop, orchard and nursery fires. Harrah's fire district includes several miles of Unincorporated Oklahoma County either side of the incorporated city, from NE 63rd St to SE 29th St.

Source: Oklahoma State Fire Marshal's office

D.) CAPABILITY ASSESSMENT

This section identifies the following mitigation capabilities within Unincorporated Oklahoma County:

- Legal and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Community classification.

D.1) Legal and Regulatory Capability

Regulatory Tools (Codes, Ordinances., Plans)	Do you have this? (Y or N)	Code Citation (Section, Paragraph, Page Number, Date of adoption)	HM Plan integration into plan	Update cycle	Party(s) responsible for updating document
Building Code	Y	5-101 Ord 1984-6, February 16, 1984			
Comprehensive / Master Plan	N	Expired 2010	No		
Zoning Management Ordinance	Y	12-215, 1986			
Subdivision Management Ordinance	Y	12-215, 1986			
Site Plan Review Requirements	Y	In-house requirements			
NFIP Flood Damage Prevention Ordinance (if you are in the NFIP, you must have this!)	Y	12-215.5 Ord 1991-13, August 1, 1991 Ord 2002-08-114			
NFIP Elevation Certificates Maintained	Y	12-215, 1986			
Floodplain Management Plan	Y	12-215, 1986	Yes	Irregular/as needed	Floodplain Manager
Stormwater Management Plan / Ordinance	Y	12-215, 1986	No		
Stream Corridor Management or Protection Plan	Y	12-215, 1986	No		
Erosion Management Ordinance	Y	12-215, 1986			
Capital Improvements Plan	N				
Open Space Plan	N				
Economic Development Plan	Y	Industrial Trust	No		
Emergency Response Plan	Y		No		
Post Disaster Recovery Plan /	N	Hazard Mitigation			

Regulatory Tools (Codes, Ordinances., Plans)	Do you have this? (Y or N)	Code Citation (Section, Paragraph, Page Number, Date of adoption)	HM Plan integration into plan	Update cycle	Party(s) responsible for updating document
Ordinance		Plan			
Real Estate Disclosure Requirements	N				
Highway Management Plan	N				
COOP/COG Plan	N				
Other (Special Purpose Ordinances such as critical or sensitive areas)					

Additionally, any change in ordinances happens at the behest of local government bodies, state legislation or court actions and are not on a scheduled reoccurring basis.

D.2) Administrative and Technical Capability

Staff/ Personnel Resources	Available (Y or N)	Department/ Agency/ Position
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Y	Myers Engineering Wiley Rice, City Planner
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Y	Myers Engineering Wiley Rice, City Planner
Planners or engineers with an understanding of natural hazards	Y	Myers Engineering Wiley Rice, City Planner
NFIP Floodplain Administrator (if you are in the NFIP, you must have this person designated – often your code official)	Y	Chris Bain, Floodplain Manager Code Enforcement / Building Inspector
Surveyor(s)	Y	George Davis, Surveyor
Personnel skilled or trained in “GIS” applications	N	
Scientist(s) familiar with natural hazards in the County.	N	
Emergency Manager	Y	DeWayne Jenkins, Sr. Firefighter
Grant Writer(s)	Y	Sue Musch, PT Receptionist / City Manager Secretary
Staff with expertise or training in benefit/cost analysis	Y	Michele Cogdill, Finance / HR Director

D.3) Fiscal Capability

Financial Resources	Accessible or Eligible to use (Yes/No/Don't know)
Community Development Block Grants (CDBG)	Yes, previously used
Capital Improvements Project Funding	Yes, previously used
Authority to Levy Taxes for specific purposes	Yes, previously used
User fees for water, sewer, gas or electric service	Yes, previously used
Impact Fees for homebuyers or developers of new development/homes	Yes, previously used
Incur debt through general obligation bonds	Yes, previously used
Incur debt through special tax bonds	Yes
Incur debt through private activity bonds	Don't Know
Withhold public expenditures in hazard-prone areas	Don't Know
Other	

D.4) Community Classifications

Program	Classification	Date Classified
Community Rating System (CRS)	NP	N/A
Building Code Effectiveness Grading Schedule (BCEGS)	TBD	TBD
Public Protection	TBD	TBD
Storm Ready	County	TBD
Firewise	NP	N/A

N/A = Not applicable. NP = Not participating. - = Unavailable. TBD = To Be Determined

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at http://www.isomitigation.com/ppc/0000/ppc0001.html
- The National Weather Service Storm Ready website at http://www.weather.gov/stormready/howto.htm
- The National Firewise Communities website at http://firewise.org/

Expanding on and Improving Existing Policies and Programs

By adopting updated codes, including fire, building and NFIP ordinances this jurisdiction will continue to improve their mitigation approach. Furthermore, employing experts in land management and construction practices, in coordination with planners and engineers with understanding of natural hazards, the overall stratagem will continue to advance.

In addition, by participating in multi-jurisdictional training and radio interoperability, public safety agencies bolster their response capabilities. This, along with reinforcement from Annual Equipment Agreements with Oklahoma County, ensures continued improvement within the jurisdiction.

Moreover, this jurisdiction participates in Wildland Automatic Response (or WAR – an automatic mutual aid agreement during high wildland hazard days). This ensures a greater response to wildland fires.

E.) PROPOSED HAZARD MITIGATION INITIATIVES

Note some of the identified mitigation initiatives in Table F are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities.

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
AC/DC Emergency Storm Sirens –to alert the citizens of Harrah and surrounding areas of severe weather conditions, wildfires, floods, and hazardous chemical spills and other types of emergencies	N/A	Flood, Wind (incl. Tornado), Wildfire	Planned	City Fire Department	High (life safety)	Medium $25,000 each	City Funds, HMGP, other grants, land developers	Ongoing, Long Term	High
Maintain compliance with and good-standing in the NFIP including adoption and enforcement of floodplain management requirements (e.g. regulating all new and substantially improved construction in Special Hazard Flood Areas), floodplain identification and mapping, and flood insurance outreach to the community.	New & Existing	NFIP Compliance	Ongoing	Municipality (via Municipal Engineer/NFIP Floodplain Administrator) with support from OEM, ISO FEMA	High	Low – Medium	Local Budget	Ongoing	High
Begin the process to adopt higher regulatory standards to manage flood risk (i.e. increased freeboard, cumulative substantial damage/improvements).	New & Existing	NFIP Compliance	Ongoing	Municipality (via Municipal Engineer/NFIP Floodplain Administrator) with support from OEM, FEMA	Low	Low	Municipal Budget	Short	High

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Conduct and facilitate community and public education and outreach for residents and businesses to include, but not be limited to, the following to promote and effect natural hazard risk reduction: • Provide and maintain links to the HMP website, and regularly post notices on the County/municipal homepage(s) referencing the HMP webpages. • Prepare and distribute informational letters to flood vulnerable property owners and neighborhood associations, explaining the availability of mitigation grant funding to mitigate their properties, and instructing them on how they can learn more and implement mitigation. • Use email notification systems and newsletters to better educate the public on flood insurance, the availability of mitigation grant funding, and personal natural hazard risk reduction measures. • Work with neighborhood associations, civic and business groups to disseminate information on flood insurance and the availability of mitigation grant funding.									
See above.	NA	Flood	Ongoing	Municipality with support from Planning Partners, OEM, FEMA	Low – Medium	Low – Medium	Municipal Budget; HMA programs with local or county match	Short	High
Have designated NFIP Floodplain Administrator (FPA) become a Certified Floodplain Manager through the ASFPM, and pursue relevant continuing education training such as FEMA Benefit-Cost Analysis.	N/A	NFIP Compliance	Ongoing	NFIP Floodplain Administrator	Medium	Low	Municipal Budget	Short (DOF)	High
Archive elevation certificates	NA	NFIP Compliance	Ongoing	NFIP Floodplain Administrator	Low	Low	Local Budget	On-going	High
Conduct All-Hazard mitigation classes through town hall meetings and senior centers		Dam Failure, Drought, Earthquake, Extreme Temperatures, Flood, Hail, Lightning, Wind (incl. Tornado), Wildfire, Winter Storms	Ongoing	Fire Department	High	$6,000	City budget	Long	Low

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Distribute All-Hazard Weather Radios to senior centers and other high risk residents		Dam Failure, Drought, Earthquake, Extreme Temperatures, Flood, Hail, Lightning, Wind (incl. Tornado), Wildfire, Winter Storms	Ongoing	Fire Department	High	$130,000	HMGP, City budget	Long	Low
Volunteer acquisition of homes in flooding areas within jurisdiction.	Existing	Flood	Planned	City of Harrah		High (approx. $150,000)	City Funds, RFC	Short	Medium

Notes:
*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (NA) is inserted if this does not apply.

Costs:
Where actual project costs have been reasonably estimated:
Low = < $10,000
Medium = $10,000 to $100,000
High = > $100,000
Where actual project costs cannot reasonably be established at this time:
Low = Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium = Could budget for under existing work-plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High = Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:
Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:
Low = < $10,000
Medium = $10,000 to $100,000
High = > $100,000
Where numerical project benefits cannot reasonably be established at this time:
Low = Long term benefits of the project are difficult to quantify in the short term.
Medium = Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High = Project will have an immediate impact on the reduction of risk exposure to life and property.

Potential FEMA HMA Funding Sources:
PDM = Pre-Disaster Mitigation Grant Program
FMA = Flood Mitigation Assistance Grant Program
RFC = Repetitive Flood Claims Grant Program
SRL = Severe Repetitive Loss Grant Program
HMGP = Hazard Mitigation Grant Program

Timeline:
Short = 1 to 5 years. Long Term= 5 years or greater. OG = On-going program.
DOF = Depending on funding.

Explanation of Priorities

- ***High Priority*** - A project that meets multiple objectives (i.e., multiple hazards), benefits exceeds cost, has funding secured or is an on-going project and project meets eligibility requirements for the Hazard Mitigation Grant Program (HMGP) or Pre-Disaster Mitigation Grant Program (PDM) programs. High priority projects can be completed in the short term (1 to 5 years).

- ***Medium Priority*** - A project that meets goals and objectives, benefits exceeds costs, funding has not been secured but project is grant eligible under, HMGP, PDM or other grant programs. Project can be completed in the short term, once funding is completed. Medium priority projects will become high priority projects once funding is secured.

- ***Low Priority*** - Any project that will mitigate the risk of a hazard, benefits do not exceed the costs or are difficult to quantify, funding has not been secured and project is not eligible for HMGP or PDM grant funding, and time line for completion is considered long term (1 to 10 years). Low priority projects may be eligible other sources of grant funding from other programs. A low priority project could become a high priority project once funding is secured as long as it could be completed in the short term.

Prioritization of initiatives was based on above definitions: Yes

Prioritization of initiatives was based on parameters other than stated above: Not applicable.

F.) FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

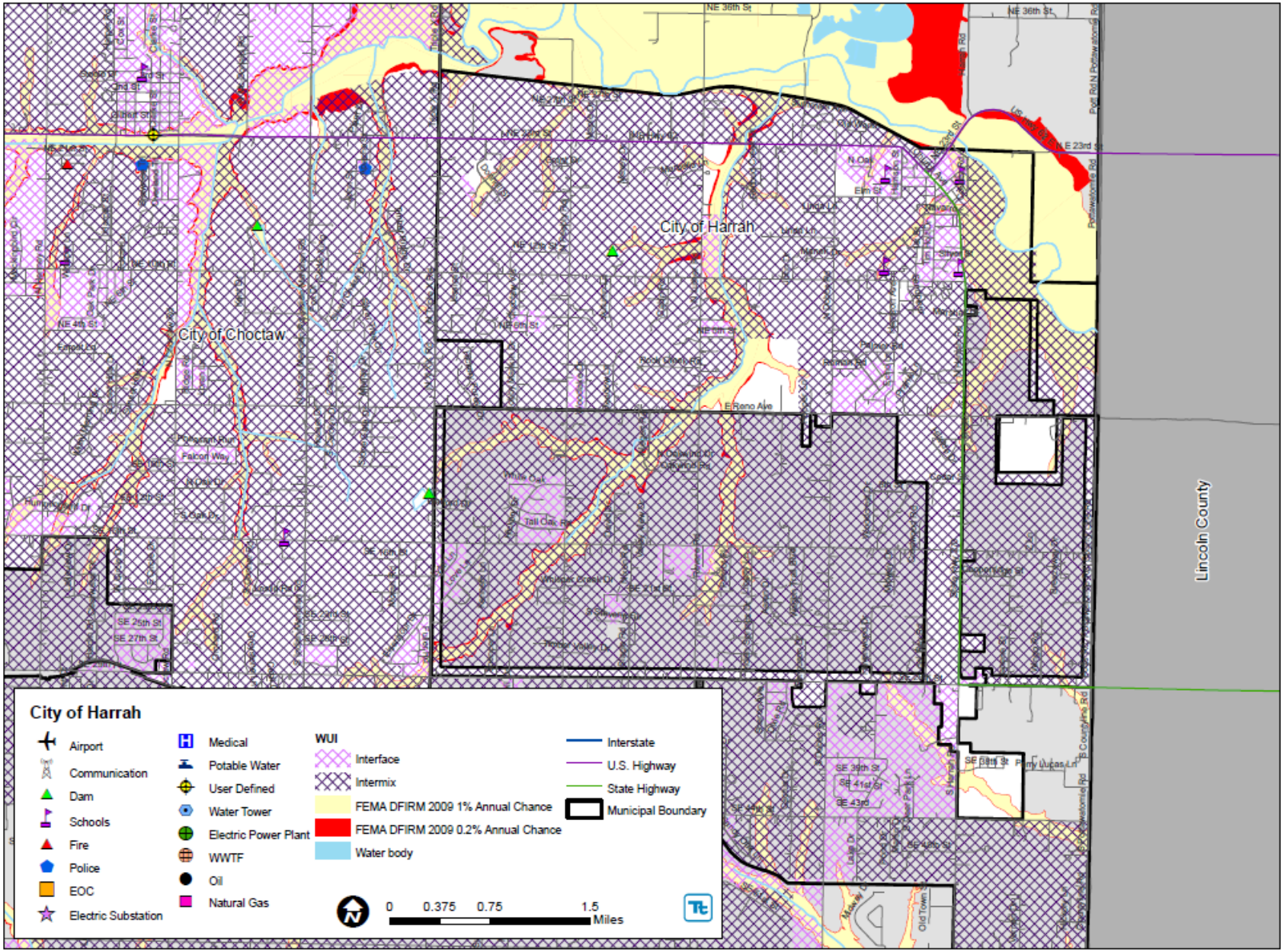
None at this time.

G.) HAZARD AREA EXTENT AND LOCATION

A hazard area extent and location map has been generated and is provided below for the City of Harrah to illustrate the probable areas impacted within the City of Harrah. This map is based on the best available data at the time of the preparation of this Plan, and is considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the City of Harrah has significant exposure.

H.) ADDITIONAL COMMENTS

No additional comments at this time.


City of Harrah
City of Choctaw
Lincoln County
City of Harrah
Airport
Communication
Dam
Schools
Fire
Police
EOC
Electric Substation
Medical
Potable Water
User Defined
Water Tower
Electric Power Plant
WWTF
Oil
Natural Gas
WUI
Interface
Intermix
FEMA DFIRM 2009 1% Annual Chance
FEMA DFIRM 2009 0.2% Annual Chance
Water body
Interstate
U.S. Highway
State Highway
Municipal Boundary
0 0.375 0.75 1.5
Miles

9.9 TOWN OF LUTHER

This section presents the jurisdictional annex for the Town of Luther.

A.) HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact	Alternate Point of Contact
John Brown, Fire Chief, Emergency Manager 110 S. Ash St., Luther, OK 73054 (405) 277-3883 firechief@townoflutherok.com	

B.) MUNICIPAL PROFILE

The Town of Luther is located in northeastern Oklahoma County. The Town is bordered to the north and south by Oklahoma City, to the east by Lincoln County and to the west by the Town of Edmond and Oklahoma City. The Town of Luther has a total land area of 4.5 square miles, all of it land. The 2010 U.S. Census population for the Town of Luther was 1,221.

Growth/Development Trends

Modest residential development is anticipated on the north side of Route 66.
Development is proposed around NE 206 (Covell Rd) and ½ mile east of Luther Rd, near the river.
The development around NE 206 (Covell Rd) is expected to cause a slight increase to the WUI fire risk
Building codes and NFIP requirements are expected to negate an increased risk of flooding.

The Oklahoma Turnpike Authority is constructing a turnpike from I-44 to I-40 that cuts through the southwest part of Luther from east of Luther Rd and I-44, crossing NE 150th St. west of Luther Rd.

Past Mitigation Activity/Efforts

Each initiative from the 2013 plan was reviewed going forward into this 2019 plan. Any initiatives that were completed or abandoned are stated below, while any new or ongoing initiatives will be found under the Proposed Hazard Mitigation Initiatives header of this section.
The following table summarizes progress on the mitigation strategy identified by the Town of Luther in the 2013 plan.

Completed 2013 Initiative Description	Comments
Luther Fire Dept developed an EOC and expanded the fire dept. building at the corner of Luther Rd and 2nd Street.	
The Oklahoma County Highway District #3 will need to rebuild the apron of the State Highway 66 bridge and/or rebuild the south side of the bridge to help improve flow of the Deep Fork River under it, and to reduce the buildup of floating debris which causes localized flooding and endangers the bridge structure.	This mitigated flooding along Route 66.
Provide backup power for two (2) wastewater lift stations	
Provide backup power for three potable water wells	
Begin the process to develop and adopt an ordinance for additional freeboard (18" in 100-year zone, 12" in 500-year zone).	

Completed 2013 Initiative Description	Comments
Adopt ordinance requiring any mobile homes, campers, RVs to be required to get a building permit if occupied more than 180 days. Building permits will require compliance with FDPO and 18" freeboard requirement.	
Provide backup power (generator) at police station	

Abandoned 2013 Initiative Description	Comments
Enact a regulation to require a check for expansive soils prior to building a city building and perform soil stabilization if expansive soils are found.	NRCS data shows no significant areas of expansive soils.

Hazard Vulnerabilities Identified

Hazard profiling, Section 5.3, has identified that the Town of Luther is vulnerable to the following hazards of concern:

Hazard	Local Vulnerability	Comments
Dam Failure	Yes	Arcadia Lake - See local hazard map end of section
Drought	Yes	
Earthquake	Yes	
Expansive Soils	No	No significant areas
Extreme Temperatures	Yes	
Flooding	Yes	See local hazard map end of section
Hail	Yes	
Lightning	Yes	
Wildfire	Yes	See local hazard map end of section
Wind (incl. tornado)	Yes	
Severe Winter Storm	Yes	

According to the Town of Luther, the following have been identified as specific hazard vulnerabilities:

- Wastewater lift stations are vulnerable to flooding (but now have generators).
- Potable water system is vulnerable to lightning
- Residences and potential new development on the north side of Route 66 lack fire protection
- Warning systems are inadequate and lack sirens to the north
- Many residents lack storm sheltering
- Town hall is vulnerable to hazard events (esp. wind). There are plans to relocate Town Hall to a better facility.
- Public Works has hazardous materials and city equipment located adjacent to the flood plain

Vulnerability assessment modeling has identified the following flood vulnerabilities (see Flood Hazard Profile in Section 5.3.6):

Critical Facilities Located in the DFIRM Flood Boundaries and Estimated Potential Damage from the 100- and 500-Year MRP Events

Name	Municipality	Type	Exposure		Potential Loss			
			100-Yr	500-Yr	100-Yr Structure Damage %	100-Yr Content Damage %	500-Yr Structure Damage %	500-Yr Content Damage %
Luther Mill And Farm Supply	Luther (T)	User Defined	X	X	-	-	-	-

Source: FEMA, 2009;

Utilities Located in the Preliminary DFIRM Flood Boundaries and Estimated Potential Damage from the 100- and 500-Year MRP Events

Name	Municipality	Type	Exposure		Potential Loss	
			100 Year	500 Year	100 Year Damage %	500 Year Damage %
Octagon Resources / Dynamic Booster Station	Luther (T)	Natural Gas	X	X	-	40.0
Wastewater Treatment Plant	Midwest City (C)	WWTF	X	X	20.2	10.9

Source: FEMA, 2009;

Notes:

(1) 'X' indicates the facility location as provided by Oklahoma County's Planning Committee is located in the DFIRM flood zone.

C.) NATURAL HAZARD EVENT HISTORY SPECIFIC TO THE TOWN

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
June 8-10, 1974	Flooding	DR-441	Yes	
November 26, 1974	Flooding	DR-453	Yes	
May 13, 1975	Tornado	N/A	N/A	
October 17-19, 1983	Flooding	DR-693	Yes	
September 29 – October 1, 1986	Flooding	DR-778	Yes	
May 2, 1990	Flooding, Tornado	DR-866	Yes	
May 8, 1993	Tornadoes	DR-991	Yes	
June 9, 1993	Flash Flooding	N/A	N/A	
July 26 – August 2, 1995	Tornado, Flooding	DR-1066	Yes	
April 24-26, 1999	Flooding	N/A	N/A	
May 3-4, 1999	Tornadoes, Flooding	DR-1272	Yes	
June 23, 1999	Flash Flooding	N/A	N/A	
October 21-29, 2000	Flooding	DR-1349	Yes	
May 30, 2001	Flooding	N/A	N/A	
September 7, 2001	Urban Flooding	N/A	N/A	
May 9, 2003	Tornado	N/A	N/A	Two injuries resulted from the F3 tornado. This tornado affected Jones as well.
August 11-12, 2004	Flash Flood	N/A	N/A	
November 10, 2004	Tornado	N/A	N/A	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
March 12, 2006	Tornadoes	DR-1637	No	
December 28-30, 2006	Severe Winter Storm	DR-1677	No	
January 12-26, 2007	Severe Winter Storms	DR-1678	No	
March 29, 2007	Severe Storms and Tornadoes	N/A	N/A	
May 4-11, 2007	Tornadoes, Flooding	DR-1707	No	
May 24, 2007 to June 1, 2007	Flooding, Tornadoes	DR-1723	No	
June 10, 2007 to July 25, 2007	Flooding, Tornadoes	DR-1712	Yes	
Aug. 18, 2007 to Sept. 12, 2007	Tornadoes, Flooding	DR-1718	Yes	
Dec. 8, 2007 to Jan. 3, 2008	Severe Winter Storms	DR-1735	Yes	
March 17-23, 2008	Tornadoes, Flooding	DR-1752	No	
March 22, 2008	Wildfire	N/A	N/A	
March 30-31, 2008	Severe T-Storms	N/A	N/A	
April 9-28, 2008	Tornadoes, Flooding	DR-1754	No	
April 30, 2008	Hail/Damaging Winds	N/A	N/A	
May 9, 2008	Floods	DR-1754	No	
May 10-13, 2008	Tornadoes, Flooding	DR-1756	No	
June 3-20, 2008	Flooding	DR-1775	No	
August 20, 2008	Flooding	N/A	N/A	
September 12-19, 2008	Tornadoes, Flooding	DR-1803	No	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
February 10-11, 2009	Tornadoes	DR-1820	Yes	
January 26-28, 2009	Severe Winter Storm	DR-1823	No	
February 10-11, 2009	Tornadoes	DR-1820	Yes	
March 24, 2009	Severe Storms	N/A	N/A	
March 26-27, 2009	Snow/Ice/Severe Storm	N/A	N/A	
March 30, 2009	Severe Storm	N/A	N/A	
April 9-12, 2009	Wildfires	DR-1846	Yes	
May 13, 2009	Severe Storms	N/A	N/A	
December 24-25, 2009	Severe Winter Storm	DR-1876	No	
2010-2011	Severe Drought	N/A	N/A	
January 28-30, 2010	Severe Winter Storm	DR-1883	No	
Jan. 30-Feb. 9, 2010	Severe Winter Storm	N/A	N/A	
March 19, 2010	Severe Winter Storm	N/A	N/A	
May 16, 2010	Hail Storm	N/A	N/A	
May 19, 2010	Severe Storm	N/A	N/A	
June 13-15, 2010	Tornadoes, Straight-line Winds, and Flooding	DR-1926	Yes	Yes, documentation of damages TBD.
May 10-13, 2010	Tornadoes, Straight-Line Winds	DR-1917	Yes	
July 7-8, 2010	Flooding	N/A	N/A	
Oct. 13, 2010	Earthquake	N/A	N/A	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
Jan. 31, 2011 to Feb. 5, 2011	Severe Winter Storm and Snowstorm	DR-1985	No	
April 14, 2011	Tornadoes, Straight-Line Winds	DR-1970	No	
April 21-28, 2011	Flooding	DR-1988	No	
May 22-25, 2011	Tornadoes, Straight-line Winds, and Flooding	DR-1989	No	
June-August 2011	Extreme Heat	N/A	N/A	
November 6, 2011	Earthquake	N/A	N/A	5.6 Magnitude near Prague
August 03, 2012	Wildfire	N/A	N/A	Extreme temperatures coupled with a low humidity and increased winds lead to multiple fires including a large wildfire in Luther totaling 2,621 acers. The fire moved quickly and damaged or destroyed 38 structures in and around the Luther area. Damage estimates were unavailable.
May 19, 2013	Tornado	N/A	N/A	A tornado touched down in Luther that was rated up to EF2 that created damage to buildings. An estimate of damages was not available.
May 29, 2013	Hail	N/A	N/A	Luther saw hail up to 2.75 inches.
November 27-28, 2015	Winter Storm	DR-4247	Yes	Ice storm.
December 27-28, 2015	Winter Storm	DR-4256	No	Ice storm.
April 07, 2016	Earthquake	N/A	N/A	This 4.2 magnitude quake at Luther registered at a depth of 6.1 km. Though most of the county felt shaking, the northeast side had multiple reports of strong shaking with light damage.
April 26, 2016	Tornado	N/A	N/A	An EF1 tornado traveled from 4 NW Jones to 3 NNW Luther, damaging a few homes in far NW Luther.
April 07, 2016	Earthquake	N/A	N/A	This quake registered at a depth of 6.1km. Though most of the county felt shaking, the northeast side had multiple reports of strong shaking with light damage. This quake originated in Luther and was Magnitude 4.2
September 3, 2016	Earthquake	N/A	N/A	Magnitude 5.8 near Pawnee

Number of FEMA Identified Repetitive Flood Loss Properties: 0
Number of FEMA Identified Severe Repetitive Flood Loss Properties: 0
Source: Oklahoma Water Resources Board (OWRB)

Wildfire History for Luther

Acres may include loss from wildland, grass, brush, crop, orchard and nursery fires. Luther's fire district includes a large part of unincorporated Oklahoma County east of Henny Rd and north of ½ mile north of NE 122nd St.

	Loss	Acres
2018	$0	32.0
2017	$5,000	50.0
2016	$0	96.6
2015	$0	46.5
2014	$0	28.0
2013	$0	2.7
2012	$0	2,719.5
2011	$0	441.0
2010	$0	2.0
2009	$0	35.0
2008	$0	110.0
2007	$0	33.0
2006	$0	20.0
2005	$500	317.0
2004	$0	41.0
TOTAL LOSS	**$5,500**	**3,974.3**

Source: Oklahoma State Fire Marshal's office

D.) CAPABILITY ASSESSMENT

This section identifies the following mitigation capabilities within Unincorporated Oklahoma County:

- Legal and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Community classification.

D.1) Legal and Regulatory Capability

Regulatory Tools (Codes, Ordinances., Plans)	Do you have this? (Y or N)	Code Citation (Section, Paragraph, Page Number, Date of adoption)	HM Plan integration into plan	Update cycle	Party(s) responsible for updating document
Building Code	Y	IRC 2009; State IBC August 2012			
Comprehensive / Master Plan	N	Not formalized			
Zoning Management Ordinance	Y	12-101			
Subdivision Management Ordinance	Y	12-301			
Site Plan Review Requirements	Y	5-101			
NFIP Flood Damage Prevention Ordinance	Y	12-401; pre-1980 community			
NFIP Elevation Certificates Maintained	Y	Per OWRD, since July 2011			
Floodplain Management Plan	Y	12-401; also through All Hazards Plan (2012)	No	As needed	Floodplain Manager
Stormwater Management Plan / Ordinance	N				
Stream Corridor Management or Protection Plan	N				
Erosion Management Ordinance	N				
Capital Improvements Plan	Y	August 2010 completed	No	As needed	Town Council
Open Space Plan	N				
Economic Development Plan	Y	Formed Economic Development Authority for the town in Spring 2011	No	Annual	Planning Commission w/ Town Council
Emergency Response Plan	N	Under development			
Post Disaster Recovery Plan / Ordinance	N				
Real Estate Disclosure Requirements	N				
Highway Management Plan	N				
COOP/COG Plan	N				
Other (Special Purpose	N				

Regulatory Tools (Codes, Ordinances., Plans)	Do you have this? (Y or N)	Code Citation (Section, Paragraph, Page Number, Date of adoption)	HM Plan integration into plan	Update cycle	Party(s) responsible for updating document
Ordinances such as critical or sensitive areas)					

Additionally, any change in ordinances happens at the behest of local government bodies, state legislation or court actions and are not on a scheduled reoccurring basis.

D.2) Administrative and Technical Capability

Staff/ Personnel Resources	Available (Y or N)	Department/ Agency/ Position
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Y	Building Official
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Y	Building Official
Planners or engineers with an understanding of natural hazards	Y	Building Official and NFIP FPA
NFIP Floodplain Administrator	Y	Building Official and NFIP FPA
Surveyor(s)	Y	Contracted
Personnel skilled or trained in “GIS” applications	Y	Building Official and private contractor
Scientist(s) familiar with natural hazards in the County.	N	
Emergency Manager	Y	Fire Chief
Grant Writer(s)	Y	Town Clerk
Staff with expertise or training in benefit/cost analysis	N	

D.3) Fiscal Capability

Financial Resources	Accessible or Eligible to use (Yes/No/Don’t know)
Community Development Block Grants (CDBG)	Yes. Used for addition to the FD approved in 2011
Capital Improvements Project Funding	Yes. ACOG REAP grants.
Authority to Levy Taxes for specific purposes	No
User fees for water, sewer, gas or electric service	Yes. Water, sewer, solid waste.

Impact Fees for homebuyers or developers of new development/homes	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	Yes
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	No
Other	No

D.4) Community Classifications

Program	Classification	Date Classified
Community Rating System (CRS)	NP	N/A
Building Code Effectiveness Grading Schedule (BCEGS)	TBD	TBD
Public Protection	7/9	TBD
Storm Ready	County	TBD
Firewise	NP	N/A

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- The National Firewise Communities website at http://firewise.org/

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By adopting updated codes, including fire, building and NFIP ordinances this jurisdiction will continue to improve their mitigation approach. Also, by employing experts in land management and construction practices, in coordination with planners and engineers with understanding of natural hazards, the overall stratagem will continue to advance.

In addition, by participating in multi-jurisdictional training and radio interoperability, public safety agencies bolster their response capabilities. This, along with reinforcement from Annual Equipment Agreements with Oklahoma County, ensures continued improvement within the jurisdiction.

Moreover, this jurisdiction participates in Wildland Automatic Response (or WAR – an automatic mutual aid agreement during high wildland hazard days). This ensures a greater response to wildland fires.

E.) PROPOSED HAZARD MITIGATION INITIATIVES

Note some of the identified mitigation initiatives in Table F are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities.

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Install floodwalls (approx. 20' x 20') for two (2) wastewater lift stations	Existing	Flood	Planned	Engineering; DPW	High (protection of critical infrastructure)	$65K each station	HMA Grant Funding; Local Budgets	Long	Low
Provide lightning protection for three potable water wells	Existing	Lightning,	Planned	Engineering; DPW	High (protection of critical infrastructure)	Medium	HMA Grant Funding; Local Budgets	Short	Medium
Install a storm siren on the north side of town	Existing	Wind (incl. Tornado)	Planned	Engineering; DPW	High (protection of critical infrastructure)	Medium	HMA Grant Funding; Local Budgets	Short	High
Install backup power at Town Hall/Police Station facility	Existing	Dam Failure, Flood, Earthquake, Extreme Temps, Hail, Lightning, Wildfire, Wind (incl. Tornado), Winter Storm	New	Engineering; DPW	High (protection of critical infrastructure)	$20K	HMA Grant Funding; Local Budgets	Short	Medium
Upgrade early warning system(s) including adding a mass notification system	N/A	Dam Failure, Drought, Flood, Earthquake, Extreme Temps, Hail, Lightning, Wildfire, Wind (incl. Tornado),	Planned	Local EM	High (life safety)	Medium	Emergency preparedness grant programs; local budgets for match	Short	Medium

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
		Winter Storm							
Distribute All-Hazards Weather Radios to elderly and special needs citizens	N/A	Dam Failure, Drought, Flood, Earthquake, Extreme Temps, Hail, Lightning, Wildfire, Wind (incl. Tornado), Winter Storm	Ongoing	Fire / EM	High (life safety)	Low	HMGP; local budgets for match	Long	Low
Relocate sewer lines through the main drainage in the Special Flood Hazard Area.	Existing	Flood	Planned	Engineering; DPW	High (protection of critical infrastructure)	$25k	HMA Grant Funding; Local Budgets	Short	High
Raise 15 manholes above Base Flood Elevation	Existing	Flood	Planned	Engineering; DPW	High (protection of critical infrastructure – including lift stations and possibly sewage lagoons)	$4-5k each	HMA Grant Funding; Local Budgets	Short	High
Relocate equipment and hazardous materials associated with public works, that are currently located adjacent to the floodplain	Existing	Flood	Planned	Engineering; DPW	Medium	TBD	TBD	Long	Medium

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Maintain compliance with and good-standing in the NFIP including adoption and enforcement of floodplain management requirements (e.g. regulating all new and substantially improved construction in Special Hazard Flood Areas), floodplain identification and mapping, and flood insurance outreach to the community.	New & Existing	NFIP Compliance	Ongoing	Municipality (via Municipal Engineer/NFIP Floodplain Administrator) with support from OEM, ISO FEMA	High	Low - Medium	Local Budget	Ongoing	High
Conduct and facilitate community and public education and outreach for residents and businesses to include, but not be limited to, the following to promote and effect natural hazard risk reduction: • Provide and maintain links to the HMP website, and regularly post notices on the municipal homepage(s) referencing the HMP webpages. • Prepare and distribute informational letters to flood vulnerable property owners and neighborhood associations, explaining the availability of mitigation grant funding to mitigate their properties, and instructing them on how they can learn more and implement mitigation. • Use email notification systems and newsletters to better educate the public on flood insurance, the availability of mitigation grant funding, and personal natural hazard risk reduction measures. • Work with neighborhood associations, civic and business groups to disseminate information on flood insurance and the availability of mitigation grant funding. • Participate in regional public awareness and education initiatives through the LEPCs.									
See above.	NA	Flood	Ongoing	Municipality with support from Planning Partners, OEM, FEMA	Low - Medium	Low - Medium	Municipal Budget; HMA programs with local or county match	Long	Low
Create mitigation education pamphlets and distribute at booths during large		Dam Failure, Drought, Earthquake, Extreme	Ongoing	Fire / EM	High	Low	HMGP, Local budget	Long	Low

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
public events and at public city venues.		Temperatures, Flood, Hail, Lightning, Wildfire, Wind (incl. Tornado), Winter Storms							
Replace Tin-Horns at several major intersections		Flood	Planned	Public Works w/ County	High	High	HMGP w/ local match	Long	Medium

Notes:
*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (NA) is inserted if this does not apply.

Costs:
Where actual project costs have been reasonably estimated:
Low = < $10,000
Medium = $10,000 to $100,000
High = > $100,000
Where actual project costs cannot reasonably be established at this time:
Low = Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium = Could budget for under existing work-plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High = Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:
Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:
Low = < $10,000
Medium = $10,000 to $100,000
High = > $100,000
Where numerical project benefits cannot reasonably be established at this time:
Low = Long term benefits of the project are difficult to quantify in the short term.
Medium = Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High = Project will have an immediate impact on the reduction of risk exposure to life and property.

Potential FEMA HMA Funding Sources:
PDM = Pre-Disaster Mitigation Grant Program
FMA = Flood Mitigation Assistance Grant Program
RFC = Repetitive Flood Claims Grant Program

SRL = Severe Repetitive Loss Grant Program
HMGP = Hazard Mitigation Grant Program

Timeline:
Short = 1 to 5 years. Long Term= 5 years or greater. OG = On-going program.
DOF = Depending on funding.

Explanation of Priorities

- ***High Priority*** - A project that meets multiple objectives (i.e., multiple hazards), benefits exceeds cost, has funding secured or is an on-going project and project meets eligibility requirements for the Hazard Mitigation Grant Program (HMGP) or Pre-Disaster Mitigation Grant Program (PDM) programs. High priority projects can be completed in the short term (1 to 5 years).

- ***Medium Priority*** - A project that meets goals and objectives, benefits exceeds costs, funding has not been secured but project is grant eligible under, HMGP, PDM or other grant programs. Project can be completed in the short term, once funding is completed. Medium priority projects will become high priority projects once funding is secured.

- ***Low Priority*** - Any project that will mitigate the risk of a hazard, benefits do not exceed the costs or are difficult to quantify, funding has not been secured and project is not eligible for HMGP or PDM grant funding, and time line for completion is considered long term (1 to 10 years). Low priority projects may be eligible other sources of grant funding from other programs. A low priority project could become a high priority project once funding is secured as long as it could be completed in the short term.

Prioritization of initiatives was based on above definitions: Yes

Prioritization of initiatives was based on parameters other than stated above: Not applicable.

F.) FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

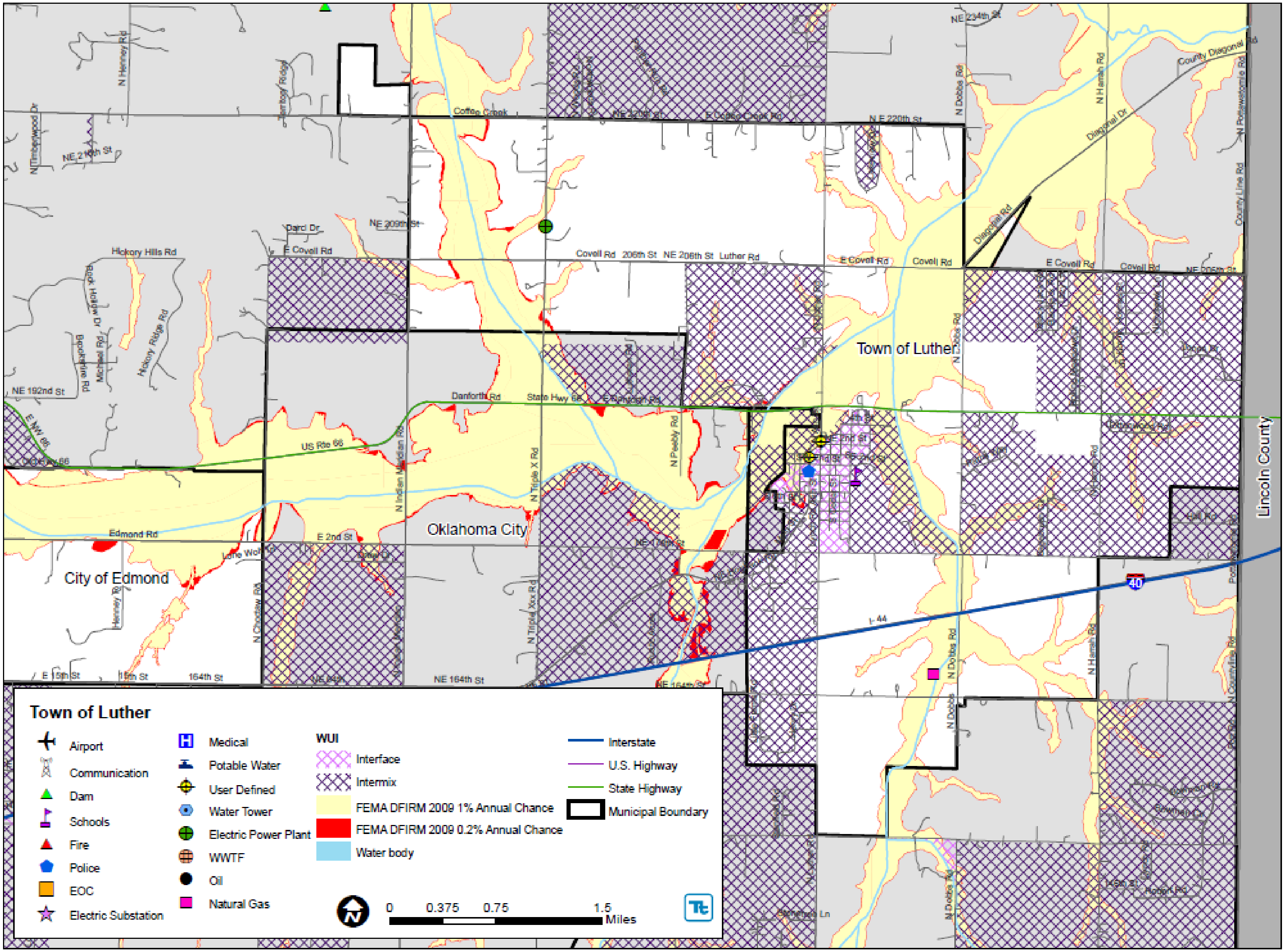
None at this time.

G.) HAZARD AREA EXTENT AND LOCATION

A hazard area extent and location map has been generated and is provided below for the Town of Luther to illustrate the probable areas impacted within the Town of Luther. This map is based on the best available data at the time of the preparation of this Plan, and is considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the Town of Luther has significant exposure.

H.) ADDITIONAL COMMENTS

No additional comments at this time.


Town of Luther
Oklahoma City
City of Edmond
Lincoln County
Town of Luther
Airport
Communication
Dam
Schools
Fire
Police
EOC
Electric Substation
Medical
Potable Water
User Defined
Water Tower
Electric Power Plant
WWTF
Oil
Natural Gas
WUI
Interface
Intermix
FEMA DFIRM 2009 1% Annual Chance
FEMA DFIRM 2009 0.2% Annual Chance
Water body
Interstate
U.S. Highway
State Highway
Municipal Boundary
0 0.375 0.75 1.5
Miles
Covell Rd
E Covell Rd
Danforth Rd
State Hwy 66
US Rte 66
Edmond Rd
E 2nd St
NE 164th St
I- 44
N Dobbs Rd
N Triple X Rd
N Indian Meridian Rd
N Harrah Rd
Coffee Creek
Luther Rd

9.10 CITY OF MIDWEST CITY

This section presents the jurisdictional annex for the City of Midwest City.

A.) HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact	Alternate Point of Contact
Mike Bower Emergency Management 100 North Midwest Boulevard, Midwest City, OK 73110 (405) 739-1386 mbower@midwestcityok.org	Patrick Menefee, PE City Engineer 100 North Midwest Boulevard, Midwest City, OK 73110 (405) 739-1220 pmenefee@midwestcityok.org

B.) MUNICIPAL PROFILE

The City of Midwest City is located in southern Oklahoma County. It is bordered to the north by the Town of Spencer, to the south by Oklahoma City, to the east by the City of Choctaw, and to the west by the City of Del City. The City of Midwest City has a total land area of 24.6 square miles, all of it land. The City is governed by a mayor and six member City Council. The 2010 U.S. Census population for the City of Midwest City was 54,371.

Low-lying areas in the City are subject to periodic flooding caused by overflow of Crutcho, Soldier and Silver Creeks. Most flooding occurs upstream from roadways that restrict the flow. Urban expansion and future development in floodplains could increase the severity of flooding in the City. (FEMA NFIP FIS – 2009)

Known or Anticipated Future Development

The following table summarizes major residential/commercial development and major infrastructure development that are identified for the next five (5) years in the City. Refer to the map at the end of this annex which illustrates the hazard areas along with the location of potential new development.

Property Name	Type (Residential or Commercial)	Number of Structures	Address	Known Hazard Zone	Description/Status
Soldier Creek Industrial Park	Commercial	Unknown	7500 blk of NE 23rd St.	No SHFA	Under development

Although there has been small areas of development within the City of Midwest City, there has not been a significant change to the hazard vulnerabilities for the city. Midwest City does restrict the development and/or land use in the flood areas.

Past Mitigation Activity/Efforts

Each initiative from the 2013 plan was reviewed going forward into this 2019 plan. Any initiatives that were completed or abandoned are stated below, while any new or ongoing initiatives will be found under the Proposed Hazard Mitigation Initiatives header of this section.
The following table summarizes progress on the mitigation strategy identified by the City of Midwest City in the 2013 plan.

2013 Initiative Description	Comments
The City of Midwest City would put out a bid to replace the bridge structure at Soldier Creek, which is subject to repeated flooding. This is located near Midwest Boulevard and is South of NE 10th Street. The City of Midwest City would try to do an in-kind march, HMGP with a 80/20 match, Oklahoma State BRO program.	Completed
Flooding at SE 15th St. and Westminister to Anderson Rd where two creeks cross.	New culverts and drainage improved.
Implement the City-wide safe room program, providing a total of 1500 safe rooms to Midwest City residents through the two FEMA HMGP grants (DR-1917 and DR-1803, DR-4109, Red Cross).	Implemented

Further details on mitigation activities completed or ongoing in the City include:

- Channel improvements and tributary 6 along Soldier Creek
- Crutcho tributary D improvements.

Hazard Vulnerabilities Identified

Hazard profiling, Section 5.3, has identified that the City of Midwest City is vulnerable to the following hazards of concern:

Hazard	Local Vulnerability	Comments
Dam Failure	Yes	Canton Lake, Overholser - See local hazard map end of section
Drought	Yes	
Earthquake	Yes	
Expansive Soils	Yes	
Extreme Temperatures	Yes	
Flooding	Yes	See local hazard map end of section
Hail	Yes	
Lightning	Yes	
Wildfire	Yes	See local hazard map end of section
Wind (incl. tornado)	Yes	
Severe Winter Storm	Yes	

Additional vulnerabilities noted by the City of Midwest City include:
An apartment complex on NE 10th has repeat flood problems.
Three residences have flooded near the 300 block of Post Rd.
Residents desire additional safe rooms.

Vulnerability assessment modeling has identified the following flood vulnerabilities (see Flood Hazard Profile in Section 5.3.6):

Critical Facilities Located in the DFIRM Flood Boundaries and Estimated Potential Damage from the 100- and 500-Year MRP Events

Name	Municipality	Type	Exposure		Potential Loss			
			100-Yr	500-Yr	100-Yr Structure Damage %	100-Yr Content Damage %	500-Yr Structure Damage %	500-Yr Content Damage %
Crutcho Elementary School (Independent School District)	Midwest City (C)	School	X	X	-	-	-	-
STEED ES (Mid-Del School)	Midwest City (C)	School	X	X	9.1	64.3	9.0	52.7
Fairfax Apartments	Midwest City (C)	User Defined	X	X	-	-	-	-
Parkview Apartments	Midwest City (C)	User Defined		X	29.9	37.9	33.5	42.1
YMCA	Midwest City (C)	User Defined	X	X	-	-	-	-
Boeing Aero Space	Midwest City (C)	User Defined	X	X	-	-	-	-
Midwest Square Office Park	Midwest City (C)	User Defined		X	20.7	32.9	38.6	52.6
Concord Apartments	Midwest City (C)	User Defined			22.8	27.7	22.8	27.7
Village Oaks Plaza	Midwest City (C)	User Defined			16.0	56.0	4.3	11.8

Source: FEMA, 2009;

Utilities Located in the Preliminary DFIRM Flood Boundaries and Estimated Potential Damage from the 100- and 500-Year MRP Events

Name	Municipality	Type	Exposure		Potential Loss	
			100 Year	500 Year	100 Year Damage %	500 Year Damage %
Wastewater Treatment Plant	Midwest City (C)	WWTF	X	X	20.2	10.9

Source: FEMA, 2009;
Notes:
(1) 'X' indicates the facility location as provided by Oklahoma County's Planning Committee is located in the DFIRM flood zone.

C.) NATURAL HAZARD EVENT HISTORY SPECIFIC TO THE CITY

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
June 8-10, 1974	Flooding	DR-441	Yes	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
November 26, 1974	Flooding	DR-453	Yes	
October 17-19, 1983	Flooding	DR-693	Yes	
September 29 – October 1, 1986	Flooding	DR-778	Yes	
May 2, 1990	Flooding, Tornado	DR-866	Yes	
May 8, 1993	Tornadoes	DR-991	Yes	
June 9, 1993	Flash Flooding	N/A	N/A	
July 26 – August 2, 1995	Tornado, Flooding	DR-1066	Yes	
April 24-26, 1999	Flooding	N/A	N/A	
May 3-4, 1999	Tornadoes, Flooding	DR-1272	Yes	
June 23, 1999	Flash Flooding	N/A	N/A	
October 21-29, 2000	Flooding	DR-1349	Yes	
May 30, 2001	Flooding	N/A	N/A	
September 7, 2001	Urban Flooding	N/A	N/A	
August 11-12, 2004	Flash Flood	N/A	N/A	
March 12, 2006	Tornadoes	DR-1637	No	Yes
December 28-30, 2006	Severe Winter Storm	DR-1677	No	
January 12-26, 2007	Severe Winter Storms	DR-1678	No	Yes. City experienced $113,000 in property/infrastructure damage and public assistance. Utility outages lasted about 3 days.
March 29, 2007	Tornadoes	N/A	N/A	Yes
May 4-11, 2007	Tornadoes, Flooding	DR-1707	No	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
May 24, 2007 to June 1, 2007	Flooding, Tornadoes	DR-1723	No	Yes. Damages unspecified.
June 10, 2007 to July 25, 2007	Flooding, Tornadoes	DR-1712	Yes	Yes. City experienced about $7,000 of damage due to flooding.
Aug. 18, 2007 to Sept. 12, 2007	Tornadoes, Flooding	DR-1718	Yes	Yes
Dec. 8, 2007 to Jan. 3, 2008	Severe Winter Storms	DR-1735	Yes	Yes. Damages unspecified.
March 17-23, 2008	Tornadoes, Flooding	DR-1752	No	
March 22, 2008	Wildfire	N/A	N/A	
March 30-31, 2008	Severe Storms	N/A	N/A	
April 9-28, 2008	Tornadoes, Flooding	DR-1754	No	Yes. City experienced $4.4 million in property/infrastructure damage and public assistance. City provided sheltering for 72 hours, then transferred to central shelter in OKC. Utilities for much of the city were out, some as long as 14 days.
April 30, 2008	Hail/Damaging Winds	N/A	N/A	
May 9, 2008	Floods	DR-1754	No	
May 10-13, 2008	Tornadoes, Flooding	DR-1756	No	
June 3-20, 2008	Flooding	DR-1775	No	
August 20, 2008	Flooding	N/A	N/A	
September 12-19, 2008	Tornadoes, Flooding	DR-1803	No	
February 10-11, 2009	Tornadoes	DR-1820	Yes	
March 24, 2009	Severe Storms	N/A	N/A	
March 26-27, 2009	Snow/Ice/Severe Storm	N/A	N/A	
March 30, 2009	Severe Storm	N/A	N/A	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
April 9-12, 2009	Wildfires	DR-1846	Yes	Yes. 11 homes destroyed.
May 13, 2009	Severe Storms	N/A	N/A	
December 24-25, 2009	Severe Winter Storm	DR-1876	No	
January 26-28, 2009	Severe Winter Storm	DR-1823	No	
2010-2011	Severe Drought	N/A	N/A	
January 28-30, 2010	Severe Winter Storm	DR-1883	No	
Jan. 30-Feb. 9, 2010	Severe Winter Storm	N/A	N/A	
March 19, 2010	Severe Winter Storm	N/A	N/A	
May 10-13, 2010	Severe Storms, Tornadoes, and Straight-Line Winds	DR-1917	Yes	
May 16, 2010	Hail Storm	N/A	N/A	
May 19, 2010	Severe Storm	N/A	N/A	
June 13-15, 2010	Severe Storms, Tornadoes, Straight-line Winds, and Flooding	DR-1926	Yes	
July 7-8, 2010	Flooding	N/A	N/A	
Oct. 13, 2010	Earthquake	N/A	N/A	
Jan. 31, 2011 to Feb. 5, 2011	Severe Winter Storm and Snowstorm	DR-1985	No	
April 14, 2011	Severe Storms, Tornadoes, And Straight-Line Winds	DR-1970	No	
April 21-28, 2011	Severe Storms And Flooding	DR-1988	No	
May 22-25, 2011	Severe Storms, Tornadoes, Straight-line Winds, and	DR-1989	No	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
	Flooding			
June-August 2011	Severe Heat	N/A	N/A	
November 6, 2011	Earthquake	N/A	N/A	5.6 magnitude earthquake near Prague; depth of 5.2 km
May 31 – June 01, 2013	Flood	N/A	N/A	A potent set of ingredients came together during this time that brought about a major severe weather episode over central Oklahoma. Several tornadoes occurred, including the El Reno tornado, which unfortunately claimed several lives. This flash flood event ranked as one of the worst in the area in history in terms of fatalities and damages to property. Crutcho school flooded along with military armory, mobile home park southeast of 23rd/Air Depot. Mid-Del Youth Home flooded. Part of NE 23rd washed out just west of Air Depot.
December 01, 2013	Earthquake	N/A	N/A	4.5 magnitude earthquake near Arcadia Lake; depth of 8.4 km.
June 16, 2014	Earthquake	N/A	N/A	4.3 magnitude earthquake near Spencer; depth of 5.0 km.
June 18, 2014	Earthquake	N/A	N/A	4.1 magnitude earthquake near Spencer; depth 5.0 km
November 27-28, 2015	Winter Storm	DR-4247	Yes	Ice storm.
December 27-28, 2015	Winter Storm	DR-4256	No	Ice storm with widespread power outages.
September 3, 2016	Earthquake	N/A	N/A	5.8 magnitude earthquake at Pawnee; depth of 5.4 km
August 2018	Expansive Soils	N/A	N/A	Station 2 has had over the last six months cracks in the driveway, roof leaks and underground gas lines break due to shifting ground. This is at a concentrated area of expansive soils.
October 9, 2018	Wind	N/A	N/A	A small “QLCS” tornado developed along the leading edge of a tropical-like line of storms. The tornado apparently started on Tinker AFB and traveled north through a shopping center east of Air Depot Blvd and I-40 (SE 29th & Town Center Dr.), damaging the roof of the JC Penny’s store and a few homes. Cars were flipped on Tinker AFB and in front of the JC Penny store. Two buildings suffered roof damage on Tinker AFB.

Number of FEMA Identified Repetitive Flood Loss Properties: 5 residential, 2 commercial
Number of FEMA Identified Severe Repetitive Flood Loss Properties: 0

Source: Oklahoma Water Resources Board (OWRB)

Wildfire History for Midwest City

Acres may include loss from wildland, grass, brush, crop, orchard and nursery fires.
*Loss of eleven homes in 2009 not included in this dataset.

	Loss	Acres
2018	$0	44.0
2017	$0	10.5
2016	$11,000	20.0
2015	$0	16.0
2014	$0	19.0
2013	$0	1.0
2012	$25	300.0
2011	$73,120	2221.0
2010	$0	20.4
2009	$0*	4057.0
2008	$17,500	5.0
2007	$0	11.0
2006	$37,230	110.0
2005	$1,600	2021.0
2004	$0	3.0
TOTAL LOSS	**$140,475***	**8,858.9**

Source: Oklahoma State Fire Marshal's office

D.) CAPABILITY ASSESSMENT

This section identifies the following capabilities of the local jurisdiction:

- Legal and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Community classification.

D.1) Legal and Regulatory Capability

Regulatory Tools (Codes, Ordinances., Plans)	Do you have this? (Y or N)	Code Citation (Section, Paragraph, Page Number, Date of adoption)	HM Plan integration into plan	Update cycle	Party(s) responsible for updating document
Building Code	Y	2009 IBC – Pending 2015 Adoption			
Comprehensive / Master Plan	Y	Midwest City Comprehensive Plan – 2008 (updated)	Yes	No Specific Cycle	City Staff and Emergency Manager
Zoning Management Ordinance	Y	Midwest City Zoning Ordinance – 2010			
Subdivision Management Ordinance	Y	Midwest City Zoning Ordinance – 2012			
Site Plan Review Requirements	Y	Midwest City Zoning Ordinance – 2010			
NFIP Flood Damage Prevention Ordinance	Y	Midwest City Floodplain Regulations – 2009			
NFIP Elevation Certificates Maintained	Y	Since 1983			
Floodplain Management Plan	Y	Part of All Hazards Mitigation Plan – 2006, pending 2012	Yes	No Specific Cycle	City Staff and Emergency Manager
Stormwater Management Plan / Ordinance	Y	Oklahoma County Storm Water Quality & Erosion Control Regulations – 20016	Yes	No Specific Cycle	City Staff and Emergency Manager
Stream Corridor Management or Protection Plan	N				
Erosion Management Ordinance	Y	Oklahoma County Storm Water Quality & Erosion Control Regulations – 20016			
Capital Improvements Plan	Y	C.I.P. Fund Committee	Yes	No Specific Cycle	City Staff and Emergency Manager
Open Space Plan	Y	Midwest City Zoning Ordinance – 2010	No	No Specific Cycle	City Staff and Emergency Manager
Economic Development Plan	Y	Chamber of Commerce	Yes	No Specific Cycle	City Staff and Emergency Manager
Emergency Response Plan	Y	City has an Emergency Operations Plan 2018 and an active	No	No Specific Cycle	City Staff and Emergency Manager

Regulatory Tools (Codes, Ordinances., Plans)	Do you have this? (Y or N)	Code Citation (Section, Paragraph, Page Number, Date of adoption)	HM Plan integration into plan	Update cycle	Party(s) responsible for updating document
		LEPC			
Post Disaster Recovery Plan / Ordinance	N				
Real Estate Disclosure Requirements	N				
Highway Management Plan	N				
COOP/COG Plan	Y	City is a member of the Association of Central Oklahoma Governments (ACOG)	No	No Specific Cycle	City Staff and Emergency Manager
Other (Special Purpose Ordinances such as critical or sensitive areas)					

Additionally, any change in ordinances happens at the behest of local government bodies, state legislation or court actions and are not on a scheduled reoccurring basis.

D.2) Administrative and Technical Capability

Staff/ Personnel Resources	Available (Y or N)	Department/ Agency/ Position
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Y	Engineering Department – one engineer; four planners
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Y	One Chief Building Official; two building inspectors
Planners or engineers with an understanding of natural hazards	Y	Engineering Department – one engineer; one planner
NFIP Floodplain Administrator	Y	Engineering Department – planner and floodplain administrator; two CFMs
Surveyor(s)	N	
Personnel skilled or trained in “GIS” applications	Y	GIS Supervisor and Tech
Scientist(s) familiar with natural hazards in the County.	N	
Emergency Manager	Y	Emergency Management: one EM director and two assistants
Grant Writer(s)	Y	Three grant writers

Staff with expertise or training in benefit/cost analysis	Y	Emergency Manager and grants

D.3) Fiscal Capability

Financial Resources	Accessible or Eligible to use (Yes/No/Don't know)
Community Development Block Grants (CDBG)	Yes
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for specific purposes	No
User fees for water, sewer, gas or electric service	No
Impact Fees for homebuyers or developers of new development/homes	Yes
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	Yes
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	Yes
Other	

D.4) Community Classifications

Program	Classification	Date Classified
Community Rating System (CRS)	NP	N/A
Building Code Effectiveness Grading Schedule (BCEGS)	1	Nov. 2017
Public Protection	TBD	TBD
Storm Ready	Yes	2017
Firewise	NP	N/A

N/A = Not applicable. NP = Not participating. - = Unavailable. TBD = To Be Determined

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at http://www.isomitigation.com/ppc/0000/ppc0001.html
- The National Weather Service Storm Ready website at http://www.weather.gov/stormready/howto.htm
- The National Firewise Communities website at http://firewise.org/

Expanding on and Improving Existing Policies and Programs

By adopting updated codes, including fire, building and NFIP ordinances this jurisdiction will continue to improve their mitigation approach. Also, by employing experts in land management and construction practices, in coordination with planners and engineers with understanding of natural hazards, the overall stratagem will continue to advance.

In addition, by participating in multi-jurisdictional training and radio interoperability, public safety agencies bolster their response capabilities. This, along with reinforcement from Annual Equipment Agreements with Oklahoma County, ensures continued improvement within the jurisdiction.

E.) PROPOSED HAZARD MITIGATION INITIATIVES

Note some of the identified mitigation initiatives in Table F are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities.

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Replace and enlarge the existing culvert at SE 15th Street and Choctaw Creek Tributary 4 East Branch (just West of Hiwassee Road). Project will reduce road overtopping	Existing	Flood	New	City Engineering with ODOT	Reduced local flooding	High	ODOT	Long	DOF (Dependent of Funding)
Soldier Creek Industrial Park – 7900 Block of NE 23rd Street. FEMA LOMR and CLOMR applications will be filed updating the flood area and model for the property	Existing	Flood	New	City Engineering	Improved floodplain delineation	Medium High	EDA Grant	Short	High
Maintain compliance with and good-standing in the NFIP including adoption and enforcement of floodplain management requirements (e.g. regulating all new and substantially improved construction in Special Hazard Flood Areas), floodplain identification and mapping, and flood insurance outreach to the community.	New & Existing	NFIP Compliance	Ongoing	Municipality (via Municipal Engineer/NFIP Floodplain Administrator) with support from OEM, ISO FEMA	High	Low - Medium	Local Budget	Ongoing	High

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Conduct and facilitate community and public education and outreach for residents and businesses to include, but not be limited to, the following to promote and effect natural hazard risk reduction: • Provide and maintain links to the HMP website, and regularly post notices on the County/municipal homepage(s) referencing the HMP webpages. • Prepare and distribute informational letters to flood and other hazard vulnerable property owners and neighborhood associations, explaining the availability of mitigation grant funding to mitigate their properties, and instructing them on how they can learn more and implement mitigation. • Use email notification systems and monthly newsletters (water bills) to better educate the public on flood insurance, the availability of mitigation grant funding, personal natural hazard risk reduction measures, and the household hazardous waste program. • Leverage strong public outreach resources and channels of the stormwater quality division. • Work with neighborhood associations, civic and business groups to disseminate information on flood insurance and the availability of mitigation grant funding. • Participate in regional public awareness and education initiatives through the LEPCs.									
See above.	NA	Flood	Ongoing	Municipality with support from Planning Partners, OEM, FEMA	Low - Medium	Low - Medium	Municipal Budget; HMA programs with local or county match	Short	High
Participate in the Community Rating System (CRS) to further manage flood risk and reduce flood insurance premiums for NFIP policyholders. This shall start with the submission to FEMA-DHS of a Letter of Intent to join CRS, followed by the completion and submission of an application to the program.	NA	NFIP Compliance	Ongoing	NFIP Floodplain Administrator with support from OEM, FEMA	Low	Low	Municipal Budget	Short (year 1)	Medium
Continue to archive elevation certificates	NA	NFIP Compliance	Ongoing	NFIP Floodplain Administrator	Low	Low	Local Budget	On-going	High
Purchase structures in the area of 7801 NE 10th (Fairfax apartments) that are repeatedly flooded by heavy rains and convert	Existing	Flood	Planned	NFIP Coordinator with City Engineer	High	High	HMGP with local match	Short	Medium

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
the area to green space.									
Install new underground drainage with drop inlets at the 300 block of Post Road to reduce or eliminate flooding of three residences.	Existing	Flood	Planned	NFIP Coordinator with City Engineer	High	High	HMGP and/or City budget	Short	Medium
Create mitigation education pamphlets and distribute at booths during large public events and at public city venues.		Dam Failure, Drought, Earthquake, Expansive Soils, Extreme Temperatures, Flood, Hail, Lightning, Wildfire, Wind (incl. Tornado), Winter Storms	Ongoing	Emergency Management	High	Low	HMGP, City budget	Long	Low
Distribute All-Hazard Weather Radios to senior centers, and high risk residents		Dam Failure, Drought, Earthquake, Extreme Temperatures, Flood, Hail, Lightning, Wildfire, Wind (incl. Tornado), Winter Storms	Ongoing	Emergency Management	High	Low	HMGP, City budget	Short	Low
Enact a regulation to require a check for expansive soils prior to building a city building and perform soil stabilization if expansive soils are found.		Expansive Soil	Planned	City Engineer	High	Medium	City Budget	Short	Medium
Add storm sirens to the deficient areas within the jurisdiction.		Wind (incl. Tornado)	New	Emergency Management	High	High	EMPG, Bond	Short	High

Notes:
*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (NA) is inserted if this does not apply.
Costs:
Where actual project costs have been reasonably estimated:
Low = < $10,000
Medium = $10,000 to $100,000
High = > $100,000
Where actual project costs cannot reasonably be established at this time:
Low = Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium = Could budget for under existing work-plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High = Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:
Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:
Low = < $10,000
Medium = $10,000 to $100,000
High = > $100,000
Where numerical project benefits cannot reasonably be established at this time:
Low = Long term benefits of the project are difficult to quantify in the short term.
Medium = Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High = Project will have an immediate impact on the reduction of risk exposure to life and property.

Potential FEMA HMA Funding Sources:
PDM = Pre-Disaster Mitigation Grant Program
FMA = Flood Mitigation Assistance Grant Program
RFC = Repetitive Flood Claims Grant Program
SRL = Severe Repetitive Loss Grant Program
HMGP = Hazard Mitigation Grant Program

Timeline:
Short = 1 to 5 years. Long Term= 5 years or greater. OG = On-going program.
DOF = Depending on funding.

Explanation of Priorities

- ***High Priority*** - A project that meets multiple objectives (i.e., multiple hazards), benefits exceeds cost, has funding secured or is an on-going project and project meets eligibility requirements for the Hazard Mitigation Grant Program (HMGP) or Pre-Disaster Mitigation Grant Program (PDM) programs. High priority projects can be completed in the short term (1 to 5 years).

- ***Medium Priority*** - A project that meets goals and objectives, benefits exceeds costs, funding has not been secured but project is grant eligible under, HMGP, PDM or other grant programs. Project can be completed in the short term, once funding is completed. Medium priority projects will become high priority projects once funding is secured.

- ***Low Priority*** - Any project that will mitigate the risk of a hazard, benefits do not exceed the costs or are difficult to quantify, funding has not been secured and project is not eligible for HMGP or PDM grant funding, and time line for completion is considered long term (1 to 10 years). Low priority projects may be eligible other sources of grant funding from other programs. A low priority project could become a high priority project once funding is secured as long as it could be completed in the short term.

Prioritization of initiatives was based on above definitions: Yes

Prioritization of initiatives was based on parameters other than stated above: Not applicable.

F.) FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

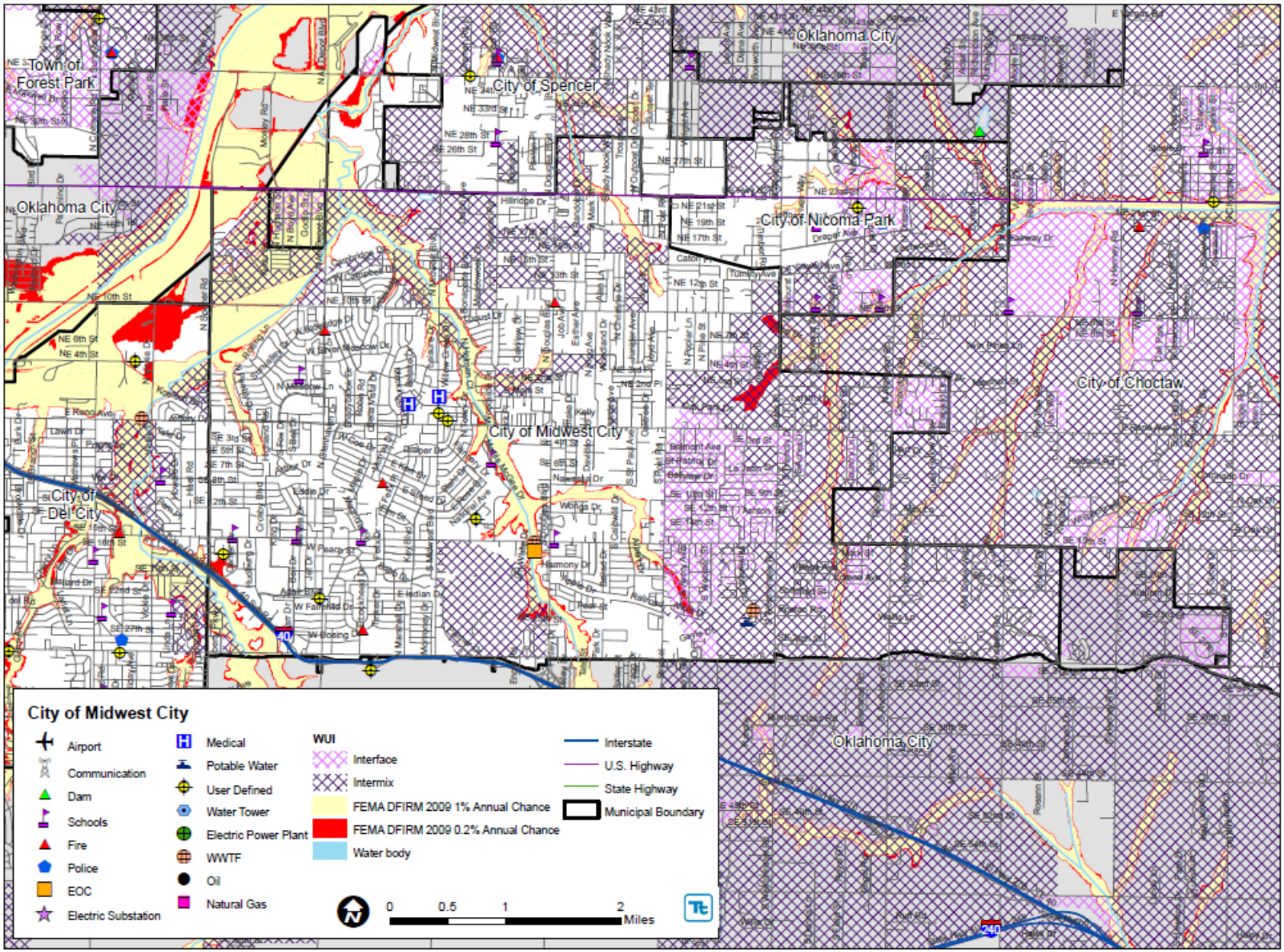
None at this time.

G.) HAZARD AREA EXTENT AND LOCATION

A hazard area extent and location map has been generated and is provided below for the City of Midwest City to illustrate the probable areas impacted within the City of Midwest City. This map is based on the best available data at the time of the preparation of this Plan, and is considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the City of Midwest City has significant exposure.

H.) ADDITIONAL COMMENTS

No additional comments at this time.


Town of Forest Park
Oklahoma City
City of Spencer
Oklahoma City
City of Nicoma Park
City of Midwest City
City of Choctaw
City of Del City
Oklahoma City
City of Midwest City
Airport
Communication
Dam
Schools
Fire
Police
EOC
Electric Substation
Medical
Potable Water
User Defined
Water Tower
Electric Power Plant
WWTF
Oil
Natural Gas
WUI
Interface
Intermix
FEMA DFIRM 2009 1% Annual Chance
FEMA DFIRM 2009 0.2% Annual Chance
Water body
Interstate
U.S. Highway
State Highway
Municipal Boundary
0
0.5
1
2
Miles

9.11 CITY OF NICHOLS HILLS

This section presents the jurisdictional annex for the City of Nichols Hills.

A.) HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact	Alternate Point of Contact
Kevin Boydston, Fire Chief City of Nichols Hills Fire Department 6407 Avondale Drive, Nichols Hills, OK 73116 (405) 843-8526 kboydston@nicholshills.net	Randy Lawrence, Director Nichols Hills Public Works 1009 NW 75th Street, Nichols Hills, OK 73116 (405) 843-5222 pworks@nicholshills.net

B.) MUNICIPAL PROFILE

The City of Nichols Hills is located in western Oklahoma County. It is bordered to the east, south and west by Oklahoma City and to the north by the City of The Village. The City has a total land area of 2.5 square miles, all of it land. The City is governed by a mayor and three member City Council. The 2010 U.S. Census population for the City of Nichols Hills was 3,710.

Known or Anticipated New Development

The following major residential/commercial development and/or major infrastructure development are currently known or anticipated in the City of Nichols Hills:

Property Name	Type Residential or Commercial	Number of Structures	Address	Known Hazard Zone(s)	Description/Status
The Glenbrook Park, LLC	Res.	14 Units	1601 63rd Street		Ongoing
Washington Prime	Commercial	3 or more	1100 Block NW 63rd		New Commercial Structures
1100 Block of Cumberland	Res.	23 Units			New Houses

Although there has been small areas of development within the City of Nichols Hills, there has not been a significant change to the hazard vulnerabilities for the city.

Past Mitigation Activity/Efforts

Each initiative from the 2013 plan was reviewed going forward into this 2019 plan. Any initiatives that were completed or abandoned are stated below, while any new or ongoing initiatives will be found under the Proposed Hazard Mitigation Initiatives header of this section.
The following table summarizes progress on the mitigation strategy identified by the City of Nichols Hills in the 2013 plan.

Completed 2013 Initiative	Comments
Perform Soil Stabilization at Public Works New Facility	City budgeted item
Installed drainage system for flooding issues on Stratford Street.	$3.5 Million Drainage system installed.
Alleviated flooding issues on Grand & Brentwood	Installed drainage improvements to alleviate flooding.
Replaced well field with PVC piping	To address expansive soils, the City has replaced most of their well field with PVC (flexible) piping.
Wilshire Blvd & Waverly Ave. drainage control	Completed a drainage control project at Wilshire and Waverly Ave
Repaired collapsed storm drain	Repaired a collapsed storm drain on Devonshire that backs up and flooded two properties.
Mitigated vulnerability to power outages.	Stand-by generator at City Hall, hardwired, Generator at Public Works for essential uses (PW building and fueling station), Four permanent stand-by generators at water wells.

In addition, Chesapeake undergrounded utilities along the north side of NW 63rd St. from Western to Grand Ave.

Hazard Vulnerabilities Identified

Hazard profiling, Section 5.3, has identified that the City of Nichols Hills is vulnerable to the following hazards of concern:

Hazard	Local Vulnerability	Comments
Dam Failure	No	
Drought	Yes	
Earthquake	Yes	
Expansive Soils	Yes	
Extreme Temperatures	Yes	
Flooding	Yes	See local hazard map end of section
Hail	Yes	
Lightning	Yes	
Wildfire	No	See local hazard map end of section
Wind (incl. tornado)	Yes	
Severe Winter Storm	Yes	

According to the City of Nichols Hills, the following have been identified as specific hazards:
Utilities are vulnerable to ice storms as evidenced by recent events.

Along Grand Boulevard, the City has boxed in 200-300 feet of the Grand Canal through general obligation bonding to mitigate bank scouring when it overflows. There is another 300 feet that needs to be addressed.

C.) NATURAL HAZARD EVENT HISTORY SPECIFIC TO THE CITY

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
June 8-10, 1974	Flooding	DR-441	Yes	
November 26, 1974	Flooding	DR-453	Yes	
October 17-19, 1983	Flooding	DR-693	Yes	
September 29 – October 1, 1986	Flooding	DR-778	Yes	
May 2, 1990	Flooding, Tornado	DR-866	Yes	
May 8, 1993	Tornadoes	DR-991	Yes	
June 9, 1993	Flash Flooding	N/A	N/A	
July 26 – August 2, 1995	Tornado, Flooding	DR-1066	Yes	
April 24-26, 1999	Flooding	N/A	N/A	
May 3-4, 1999	Tornadoes, Flooding	DR-1272	Yes	
June 23, 1999	Flash Flooding	N/A	N/A	
October 21-29, 2000	Flooding	DR-1349	Yes	
May 30, 2001	Flooding	N/A	N/A	
September 7, 2001	Urban Flooding	N/A	N/A	
August 11-12, 2004	Flash Flood	N/A	N/A	
May 8, 2003	Wind	DR-1465	N/A	A tornadic thunderstorm cell produced straight line wind damage in the city.
March 12, 2006	Tornadoes	DR-1637	No	
December 28-30, 2006	Severe Winter Storm	DR-1677	No	
January 12-26, 2007	Severe Winter Storms	DR-1678	No	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
March 29, 2007	Tornadoes	N/A	N/A	
May 4-11, 2007	Tornadoes, and Flooding	DR-1707	No	
May 24, 2007 to June 1, 2007	Flooding, and Tornadoes	DR-1723	No	
June 10, 2007 to July 25, 2007	Flooding, Tornadoes	DR-1712	Yes	
Aug. 18, 2007 to Sept. 12, 2007	Tornadoes, Flooding	DR-1718	Yes	
Dec. 8, 2007 to Jan. 3, 2008	Severe Winter Storms	DR-1735	Yes	Several homes were without electricity in the City; the City had to remove approximately 24,000 cubic yards of vegetative debris from public property
March 17-23, 2008	Tornadoes, Flooding	DR-1752	No	
March 30-31, 2008	Severe Storms	N/A	N/A	
April 9-28, 2008	Tornadoes, and Flooding	DR-1754	No	
April 30, 2008	Hail/Damaging Winds	N/A	N/A	
May 9, 2008	Floods	DR-1754	No	
May 10-13, 2008	Tornadoes, Flooding	DR-1756	No	
June 3-20, 2008	Flooding	DR-1775	No	
August 20, 2008	Flooding	N/A	N/A	
September 12-19, 2008	Tornadoes, Flooding	DR-1803	No	
February 10-11, 2009	Tornadoes	DR-1820	Yes	
March 24, 2009	Severe Storms	N/A	N/A	
March 26-27, 2009	Snow/Ice/Severe Storm	N/A	N/A	
March 30, 2009	Severe Storm	N/A	N/A	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
May 13, 2009	Severe Storms	N/A	N/A	
December 24-25, 2009	Severe Winter Storm	DR-1876	No	
January 26-28, 2009	Severe Winter Storm	DR-1823	No	
2010-2011	Severe Drought	N/A	N/A	
January 28-30, 2010	Severe Winter Storm	DR-1883	No	
Jan. 30-Feb. 9, 2010	Severe Winter Storm	N/A	N/A	
March 19, 2010	Severe Winter Storm	N/A	N/A	
2010-2011	Severe Drought	N/A	N/A	
May 16, 2010	Hail Storm	N/A	N/A	
May 19, 2010	Severe Storm	N/A	N/A	
June 13-15, 2010	Tornadoes, Straight-line Winds, and Flooding	DR-1926	Yes	Three streets were damaged from this storm – Trenton Road, Huntington Ave., and Dorchester Drive, causing the City over $55,000 in expenses
May 10-13, 2010	Tornadoes, and Straight-Line Winds	DR-1917	Yes	Several hundred homes were without power; city buildings had damage from hail, causing $310,000 in damages; most of the roofs of homes in Nichols Hills were destroyed; numerous windows and vehicles were damaged or destroyed, causing millions in damages; over 30 pine trees were removed due to disease from the hail, causing $40,000 in damages
July 7-8, 2010	Flooding	N/A	N/A	
Oct. 13, 2010	Earthquake	N/A	N/A	
Jan. 31, 2011 to Feb. 5, 2011	Severe Winter Storm and Snowstorm	DR-1985	No	The City had ten water main breaks and overtime for public works employees, resulting in $12,000 in expenses
April 14, 2011	Tornadoes, And Straight-Line Winds	DR-1970	No	
April 21-28, 2011	Flooding	DR-1988	No	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
May 22-25, 2011	Tornadoes, Straight-line Winds, and Flooding	DR-1989	No	
June-August 2011	Severe Heat	N/A	N/A	
November 6, 2011	Earthquake	N/A	N/A	5.6 magnitude earthquake near Prague; depth of 5.2 km
May 29, 2012	Hail			Significant damage occurred across the Oklahoma County area due to very large hail. Nichols Hills saw hail up to 2.75 inches. Total damages of $400 to $500 million were estimated across the Oklahoma County area.
July 19, 2014	Lightning			Multiple storms produced numerous cloud to ground lightning flashes. At least three homes were damaged or destroyed in Nichols Hills. Property damages was estimated to be $2.80M
November 27-28, 2015	Winter Storm	DR-4247	Yes	Ice storm. Widespread power outages and tree damage.
December 27-28, 2015	Winter Storm	DR-4256	No	Ice storm with widespread power outages.
September 3, 2016	Earthquake	N/A	N/A	5.8 magnitude earthquake at Pawnee; depth of 5.4 km
June 7, 2018	Flood	N/A	N/A	Widespread flooding across the north Metro. Reports of flooding including NW 234th and Rockwell, parts of The Village, Edmond and Nichols Hill stranding multiple cars and closing roadways. 2-2.5 inches of rain fell over 2-3 hours.

Number of FEMA Identified Repetitive Flood Loss Properties: 2 residential
Number of FEMA Identified Severe Repetitive Flood Loss Properties: 0

Source: Oklahoma Water Resources Board (OWRB)

D.) CAPABILITY ASSESSMENT

This section identifies the following mitigation capabilities within Unincorporated Oklahoma County:

- Legal and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Community classification.

D.1) Legal and Regulatory Capability

Regulatory Tools (Codes, Ordinances., Plans)	Do you have this? (Y or N)	Code Citation (Section, Paragraph, Page Number, Date of adoption)	HM Plan Mitigation Integrated into other plans	Update Cycle	Party(s) Responsible for updating document
Building Code	Y	IBC 2015, IRC: 09, D.C., M.C, NEC 08			
Comprehensive / Master Plan	Y	Last four years	Yes	Annual	City Manager/Council
Zoning Management Ordinance	Y				
Subdivision Management Ordinance					
Site Plan Review Requirements	Y				
NFIP Flood Damage Prevention Ordinance	Y	Chapter 12			
NFIP Elevation Certificates Maintained	Y				
Floodplain Management Plan	Y	2006 Countywide All Hazards Mitigation Plan	Yes	Irregular	Floodplain Manager
Stormwater Management Plan / Ordinance	Y		Yes	Annual	Public Works Director
Stream Corridor Management or Protection Plan					
Erosion Management Ordinance					
Capital Improvements Plan	Y	Annually budgeted	Yes	Annual	Dept. Heads, City Manager, & Engineering Committee
Open Space Plan					
Economic Development Plan					
Emergency Response Plan	Y	2017	No		
Post Disaster Recovery Plan / Ordinance					
Real Estate Disclosure Requirements					
Highway Management Plan					
COOP/COG Plan					

Regulatory Tools (Codes, Ordinances., Plans)	Do you have this? (Y or N)	Code Citation (Section, Paragraph, Page Number, Date of adoption)	HM Plan Mitigation Integrated into other plans	Update Cycle	Party(s) Responsible for updating document
Other (Special Purpose Ordinances such as critical or sensitive areas)					

Additionally, any change in ordinances happens at the behest of local government bodies, state legislation or court actions and are not on a scheduled reoccurring basis.

D.2) Administrative and Technical Capability

Staff/ Personnel Resources	Available (Y or N)	Department/ Agency/ Position
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Y	Contract planner and engineer
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Y	
Planners or engineers with an understanding of natural hazards	Y	
NFIP Floodplain Administrator	Y	Code Enforcement Officer (designated by City Council per City code)
Surveyor(s)	Y	Through engineering contractor
Personnel skilled or trained in “GIS” applications	Y	
Scientist(s) familiar with natural hazards in the County.	Y	
Emergency Manager	Y	Fire Chief
Grant Writer(s)	N	Some police and fire grants; no mitigation grants
Staff with expertise or training in benefit/cost analysis		

D.3) Fiscal Capability

Financial Resources	Accessible or Eligible to use (Yes/No/Don’t know)
Community Development Block Grants (CDBG)	Yes
Capital Improvements Project Funding	Yes, annually budgeted
Authority to Levy Taxes for specific purposes	Yes
User fees for water, sewer, gas or electric service	

Impact Fees for homebuyers or developers of new development/homes	Yes
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	
Incur debt through private activity bonds	
Withhold public expenditures in hazard-prone areas	
Other	

D.4) Community Classifications

Program	Classification	Date Classified
Community Rating System (CRS)	NP	N/A
Building Code Effectiveness Grading Schedule (BCEGS)	5	2/3/2018
Public Protection	TBD	TBD
Storm Ready	County	TBD
Firewise	NP	N/A

N/A = Not applicable. NP = Not participating. - = Unavailable. TBD = To Be Determined

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at http://www.isomitigation.com/ppc/0000/ppc0001.html
- The National Weather Service Storm Ready website at http://www.weather.gov/stormready/howto.htm
- The National Firewise Communities website at http://firewise.org/

Expanding on and Improving Existing Policies and Programs

By adopting updated codes, including fire, building and NFIP ordinances this jurisdiction will continue to improve their mitigation approach. Also, by employing experts in land management and construction practices, in coordination with planners and engineers with understanding of natural hazards, the overall stratagem will continue to advance.

In addition, by participating in multi-jurisdictional training and radio interoperability, public safety agencies bolster their response capabilities. This, along with reinforcement from Annual Equipment Agreements with Oklahoma County, ensures continued improvement within the jurisdiction.

E.) PROPOSED HAZARD MITIGATION INITIATIVES

Note some of the identified mitigation initiatives in Table F are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities.

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Replace ductile iron piping with PVC in potable water system as resources permit (est. nearly 20 miles still need retrofitting).	Existing	Expansive Soils	Planned	Public Works	Eliminate water main breaks due to shifting soils	High	City budget with other funding sources as available (project dependent)	Longterm (for complete system retrofit)	Med – Low
Box-in the remaining 155 feet of the Grand Canal adjacent to Grand Boulevard to mitigate bank scouring when it overflows	Existing	Flood	In Progress	Public Works	Mitigate bank scouring that threatens Grand Boulevard	High	General Obligation Bonds or FEMA mitigation grant funding	Short	Medium
Maintain compliance with and good-standing in the NFIP including adoption and enforcement of floodplain management requirements (e.g. regulating all new and substantially improved construction in Special Hazard Flood Areas), floodplain identification and mapping, and flood insurance outreach to the community.	New & Existing	NFIP Compliance	Ongoing	Municipality (via Municipal Engineer/NFIP Floodplain Administrator) with support from OEM, ISO FEMA	High	Low - Medium	Local Budget	Ongoing	High
Participate in the Community Rating System (CRS) to further	NA	NFIP Compliance	Ongoing	NFIP Floodplain Administrator	Low	Low	Municipal Budget	Short (year 1)	Medium

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
manage flood risk and reduce flood insurance premiums for NFIP policyholders. This shall start with the submission to FEMA-DHS of a Letter of Intent to join CRS, followed by the completion and submission of an application to the program once the community's current compliance with the NFIP is established.				with support from OEM, FEMA					
Archive elevation certificates	NA	NFIP Compliance	Ongoing	NFIP Floodplain Administrator	Low	Low	Local Budget	On-going	High
Distribute mitigation information materials at schools and during Earth Day events		Drought, Earthquake, Expansive Soils, Extreme Temps, Flood, Hail, Lightning, Wind (incl. Tornado), Winter Storm	Ongoing	Fire Dept.	High	Low	Local budget	Short	Medium
Build a retention pond at Grand and Sherwood to eliminate road flooding damage		Flood	Planned	Public Works	High	High	Bonds, HMGP	Short	Medium
Drill Water Wells to increase water supply		Drought	Planned	Public Works	More reliable pressure	High	Bonds, HMGP	Short	High
Adopt and enforce 2012 Building Codes, which	New	Earthquake, Wind	Ongoing	Code Inspector	Reduce earthquake	Low	Local budget	Short	Medium

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
include provisions for building to earthquake standards					damage				
Publish heat/cold prevention /mitigation newsletters in utility bills prior to extreme heat and cold		Extreme Temps	Ongoing	Fire Dept.	Reduced loss of life	Low	Local budget	Short	Low
Map expansive soil risk areas with greater detail	New/Existing	Expansive Soils	New	Public Works	Medium	Low	Local budget	Long Term	Low
Distribute All-Hazards Weather Radios to elderly and special needs citizens		Flood, Earthquake, Extreme Temps, Hail, Lightning, Wind (incl. Tornado), Winter Storm	Ongoing	Fire Dept.	High (life safety)	Low	HMGP; Local budget	Short	Low
Drainage Canal Improvements along Grand Blvd from Huntington Ave to Bedford	Existing	Flood	New	Public Works		High	GO Bonds, FMA, HMGP	Ongoing	Medium
Flood Control Drainage installed on west Grand 6700 Blk to 6800 Blk	Existing	Flood	New	Public Works	Flood mitigation	High	GO Bonds, FMA	Short	High
Add more generators to water wells (19 more)	Existing	Winter Storms, Lightning, Wind (incl. Tornado), Earthquake	New	Public Works		High	GO Bonds	Long Term	Low
Add Generator to well 10 & 23	Existing	Earthquake, Lightning, Wind (incl. Tornado)	New	Public Works		Medium	GO Bonds	Short	High
Refurbish outdoor warning sirens	Existing	Wind (incl. Tornado)	New	Fire/IT, Emergency	Update system to	Medium	GO Bonds	Short	High

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
				Management	ensure safety of citizens				
Indoor information devices installed in City Hall, Police, & Public Works building.	Exiting	Wind (incl. Tornado)	New	Fire/IT, emergency Management	Alert occupants inside city buildings to when the outdoor warning siren is activated	Low	GO Bonds	Short	Medium

Notes:
*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (NA) is inserted if this does not apply.

Costs:
Where actual project costs have been reasonably estimated:
Low = < $10,000
Medium = $10,000 to $100,000
High = > $100,000
Where actual project costs cannot reasonably be established at this time:
Low = Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium = Could budget for under existing work-plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High = Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:
Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:
Low = < $10,000
Medium = $10,000 to $100,000
High = > $100,000
Where numerical project benefits cannot reasonably be established at this time:
Low = Long term benefits of the project are difficult to quantify in the short term.
Medium = Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High = Project will have an immediate impact on the reduction of risk exposure to life and property.

Potential FEMA HMA Funding Sources:
PDM = Pre-Disaster Mitigation Grant Program

FMA = Flood Mitigation Assistance Grant Program
RFC = Repetitive Flood Claims Grant Program
SRL = Severe Repetitive Loss Grant Program
HMGP = Hazard Mitigation Grant Program

Timeline:
Short = 1 to 5 years. Long Term= 5 years or greater. OG = On-going program. DOF = Depending on funding.

Explanation of Priorities

- ***High Priority*** - A project that meets multiple objectives (i.e., multiple hazards), benefits exceeds cost, has funding secured or is an on-going project and project meets eligibility requirements for the Hazard Mitigation Grant Program (HMGP) or Pre-Disaster Mitigation Grant Program (PDM) programs. High priority projects can be completed in the short term (1 to 5 years).

- ***Medium Priority*** - A project that meets goals and objectives, benefits exceeds costs, funding has not been secured but project is grant eligible under, HMGP, PDM or other grant programs. Project can be completed in the short term, once funding is completed. Medium priority projects will become high priority projects once funding is secured.

- ***Low Priority*** - Any project that will mitigate the risk of a hazard, benefits do not exceed the costs or are difficult to quantify, funding has not been secured and project is not eligible for HMGP or PDM grant funding, and time line for completion is considered long term (1 to 10 years). Low priority projects may be eligible other sources of grant funding from other programs. A low priority project could become a high priority project once funding is secured as long as it could be completed in the short term.

Prioritization of initiatives was based on above definitions: Yes

Prioritization of initiatives was based on parameters other than stated above: Not applicable.

F.) FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

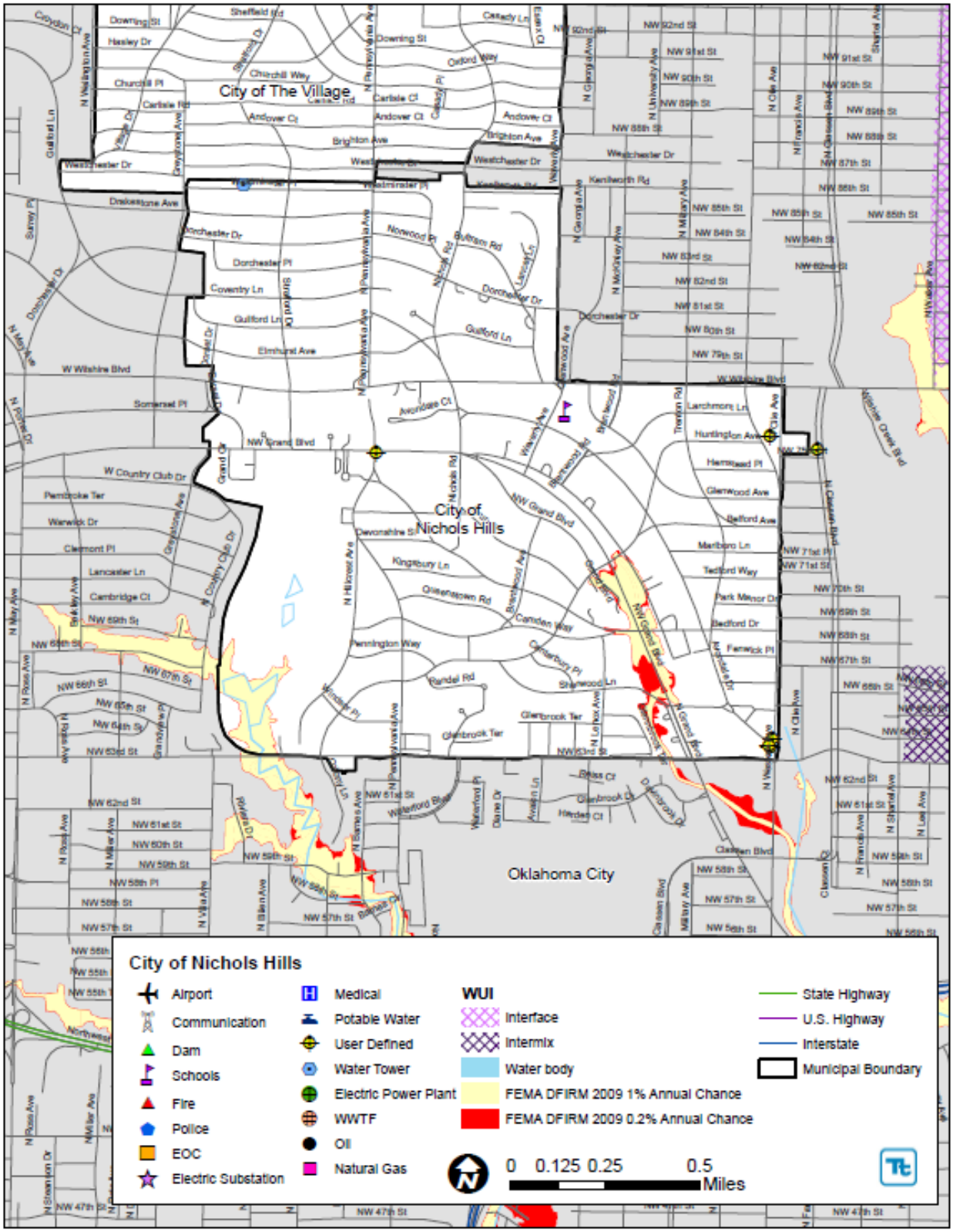
None at this time.

G.) HAZARD AREA EXTENT AND LOCATION

A hazard area extent and location map has been generated and is provided below for the City of Nichols Hills to illustrate the probable areas impacted within the City of Nichols Hills. This map is based on the best available data at the time of the preparation of this Plan, and is considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the City of Nichols Hills has significant exposure.

H.) ADDITIONAL COMMENTS

No additional comments at this time.


City of The Village
City of Nichols Hills
Oklahoma City
City of Nichols Hills
Airport
Communication
Dam
Schools
Fire
Police
EOC
Electric Substation
Medical
Potable Water
User Defined
Water Tower
Electric Power Plant
WWTF
Oil
Natural Gas
WUI
Interface
Intermix
Water body
FEMA DFIRM 2009 1% Annual Chance
FEMA DFIRM 2009 0.2% Annual Chance
State Highway
U.S. Highway
Interstate
Municipal Boundary
0 0.125 0.25 0.5
Miles

9.12 CITY OF NICOMA PARK

This section presents the jurisdictional annex for the City of Nicoma Park.

A.) HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact	Alternate Point of Contact
TJ Chartney, Fire Chief P.O. Box 250, Nicoma Park, OK 73066 (405) 443-6870 npinspector@nicompark.net	

B.) MUNICIPAL PROFILE

The City of Nicoma Park is located in western Oklahoma County. It is bordered to the north by Oklahoma City, to the south and east by the City of Choctaw, to the west by the City of Midwest City. The City of Nicoma Park has a total land area of 3.7 square miles, all of it land. The City is governed by a mayor and six member City Council. The 2010 U.S. Census population for the City of Nicoma Park was 2,393.

Low-lying areas in the Town are subject to periodic flooding caused by overflow of Choctaw Creek and its tributaries. The most severe flooding occurs as a result of thunderstorms and intense rainfall. Most flooding occurs upstream from roadways that restrict the flow. (NFIP FIS – 2009)

Growth/Development Trends

Nicoma Park plans to install a municipal water system along NE 23rd street which is expected to promote commercial development between Hiwassee and Post Rd along NE 23rd St. No specific known new development has been identified in the City of Nicoma Park at this time.

Past Mitigation Activity/Efforts

Each initiative from the 2013 plan was reviewed going forward into this 2019 plan. Any initiatives that were completed or abandoned are stated below, while any new or ongoing initiatives will be found under the Proposed Hazard Mitigation Initiatives header of this section.
The following table summarizes progress on the mitigation strategy identified by the City of Nicoma Park in the 2013 plan.

Completed 2013 Initiative	Comments
Undersized culverts in the Spring Shadows housing addition.	Culverts replaced.
Create firebreak to protect residences in the 11th and Whitehurst area (approx.. 25' x 572' long).	
Clean the drainage between Nichols Drive and NE 23rd St.	Drainage widened to improve capacity.

Additionally, the below table identifies the initiatives that were abandoned:

Abandoned 2013 Initiative	Comments
Educational programs to retrofit structures with personal safe rooms.	State already promoting safe rooms
Upgrade public notification and warning systems by implementing reverse 911 system and well as utilizing email and text messaging.	Funding not available and problems coordinating with neighboring agencies
Retrofit structures located in hazard-prone areas to protect structures from future damage, with repetitive loss and severe repetitive loss properties as priority. Specifically identified are the following: -2000 Blk. N. Westminister Rd. Phase 1: Identify appropriate candidates for retrofitting based on cost-effectiveness versus relocation.	Problem mitigated through building retaining walls.
Replace the roof on City Hall with a metal roof.	Roof replaced with composite shingles

Further details on mitigation activities completed or ongoing in the City include:

Added generators to City Hall, Police Station and Fire Department.
Flooding at 2000 Block of Westminster mitigated by local business building retaining walls.
Added an ordinance to prohibit residents from depositing debris into drainage channels.
Cooperative agreement with Oklahoma County District 2 to remove storm debris and widen culverts on a maintenance schedule.

Hazard Vulnerabilities Identified

Hazard profiling, Section 5.3, has identified that the City of Nicoma Park is vulnerable to the following hazards of concern:

Hazard	Local Vulnerability	Comments
Dam Failure	No	
Drought	Yes	
Earthquake	Yes	
Expansive Soils	No	
Extreme Temperatures	Yes	
Flooding	Yes	See local hazard map end of section
Hail	Yes	
Lightning	Yes	
Wildfire	Yes	See local hazard map end of section
Wind (incl. tornado)	Yes	
Severe Winter Storm	Yes	

According to the City of Nicoma Park, the following have been identified as specific hazards:

- Ice storm – damage to dwellings – accessory buildings and electrical lines and equipment
- Fires, drought, severe storms – hail, floods, tornado, straight-line winds, snow, ice storm
- Floods – business and residential damage

A flood risk exists around the 2000 Block of N. Westminister and around the 2600 block of N. Ives Way.

Some creek beds are silted in with debris and need cleanup from the 2500 Block of Nichols Drive west to NE 23rd St.

It is estimated that in Nicoma Park, 148 residents live within the 1% annual chance flood area (NFIP Special Flood Hazard Area). $36,504,000 (12.2%) of the municipality's general building stock replacement cost value (structure and contents) is located within the 1% annual chance flood area. There are 8 NFIP policies in the community, including 1 Repetitive Loss (RL) and 0 Severe Repetitive Loss (SRL) properties.

C.) NATURAL HAZARD EVENT HISTORY SPECIFIC TO THE CITY

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
June 8-10, 1974	Severe Storms, Flooding	DR-441	Yes	
November 26, 1974	Severe Storms, Flooding	DR-453	Yes	
October 17-19, 1983	Severe Storms, Flooding	DR-693	Yes	
September 29 – October 1, 1986	Severe Storms, Flooding	DR-778	Yes	
May 2, 1990	Flooding, Severe Storm, Tornado	DR-866	Yes	
May 8, 1993	Severe Storm, Tornadoes	DR-991	Yes	
June 9, 1993	Flash Flooding	N/A	N/A	
July 26 – August 2, 1995	Tornado, Flooding	DR-1066	Yes	
April 24-26, 1999	Flooding	N/A	N/A	
May 3-4, 1999	Tornadoes, Severe Storms and Flooding	DR-1272	Yes	
June 23, 1999	Flash Flooding	N/A	N/A	
October 21-29, 2000	Severe Storms and Flooding	DR-1349	Yes	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
May 30, 2001	Flooding	N/A	N/A	
September 7, 2001	Urban Flooding	N/A	N/A	
August 11-12, 2004	Flash Flood	N/A	N/A	
March 12, 2006	Severe Storms and Tornadoes	DR-1637	No	
December 28-30, 2006	Severe Winter Storm	DR-1677	No	
January 12-26, 2007	Severe Winter Storms	DR-1678	No	
March 29, 2007	Severe Storms and Tornadoes	N/A	N/A	
May 4-11, 2007	Severe Storms, Tornadoes, and Flooding	DR-1707	No	
May 24, 2007 to June 1, 2007	Severe Storms, Flooding, and Tornadoes	DR-1723	No	
June 10, 2007 to July 25, 2007	Severe Storms, Flooding, and Tornadoes	DR-1712	Yes	
Aug. 18, 2007 to Sept. 12, 2007	Severe Storms, Tornadoes, and Flooding	DR-1718	Yes	
Dec. 8, 2007 to Jan. 3, 2008	Severe Winter Storms	DR-1735	Yes	Utility outages, commercial closures, road and tree damage; City had over $379,000 in costs related to this storm
March 17-23, 2008	Severe Storms, Tornadoes, and Flooding	DR-1752	No	
March 22, 2008	Wildfire	N/A	N/A	Loss is associated with mutual aid provided to neighboring jurisdictions.
March 30-31, 2008	Severe Storms	N/A	N/A	
April 9-28, 2008	Severe Storms, Tornadoes, and Flooding	DR-1754	No	
April 30, 2008	Hail/Damaging Winds	N/A	N/A	
May 9, 2008	Severe Storms & Floods	DR-1754	No	
May 10-13, 2008	Severe Storms, Tornadoes, and Flooding	DR-1756	No	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
June 3-20, 2008	Severe Storms and Flooding	DR-1775	No	
August 20, 2008	Flooding	N/A	N/A	
September 12-19, 2008	Severe Storms, Tornadoes, and Flooding	DR-1803	No	
February 10-11, 2009	Severe Storms and Tornadoes	DR-1820	Yes	
March 24, 2009	Severe Storms	N/A	N/A	
March 26-27, 2009	Snow/Ice/Severe Storm	N/A	N/A	
March 30, 2009	Severe Storm	N/A	N/A	
April 9-12, 2009	Wildfires	DR-1846	Yes	Loss is associated with mutual aid provided to neighboring jurisdictions.
May 13, 2009	Severe Storms	N/A	N/A	
December 24-25, 2009	Severe Winter Storm	DR-1876	No	
January 26-28, 2009	Severe Winter Storm	DR-1823	No	
2010-2011	Severe Drought	N/A	N/A	
January 28-30, 2010	Severe Winter Storm	DR-1883	No	
Jan. 30-Feb. 9, 2010	Severe Winter Storm	N/A	N/A	
March 19, 2010	Severe Winter Storm	N/A	N/A	
2010-2011	Severe Drought	N/A	N/A	
May 10-13, 2010	Severe Storms, Tornadoes, and Straight-Line Winds	DR-1917	Yes	
May 16, 2010	Hail Storm	N/A	N/A	
May 19, 2010	Severe Storm	N/A	N/A	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
June 13-15, 2010	Severe Storms, Tornadoes, Straight-line Winds, and Flooding	DR-1926	Yes	
May 10-13, 2010	Severe Storms, Tornadoes, and Straight-Line Winds	DR-1917	Yes	
July 7-8, 2010	Flooding	N/A	N/A	
Oct. 13, 2010	Earthquake	N/A	N/A	
Jan. 31, 2011 to Feb. 5, 2011	Severe Winter Storm and Snowstorm	DR-1985	No	
April 14, 2011	Severe Storms, Tornadoes, And Straight-Line Winds	DR-1970	No	
April 21-28, 2011	Severe Storms And Flooding	DR-1988	No	
May 22-25, 2011	Severe Storms, Tornadoes, Straight-line Winds, and Flooding	DR-1989	No	
June-August 2011	Severe Heat	N/A	N/A	
November 6, 2011	Earthquake	N/A	N/A	5.6 magnitude earthquake near Prague; depth of 5.2 km
December 01, 2013	Earthquake	N/A	N/A	4.5 magnitude earthquake near Arcadia Lake; depth of 8.4 km.
June 16, 2014	Earthquake	N/A	N/A	4.3 magnitude earthquake near Spencer; depth of 5.0 km.
June 18, 2014	Earthquake	N/A	N/A	4.1 magnitude earthquake near Spencer; depth 5.0 km
November 27-28, 2015	Winter Storm	DR-4247	Yes	Ice storm.
December 27-28, 2015	Winter Storm	DR-4256	No	Ice storm.
June 2018	Flooding	N/A	N/A	Water entered garage of a residence in the 1900 block of Avery Ave.
July 14, 2018	Flooding	N/A	N/A	Flooding caused erosion to sewer main in the 2600 block of Ives Way.

Number of FEMA Identified Repetitive Flood Loss Properties: 1 commercial
Number of FEMA Identified Severe Repetitive Flood Loss Properties: 0

Source: Oklahoma Water Resources Board (OWRB)

Wildfire History for Nicoma Park

Acres may include loss from wildland, grass, brush, crop, orchard and nursery fires.

	Loss	Acres
2018	N/A	N/A
2017	$0	1.6
2016	$0	0.2
2015	$0	3.1
2014	$20,500	108.0
2013	$0	6.0
2012	$0	6.0
2011	$0	1,160.0
2010	$0	1.0
2009	$0	0.0
2008	$0	0.0
2007	$0	3.0
2006	$0	0.0
2005	$0	0.0
2004	$0	0.0
TOTAL LOSS	$20,500	1,288.9

Source: Oklahoma State Fire Marshal's office

D.) CAPABILITY ASSESSMENT

This section identifies the following mitigation capabilities within Unincorporated Oklahoma County:

- Legal and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Community classification.

D.1) LEGAL AND REGULATORY CAPABILITY

Regulatory Tools (Codes, Ordinances., Plans)	Do you have this? (Y or N)	Code Citation (Section, Paragraph, Page Number, Date of adoption)	HM Plan integration into plan	Update Cycle	Party(s) responsible for updating document
Building Code	Y	2015 International Building Code			
Comprehensive / Master Plan	Y	June 2018	No		
Zoning Management Ordinance	Y	Ord. 1973 2.1			
Subdivision Management Ordinance	Y	Ord. 1973			
Site Plan Review Requirements	Y	2015 International Building Code			
NFIP Flood Damage Prevention Ordinance	Y	Ord. 387 – November 3, 2009			
NFIP Elevation Certificates Maintained	Y	Ord. 387 – November 3, 2009			
Floodplain Management Plan	Y	Ord. 387 – November 3, 2009; repeated 233 – April 7, 1987	Yes	Annual	Emergency Manager/Fire Chief, and Floodplain Manager
Stormwater Management Plan / Ordinance	Y	Ord. 373 – March 4, 2008			
Stream Corridor Management or Protection Plan	N				
Erosion Management Ordinance	Y	Ord. 373 – March 4, 2008			
Capital Improvements Plan	Y	Resolution Sept. 12, 2007 – May 2007	Yes	5 Year Cycle	ACOG, City Council, City Manager, City Clerk, Dept. Heads, Mayor,
Open Space Plan	N				
Economic Development Plan	N				
Emergency Response Plan	N	In development 2018			
Post Disaster Recovery Plan / Ordinance	N				
Real Estate Disclosure	N				

Regulatory Tools (Codes, Ordinances., Plans)	**Do you have this?** (Y or N)	**Code Citation** (Section, Paragraph, Page Number, Date of adoption)	**HM Plan integration into plan**	**Update Cycle**	**Party(s) responsible for updating document**
Requirements					
Highway Management Plan	N				
COOP/COG Plan	N				
Other (Special Purpose Ordinances such as critical or sensitive areas)					

Additionally, any change in ordinances happens at the behest of local government bodies, state legislation or court actions and are not on a scheduled reoccurring basis.

D.2) ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/ Personnel Resources	**Available (Y or N)**	**Department/ Agency/ Position**
Planner(s) or Engineer(s) with knowledge of land development and land management practices	N	
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Y	Building Inspector
Planners or engineers with an understanding of natural hazards	Y	Emergency Manager
NFIP Floodplain Administrator	Y	Emergency Manager
Surveyor(s)	N	
Personnel skilled or trained in “GIS” applications	N	
Scientist(s) familiar with natural hazards in the County.	N	
Emergency Manager	Y	Asst. Fire Chief
Grant Writer(s)	Y	VoTech Partnership
Staff with expertise or training in benefit/cost analysis	N	

D.3) FISCAL CAPABILITY

Financial Resources	Accessible or Eligible to use (Yes/No/Don't know)
Community Development Block Grants (CDBG)	ACOG
Capital Improvements Project Funding	ACOG
Authority to Levy Taxes for specific purposes	No
User fees for water, sewer, gas or electric service	Sewer fees
Impact Fees for homebuyers or developers of new development/homes	No
Incur debt through general obligation bonds	No
Incur debt through special tax bonds	No
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	No
Other	

D.4) COMMUNITY CLASSIFICATIONS

Program	Classification	Date Classified
Community Rating System (CRS)	NP	N/A
Building Code Effectiveness Grading Schedule (BCEGS)	3,4	2004
Public Protection	4/6	TBD
Storm Ready	County	TBD
Firewise	NP	N/A

N/A = Not applicable. NP = Not participating. - = Unavailable. TBD = To Be Determined

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at http://www.isomitigation.com/ppc/0000/ppc0001.html
- The National Weather Service Storm Ready website at http://www.weather.gov/stormready/howto.htm
- The National Firewise Communities website at http://firewise.org/

Expanding on and Improving Existing Policies and Programs

By adopting updated codes, including fire, building and NFIP ordinances this jurisdiction will continue to improve their mitigation approach. Also, by employing experts in construction practices, in coordination with planners and engineers with understanding of natural hazards, the overall stratagem will continue to advance.

In addition, by participating in multi-jurisdictional training and radio interoperability, public safety agencies bolster their response capabilities. This, along with reinforcement from Annual Equipment Agreements with Oklahoma County, ensures continued improvement within the jurisdiction.

Moreover, this jurisdiction participates in Wildland Automatic Response (or WAR – an automatic mutual aid agreement during high wildland hazard days). This ensures a greater response to wildland fires.

E.) PROPOSED HAZARD MITIGATION INITIATIVES

Note some of the identified mitigation initiatives in Table F are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities.

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Clean and widen the drainage channel between Ives Way and NE 23rd	Existing	Flooding	New	Emergency Management	High	Medium	REAP	Short	High
Create new drainage channels and widen culverts around 17th & Avery Ave.	Existing	Flooding	New	Emergency Management	High	Medium	Municipal	Short	High
Address overflow problems in and along city creeks. Request OK County D2 for assistance in clearing creeks of debris, silt and ensure water channels are open.		(Non mitigation)	Ongoing	Public Works with OK Co District 2	High	Medium	REAP grant through OK Co D2	Short	Medium
Provide flood protection for Hiwassee lift station which may eventually flood from erosion during flooding. Provide rip raff and sod to mitigate the flooding and redirect the small channel.	Existing	Flood	Planned	Public Works	High	High	CNP DA - OK County D2	Short	Medium
Retrofit Community Center to serve as a warming/cooling center, including oxygen and a small triage station.	Existing	Extreme Temps	Planned	Contractor w/ Public Works	High	High	Grants and matching funds	Long Term DOF	Low
Maintain compliance with and good-standing in the NFIP including adoption and enforcement of floodplain management requirements, floodplain	New & Existing	NFIP Compliance	Ongoing	Municipal Engineer/NFIP Floodplain Administrator with support from OEM,	High	Low - Medium	Local Budget	Ongoing	Medium

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
identification and mapping, and flood outreach to the community.				ISO FEMA					
Educate public on water and soil conservation as well as climate conditions.		Drought	Ongoing	Emergency Management	High	Low to Medium	Local Budget	Short	Low
Monitor state, county and local drought conditions and prohibit any outdoor burning when conditions prohibit such activity.		Drought, Wildfire	Ongoing	Fire Dept.	High	Low to Medium	Local Budget	Short	Low
Establish regular public notification system via website when drought conditions exist by using 3-tiered warning system from low to high risk, with a request to conserve water.		Drought	Ongoing	Emergency Management	High	Low to Medium	Local Budget	Short	Low
Enact an ordinance for all future construction to require burial of utility lines. Lines may sway and come down in an earthquake, be taken down in a winter storm, poles burned in a wildfire, insulators destroyed by hail, equipment damaged by lightning, and be taken down by high wind or floods.	New	Flood, Earthquake, Hail, Lightning, Wind (incl. Tornado), Wildfire, Winter Storm	Planned	Code Enforcement	High	Low to Medium	Local Budget	Short	Low
Adopt and enforce IBC building codes related to soil conditions.	New	Earthquake	Ongoing	Code Enforcement	High	Low to Medium	Local Budget	Short	Low
Educate public about the potential hazards associated with extreme		Extreme Temp	Ongoing	Emergency Management	High	Low to Medium	Local Budget	Short	Low

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
temperature conditions via newsletters and social media.									
Using demographics, identify highest vulnerable group of citizens such as seniors and children and develop strategy to assist those with the highest need of either fans and or heaters.		Extreme Temp	Ongoing	City Planning with Fire Dept.	High	Low to Medium	Local Budget	Short	Low
Educate public through social media about the potential material and human damage from hail. Including insurance coverage for home, auto and crops.		Hail	Ongoing	Fire Dept.	High	Low to Medium	Local Budget	Short	High
Utilize city website to provide public warning system to take during severe lightning storms.		Lightning	Ongoing	Emergency Manager	High	Low to Medium	Local Budget	Short	High
Retrofit municipal facilities with lightning detection and arrestor systems.	Existing	Lightning	Planned	Public Works	High	Medium	FEMA Grant programs and matching local funds.	Long-Term DOF	Medium
Educate public about the potential material and human damage from hail, wind and lightning. Item 1. Insurance coverage for home, auto and crops against lightning, wind and hail. Item 2. Encourage adoption of lightning arresters for businesses		Hail, Lightning, Wind (incl. Tornado)	Planned	Code Enforcement with Fire Dept.	High	Low to Medium	FEMA Grant programs and matching local funds.	Short	Medium

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
and residences.									
Locate safe areas or safe harbors from high winds and earthquakes in city facilities and retrofit facilities deemed as not having a safe area for municipal employees.	Existing	Earthquake, Wind (incl. Tornado)	Planned	Code Enforcement with Public Works	High	High	FEMA Grant programs and matching local funds.	Long	Low
Replace antiquated storm sirens		Wind (incl. Tornado)	New	Emergency Management	High	Medium	FEMA grant and municipal funds	Short	Medium
Educate public about the potential dangers of severe winter storms and develop an outreach program to assist citizens isolated or stranded without power during winter storms.		Winter Storms	Ongoing	Emergency Management	High	Low to Medium	FEMA Grant programs and matching local funds.	Short/ Continuous	Medium
Host a class at the community center to educate the public on making their home less vulnerable to wildfires.	Existing	Wildfire	New	Fire Department	High	Low	No cost – NFA provided materials	Short	Medium
Provide weather radios to citizens		Flood, Earthquake, Hail, Lightning, Wind (incl. Tornado), Wildfire, Winter Storm	New	Fire Department	High	Medium	FEMA grant and matching local funds.	Short	Medium

Notes:
*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (NA) is inserted if this does not apply.
Costs:
Where actual project costs have been reasonably estimated:
Low = < $10,000

Medium = $10,000 to $100,000
High = > $100,000
Where actual project costs cannot reasonably be established at this time:
Low = Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
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Prioritization of initiatives was based on above definitions: Yes

Prioritization of initiatives was based on parameters other than stated above: Not applicable.

F.) FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

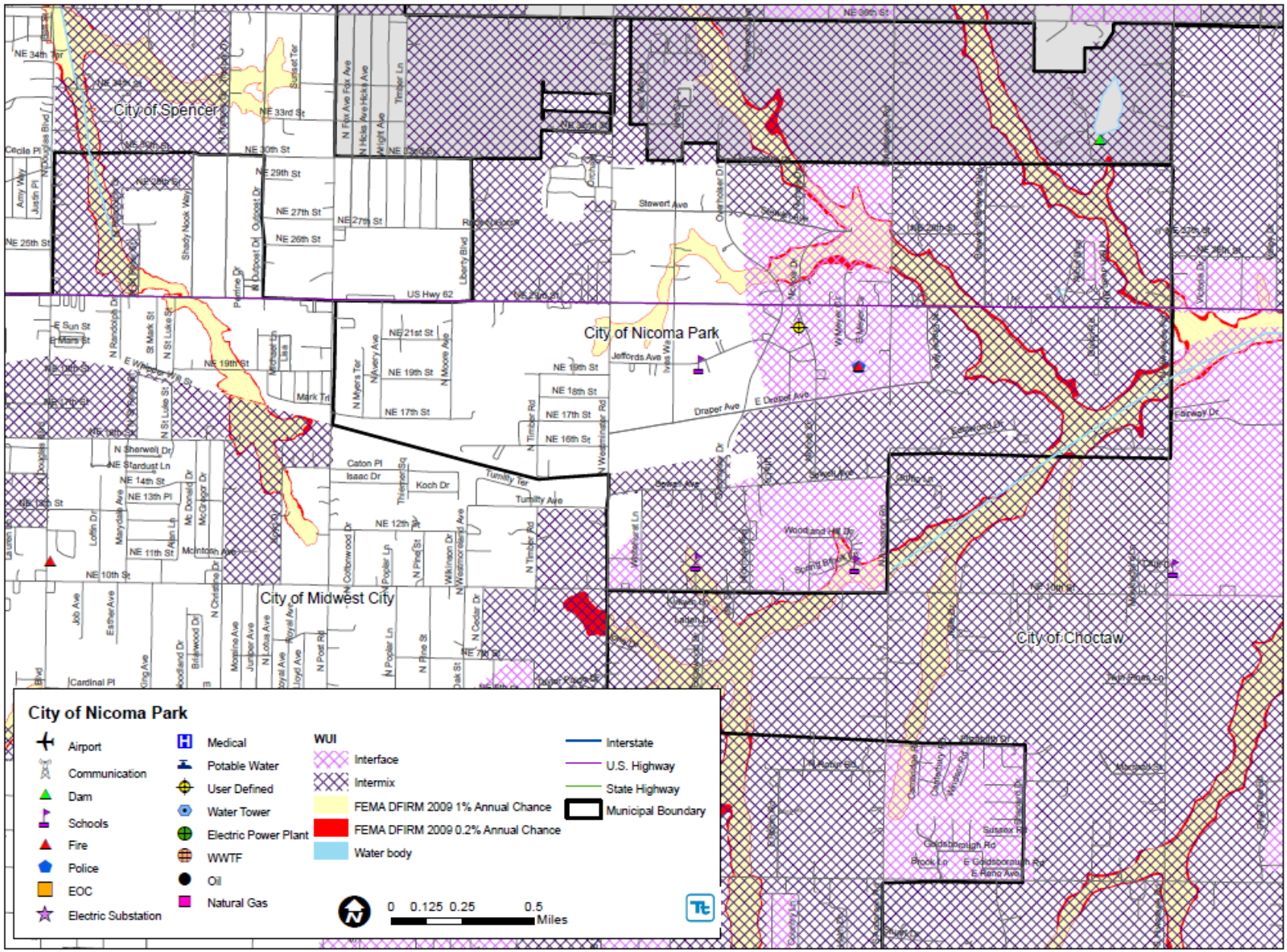
None at this time.

G.) HAZARD AREA EXTENT AND LOCATION

A hazard area extent and location map has been generated and is provided below for the City of Nicoma Park to illustrate the probable areas impacted within the City of Nicoma Park. This map is based on the best available data at the time of the preparation of this Plan, and is considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the City of Nicoma Park has significant exposure.

H.) ADDITIONAL COMMENTS

No additional comments at this time.


City of Spencer
City of Nicoma Park
City of Midwest City
City of Choctaw
US Hwy 62
NE 34th Ter
NE 33rd St
NE 30th St
NE 29th St
NE 27th St
NE 26th St
NE 25th St
NE 23rd St
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NE 13th Pl
NE 12th St
NE 11th St
NE 10th St
NE 7th St
Draper Ave
Jeffords Ave
Stewart Ave
Tumilty Ave
Koch Dr
Caton Pl
Isaac Dr
Cardinal Pl
City of Nicoma Park
Airport
Communication
Dam
Schools
Fire
Police
EOC
Electric Substation
Medical
Potable Water
User Defined
Water Tower
Electric Power Plant
WWTF
Oil
Natural Gas
WUI
Interface
Intermix
FEMA DFIRM 2009 1% Annual Chance
FEMA DFIRM 2009 0.2% Annual Chance
Water body
Interstate
U.S. Highway
State Highway
Municipal Boundary
0 0.125 0.25 0.5
Miles

9.13 CITY OF SPENCER

This section presents the jurisdictional annex for the City of Spencer.

A.) HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact	Alternate Point of Contact
Dale Griffith, Fire Chief 8310 NE 36th St., Spencer, OK 73084 (405) 771-3621 spencerfdchief@sbcglobal.net	Chuck Blair, Emergency Management Director 4203 N. Coaltrane, Forest Park, OK 73121 (405) 823-2728 chuckblair801@gmail.com

B.) MUNICIPAL PROFILE

The City of Spencer is located in central Oklahoma County. The City is bordered to the north and west by Oklahoma City, to the south by the City of Midwest City, and to the east by the City of Nicoma Park. The City has a total land area of 5.3 square miles, all of it land. The City is governed by a mayor and four member City Council. The 2010 U.S. Census population for the City of Spencer was 3,912.

Low-lying areas in the City are subject to periodic flooding caused by overflow from the North Canadian River, Crutcho Creek, Silver Creek and Tributary 9. The most severe flooding typically occurs after thunderstorms with intense rainfall. Most flooding occurs upstream from roadways that restrict the flow. (FEMA NFIP FIS – 2009)

Growth/Development Trends

The City of Spencer has had only small growth over the past few years. Growth is anticipated over the next few years.

New Development/Potential Development in the City of Spencer						
Property Name	Type Residential or Commercial	Number of Structures	Address	Block and Lot	Known Hazard Zone	Description/Status
Reserve at Spencer	Commercial	3\6	8400 blk of NE 36th St.			Completed
Valero Gas Station	Commercial	1	NE 36th & Midwest			Completed

Although there has been small areas of development within the City of Spencer, there has not been a significant change to the hazard vulnerabilities for the city.

Past Mitigation Activity/Efforts

Each initiative from the 2013 plan was reviewed going forward into this 2019 plan. Any initiatives that were completed or abandoned are stated below, while any new or ongoing initiatives will be found under the Proposed Hazard Mitigation Initiatives header of this section.
The following table summarizes progress on the mitigation strategy identified by the City of Spencer in the 2013 plan.

Completed 2013 Initiative Description	Comments

Abandoned 2013 Initiative Description	Comments
Establish pre-determined heating and cooling stations to protect the public	Determined this project is unneeded.
Inform citizens and developers how to mitigate expansive soil events through literature distributed during building permitting	Due to NRCS Map shows no significant expansive soils in jurisdiction, this project was abandoned.
Pass an ordinance that establish building code requirements to check for expansive soils and perform soil stabilization before construction	Due to NRCS Map shows no significant expansive soils in jurisdiction, this project was abandoned.
Completed 2013 Initiative Description	**Comments**
Implement a concrete lined channel along the bed of Silver Creek to prevent further erosion.	Flooding mitigation efforts have been successful at minimizing flooding in the area.

Further details on mitigation activities completed or ongoing in the City include:

A generator has been installed to power the critical facilities that support the city government.

Hazard Vulnerabilities Identified

Hazard profiling, Section 5.3, has identified that the City of Spencer is vulnerable to the following hazards of concern:

Hazard	Local Vulnerability	Comments
Dam Failure	Yes	Canton Lake, Overholser - See local hazard map end of section
Drought	Yes	
Earthquake	Yes	
Expansive Soils	No	NRCS Map shows no significant expansive soils in jurisdiction.
Extreme Temperatures	Yes	
Flooding	Yes	See local hazard map end of section
Hail	Yes	
Lightning	Yes	
Wildfire	Yes	See local hazard map end of section
Wind (incl. tornado)	Yes	
Severe Winter Storm	Yes	

According to the City of Spencer, the following have been identified as specific hazards:

Approximately 8 to 10 homes flood in the Silver Creek area every time heavy amounts of rain occur.

C.) NATURAL HAZARD EVENT HISTORY SPECIFIC TO THE CITY

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
June 8-10, 1974	Tornadoes, Flooding	DR-441	Yes	
November 26, 1974	Severe Storms, Flooding	DR-453	Yes	
October 17-19, 1983	Severe Storms, Flooding	DR-693	Yes	
September 29 – October 1, 1986	Severe Storms, Flooding	DR-778	Yes	
May 2, 1990	Flooding, Severe Storm, Tornado	DR-866	Yes	
May 8, 1993	Severe Storm, Tornadoes	DR-991	Yes	
June 9, 1993	Flash Flooding	N/A	N/A	
July 26 – August 2, 1995	Tornado, Flooding	DR-1066	Yes	
April 24-26, 1999	Flooding	N/A	N/A	
May 3-4, 1999	Tornadoes, Severe Storms and Flooding	DR-1272	Yes	
June 23, 1999	Flash Flooding	N/A	N/A	
October 21-29, 2000	Severe Storms and Flooding	DR-1349	Yes	
May 30, 2001	Flooding	N/A	N/A	
September 7, 2001	Urban Flooding	N/A	N/A	
August 11-12, 2004	Flash Flood	N/A	N/A	
November 10, 2004	Tornado	N/A	N/A	
March 12, 2006	Severe Storms and Tornadoes	DR-1637	No	
December 28-30, 2006	Severe Winter Storm	DR-1677	No	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
January 12-26, 2007	Severe Winter Storms	DR-1678	No	
March 29, 2007	Severe Storms and Tornadoes	N/A	N/A	
May 4-11, 2007	Severe Storms, Tornadoes, and Flooding	DR-1707	No	
May 24, 2007 to June 1, 2007	Severe Storms, Flooding, and Tornadoes	DR-1723	No	
June 10, 2007 to July 25, 2007	Severe Storms, Flooding, and Tornadoes	DR-1712	Yes	
Aug. 18, 2007 to Sept. 12, 2007	Severe Storms, Tornadoes, and Flooding	DR-1718	Yes	
Dec. 8, 2007 to Jan. 3, 2008	Severe Winter Storms	DR-1735	Yes	
March 17-23, 2008	Severe Storms, Tornadoes, and Flooding	DR-1752	No	
March 30-31, 2008	Severe Storms	N/A	N/A	
April 9-28, 2008	Severe Storms, Tornadoes, and Flooding	DR-1754	No	
April 30, 2008	Hail/Damaging Winds	N/A	N/A	
May 9, 2008	Severe Storms & Floods	DR-1754	No	
May 10-13, 2008	Severe Storms, Tornadoes, and Flooding	DR-1756	No	
June 3-20, 2008	Severe Storms and Flooding	DR-1775	No	
August 20, 2008	Flooding	N/A	N/A	
September 12-19, 2008	Severe Storms, Tornadoes, and Flooding	DR-1803	No	
February 10-11, 2009	Severe Storms and Tornadoes	DR-1820	Yes	
March 24, 2009	Severe Storms	N/A	N/A	
March 26-27, 2009	Snow/Ice/Severe Storm	N/A	N/A	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
March 30, 2009	Severe Storm	N/A	N/A	
April 9-12, 2009	Wildfires	DR-1846	Yes	
May 13, 2009	Severe Storms	N/A	N/A	
December 24-25, 2009	Severe Winter Storm	DR-1876	No	
January 26-28, 2009	Severe Winter Storm	DR-1823	No	
2010-2011	Severe Drought	N/A	N/A	
January 28-30, 2010	Severe Winter Storm	DR-1883	No	
Jan. 30-Feb. 9, 2010	Severe Winter Storm	N/A	N/A	
March 19, 2010	Severe Winter Storm	N/A	N/A	
2010-2011	Severe Drought	N/A	N/A	
May 10-13, 2010	Severe Storms, Tornadoes, and Straight-Line Winds	DR-1917	Yes	
May 16, 2010	Hail Storm	N/A	N/A	
May 19, 2010	Severe Storm	N/A	N/A	
June 13-15, 2010	Severe Storms, Tornadoes, Straight-line Winds, and Flooding	DR-1926	Yes	
May 10-13, 2010	Severe Storms, Tornadoes, and Straight-Line Winds	DR-1917	Yes	
July 7-8, 2010	Flooding	N/A	N/A	
Oct. 13, 2010	Earthquake	N/A	N/A	
Jan. 31, 2011 to Feb. 5, 2011	Severe Winter Storm and Snowstorm	DR-1985	No	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
April 14, 2011	Severe Storms, Tornadoes, And Straight-Line Winds	DR-1970	No	
April 21-28, 2011	Severe Storms And Flooding	DR-1988	No	
May 22-25, 2011	Severe Storms, Tornadoes, Straight-line Winds, and Flooding	DR-1989	No	
June-August 2011	Severe Heat	N/A	N/A	
November 6, 2011	Earthquake	N/A	N/A	5.6 magnitude earthquake near Prague; depth of 5.2 km
May 31-June 1st, 2013	Severe Storms, Flooding	DR-4117	Yes	Nearby mesonet station reported a 2 day total of 6.73" of rain.
December 01, 2013	Earthquake	N/A	N/A	4.5 magnitude earthquake near Arcadia Lake; depth of 8.4 km.
June 16, 2014	Earthquake	N/A	N/A	At a depth of 5.0km, this earthquake was felt throughout Oklahoma County and beyond. Reports of light to moderate shaking, with some very light damage were received. This quake originated in Spencer and was measured at 4.3
June 18, 2014	Earthquake	N/A	N/A	USGS reports this quake is at a 5.0km depth. Multiple reports throughout the county ranging from light to strong shaking. Some light damage was also reported. This quake originated in Spencer and was measured at 4.1
November 27-28, 2015	Winter Storm	DR-4247	Yes	Ice storm.
December 27-28, 2015	Winter Storm	DR-4256	No	Ice storm.
September 3, 2016	Earthquake	N/A	N/A	5.8 magnitude earthquake at Pawnee; depth of 5.4 km

Number of FEMA Identified Repetitive Flood Loss Properties: 1 residential
Number of FEMA Identified Severe Repetitive Flood Loss Properties: 0

Source: Spencer Fire Department

Wildfire History for Spencer

	Loss	Acres
2018	$0	3.0
2017	$0	0.0
2016	$0	0.0
2015	$0	8.0
2014	$0	0.0
2013	$0	0.0
2012	$0	102.0
2011	$0	2.0
2010	$0	0.0
2009	$0	20.0
2008	$0	0.0
2007	$0	0.0
2006	$0	0.0
2005	$0	0.0
2004	$0	1.0
TOTAL LOSS	**$0**	**136.0**

Acres may include loss from wildland, grass, brush, crop, orchard and nursery fires.

Source: Oklahoma State Fire Marshal's office

D.) CAPABILITY ASSESSMENT

This section identifies the following mitigation capabilities within Unincorporated Oklahoma County:

- Legal and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Community classification.

D.1) Legal and Regulatory Capability

Regulatory Tools (Codes, Ordinances., Plans)	Do you have this? (Y or N)	Code Citation (Section, Paragraph, Page Number, Date of adoption)	HM Plan integration into plan	Update cycle	Party(s) responsible for updating document
Building Code	Y				
Comprehensive / Master Plan					
Zoning Management Ordinance	Y				
Subdivision Management Ordinance	Y				

Regulatory Tools (Codes, Ordinances., Plans)	Do you have this? (Y or N)	Code Citation (Section, Paragraph, Page Number, Date of adoption)	HM Plan integration into plan	Update cycle	Party(s) responsible for updating document
Site Plan Review Requirements	Y		No		
NFIP Flood Damage Prevention Ordinance (if you are in the NFIP, you must have this!)	Y				
NFIP Elevation Certificates Maintained	Y				
Floodplain Management Plan	Y		Yes	No Update Scheduled	City Manager & Code Enforcements Officer
Stormwater Management Plan / Ordinance	N				
Stream Corridor Management or Protection Plan	N				
Erosion Management Ordinance	N				
Capital Improvements Plan	Y		No		
Open Space Plan	Y		No		
Economic Development Plan	Y		Yes	No Update Scheduled	City Manager
Emergency Response Plan	Y	County plan used for jurisdiction	No		
Post Disaster Recovery Plan / Ordinance					
Real Estate Disclosure Requirements					
Highway Management Plan					
COOP/COG Plan					
Other (Special Purpose Ordinances such as critical or sensitive areas)					

Additionally, any change in ordinances happen at the behest of local government bodies, state legislation or court actions and are not a reoccurring basis.

D.2) Administrative and Technical Capability

Staff/ Personnel Resources	Available (Y or N)	Department/ Agency/ Position
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Y	
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Y	
Planners or engineers with an understanding of natural hazards	Y	
NFIP Floodplain Administrator (if you are in the NFIP, you must have this person designated – often your code official)	Y	
Surveyor(s)		
Personnel skilled or trained in "GIS" applications		
Scientist(s) familiar with natural hazards in the County.		
Emergency Manager	Y	
Grant Writer(s)		
Staff with expertise or training in benefit/cost analysis		

D.3) Fiscal Capability

Financial Resources	Accessible or Eligible to use (Yes/No/Don't know)
Community Development Block Grants (CDBG)	
Capital Improvements Project Funding	
Authority to Levy Taxes for specific purposes	Yes
User fees for water, sewer, gas or electric service	Yes
Impact Fees for homebuyers or developers of new development/homes	
Incur debt through general obligation bonds	
Incur debt through special tax bonds	
Incur debt through private activity bonds	
Withhold public expenditures in hazard-prone areas	
Other	

D.4) Community Classifications

Program	Classification	Date Classified
Community Rating System (CRS)	NP	N/A
Building Code Effectiveness Grading Schedule (BCEGS)	TBD	TBD
Public Protection	TBD	TBD
Storm Ready	County	TBD
Firewise	NP	N/A

N/A = Not applicable. NP = Not participating. - = Unavailable. TBD = To Be Determined

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at http://www.isomitigation.com/ppc/0000/ppc0001.html
- The National Weather Service Storm Ready website at http://www.weather.gov/stormready/howto.htm
- The National Firewise Communities website at http://firewise.org/

Expanding on and Improving Existing Policies and Programs

By adopting updated codes, including fire, building and NFIP ordinances this jurisdiction will continue to improve their mitigation approach. Also, by employing experts in land management and construction practices, in coordination with planners and engineers with understanding of natural hazards, the overall stratagem will continue to advance.

In addition, by participating in multi-jurisdictional training and radio interoperability, public safety agencies bolster their response capabilities. This, along with reinforcement from Annual Equipment Agreements with Oklahoma County, ensures continued improvement within the jurisdiction.
Moreover, this jurisdiction participates in Wildland Automatic Response (or WAR – an automatic mutual aid agreement during high wildland hazard days). This ensures a greater response to wildland fires.

E.) PROPOSED HAZARD MITIGATION INITIATIVES

Note some of the identified mitigation initiatives in Table F are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities.

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Purchase, or relocate structures located in hazard-prone areas to protect structures from future damage, with repetitive loss and severe repetitive loss properties as priority. Specifically identified are the following: three (3) repetitive loss properties Phase 1: Identify appropriate candidates for relocation based on cost-effectiveness versus retrofitting. Phase 2: Where relocation is determined to be a viable option, work with property owners toward implementation of that action based on available funding from FEMA and local match availability.									
See above.	Existing	Flood	Planned	Municipality (via Municipal Engineer/NFIP Floodplain Administrator) with support from OEM, FEMA	High	High	FEMA Mitigation Grant Programs and local budget (or property owner) for cost share	Long-term DOF	Medium-High*
Maintain compliance with and good-standing in the NFIP including adoption and enforcement of floodplain management requirements (e.g. regulating all new and substantially improved construction in Special Hazard Flood Areas), floodplain identification and mapping, and flood insurance outreach to the community.	New & Existing	NFIP Compliance	Ongoing	Municipality (via Municipal Engineer/NFIP Floodplain Administrator) with support from OEM, ISO FEMA	High	Low - Medium	Local Budget	Ongoing	High

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Conduct and facilitate community and public education and outreach for residents and businesses to include, but not be limited to, the following to promote and effect natural hazard risk reduction: • Provide and maintain links to the HMP website, and regularly post notices on the County/municipal homepage(s) referencing the HMP webpages. • Prepare and distribute informational letters to flood and dam failure vulnerable property owners and neighborhood associations, explaining the availability of mitigation grant funding to mitigate their properties, and instructing them on how they can learn more and implement mitigation. • Use email notification systems and newsletters to better educate the public on flood insurance, the availability of mitigation grant funding, and personal natural hazard risk reduction measures. • Work with neighborhood associations, civic and business groups to disseminate information on flood insurance and the availability of mitigation grant funding.									
See above.	NA	Dam Failure, Flood	Ongoing	Municipality with support from Planning Partners, OEM, FEMA	Low - Medium	Low - Medium	Municipal Budget; HMA programs with local or county match	Short	High
Archive elevation certificates	NA	NFIP Compliance	Ongoing	NFIP Floodplain Administrator	Low	Low	Local Budget	On-going	High
Develop a location listing or map that identifies buildings and critical facilities within the Lake Overholser and Canton Lake inundation area.	Existing	NFIP Compliance	Ongoing	Municipal Engineer	High	Low-Medium	HMGP, Local Budget, Other Grants	Short	Medium
Enact a regulation to prevent structures from being built in in swash zone areas and the Special Flood Hazard Area.	New	NFIP Compliance, Dam Failure, Flood	Ongoing	Municipal Engineer	High	Low	Local Budget	Short	Medium
Drill additional water wells ensuring that an adequate water supply is available.	Existing	Drought	Planned	Municipal Engineer	High	High	OWRB REAP Grant	Short	Medium
Conduct a public education campaign to inform the citizens how to conserve water and mitigate drought using Xeriscape.		Drought	Ongoing	Municipal Engineer	High	High	Local Budget	Short	High

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Develop detailed fault maps to determine areas most likely to be effected by earthquakes and at risk structures.	New and Existing	Earthquake	Planned	Municipal Engineer	High	High	HMGP, Local Budget, other grants	Long	Medium
Enact a regulation to require power lines to be buried in new housing developments.	New	Dam Failure, Earthquake, Flooding, Hail, Lightning, Wildfire, Wind (incl. Tornado), Winter Storm	Planned	Code Enforcement	High – insulators will not be destroyed by hail; lines not stretched during winter storms or taken down by swinging from an earthquake, lightning, flood, wildfires, or wind	High	Local Budget	Long	Medium
Provide public literature to high risk populations on the dangers associated with extreme temperature events through distribution at public events and at public facilities.		Extreme Temperatures	Planned	Fire Department	High	Low	City Budget	Short	High
Plant trees in public areas around buildings and in parks to provide shade		Extreme Temperatures	Ongoing	Public Works	High	Low	OK Dept of Forestry, City Budget	Short	Low
Widen and increase the drainage upstream from the repetitive loss properties, including installing tinhorns and	New and Existing	Flood	Planned	Public Works	High	High	OWRB REAP Grant, HMGP, City	Long, DOF	High

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
possibly riprap							Budget		
Develop a mitigation educational program and present it to farmers and ranchers explaining the need for crop insurance and how to make buildings more resistant to hail through improved roofing materials.	New and Existing	Hail	Ongoing	Code Enforcement	High	Low	City Budget	Short	Medium
Enact a building code requiring hail resistant materials for roofing and siding on all new homes.	New	Hail	Planned	Code Enforcement	High	Low	City Budget	Short	Medium
Install lightning protection and suppression systems protecting radios, computers and other critical equipment at city owned facilities.	Existing	Lightning	Planned	Public Works	High	Medium	City Budget, Grants	Short	Medium
Include lightning mitigation and safety brochures with monthly water bills	Existing	Lightning	Ongoing	Code Enforcement	High	Low	City Budget	Short	Medium
Purchase and install lightning detection systems with alarms for city parks and public areas.		Lightning	Planned	Public Works	High	High	HMGP	Long	Medium
Enact an ordinance to require the securing of mobile homes and other small structures helping reduce damage from high winds.	New and Existing	Wind (incl. Tornado)	Planned	Code Enforcement	High	Low	City Budget	Short	High
Provide tie downs to secure mobile homes and other small structures from high winds	New and Existing	Wind (incl. Tornado)	Planned	Code Enforcement	High	Low	HMGP, City Budget	Short	High
Purchase and install generators for city police,	New and Existing	Earthquake, Extreme	Planned	Public Works	High	Medium	HMGP, USDA	Short	High

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
fire departments and EOC facilities. Generators can be used to power items after an earthquake shakes lines down, rolling blackouts during extreme temps, outages caused by floods, lightning, hail destroying power insulators, wildfires burning up poles, and ice taking down lines in winter storms.		Heat, Flood, Hail, Lightning, Wildfire, Wind (incl. Tornado), Winter Storm					REAP		
Provide public education through pamphlets and business group meetings to inform individuals and companies how to mitigate against winter storms		Winter Storm	Ongoing	Fire Department	High	Low	City Budget	Short	High
Bolster drainage infrastructure on 36th St between Midwest Blv and Spencer Rd to alleviate growing flooding issues that affects access to public safety facilities.	Existing	Flooding	New	Public Works	High	Medium	HMGP, City Budget, County	Short	High
Upgrade exiting tornado sirens and add additional sirens in areas not currently covered.	Existing	Wind (incl. Tornado)	New	EM	High	Medium	HMGP, City Budget	Short	High

Notes:
*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (NA) is inserted if this does not apply.
Costs:
Where actual project costs have been reasonably estimated:
Low = < $10,000
Medium = $10,000 to $100,000
High = > $100,000
Where actual project costs cannot reasonably be established at this time:
Low = Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.

Medium = Could budget for under existing work-plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High = Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:
Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:
Low = < $10,000
Medium = $10,000 to $100,000
High = > $100,000
Where numerical project benefits cannot reasonably be established at this time:
Low = Long term benefits of the project are difficult to quantify in the short term.
Medium = Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High = Project will have an immediate impact on the reduction of risk exposure to life and property.

Potential FEMA HMA Funding Sources:
PDM = Pre-Disaster Mitigation Grant Program
FMA = Flood Mitigation Assistance Grant Program
RFC = Repetitive Flood Claims Grant Program
SRL = Severe Repetitive Loss Grant Program
HMGP = Hazard Mitigation Grant Program

OWRB REAP = Oklahoma Water Resources Board, Rural Economic Action Plan
USDA REAP = U.S. Dept. of Ag Rural Energy for America Program

Timeline:
Short = 1 to 5 years. Long Term= 5 years or greater. OG = On-going program.
DOF = Depending on funding.

Explanation of Priorities

- ***High Priority*** - A project that meets multiple objectives (i.e., multiple hazards), benefits exceeds cost, has funding secured or is an on-going project and project meets eligibility requirements for the Hazard Mitigation Grant Program (HMGP) or Pre-Disaster Mitigation Grant Program (PDM) programs. High priority projects can be completed in the short term (1 to 5 years).

- ***Medium Priority*** - A project that meets goals and objectives, benefits exceeds costs, funding has not been secured but project is grant eligible under, HMGP, PDM or other grant programs. Project can be completed in the short term, once funding is completed. Medium priority projects will become high priority projects once funding is secured.

- ***Low Priority*** - Any project that will mitigate the risk of a hazard, benefits do not exceed the costs or are difficult to quantify, funding has not been secured and project is not eligible for HMGP or PDM grant funding, and time line for completion is considered long term (1 to 10 years). Low priority projects may be eligible other sources of grant funding from other programs. A low priority project could become a high priority project once funding is secured as long as it could be completed in the short term.

Prioritization of initiatives was based on above definitions: Yes

Prioritization of initiatives was based on parameters other than stated above: Not applicable.

F.) FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

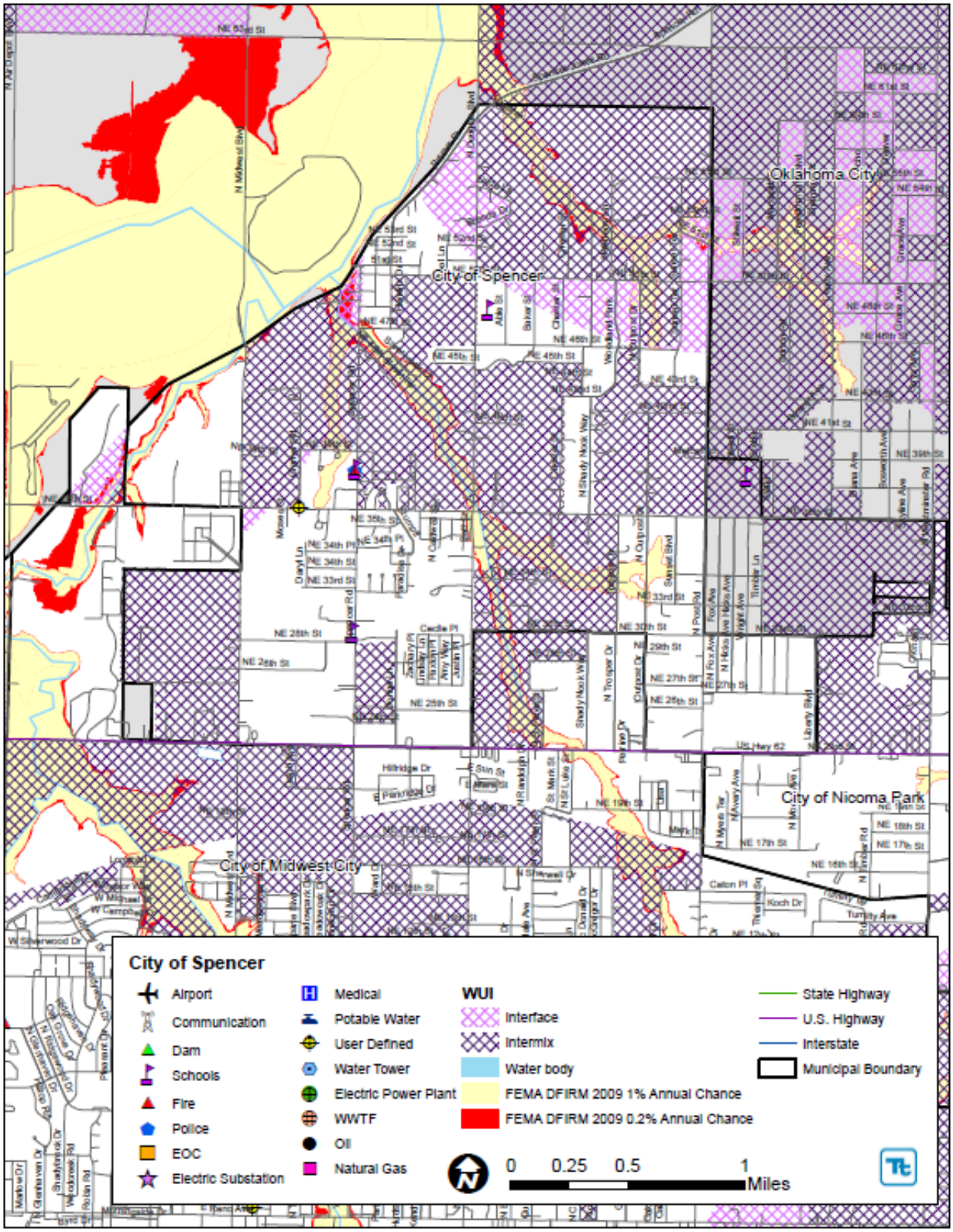
None at this time.

G.) HAZARD AREA EXTENT AND LOCATION

A hazard area extent and location map has been generated and is provided below for the City of Spencer to illustrate the probable areas impacted within the City of Spencer. This map is based on the best available data at the time of the preparation of this Plan, and is considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the City of Spencer has significant exposure.

H.) ADDITIONAL COMMENTS

No additional comments at this time.


City of Spencer
Oklahoma City
City of Midwest City
City of Nicoma Park
City of Spencer
Airport
Communication
Dam
Schools
Fire
Police
EOC
Electric Substation
Medical
Potable Water
User Defined
Water Tower
Electric Power Plant
WWTF
Oil
Natural Gas
WUI
Interface
Intermix
Water body
FEMA DFIRM 2009 1% Annual Chance
FEMA DFIRM 2009 0.2% Annual Chance
State Highway
U.S. Highway
Interstate
Municipal Boundary
0 0.25 0.5 1
Miles

9.14 CITY OF THE VILLAGE

This section presents the jurisdictional annex for the City of The Village.

A.) HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact	Alternate Point of Contact
TJ Hamill, Fire Chief 2201 W. Britton Road, The Village, OK 73120 (405) 755-2499 tjhamill@thevillageok.org	Ken Nelson, Building Inspector 2304 Manchester Drive, The Village, OK 73120 (405) 751-8861 ken_nelson@thevillageok.org

B.) MUNICIPAL PROFILE

The City of The Village is located in western Oklahoma County. It is bordered to the north, east and west by Oklahoma City and to the south by the City of Nichols Hills. The City has a total land area of 2.5 square miles, all of it land. The City is governed by a mayor and five member City Council. The 2010 U.S. Census population for the City of The Village was 8,929.

Growth/Development Trends

The City has several residential developments (Crossings at The Village) going on at this time. Although there has been small areas of development within the City of The Village, there has not been a significant change to the hazard vulnerabilities for the city.

Past Mitigation Activity/Efforts

Each initiative from the 2013 plan was reviewed going forward into this 2019 plan. Any new or ongoing initiatives will be found under the Proposed Hazard Mitigation Initiatives header of this section.
An economic downturn and associated loss of city sales taxes contributed to the lack of completion of large-scale mitigation projects during the past five years.

Hazard Vulnerabilities Identified

Hazard profiling, Section 5.3, has identified that the City of The Village is vulnerable to the following hazards of concern:

Hazard	Local Vulnerability	Comments
Dam Failure	No	
Drought	Yes	
Earthquake	Yes	
Expansive Soils	Yes	
Extreme Temperatures	Yes	
Flooding	Yes	See local hazard map end of section
Hail	Yes	
Lightning	Yes	
Wildfire	No	See local hazard map end of section
Wind (incl. tornado)	Yes	

Hazard	Local Vulnerability	Comments
Severe Winter Storm	Yes	

According to the City of The Village, the following have been identified as specific hazards:

- Potential for flood damage exists within the City along the Chisholm Creek channel from Barclay Road downstream to Hefner Road. The potential for the greatest flood damage exists for the homes bordering Village Drive from Goldstone Terrace to Finley Drive and within the apartment complex along the floodplains from Finley Drive to Cavanaugh. (FEMA NFIP FIS – 2009)

Vulnerability assessment modeling has identified the following flood vulnerabilities (see Flood Hazard Profile in Section 5.3.6):

Critical Facilities Located in the DFIRM Flood Boundaries and Estimated Potential Damage from the 100- and 500-Year MRP Events

Name	Municipality	Type	Exposure		Potential Loss			
			100-Yr	500-Yr	100-Yr Structure Damage %	100-Yr Content Damage %	500-Yr Structure Damage %	500-Yr Content Damage %
Village Police Dept	The Village (C)	Police	X	X	9.7	18.6	11.3	43.5

Source: FEMA, 2009;

C.) NATURAL HAZARD EVENT HISTORY SPECIFIC TO THE CITY

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
June 8-10, 1974	Severe Storms, Flooding	DR-441	Yes	
November 26, 1974	Severe Storms, Flooding	DR-453	Yes	
October 17-19, 1983	Severe Storms, Flooding	DR-693	Yes	
September 29 – October 1, 1986	Severe Storms, Flooding	DR-778	Yes	
May 2, 1990	Flooding, Severe Storm, Tornado	DR-866	Yes	
May 2, 1990	Flooding, Severe Storm, Tornado	DR-866	Yes	
May 8, 1993	Severe Storm, Tornadoes	DR-991	Yes	
June 9, 1993	Flash Flooding	N/A	N/A	
July 26 – August 2,	Tornado, Flooding	DR-1066	Yes	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
1995				
April 24-26, 1999	Flooding	N/A	N/A	
May 3-4, 1999	Tornadoes, Severe Storms and Flooding	DR-1272	Yes	
June 23, 1999	Flash Flooding	N/A	N/A	
October 21-29, 2000	Severe Storms and Flooding	DR-1349	Yes	
May 30, 2001	Flooding	N/A	N/A	
September 7, 2001	Urban Flooding	N/A	N/A	
August 11-12, 2004	Flash Flood	N/A	N/A	
March 12, 2006	Severe Storms and Tornadoes	DR-1637	No	
December 28-30, 2006	Severe Winter Storm	DR-1677	No	
January 12-26, 2007	Severe Winter Storms	DR-1678	No	
March 29, 2007	Severe Storms and Tornadoes	N/A	N/A	
May 4-11, 2007	Severe Storms, Tornadoes, and Flooding	DR-1707	No	
May 24, 2007 to June 1, 2007	Severe Storms, Flooding, and Tornadoes	DR-1723	No	
June 10, 2007 to July 25, 2007	Severe Storms, Flooding, and Tornadoes	DR-1712	Yes	
Aug. 18, 2007 to Sept. 12, 2007	Severe Storms, Tornadoes, and Flooding	DR-1718	Yes	
Dec. 8, 2007 to Jan. 3, 2008	Severe Winter Storms	DR-1735	Yes	
March 17-23, 2008	Severe Storms, Tornadoes, and Flooding	DR-1752	No	
March 30-31, 2008	Severe Storms	N/A	N/A	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
April 9-28, 2008	Severe Storms, Tornadoes, and Flooding	DR-1754	No	
April 30, 2008	Hail/Damaging Winds	N/A	N/A	
May 9, 2008	Severe Storms & Floods	DR-1754	No	
May 10-13, 2008	Severe Storms, Tornadoes, and Flooding	DR-1756	No	
June 3-20, 2008	Severe Storms and Flooding	DR-1775	No	
August 20, 2008	Flooding	N/A	N/A	
September 12-19, 2008	Severe Storms, Tornadoes, and Flooding	DR-1803	No	
February 10-11, 2009	Severe Storms and Tornadoes	DR-1820	Yes	
March 24, 2009	Severe Storms	N/A	N/A	
March 26-27, 2009	Snow/Ice/Severe Storm	N/A	N/A	
March 30, 2009	Severe Storm	N/A	N/A	
May 13, 2009	Severe Storms	N/A	N/A	
December 24-25, 2009	Severe Winter Storm	DR-1876	No	
January 26-28, 2009	Severe Winter Storm	DR-1823	No	
2010-2011	Severe Drought	N/A	N/A	
January 28-30, 2010	Severe Winter Storm	DR-1883	No	
Jan. 30-Feb. 9, 2010	Severe Winter Storm	N/A	N/A	
March 19, 2010	Severe Winter Storm	N/A	N/A	
2010-2011	Severe Drought	N/A	N/A	
May 10-13, 2010	Severe Storms, Tornadoes, and Straight-Line	DR-1917	Yes	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
	Winds			
May 16, 2010	Hail Storm	N/A	N/A	
May 19, 2010	Severe Storm	N/A	N/A	
June 13-15, 2010	Severe Storms, Tornadoes, Straight-line Winds, and Flooding	DR-1926	Yes	
May 10-13, 2010	Severe Storms, Tornadoes, and Straight-Line Winds	DR-1917	Yes	
July 7-8, 2010	Flooding	N/A	N/A	
Oct. 13, 2010	Earthquake	N/A	N/A	
Jan. 31, 2011 to Feb. 5, 2011	Severe Winter Storm and Snowstorm	DR-1985	No	
April 14, 2011	Severe Storms, Tornadoes, And Straight-Line Winds	DR-1970	No	
April 21-28, 2011	Severe Storms And Flooding	DR-1988	No	
May 22-25, 2011	Severe Storms, Tornadoes, Straight-line Winds, and Flooding	DR-1989	No	
June-August 2011	Severe Heat	N/A	N/A	
November 6, 2011	Earthquake	N/A	N/A	5.6 magnitude earthquake near Prague; depth of 5.2 km
May 29, 2012	Hail			Significant damage occurred across the Oklahoma County area due to very large hail. The Village saw hail ranging between 2.75-3.00 inches. Total damages of $400 to $500 million were estimated across the Oklahoma County area.
May 29, 2012	Wind			A surface low developed over the Texas Panhandle through the day, lifting a stationary front northward as a warm front across Oklahoma. Significant damage occurred across the Oklahoma City Metropolitan area due to very large hail and severe winds. Edmond received an estimated $100M in damages with total estimated damages

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
				ranging from $400M to $500M across the Oklahoma City Metropolitan area including The Village.
July 2012-April 2013	Drought	N/A	N/A	2011-2012 was the fourth driest two-year period on record and left water storage at reservoirs at an all-time low. Oklahoma City implemented mandatory outdoor water rationing starting July 31, 2012 including cities that buy water from OKC. This includes Deer Creek Rural Water District (unincorporated county), Edmond, The Village and Warr Acres. January 17, 2013 odd/evening outdoor watering was re-implemented and by spring became a permanent program. August 4, 2012 fire near Luther consumed almost 60 homes and other structures.
May 5-10, 2015	Flood	DR-4222	Yes	A series of organized significant thunderstorms and flooding event happened during this time frame. Multiple tornados were reported during this event. Over this time, a total of 11.61" rain reported. One fatality was reported during this time due to storm activity. Multiple stranded vehicles required high water rescue. Southern parts of Oklahoma County saw the greatest rainfall. The Village experienced flooded roadways.
November 27-28, 2015	Winter Storm	DR-4247	Yes	Ice storm. Widespread tree damage and power outages.
December 27-28, 2015	Winter Storm	DR-4256	No	Ice storm. Widespread tree damage.
June 7, 2018	Flood	N/A	N/A	Widespread flooding across the north Metro. Reports of flooding including NW 234th and Rockwell, parts of The Village, Edmond and Nichols Hill stranding multiple cars and closing roadways. 2-2.5 inches of rain fell over 2-3 hours.

Number of FEMA Identified Repetitive Flood Loss Properties: 0
Number of FEMA Identified Severe Repetitive Flood Loss Properties: 0
Source: Oklahoma Water Resources Board (OWRB)

D.) CAPABILITY ASSESSMENT

This section identifies the following mitigation capabilities within Unincorporated Oklahoma County:

- Legal and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Community classification.

D.1) Legal and Regulatory Capability

Regulatory Tools (Codes, Ordinances., Plans)	Do you have this? (Y or N)	Code Citation (Section, Paragraph, Page Number, Date of adoption)	HM Plan integration into plan	Update cycle	Party(s) responsible for updating document
Building Code	Y	2015 IBC			
Comprehensive / Master Plan					
Zoning Management Ordinance	Y				
Subdivision Management Ordinance					
Site Plan Review Requirements	Y				
NFIP Flood Damage Prevention Ordinance	Y	Chapter 9			
NFIP Elevation Certificates Maintained	Y				
Floodplain Management Plan	Y	Through the countywide All Hazards Plan	Yes	Annual	City Manager, City Council, and Emergency Manager
Stormwater Management Plan / Ordinance	Y		Yes	Annual	City Manager, City Council, and Emergency Manager
Stream Corridor Management or Protection Plan	Y		Yes	Annual	City Manager, City Council, and Emergency Manager
Erosion Management Ordinance	Y				
Capital Improvements Plan	Y		No	No Scheduled Update	City Manager, City Council, and Emergency Manager
Open Space Plan					
Economic Development Plan	Y		No	No Scheduled Update	City Manager, City Council, and Emergency Manager
Emergency Response Plan	Y		No	No Scheduled Update	City Manager, City Council, and Emergency Manager
Post Disaster Recovery Plan / Ordinance					
Real Estate Disclosure Requirements					
Highway Management Plan					

Regulatory Tools (Codes, Ordinances., Plans)	Do you have this? (Y or N)	Code Citation (Section, Paragraph, Page Number, Date of adoption)	HM Plan integration into plan	Update cycle	Party(s) responsible for updating document
COOP/COG Plan					
Other (Special Purpose Ordinances such as critical or sensitive areas)					

Additionally, any change in ordinances happens at the behest of local government bodies, state legislation or court actions and are not a reoccurring basis.

D.2) Administrative and Technical Capability

Staff/ Personnel Resources	Available (Y or N)	Department/ Agency/ Position
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Y	Contract Engineer
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Y	Contract Engineer
Planners or engineers with an understanding of natural hazards		
NFIP Floodplain Administrator	Y	Emergency Management Director, per Flood Damage Prevention Ordinance
Surveyor(s)	N	
Personnel skilled or trained in “GIS” applications	N	
Scientist(s) familiar with natural hazards in the County.	N	
Emergency Manager	Y	
Grant Writer(s)	N	
Staff with expertise or training in benefit/cost analysis	N	

D.3) Fiscal Capability

Financial Resources	Accessible or Eligible to use (Yes/No/Don't know)
Community Development Block Grants (CDBG)	
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for specific purposes	Yes
User fees for water, sewer, gas or electric service	Yes
Impact Fees for homebuyers or developers of new development/homes	Yes
Incur debt through general obligation bonds	No
Incur debt through special tax bonds	No
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	
Other	

D.4) Community Classifications

Program	Classification	Date Classified
Community Rating System (CRS)	NP	N/A
Building Code Effectiveness Grading Schedule (BCEGS)	4	TBD
Fire Public Protection	4	2017
Storm Ready	County	2017
Firewise	NP	N/A

N/A = Not applicable. NP = Not participating. - = Unavailable. TBD = To Be Determined

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at http://www.isomitigation.com/ppc/0000/ppc0001.html
- The National Weather Service Storm Ready website at http://www.weather.gov/stormready/howto.htm
- The National Firewise Communities website at http://firewise.org/

Expanding on and Improving Existing Policies and Programs

By adopting updated codes, including fire, building and NFIP ordinances this jurisdiction will continue to improve their mitigation approach. Also, by employing experts in land management and construction practices, the overall stratagem will continue to advance.

In addition, by participating in multi-jurisdictional training and radio interoperability, public safety agencies bolster their response capabilities. This, along with reinforcement from Annual Equipment Agreements with Oklahoma County, ensures continued improvement within the jurisdiction.

E.) PROPOSED HAZARD MITIGATION INITIATIVES

Note some of the identified mitigation initiatives in Table F are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities.

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Increase drainage capacity (incl. upsizing of culverts) along Hefner Road and Village Drive; and just west of May at the Lutheran Church	Existing	Flood	Planned	City of the Village working along with Oklahoma City who owns one side of the road	High – Reduced flood vulnerability to infrastructure	High	FEMA Mitigation Grants; local funding for match	Long	Medium
Address shortfalls in public sheltering capacity by starting a city safe room rebate program.	Existing	Wind (incl. Tornado)	Planned	City EM with County and State OEM support	High – Public Safety, reduced reliance on public storm shelters	High	HMGP with local funding match	Short	High
Install permanent generator at Fire Station and DPW building. Generators can be used to power items after an earthquake shakes lines down, rolling blackouts during extreme temps, outages caused by floods, lightning, hail destroying power insulators, wind and ice taking down lines in winter storms.	Existing	Earthquake, Extreme Temps, Flood, Hail, Lightning, Wind (incl. Tornado), Winter Storm	Planned	City EM, City DPW; working with State OEM/FEMA	High (protection of critical facilities and maintenance of emergency services)	Medium - High	FEMA Mitigation and/or Emergency Management grants; local funding for match	Short	High
Maintain compliance with and good-standing in the NFIP including adoption	New & Existing	NFIP Compliance	Ongoing	Municipality (via Municipal Engineer/NFIP	High	Low - Medium	Local Budget	Ongoing	High

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
and enforcement of floodplain management requirements (e.g. regulating all new and substantially improved construction in Special Hazard Flood Areas), floodplain identification and mapping, and flood insurance outreach to the community.				Floodplain Administrator) with support from OEM, ISO FEMA					
Conduct and facilitate community and public education and outreach for residents and businesses to include, but not be limited to, the following to promote and effect natural hazard risk reduction: • Provide and maintain links to the HMP website, and regularly post notices on the County/municipal homepage(s) referencing the HMP webpages. • Prepare and distribute informational letters to flood vulnerable property owners and neighborhood associations, explaining the availability of mitigation grant funding to mitigate their properties, and instructing them on how they can learn more and implement mitigation. • Use email notification systems and newsletters to better educate the public on flood insurance, the availability of mitigation grant funding, and personal natural hazard risk reduction measures. • Work with neighborhood associations, civic and business groups to disseminate information on flood insurance and the availability of mitigation grant funding. • Participate in regional public awareness and education initiatives through the LEPCs.									
See above.	NA	Flood	Ongoing	Municipality with support from Planning Partners, OEM, FEMA	Low - Medium	Low - Medium	Municipal Budget; HMA programs with local or county match	Short	High
Archive elevation certificates	NA	NFIP Compliance	Ongoing	NFIP Floodplain Administrator	Low	Low	Local Budget	On-going	High
Conduct a public education campaign through newsletters in utility bills, the city cable channel and website to inform residents how to mitigate against drought (using Xeriscape, low		Drought, Expansive Soils, Extreme Temps, Hail, Lightning, Winter	Ongoing	City Manager	High	Low	City budget	Short	Medium

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
flow faucets), expansive soils (soil replacement), extreme temps (how to prevent frostbite, signs of heat exhaustion/stroke), hail (hail resistant roofing), lightning (using surge protectors), and winter storms (including the dangers of carbon monoxide)		Storm							
Establish water conservation regulations to enact during times of drought to align with OKC policy.		Drought	Ongoing	City Manager	High	Low	City budget	Short	Medium
Adopt IBC 2012 building code with earthquake guidance	New	Earthquake	Ongoing	Building Official	High	Low	City budget	Short	Low
Enact a regulation to require a check for expansive soils prior to building a city building and perform soil stabilization if expansive soils are found.	New	Expansive Soil	Ongoing	City Inspector	High	Low	City budget	Short	Medium

Notes:
*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (NA) is inserted if this does not apply.
Costs:
Where actual project costs have been reasonably estimated:
Low = < $10,000
Medium = $10,000 to $100,000
High = > $100,000
Where actual project costs cannot reasonably be established at this time:
Low = Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium = Could budget for under existing work-plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High = Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:
Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:
Low = < $10,000
Medium = $10,000 to $100,000
High = > $100,000
Where numerical project benefits cannot reasonably be established at this time:
Low = Long term benefits of the project are difficult to quantify in the short term.
Medium = Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High = Project will have an immediate impact on the reduction of risk exposure to life and property.

Potential FEMA HMA Funding Sources:
PDM = Pre-Disaster Mitigation Grant Program
FMA = Flood Mitigation Assistance Grant Program
RFC = Repetitive Flood Claims Grant Program
SRL = Severe Repetitive Loss Grant Program
HMGP = Hazard Mitigation Grant Program

Timeline:
Short = 1 to 5 years. Long Term= 5 years or greater. OG = On-going program.
DOF = Depending on funding.

Explanation of Priorities

- ***High Priority*** - A project that meets multiple objectives (i.e., multiple hazards), benefits exceeds cost, has funding secured or is an on-going project and project meets eligibility requirements for the Hazard Mitigation Grant Program (HMGP) or Pre-Disaster Mitigation Grant Program (PDM) programs. High priority projects can be completed in the short term (1 to 5 years).

- ***Medium Priority*** - A project that meets goals and objectives, benefits exceeds costs, funding has not been secured but project is grant eligible under, HMGP, PDM or other grant programs. Project can be completed in the short term, once funding is completed. Medium priority projects will become high priority projects once funding is secured.

- ***Low Priority*** - Any project that will mitigate the risk of a hazard, benefits do not exceed the costs or are difficult to quantify, funding has not been secured and project is not eligible for HMGP or PDM grant funding, and time line for completion is considered long term (1 to 10 years). Low priority projects may be eligible other sources of grant funding from other programs. A low priority project could become a high priority project once funding is secured as long as it could be completed in the short term.

Prioritization of initiatives was based on above definitions: Yes

Prioritization of initiatives was based on parameters other than stated above: Not applicable.

F.) FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

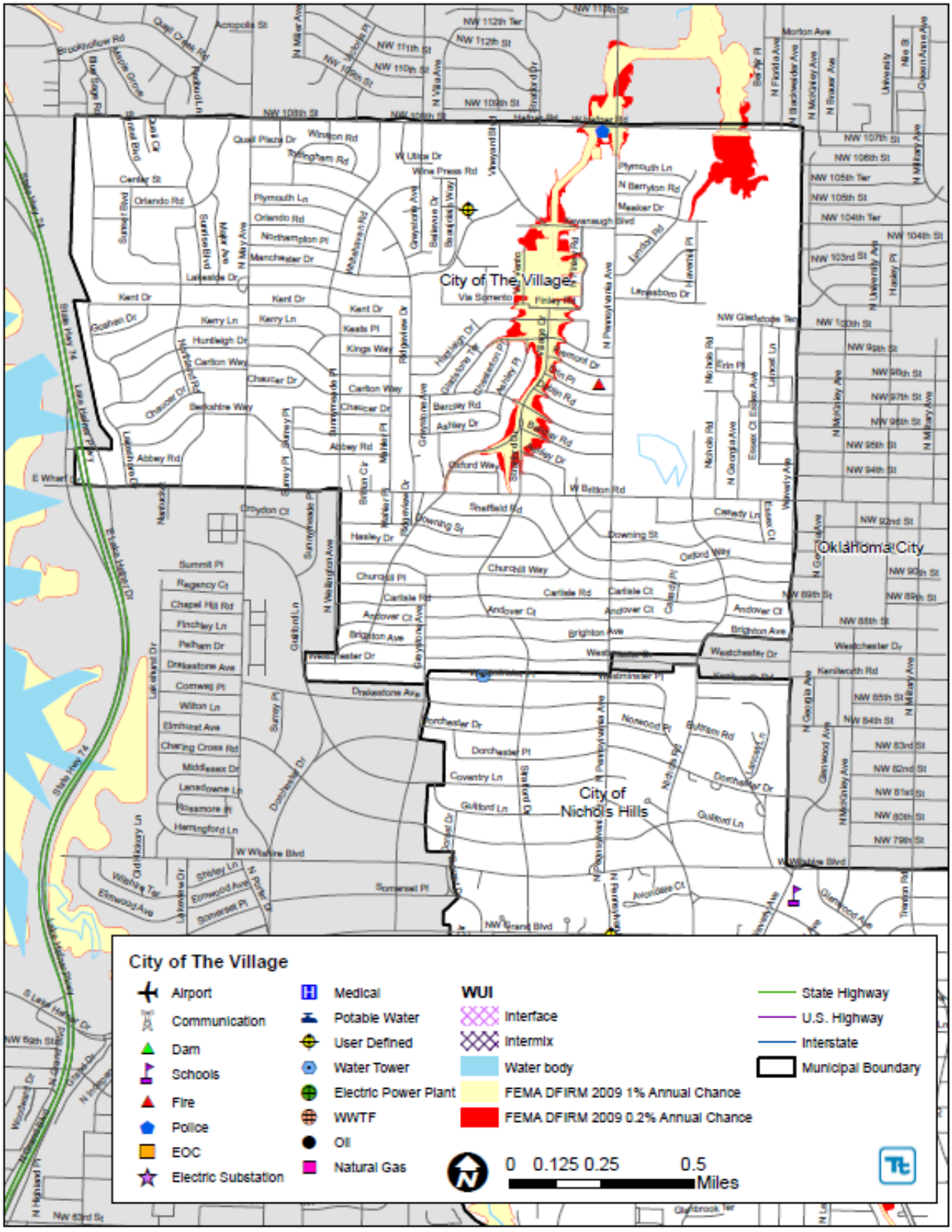
None at this time.

G.) HAZARD AREA EXTENT AND LOCATION

A hazard area extent and location map has been generated and is provided below for the City of The Village to illustrate the probable areas impacted within the City of The Village. This map is based on the best available data at the time of the preparation of this Plan, and is considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the City of The Village has significant exposure.

H.) ADDITIONAL COMMENTS

No additional comments at this time.


City of The Village
City of Nichols Hills
Oklahoma City
City of The Village
Airport
Communication
Dam
Schools
Fire
Police
EOC
Electric Substation
Medical
Potable Water
User Defined
Water Tower
Electric Power Plant
WWTF
Oil
Natural Gas
WUI
Interface
Intermix
Water body
FEMA DFIRM 2009 1% Annual Chance
FEMA DFIRM 2009 0.2% Annual Chance
State Highway
U.S. Highway
Interstate
Municipal Boundary
0 0.125 0.25 0.5
Miles

9.15 CITY OF WARR ACRES

This section presents the jurisdictional annex for the City of Warr Acres.

A.) HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact	Alternate Point of Contact
Stephen Coy, Fire Chief 5930 NW 49th, Warr Acres, OK 73120 (405) 789-5912 scoy@fire.warr-acres-ok.gov	Mike Turman, Public Works Director 6045 NW 50th St., Warr Acres, OK 73120 (405) 470-7113 publicworks@warracres-ok.gov

B.) MUNICIPAL PROFILE

The City of Warr Acres is located in southern Oklahoma County. It is bordered to the north, east and south by Oklahoma City and to the west by the Town of Bethany. It is generally bounded by Wilshire Boulevard on the north, Mueller Avenue on the west, Thirty-Third Street on the south, and Meridian Avenue on the east. State Highway 3 (Northwest Expressway) and U.S. Highway 66 (Northwest Thirty-ninth Street Expressway) pass through the community. The Putnam City School District serves some parts of Oklahoma City and almost all of Warr Acres, although some residents live in the Oklahoma City School District.

The City has a total land area of 2.8 square miles, all of it land. The City is governed by a mayor and eight member city council. The 2010 U.S. Census population for the City was 10,043.

Low-lying areas in the City are subject to periodic flooding caused by overflow of Spring Creek. The most severe flooding occurs as a result of thunderstorms and intense rainfall. Most flooding occurs upstream from roadway and ponds that restrict the flow (FEMA NFIP FIS - 2009)

Warr Acres considers their overall risk for wildfire as near zero as they have no significant areas of WUI.

Past Mitigation Activity/Efforts

Each initiative from the 2013 plan was reviewed going forward into this 2019 plan. Any initiatives that were completed or abandoned are stated below, while any new or ongoing initiatives will be found under the Proposed Hazard Mitigation Initiatives header of this section.

The following table summarizes progress on the mitigation strategy identified by the City of Warr Acres in the 2013 plan.

Completed Projects	Comments
Backup power at public works fuel pumps	
Distribute mitigation education pamphlets	
Distribute All-Hazard Weather Radios	

Further details on mitigation activities completed or ongoing in the City include:

- OG&E has been upgrading service with new poles and wires to reduce power outages
- There are an estimated 150 private residential safe rooms in the City.
- 2016 - implemented an emergency notification/voice broadcasting system to alert all residents and businesses of tornado warnings and other significant events.
- The City recently reiterated their policies on audible tornado warnings – what, when and why
- The City built a First Responder/Fire Training facility and hosted a military Vigilant Guard exercise, as well as State urban search and rescue responders.
- The City distributed weather radios for high risk public, nursing home, and all schools and daycares in Warr Acres.
- Fire extinguisher classes for Putnam City employees and Nursing home employees, the City Center employees and volunteers, Valley Hope employees, and Warr Acres City Hall employees.
- Instituted necessary programs and measures to reduce the City ISO rating to a 3 (from previous rating of 4).
- Updated/enhanced/ and maintaining mutual aid agreements with neighboring communities for continuity of operations.
- Installed window film on Fire Department to reduce hail damage and reduce extreme temperatures.
- Created and distributed mitigation education pamphlets and at booths during large public events and at public city venues.

Hazard Vulnerabilities Identified

Hazard profiling, Section 5.3, has identified that the City of Warr Acres is vulnerable to the following hazards of concern:

Hazard	Local Vulnerability	Comments
Dam Failure	Yes	Twin Lakes East and West
Drought	Yes	
Earthquake	Yes	
Expansive Soils	Yes	
Extreme Temperatures	Yes	
Flooding	Yes	See local hazard map end of section
Hail	Yes	
Lightning	Yes	
Wildfire	No	See local hazard map end of section
Wind (incl. tornado)	Yes	
Severe Winter Storm	Yes	

According to the City of Warr Acres, the following have been identified as specific hazards:

- The City has an area in the southern portion of the City that has very poor drainage. Several times a year, the City has several R-1 homes that flood.

Growth/Development Trends

The following major residential/commercial development and major infrastructure development are currently known or anticipated in the City of Warr Acres:

New Development/Potential Development in the City of Warr Acres						
Property Name	**Type Residential or Commercial**	**Number of Structures**	**Address**	**Block and Lot**	**Known Hazard Zone**	**Description/Status**
Cherokee Crossings II	Both	Up to 160	700 blk of Cherokee Crossing/west/east	Many	Not in NFIP floodplain. All utilities are being undergrounded, reducing the risk of power outages.	12 to 15 R-1 so far

The City of Warr Acres has passed a bond election providing money for widening MacArthur Blvd that will mitigate some of the flooding problems.

C.) NATURAL HAZARD EVENT HISTORY SPECIFIC TO THE CITY

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
June 8-10, 1974	Severe Storms, Flooding	DR-441	Yes	
November 26, 1974	Severe Storms, Flooding	DR-453	Yes	
October 17-19, 1983	Severe Storms, Flooding	DR-693	Yes	
September 29 – October 1, 1986	Severe Storms, Flooding	DR-778	Yes	
May 2, 1990	Flooding, Severe Storm, Tornado	DR-866	Yes	
May 8, 1993	Severe Storm, Tornadoes	DR-991	Yes	
June 9, 1993	Flash Flooding	N/A	N/A	
July 26 – August 2, 1995	Tornado, Flooding	DR-1066	Yes	
April 24-26, 1999	Flooding	N/A	N/A	
May 3-4, 1999	Tornadoes, Severe Storms and Flooding	DR-1272	Yes	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
June 23, 1999	Flash Flooding	N/A	N/A	
October 21-29, 2000	Severe Storms and Flooding	DR-1349	Yes	
May 30, 2001	Flooding	N/A	N/A	
September 7, 2001	Urban Flooding	N/A	N/A	
May 9, 2003	Tornado	N/A	N/A	Eight injured during this F1 tornado. Affected Bethany as well.
August 11-12, 2004	Flash Flood	N/A	N/A	
March 12, 2006	Severe Storms and Tornadoes	DR-1637	No	
December 28-30, 2006	Severe Winter Storm	DR-1677	No	
January 12-26, 2007	Severe Winter Storms	DR-1678	No	
March 29, 2007	Severe Storms and Tornadoes	N/A	N/A	
May 4-11, 2007	Severe Storms, Tornadoes, and Flooding	DR-1707	No	
May 24, 2007 to June 1, 2007	Severe Storms, Flooding, and Tornadoes	DR-1723	No	
June 10, 2007 to July 25, 2007	Severe Storms, Flooding, and Tornadoes	DR-1712	Yes	
Aug. 18, 2007 to Sept. 12, 2007	Severe Storms, Tornadoes, and Flooding	DR-1718	Yes	
Dec. 8, 2007 to Jan. 3, 2008	Severe Winter Storms	DR-1735	Yes	
March 17-23, 2008	Severe Storms, Tornadoes, and Flooding	DR-1752	No	
March 30-31, 2008	Severe Storms	N/A	N/A	
April 9-28, 2008	Severe Storms, Tornadoes, and Flooding	DR-1754	No	
April 30, 2008	Hail/Damaging Winds	N/A	N/A	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
May 7, 2008	Tornado	N/A	N/A	
May 9, 2008	Severe Storms & Floods	DR-1754	No	
May 10-13, 2008	Severe Storms, Tornadoes, and Flooding	DR-1756	No	
June 3-20, 2008	Severe Storms and Flooding	DR-1775	No	
August 20, 2008	Flooding	N/A	N/A	
September 12-19, 2008	Severe Storms, Tornadoes, and Flooding	DR-1803	No	
February 10-11, 2009	Severe Storms and Tornadoes	DR-1820	Yes	
March 24, 2009	Severe Storms	N/A	N/A	
March 26-27, 2009	Snow/Ice/Severe Storm	N/A	N/A	
March 30, 2009	Severe Storm	N/A	N/A	
May 13, 2009	Severe Storms	N/A	N/A	
December 24-25, 2009	Severe Winter Storm	DR-1876	No	
January 26-28, 2009	Severe Winter Storm	DR-1823	No	
2010-2011	Severe Drought	N/A	N/A	
January 28-30, 2010	Severe Winter Storm	DR-1883	No	
Jan. 30-Feb. 9, 2010	Severe Winter Storm	N/A	N/A	
March 19, 2010	Severe Winter Storm	N/A	N/A	
2010-2011	Severe Drought	N/A	N/A	
May 10-13, 2010	Severe Storms, Tornadoes, and Straight-Line Winds	DR-1917	Yes	

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
May 16, 2010	Hail Storm	N/A	N/A	
May 19, 2010	Severe Storm	N/A	N/A	
June 13-15, 2010	Severe Storms, Tornadoes, Straight-line Winds, and Flooding	DR-1926	Yes	
May 10-13, 2010	Severe Storms, Tornadoes, and Straight-Line Winds	DR-1917	Yes	
July 7-8, 2010	Flooding	N/A	N/A	
Oct. 13, 2010	Earthquake	N/A	N/A	
Jan. 31, 2011 to Feb. 5, 2011	Severe Winter Storm and Snowstorm	DR-1985	No	
April 14, 2011	Severe Storms, Tornadoes, And Straight-Line Winds	DR-1970	No	
April 21-28, 2011	Severe Storms And Flooding	DR-1988	No	
May 22-25, 2011	Severe Storms, Tornadoes, Straight-line Winds, and Flooding	DR-1989	No	
June-August 2011	Severe Heat	N/A	N/A	
November 6, 2011	Earthquake	N/A	N/A	5.6 magnitude earthquake near Prague; depth of 5.2 km
July 2012-April 2013	Drought	N/A	N/A	2011-2012 was the fourth driest two-year period on record and left water storage at reservoirs at an all-time low. Oklahoma City implemented mandatory outdoor water rationing starting July 31, 2012 including cities that buy water from OKC. This includes Deer Creek Rural Water District (unincorporated county), Edmond, The Village and Warr Acres. January 17, 2013 odd/evening outdoor watering was re-implemented and by spring became a permanent program. August 4, 2012 fire near Luther consumed almost 60 homes and other structures.
May 5-10, 2015	Flood	DR-4222	Yes	A series of organized significant thunderstorms and flooding event happened during this time frame. Multiple tornados were reported during this event. Over this time, a total of 11.61" rain

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Local Damages and Losses
				reported. One fatality was reported during this time due to storm activity. Multiple stranded vehicles required high water rescue. Southern parts of Oklahoma County saw the greatest rainfall. Warr Acres experienced flooded roadways.
Nov 27-29, 2015	Severe Winter Storm	DR-4247	N/A	Nearly all Warr Acres businesses and homes affected with power outages and significant debris, including mainly downed trees or limbs.
December 27-28, 2015	Winter Storm	DR-4256	No	Ice storm.
September 3, 2016	Earthquake	N/A	N/A	5.8 magnitude earthquake at Pawnee; depth of 5.4 km

Number of FEMA Identified Repetitive Flood Loss Properties: 1 residential
Number of FEMA Identified Severe Repetitive Flood Loss Properties: 1

Source: Oklahoma Water Resources Board (OWRB)

D.) CAPABILITY ASSESSMENT

This section identifies the following mitigation capabilities within Unincorporated Oklahoma County:

- Legal and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Community classification.
- D.1) Legal and Regulatory Capability

Regulatory Tools (Codes, Ordinances., Plans)	Do you have this? (Y or N)	Code Citation (Section, Paragraph, Page Number, Date of adoption)	HM Plan integration into plan	Update cycle	Party(s) responsible for updating document
Building Code	Y	IBC 2006 / Ord. 1017§ 1, 2006			
Comprehensive / Master Plan	Y	Warr Acres Comprehensive / Master Plan map	Yes	Annual review, as needed	Planning Commission
Zoning Management Ordinance	Y	Warr Acres Zoning in Title 19 / Ord. 1017§ 1, 2006			
Subdivision Management Ordinance	Y	Title 19 / Ord. 1017§ 1, 2006			

Regulatory Tools (Codes, Ordinances., Plans)	Do you have this? (Y or N)	Code Citation (Section, Paragraph, Page Number, Date of adoption)	HM Plan integration into plan	Update cycle	Party(s) responsible for updating document
Site Plan Review Requirements	Y	Title 19 / Ord. 1017§ 1, 2006			
NFIP Flood Damage Prevention Ordinance (if you are in the NFIP, you must have this!)	Y	Title 16:20:180, updated 2009			
NFIP Elevation Certificates Maintained	Y	Title 16:20:180, updated 2009			
Floodplain Management Plan	Y	Title 16, Chapter 16.20	Yes	As needed	City Inspector w/ Floodplain Manager and Public Works Dir.
Stormwater Management Plan / Ordinance	Y	Title 13 and MS-4 / Ord. 1076§ 1, 2009	No		Public Works Dir.
Stream Corridor Management or Protection Plan	Y	National Flood Prevention NFIP form maps	No		Public Works Dir. with City Inspector
Erosion Management Ordinance	Y	Title 13 and MS-4 / Ord. 1076§ 1, 2009			
Capital Improvements Plan	Y	Mayor Woolley has a five-year plan	Yes	Annual	Mayor with City Council
Open Space Plan	N				
Economic Development Plan	Y	City has Economic Development Authority	No	Monthly	Mayor with City Council
Emergency Response Plan	Y	City has an Emergency Operations Plan	Yes	Annual	Fire Chief/EM
Post Disaster Recovery Plan / Ordinance	N				
Real Estate Disclosure Requirements	N				
Highway Management Plan	Y	Five-year highway plan by each county commissioner district	No	5 Years / As needed	Public Works Director w/ Mayor
COOP/COG Plan	Y	City is a member of the Association of Central Oklahoma Governments (ACOG)	No	Monthly / As needed	Mayor w/ committee
Other (Special Purpose Ordinances such as critical or sensitive areas)	N				

Additionally, any change in ordinances happens at the behest of local government bodies, state legislation or court actions and are not on a scheduled reoccurring basis.

D.2) Administrative and Technical Capability

Staff/ Personnel Resources	Available (Y or N)	Department/ Agency/ Position
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Y	Warr Acres City Planner & City Engineer
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Y	Warr Acres City Engineer / Smith Roberts Baldischwiler Engineering
Planners or engineers with an understanding of natural hazards	Y	Warr Acres Public Works Director / Engineer
NFIP Floodplain Administrator	Y	Warr Acres Public Works Director
Surveyor(s)	N/Y	Subcontracted to/ Smith Roberts Baldischwiler Engineering (City Engineering firm)
Personnel skilled or trained in “GIS” applications	Y	Warr Acres in-house IT person
Scientist(s) familiar with natural hazards in the County.	N	
Emergency Manager	Y	Warr Acres Fire Chief
Grant Writer(s)	Y	Warr Acres City contract position
Staff with expertise or training in benefit/cost analysis	N	

D.3) Fiscal Capability

Financial Resources	Accessible or Eligible to use (Yes/No/Don’t know)
Community Development Block Grants (CDBG)	Yes
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for specific purposes	Yes
User fees for water, sewer, gas or electric service	Yes
Impact Fees for homebuyers or developers of new development/homes	Don’t Know
Incur debt through general obligation bonds	No
Incur debt through special tax bonds	No
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	Don’t Know
Other	

D.4) Community Classifications

Program	Classification	Date Classified
Community Rating System (CRS)	NP	N/A
Building Code Effectiveness Grading Schedule (BCEGS)	4	TBD
Public Protection	TBD	TBD
Storm Ready	County	TBD
Firewise	NP	N/A

N/A = Not applicable. NP = Not participating. - = Unavailable. TBD = To Be Determined

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at http://www.isomitigation.com/ppc/0000/ppc0001.html
- The National Weather Service Storm Ready website at http://www.weather.gov/stormready/howto.htm
- The National Firewise Communities website at http://firewise.org/

Expanding on and Improving Existing Policies and Programs

By adopting updated codes, including fire, building and NFIP ordinances this jurisdiction will continue to improve their mitigation approach. Also, by employing experts in land management and construction practices, in coordination with planners and engineers with understanding of natural hazards, the overall stratagem will continue to advance.

In addition, by participating in multi-jurisdictional training and radio interoperability, public safety agencies bolster their response capabilities. This, along with reinforcement from Annual Equipment Agreements with Oklahoma County, ensures continued improvement within the jurisdiction.

E.) PROPOSED HAZARD MITIGATION INITIATIVES

Note some of the identified mitigation initiatives in Table F are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities.

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Install a bigger drainage system and detention pond at the intersection of NW 34th and Hammond. This intersection consistently floods during average-heavy rainfall. (2006 Plan).	Existing	Flood	Planned	Public Works working with Bethany	Some 20 residential structures flood here	$3,000,000 (2006)	Federal mitigation grant funding with local match	Long	Medium
Build a saferoom for 27-30 adults (City Hall, FD, PD personnel) at City Hall	Existing	Wind (incl. Tornado)	New	Civil Defense	High	High	HMGP, City budget	Short	High
39th and MacArthur – support ODOT project to rebuild MacArthur, which will address drainage issues at this location	Existing	Flood	Planned	ODOT with support from the City	Eliminate chronic street closures	High	ODOT	3-5 years	Medium
Add an annex shelter to the Community/Senior Center which serves as the alternate EOC, including installing backup power, to support additional sheltering and provide a secondary command / communications center.	Existing	Wind (incl. Tornado)	Planned	Civil Defense	High	High	Private Funding, HMGP, City budget	Short	Medium

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Install backup power to the Community/Senior Center which serves as the alternate EOC	Existing	Earthquake, Expansive Soils, Extreme Temperatures, Flood, Hail, Lightning, Wind (incl. Tornado), Winter Storms	CIP money in position	Civil Defense	Medium	High	Private Funding, HMGP, City budget	Short	Medium
Acquisition of property in flood prone areas	New	Flooding, Dam failure	New	Municipality/Public Works	Medium	High	Federal mitigation grant funding with local match	Long	Medium
Maintain compliance with and good-standing in the NFIP including adoption and enforcement of floodplain management requirements (e.g. regulating all new and substantially improved construction in Special Hazard Flood Areas), floodplain identification and mapping, and flood insurance outreach to the community.	New & Existing	NFIP Compliance	Ongoing	Municipality (via Municipal Engineer/NFIP Floodplain Administrator) with support from OEM, ISO FEMA	High	Low - Medium	Local Budget	Ongoing	High
Adopt 2012 IBC (building code) and enforce compliance.	New & Existing	NFIP Compliance	Ongoing	Municipality (via Municipal Engineer/NFIP Floodplain Administrator) with support from OEM, FEMA	Low	Low	Municipal Budget	Short	High

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
Conduct and facilitate community and public education and outreach for residents and businesses to support personal hazard preparedness and mitigation, including information on flood and other hazard insurance, the availability of mitigation grant funding, and personal natural hazard risk reduction measures. Specific methods for public outreach and education shall include: • Provide and maintain links to the HMP website, and regularly post notices on the City homepage(s) referencing the HMP website; • Information flyers in utility bills; • Information via the Bethany Tribune; • Work with neighborhood associations, civic and business groups to disseminate information on flood and other hazard insurance and the availability of mitigation grant funding; • Participate in regional public awareness and education initiatives through the LEPCs.									
See above.	NA	Flood	Ongoing	Municipality with support from Planning Partners, OEM, FEMA	Low - Medium	Low - Medium	Municipal Budget; HMA programs with local or county match	Short	High
Archive elevation certificates	NA	NFIP Compliance	Ongoing	NFIP Floodplain Administrator	Low	Low	Local Budget	On-going	High
Offer low flow faucet adapters or change out toilets to small reservoir capacity	New	Drought	New	Municipality with OKC Water Dept	Low	Medium	Federal mitigation grant funding with building owner	Long	Lowa
Create/enhance/ maintain mutual aid agreements with neighboring communities for continuity of operations.	New & Existing	Non Mitigation	Ongoing	Municipality with support from Surrounding municipalities and County	Low	Low	Local Budget	Ongoing	High
Install window film on city buildings	Existing	Extreme Temperatures, Hail	Planned	Civil Defense	Medium	Medium	HMGP, City budget	Short	Medium
Install a steel gable roof on a city building that has been replaced twice due to	Existing	Hail	Planned	Civil Defense	Medium	Medium	HMGP	Short	Medium

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
hail damage									
Install covered parking to protect city vehicles from hail and extreme heat damage		Extreme Temperatures, Hail	Planned	Civil Defense	Medium-High	Medium	HMGP	Short	Medium
Create mitigation education pamphlets and distribute at booths during large public events and at public city venues.		Dam Failure, Drought, Earthquake, Expansive Soils, Extreme Temperatures, Flood, Hail, Lightning, Wind (incl. Tornado), Winter Storms	Ongoing	Civil Defense	High	Low	HMGP, City budget	Short	High
Conduct All-Hazard mitigation classes through town hall meetings and senior centers		Dam Failure, Drought, Earthquake, Expansive Soils, Extreme Temperatures, Flood, Hail, Lightning, Wind (incl. Tornado), Winter Storms	Ongoing	Civil Defense	High	Low	City budget	Short	High
Distribute All-Hazard Weather Radios to senior centers, and high risk residents		Dam Failure, Drought, Earthquake, Extreme Temperatures, Flood, Hail, Lightning, Wind (incl. Tornado), Winter Storms	Ongoing	Civil Defense	High	Low	HMGP, City budget	Short	High
Enact a regulation to require a check for		Expansive Soil	Planned	Public Works	High	Medium	City Budget	Short	Medium

Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority
expansive soils prior to building a city building and perform soil stabilization if expansive soils are found.									

Notes:
*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (NA) is inserted if this does not apply.

Costs:
Where actual project costs have been reasonably estimated:
Low = < $10,000
Medium = $10,000 to $100,000
High = > $100,000
Where actual project costs cannot reasonably be established at this time:
Low = Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium = Could budget for under existing work-plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High = Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:
Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:
Low = < $10,000
Medium = $10,000 to $100,000
High = > $100,000
Where numerical project benefits cannot reasonably be established at this time:
Low = Long term benefits of the project are difficult to quantify in the short term.
Medium = Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High = Project will have an immediate impact on the reduction of risk exposure to life and property.

Potential FEMA HMA Funding Sources:
PDM = Pre-Disaster Mitigation Grant Program
FMA = Flood Mitigation Assistance Grant Program
RFC = Repetitive Flood Claims Grant Program
SRL = Severe Repetitive Loss Grant Program
HMGP = Hazard Mitigation Grant Program

Timeline:
Short = 1 to 5 years. Long Term= 5 years or greater. OG = On-going program.
DOF = Depending on funding.

Explanation of Priorities

- ***High Priority*** - A project that meets multiple objectives (i.e., multiple hazards), benefits exceeds cost, has funding secured or is an on-going project and project meets eligibility requirements for the Hazard Mitigation Grant Program (HMGP) or Pre-Disaster Mitigation Grant Program (PDM) programs. High priority projects can be completed in the short term (1 to 5 years).

- ***Medium Priority*** - A project that meets goals and objectives, benefits exceeds costs, funding has not been secured but project is grant eligible under, HMGP, PDM or other grant programs. Project can be completed in the short term, once funding is completed. Medium priority projects will become high priority projects once funding is secured.

- ***Low Priority*** - Any project that will mitigate the risk of a hazard, benefits do not exceed the costs or are difficult to quantify, funding has not been secured and project is not eligible for HMGP or PDM grant funding, and time line for completion is considered long term (1 to 10 years). Low priority projects may be eligible other sources of grant funding from other programs. A low priority project could become a high priority project once funding is secured as long as it could be completed in the short term.

Prioritization of initiatives was based on above definitions: Yes

Prioritization of initiatives was based on parameters other than stated above: Not applicable.

F.) FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

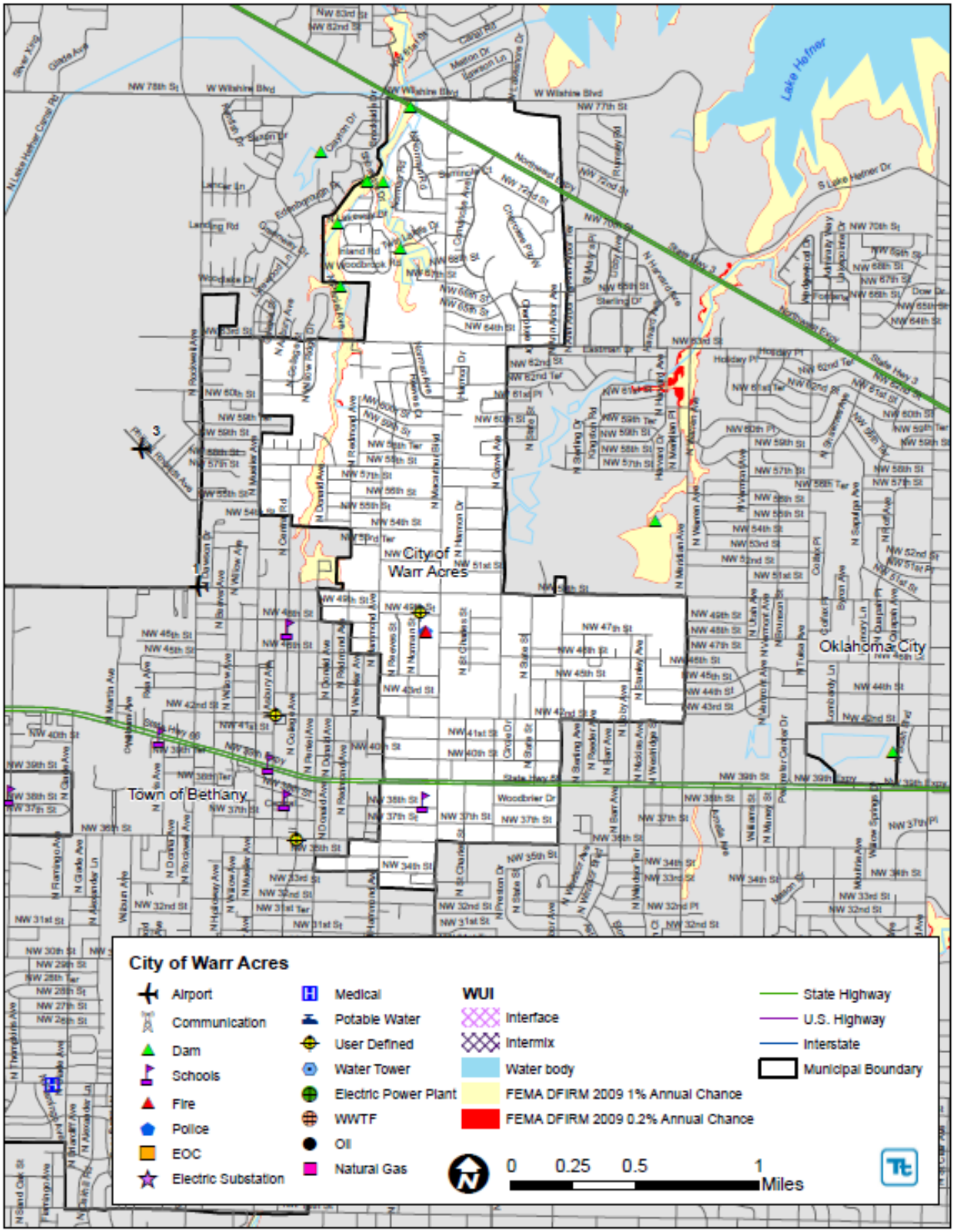
None at this time.

G.) HAZARD AREA EXTENT AND LOCATION

A hazard area extent and location map has been generated and is provided below for the City of Warr Acres to illustrate the probable areas impacted within the City of Warr Acres. This map is based on the best available data at the time of the preparation of this Plan, and is considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the City of Warr Acres has significant exposure.

H.) ADDITIONAL COMMENTS

No additional comments at this time.


City of Warr Acres
Town of Bethany
Oklahoma City
Lake Hefner
City of Warr Acres
Airport
Communication
Dam
Schools
Fire
Police
EOC
Electric Substation
Medical
Potable Water
User Defined
Water Tower
Electric Power Plant
WWTF
Oil
Natural Gas
WUI
Interface
Intermix
Water body
FEMA DFIRM 2009 1% Annual Chance
FEMA DFIRM 2009 0.2% Annual Chance
State Highway
U.S. Highway
Interstate
Municipal Boundary
0
0.25
0.5
1
Miles

Appendix A: DAM FAILURE MAPPING (NOT FOR PUBLIC VIEW)

This section provides location and vulnerable structures for the dam failure hazard.

MAPPING DETAILS

The following maps were provided by the U.S. Army Corps of Engineers, Tulsa District to Oklahoma County for the County Mitigation Plan. These maps are part of an overall Emergency Action Plan and therefore are not for public release. This section of the plan is for official use only. It is to be controlled, stored, handled, transmitted, distributed and disposed of in accordance with USACE policy related to FOUO information and is not to be released to the public or other personnel who do not have a valid "need to know" without prior approval of an authorized USACE official.

A.1 CANTON LAKE DAM

The following maps were prepared to show a partial and full dam failure of Canton Lake dam. Maximum Inundation is indicated in the pink boundary. Normal High Pool Inundation, which occurs when the pool elevation is at 10% exceedance, is demarked in the blue area.

Figure A.1-1: Canton Lake Inundation Map – Northwest Bethany Inundation

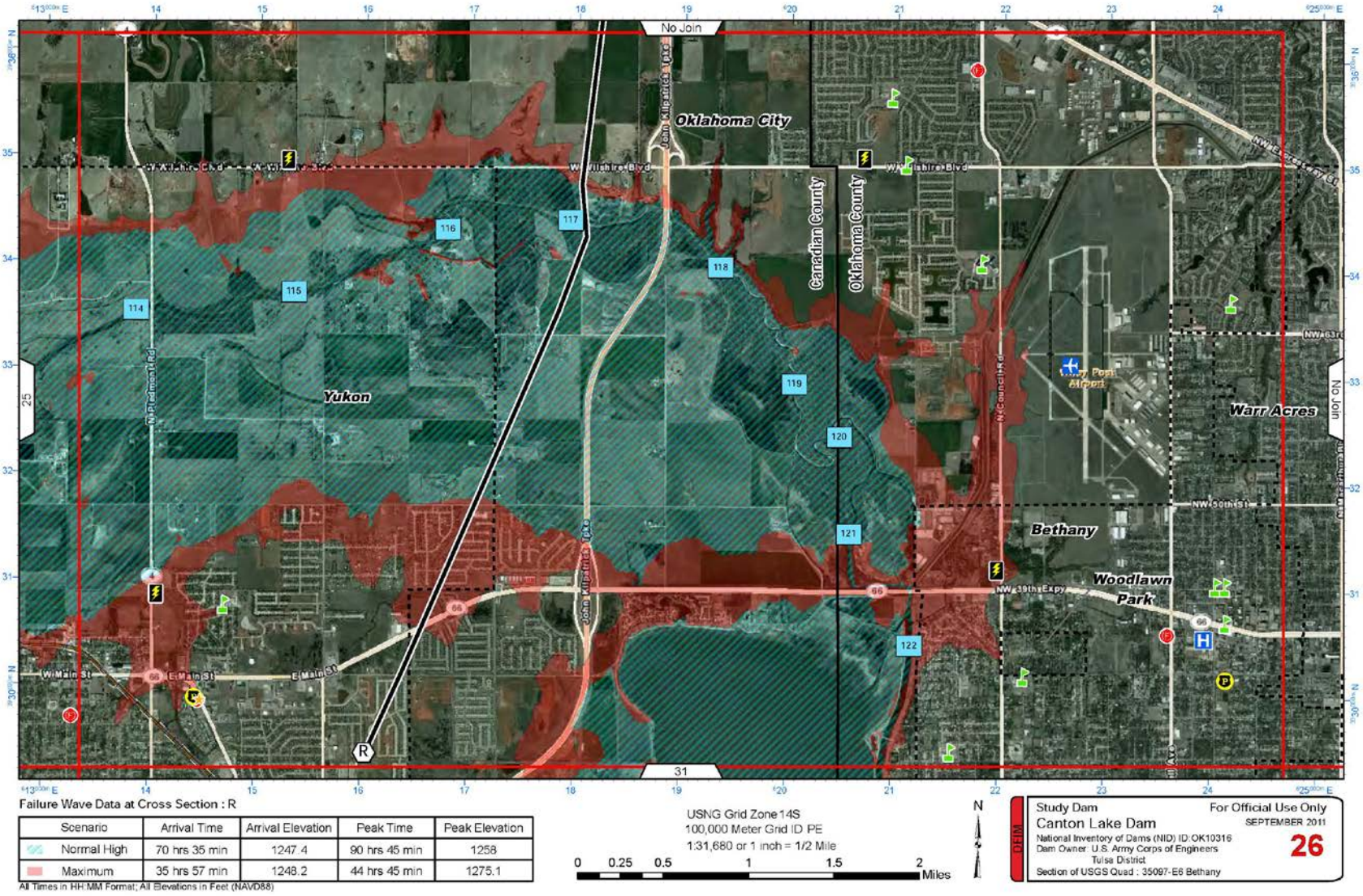


Figure A.1-2: Canton Lake Inundation Map – Southwest Corner of Bethany Inundation (Southwest Oklahoma County)

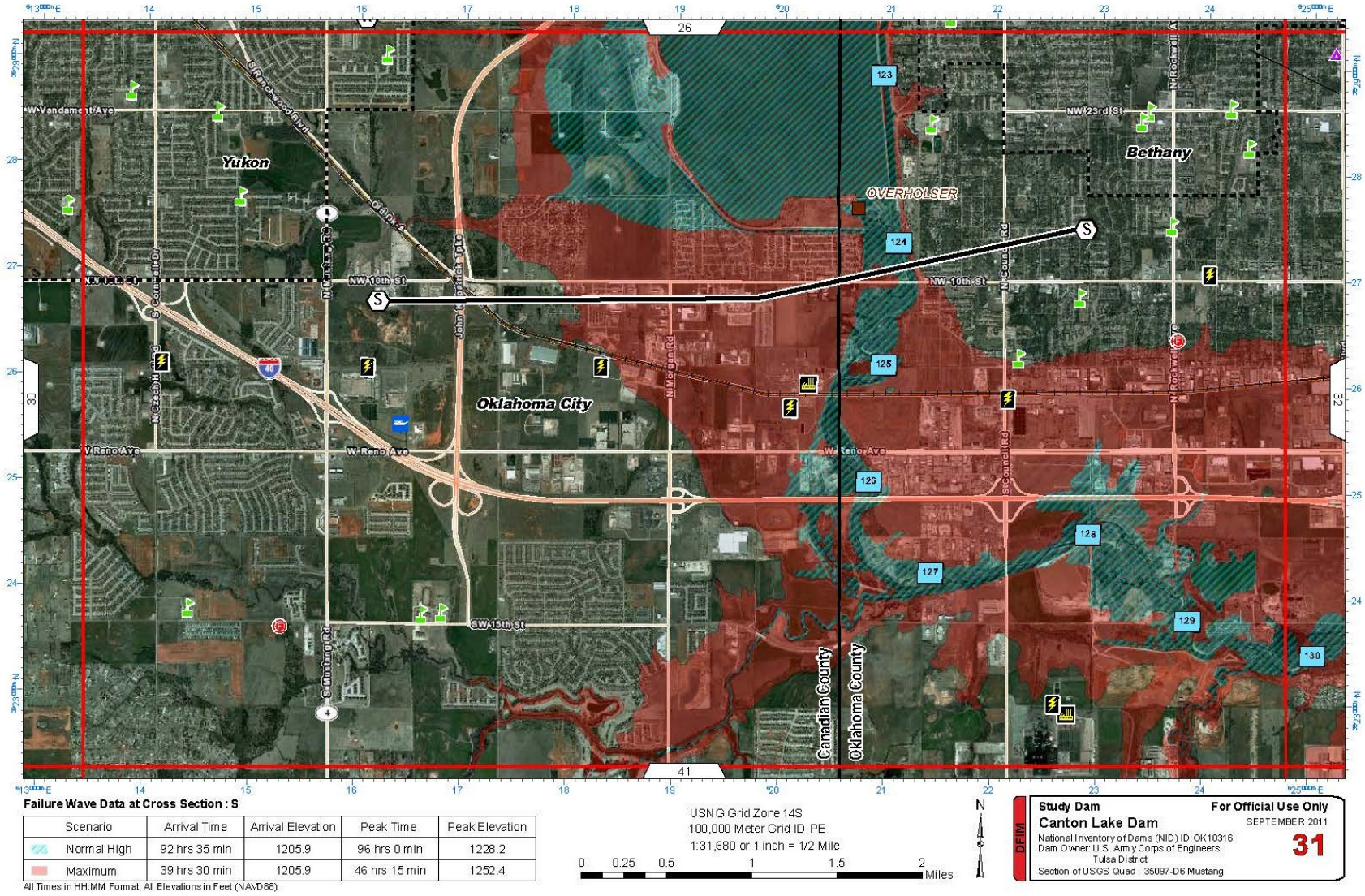


Figure A.1-3: Canton Lake Inundation Map – Northern Del City and Northwest Midwest City (South Central Oklahoma County)

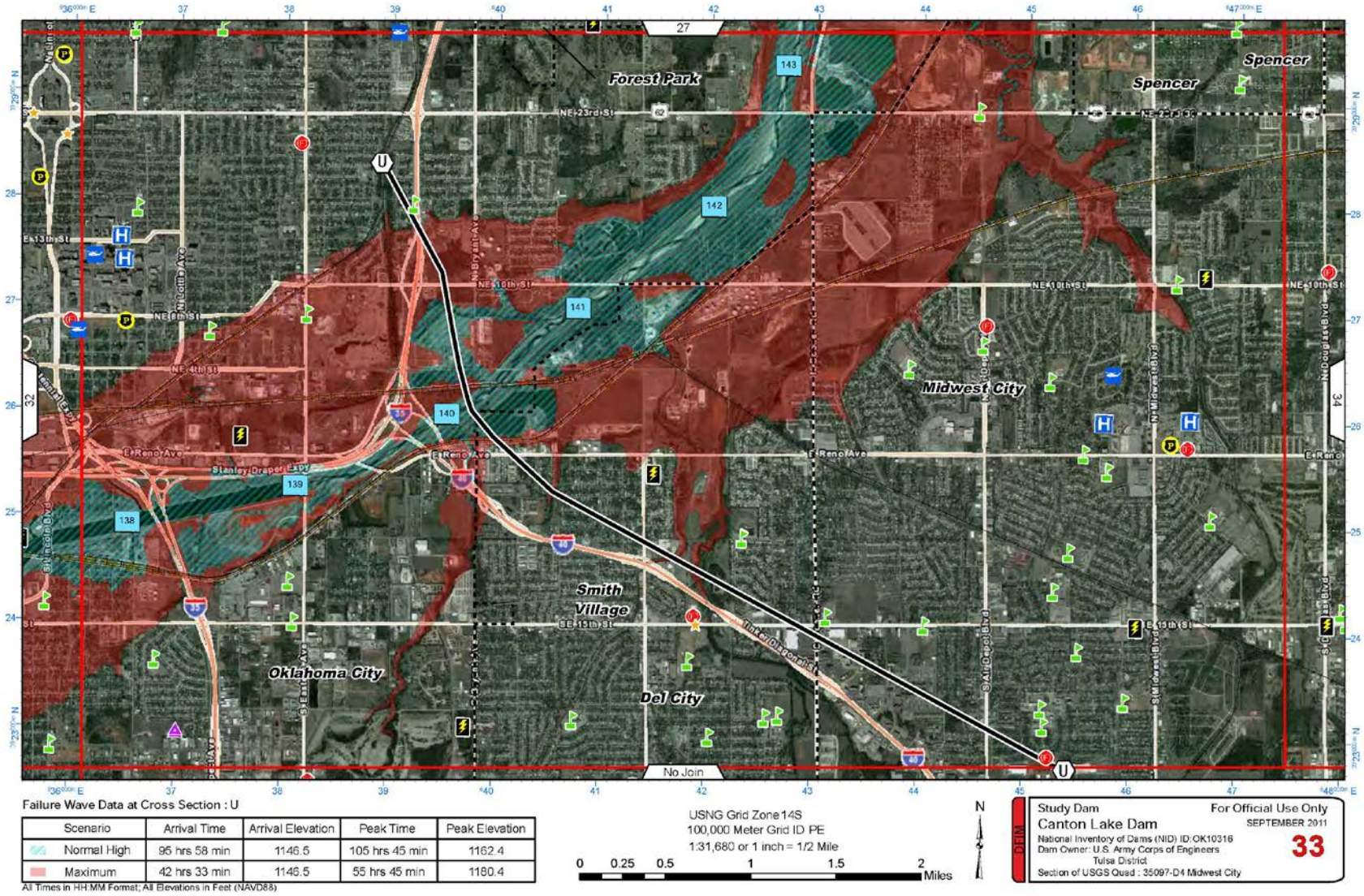


Figure A.1-4: Canton Lake Inundation Map – Extreme Northern Midwest City and Spencer Inundation (Central Oklahoma County)

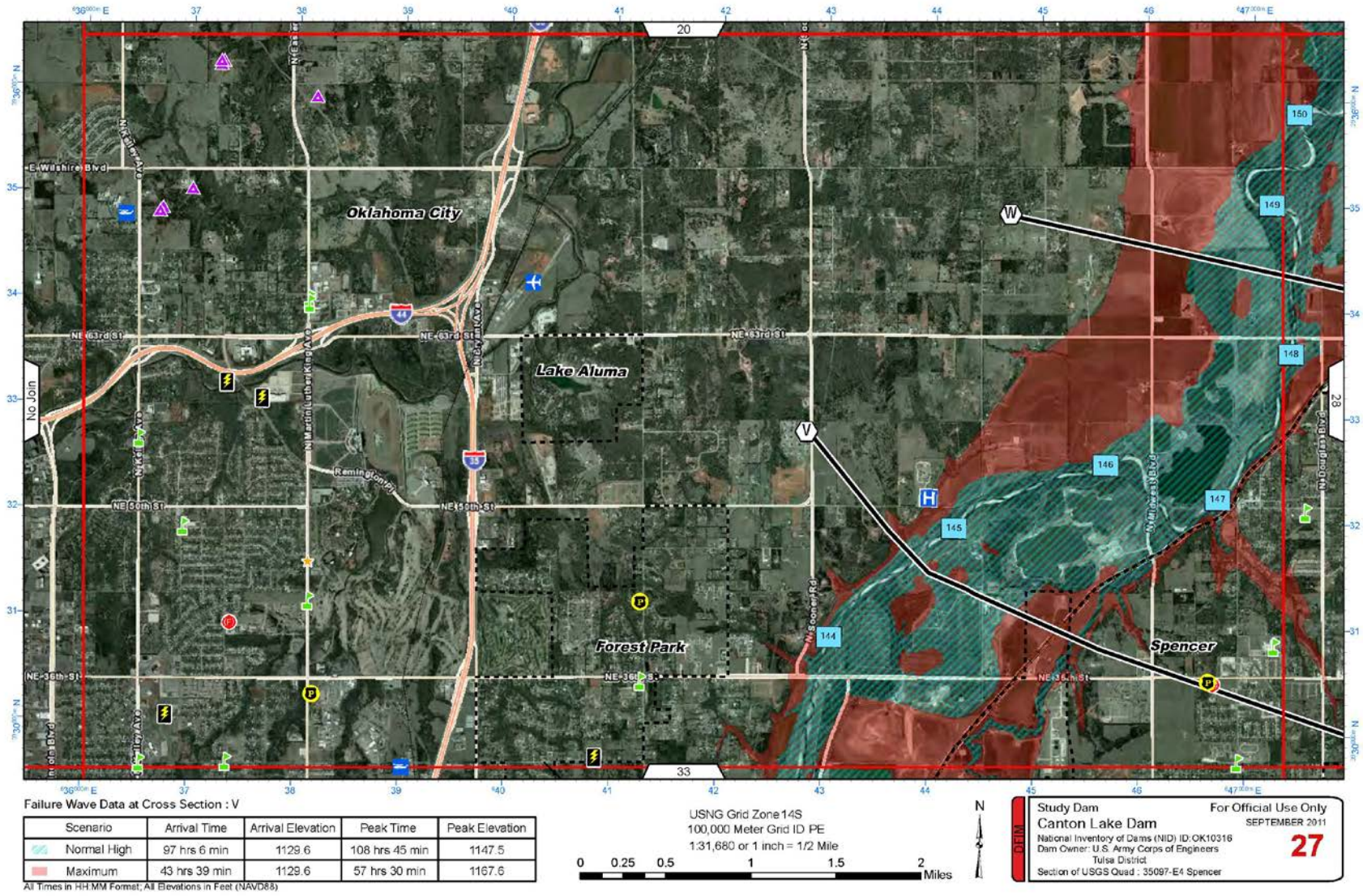


Figure A.1-5: Canton Lake Inundation Map – Northern Jones Inundation (Northeast Oklahoma County)

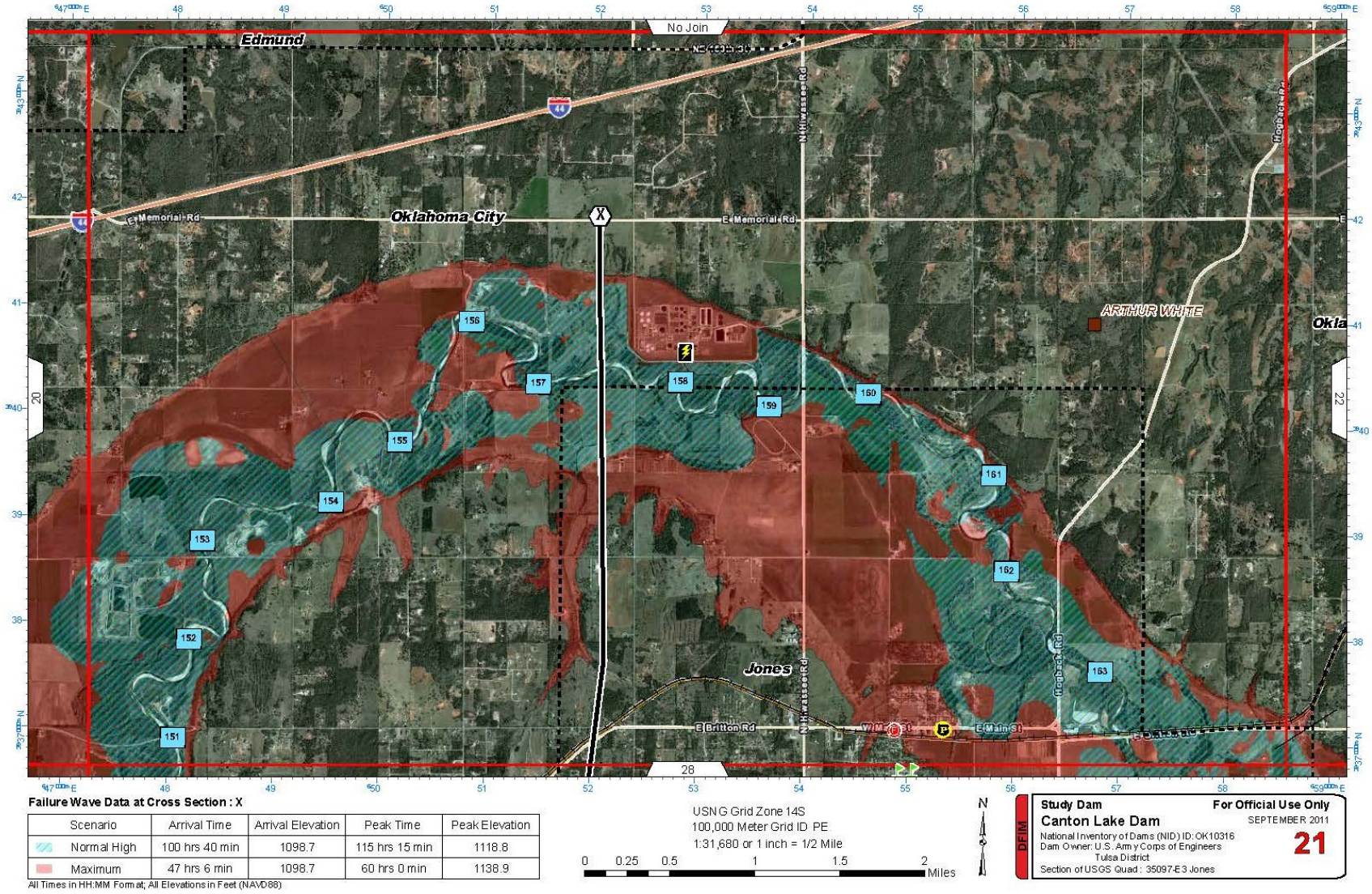


Figure A.1-6: Canton Lake Inundation Map – Eastern Jones, Unincorporated Oklahoma County, Northeast Choctaw (East Central OK Co.)

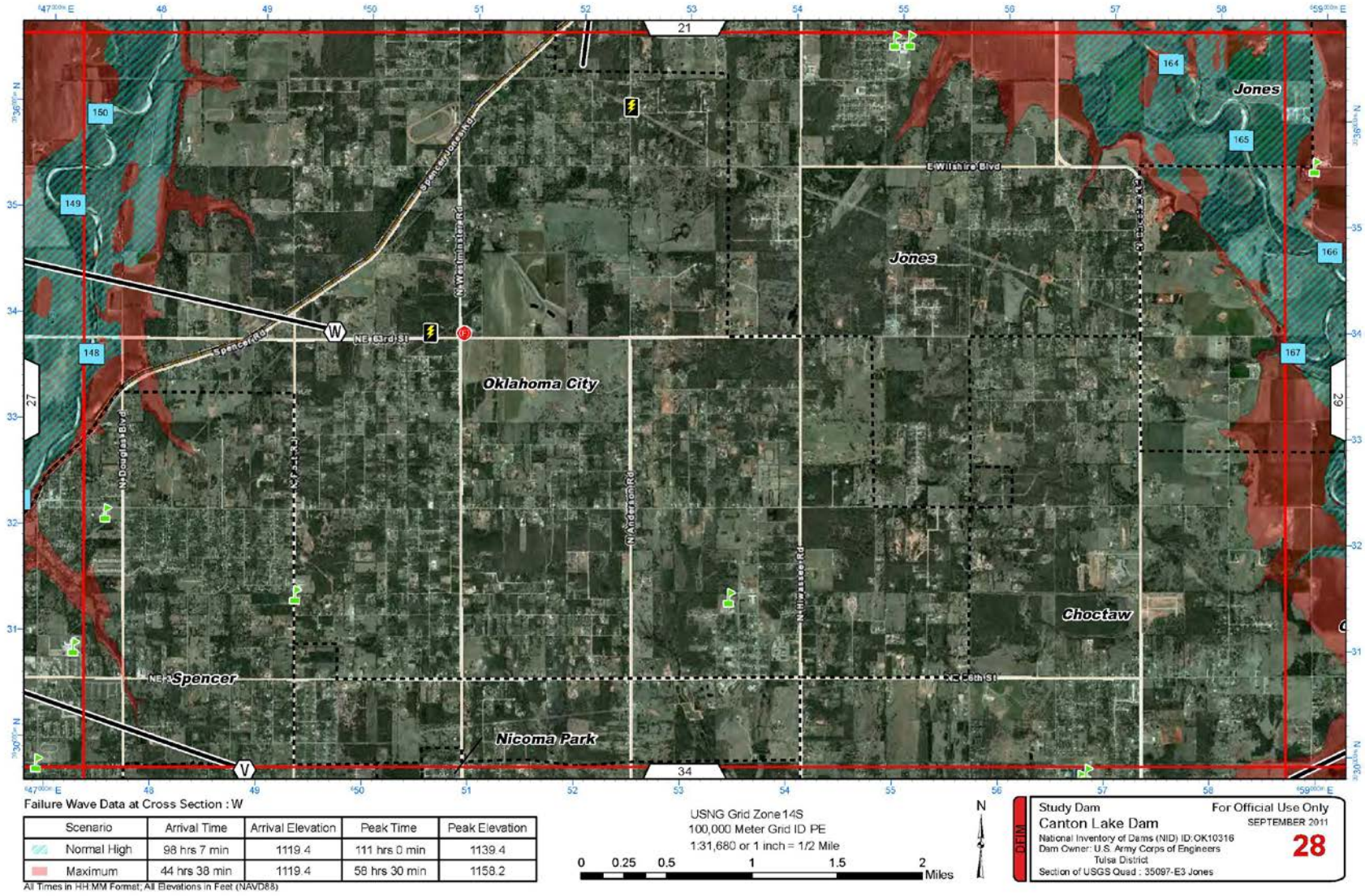


Figure A.1-7: Canton Lake Inundation Map – Northern Choctaw Inundation at NE 23rd St. & Choctaw Rd. (East Central Oklahoma County)

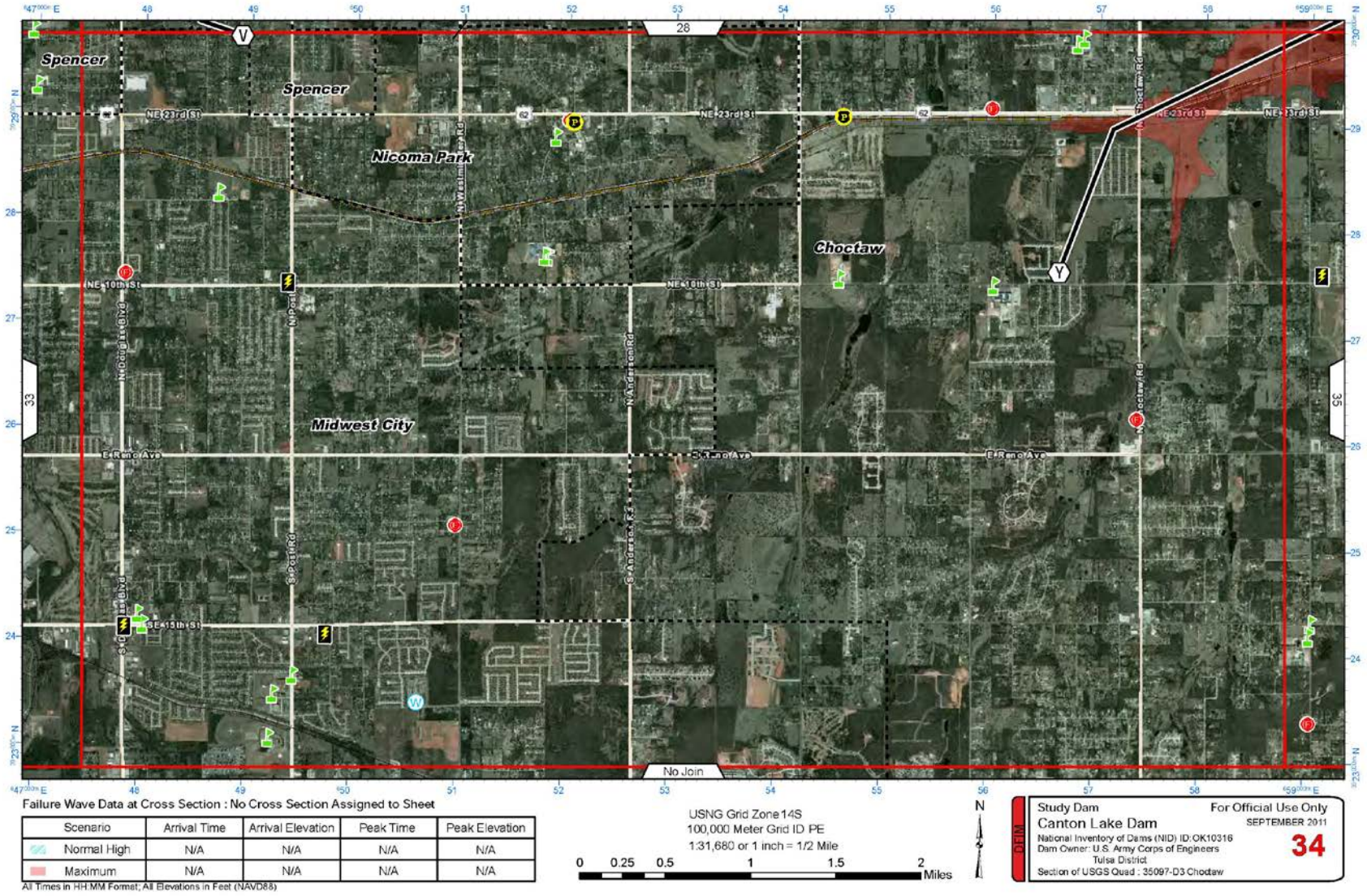


Figure A.1-8: Canton Lake Inundation Map – Northern Choctaw, Unincorporated Oklahoma County, Northern Harrah (East Central OK County)

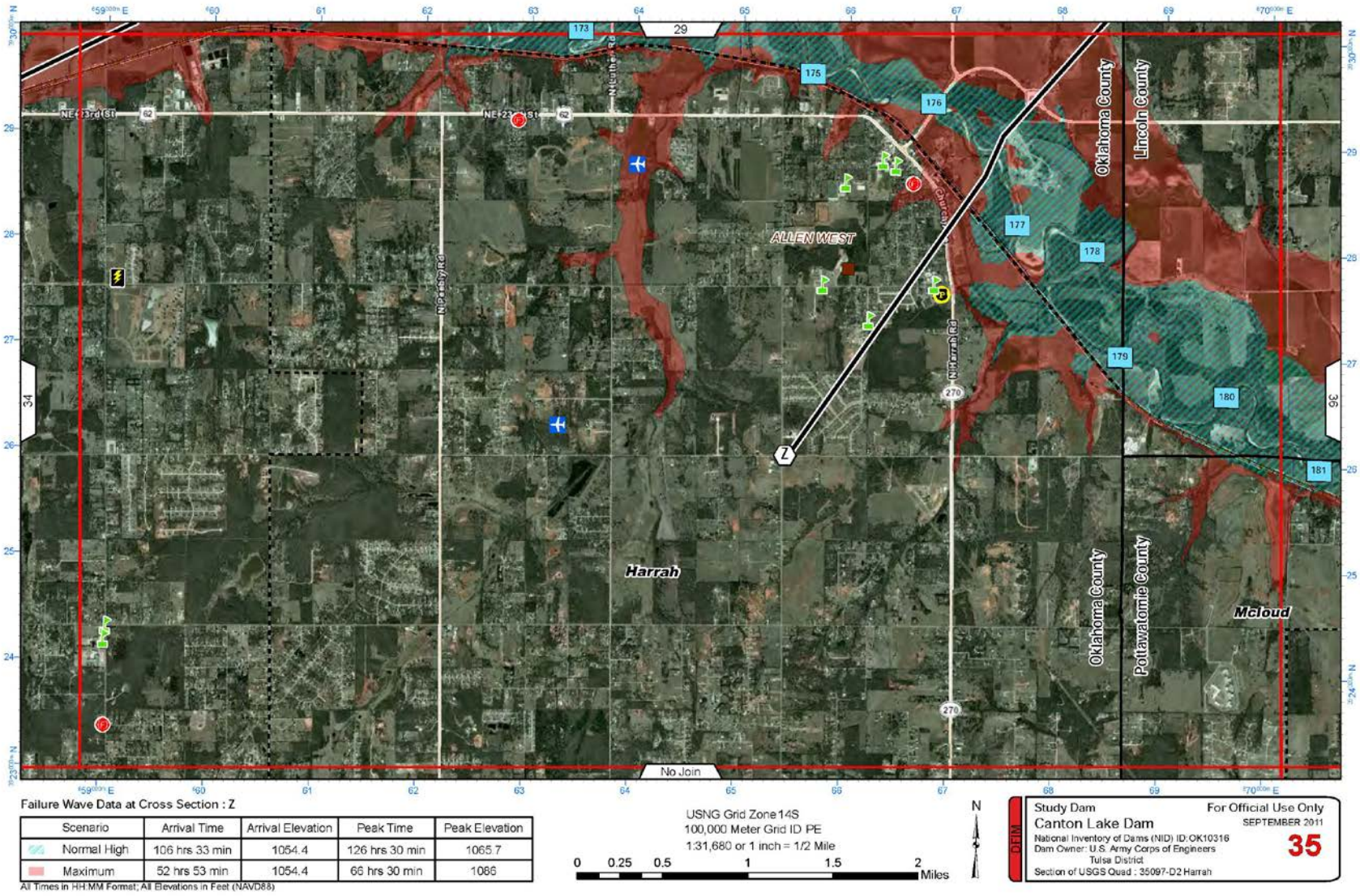
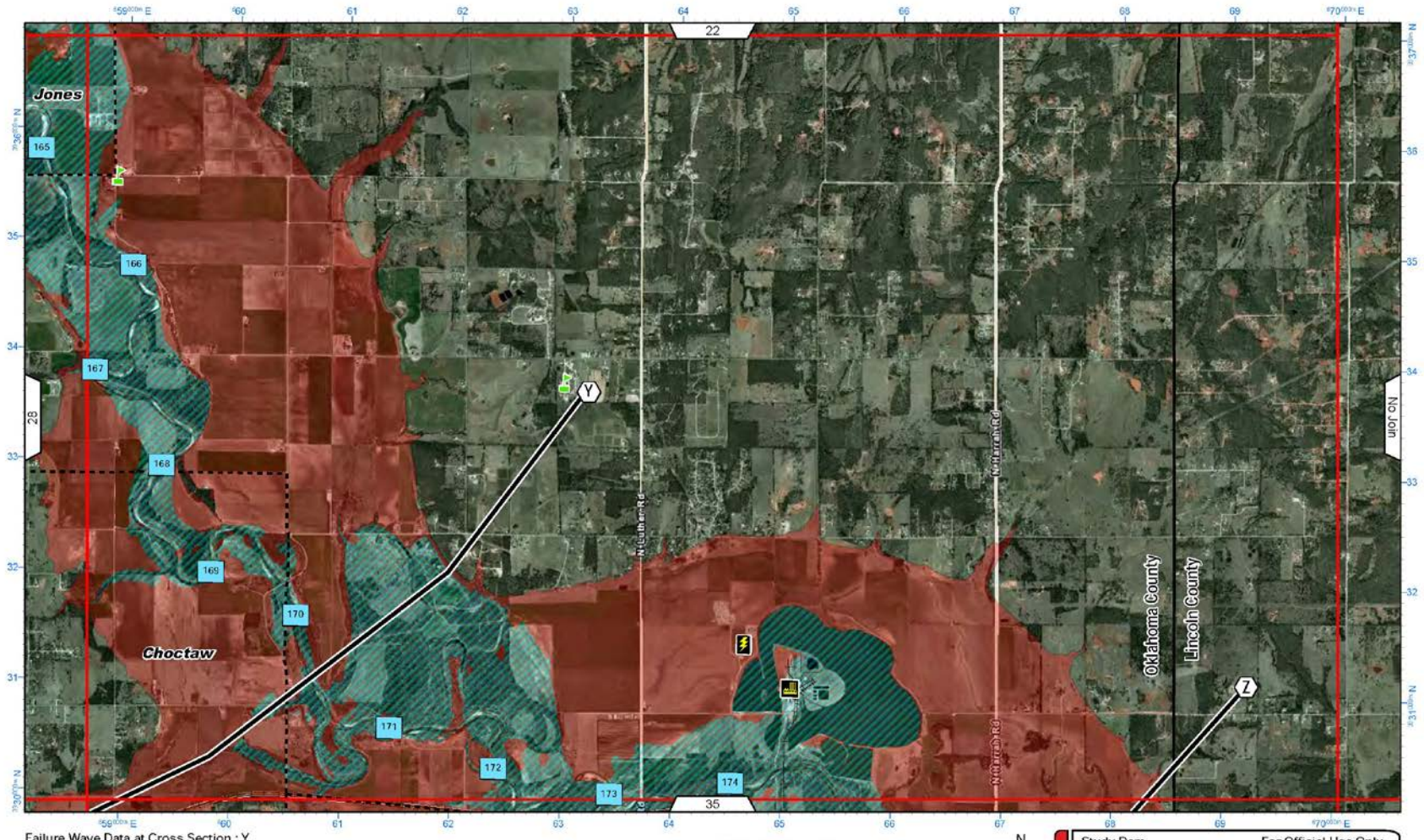


Figure A.1-9: Canton Lake Inundation Map – Southeast Jones, Northeast Choctaw, Unincorporated Oklahoma County (East Central OK County)



Failure Wave Data at Cross Section : Y

Scenario	Arrival Time	Arrival Elevation	Peak Time	Peak Elevation
Normal High	104 hrs 31 min	1068.6	123 hrs 0 min	1083.6
Maximum	50 hrs 51 min	1068.6	64 hrs 30 min	1104.4

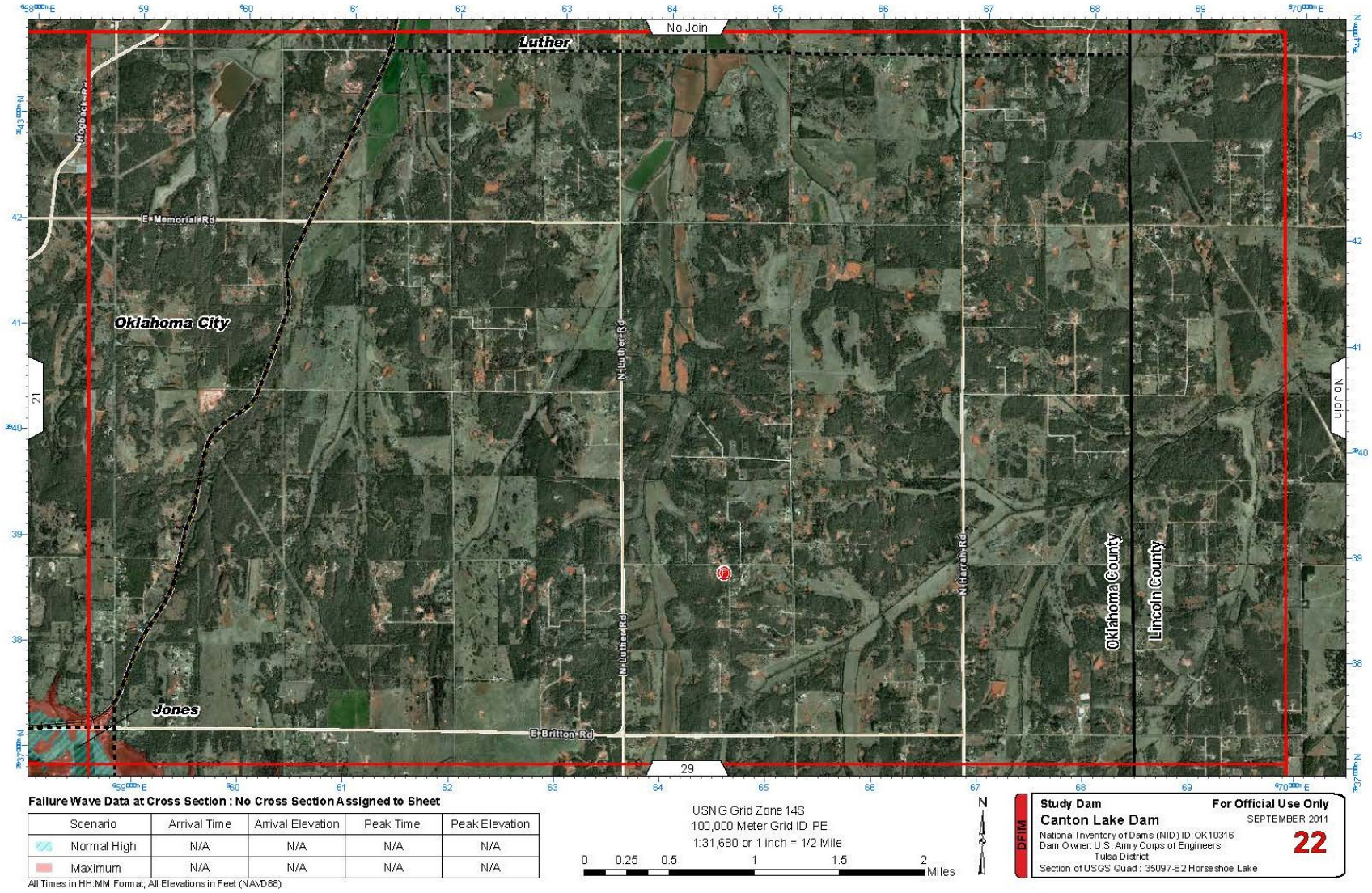
All Times in HH:MM Format; All Elevations in Feet (NAVD88)

USNG Grid Zone 14S
100,000 Meter Grid ID PE
1:31,680 or 1 inch = 1/2 Mile
0 0.25 0.5 1 1.5 2 Miles

N

DFIM
Study Dam
Canton Lake Dam
For Official Use Only
SEPTEMBER 2011
National Inventory of Dams (NID) ID: OK10316
Dam Owner: U.S. Army Corps of Engineers
Tulsa District
Section of USGS Quad : 35097-E2 Horseshoe Lake
29

Figure A.1-10: Canton Lake Inundation Map – Northeast Jones (Northeast Oklahoma County)



A.2 ARCADIA LAKE DAM

The following maps were prepared to show a partial and full dam failure of Arcadia Lake dam. In the Arcadia and Luther figures, Maximum Inundation is indicated in the pink boundary. Normal High Pool Inundation, which occurs when the pool elevation is at 10% exceedance, is demarked in the blue area.

Figure A.2-1: Arcadia Lake Inundation Map – East Edmond, Arcadia, Unincorporated Oklahoma County (Northeast Oklahoma County)

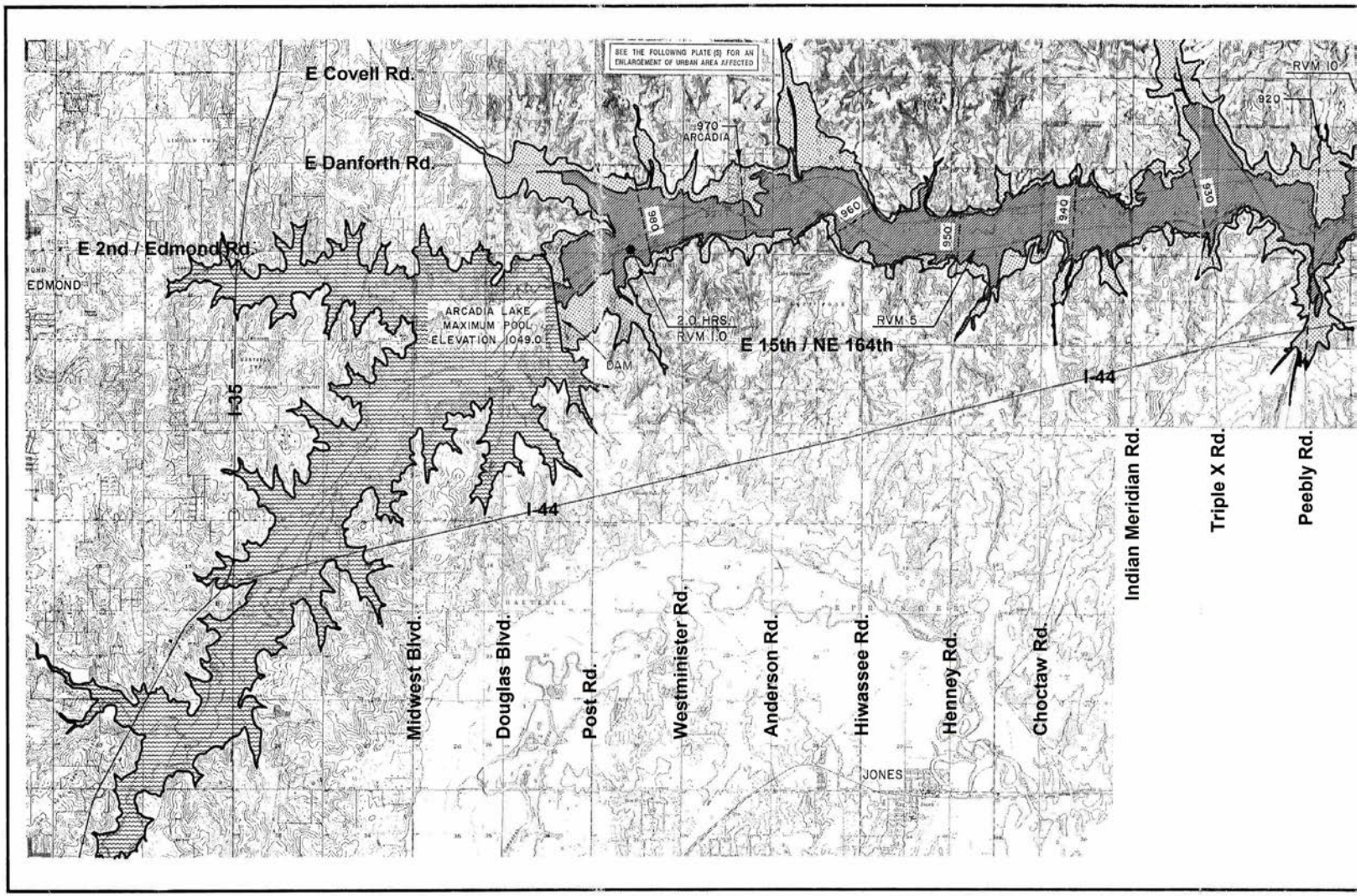


Figure A.2-2: Arcadia Lake Inundation Map – City of Arcadia

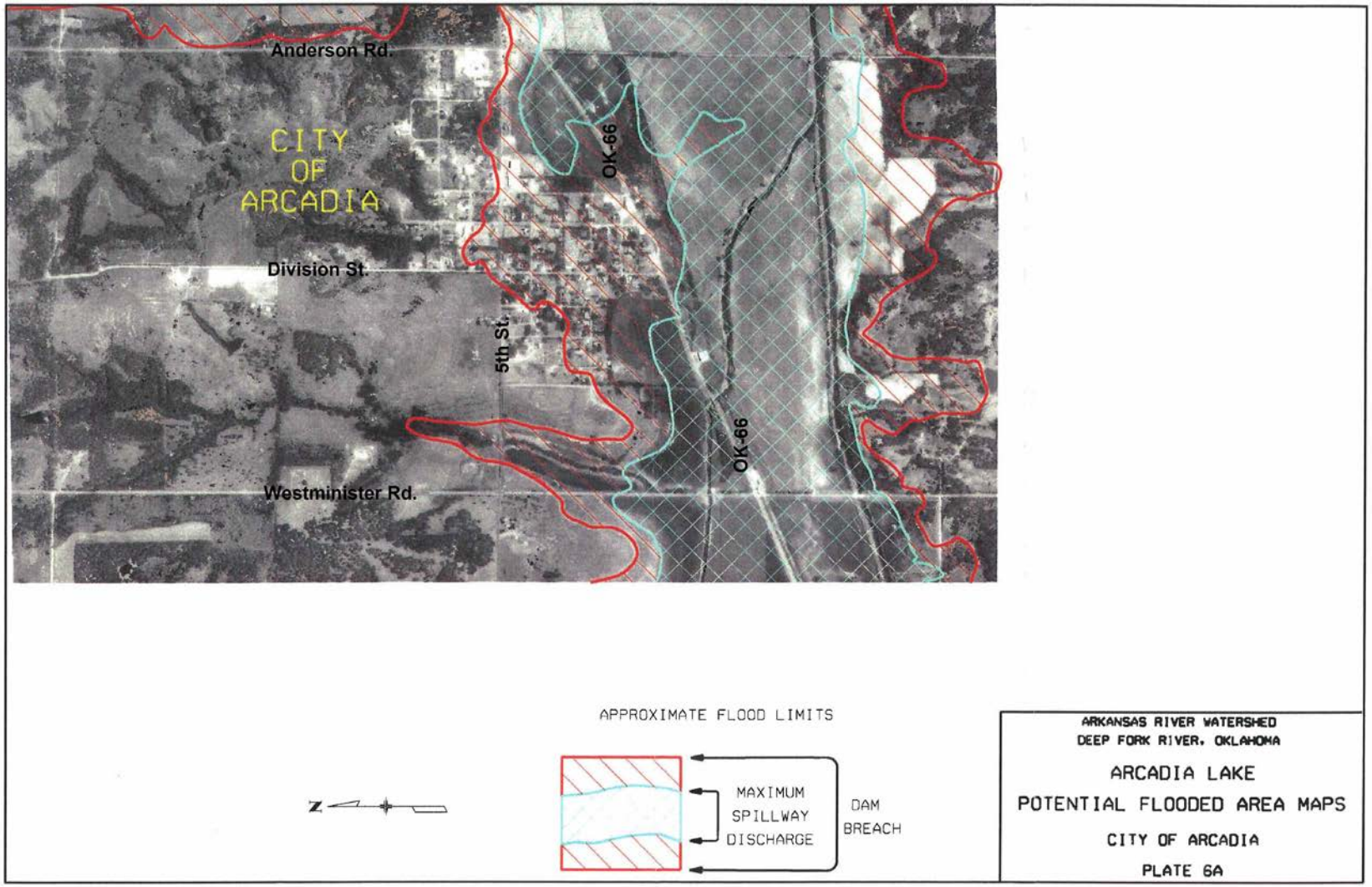


Figure A.2-3: Arcadia Lake Inundation Map – City of Luther

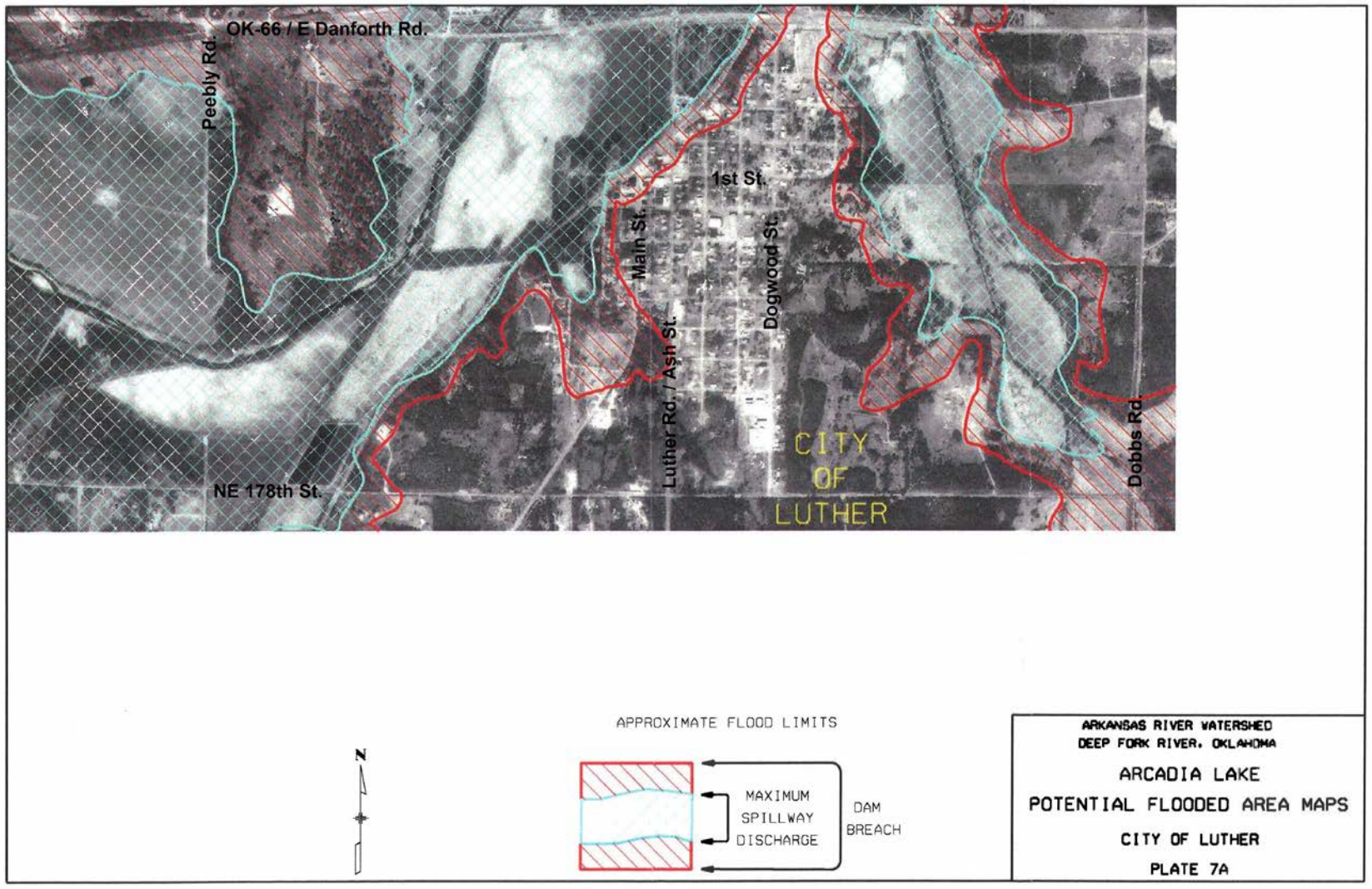
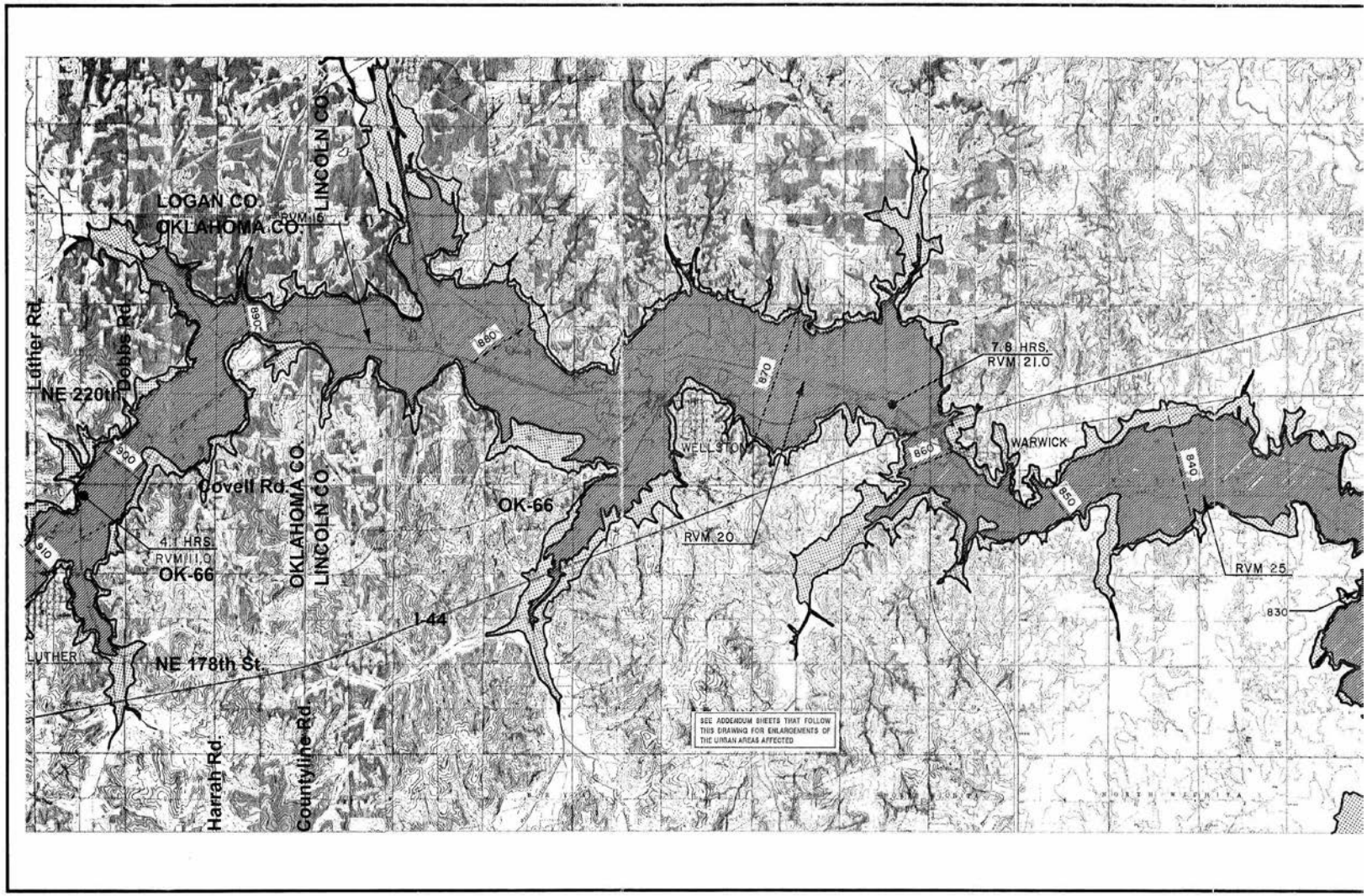


Figure A.2-4: Arcadia Lake Inundation Map – City of Luther, Unincorporated Oklahoma County (Northeast Oklahoma County)



The City of
MIDWEST CITY
COMMUNITY DEVELOPMENT DEPARTMENT

Billy Harless, Community Development Director

ENGINEERING DIVISION
Brandon Bundy, City Engineer
CURRENT PLANNING DIVISION
Kellie Gilles, Planning Manager
COMPREHENSIVE PLANNING
Petya Stefanoff, Comprehensive Planner
BUILDING INSPECTION DIVISION
Christine Brakefield, Building Official
GIS DIVISION
Greg Hakman, GIS Coordinator

To: Honorable Mayor and City Council

From: Billy Harless, Community Development Director

Date: November 12, 2019

Subject: Discussion and consideration of declaring a 2005 GMC truck, equipment #050205, as surplus and authorizing disposal by sealed bid, public auction, or other means as necessary.

The Midwest City Community Development Department requests that you declare the listed item of City property surplus and authorize disposal through sealed bid, public auction, or by other means as necessary. The vehicle is damaged and beyond use in the City fleet.

#050205 4wd Ext Cab / 2005 GMC 1500 1GTEK19B25Z304041

Staff recommends approval.

Billy Harless, AICP
Community Development Director

Memorandum

TO: Honorable Mayor and Council

FROM: Sara Hancock, City Clerk

DATE: November 12, 2019

SUBJECT: Discussion and consideration of declaring one (1) 2001 Chevrolet S10 Pickup as surplus and authorizing disposal by public auction, sealed bid, destruction, or other means if necessary.

On October 16, 2019 the Meter Readers Department had a vehicle damaged in an accident. Geico Insurance has deemed the vehicle a total loss with a valuation of $5,552.59 for the vehicle.

This agenda item will declare the item listed as surplus. There are no other operational applications available within the City.

- (1) 2001 Chevrolet S10 Pickup / Unit # 02-02-09 / Vin# 1GCCS19W518218457

Staff recommends approval.

Sara Hancock

Sara Hancock, City Clerk

MIDWEST CITY

Where the Spirit Flies High

DISCUSSION ITEMS

Grants Management
100 N. Midwest Boulevard
Midwest City, OK 73110
405.739.1216

TO: Honorable Mayor and City Council

FROM: Terri L. Craft, Grants Manager

DATE: November 12, 2019

SUBJECT: Discussion and consideration approving an ordinance amending the Midwest City Municipal Code, Chapter 21, Human Rights, by amending Article II Fair Housing, Division I Generally; by repealing and reserving Section 21-16, Fair Housing; by amending Section 21-17, Complaints; by repealing and reserving Sections 21-18, Investigation of Complaints, 21-19, Hearings, 21-20, Filing of Charges; by amending Division 2 Discriminatory Practices, Title; by amending Section 21-32, Prohibited Acts; by amending Section 21-33, Exemptions; by repealing and reserving Section 21-34, Violations; and providing for repealer and severability.

The proposed changes to the Midwest City Municipal Code, Chapter 21, are provided for consistency with current federal fair housing law. Changes were made in 1988 to the federal law that were not reflected in Midwest City's ordinance. Additional changes are proposed to eliminate reference to the obsolete Fair Housing Board and Community Relations Commission.

Staff recommends approval.

Terri L. Craft
Grants Manager

ORDINANCE NO. _____

AN ORDINANCE AMENDING THE MIDWEST CITY MUNICIPAL CODE, CHAPTER 21, HUMAN RIGHTS, BY AMENDING ARTICLE II FAIR HOUSING, DIVISION I GENERALLY: BY REPEALING AND RESERVING SECTION 21-16, FAIR HOUSING BOARD; BY AMENDING SECTION 21-17, COMPLAINTS; BY REPEALING AND RESERVING SECTIONS 21-18, INVESTIGATION OF COMPLAINTS; FINDINGS, 21-19, HEARINGS, 21-20, FILING OF CHARGES; BY AMENDING DIVISION 2 DISCRIMINATORY PRACTICES, TITLE; BY AMENDING SECTION 21-32, PROHIBITED ACTS; BY AMENDING SECTION 21-33, EXEMPTIONS; BY REPEALING AND RESERVING SECTION 21-34, VIOLATIONS; AND PROVIDING FOR REPEALER AND SEVERABILITY.

BE IT ORDAINED BY THE COUNCIL OF THE CITY OF MIDWEST CITY THAT:

ORDINANCE

SECTION 1. The Midwest City Municipal Code, Chapter 21, is hereby amended by repealing and reserving Sections 21-16, 21-18, 21-19, and 21-20 and by amending 21-17 to reads as follows:

Sec. 21-16. ~~- Fair housing board.~~

~~(a) There is hereby created a fair housing board for the city. The board shall be composed of seven (7) members who shall be appointed by the mayor and city council.~~

~~(b) It shall be the duty of the board to administer and enforce the provisions of this article.~~

~~(c) Five (5) members of the fair housing board shall constitute a quorum and a majority vote of those members present at any given meeting shall be required for the transaction of any business.~~

Sec. 21-17. - Complaints.

Any person aggrieved by a discriminatory housing practice prohibited by ordinance may file a complaint in writing with the City Manager or his designee. ~~the community relations commission a complaint in writing~~. Complaints filed under this section must be received by the federal or state agency within one (1) year of the alleged violation, so the City will consider failure to file within eleven (11) months of the alleged violation a waiver of the application of this division, however, the complainant may file directly with the appropriate federal or state office up to the one (1) year deadline. The complaint shall be signed by the person claiming to be aggrieved and shall state the name and address of the person alleged to have violated the provisions of the ordinance, and shall further set forth the particulars of the violation and may include such other information as may be required by the City Manager or his designee. ~~community relations commission~~. The City Manager or his designee will refer such complaints to the U.S. Department of Housing and Urban Development or the Office of Civil Rights for the Attorney General of the State of

Oklahoma, or to such other federal or state administrative agency that may have jurisdiction over the subject matter of the complaint. ~~Complaints filed under this section must be filed within thirty (30) days after the alleged violation and failure to file within such time shall be considered a waiver of the application of this division.~~

Sec. 21-18.~~ - Investigation of complaints; findings.~~

~~The community relations commission shall investigate each complaint filed with it and shall attempt an adjustment of the complaint by means of conference and conciliation. Sixty (60) days shall be allowed for the purpose of investigation, conference and conciliation. Upon determination that a complaint is not well founded, the commission may dismiss the complaint and notify the complainant and respondent in writing of the dismissal. If the community relations commission has not dismissed the complaint or if conference or conciliation has not resulted in withdrawal of the complaint within sixty (60) days from the date it was filed, the commission shall transmit its findings in writing and the complaint to the fair housing board.~~

Sec. 21-19.~~ - Hearings.~~

~~Upon receipt of the findings of the community relations commission and complaint, the fair housing board shall hold a hearing to determine whether a violation of an ordinance appears to have occurred. At least ten (10) days prior to such hearing the person named in the complaint and the complainant shall be notified in person in writing of the time and place of such hearing. The person named in the complaint may file a written response to the complaint and appear at the hearing on the complaint in person or by legal counsel. The board, when conducting such hearing, shall permit amendments to the complaint or the answer and any testimony heard at the hearing may be transcribed at the request of either party or at the direction of the board. If the board finds at the hearing that the person named in the complaint appears to have engaged in any discriminatory housing practice prohibited by ordinance, it shall so state in written findings which shall be furnished to the respondent and to the city attorney for consideration. If the board, upon hearing, finds that the person named in the complaint does not appear to have engaged in any discriminatory housing practice, it shall so state its findings and shall dismiss the complaint. The board shall establish rules and regulations to be approved by the city council to govern, expedite and effectuate the foregoing procedure.~~

Sec. 21-20.~~ - Filing of charges.~~

~~Unless the complaint is withdrawn by the complaining party or the city attorney finds that there is insufficient information upon which to base the filing of such a charge, the charge shall be filed in municipal court within ten (10) days from the city attorney's receipt of the findings of the fair housing board.~~

SECTION 2. That the Midwest City Municipal Code, Chapter 21, Article II, Division 2, Title, is hereby amended to read as follows:

DIVISION 2. - DISCRIMINATORY HOUSING PRACTICES

SECTION 3. The Midwest City Municipal Code, Chapter 21, Sections 21-32 and 21-33 are hereby amended to read as follows and repealing and reserving Section 21-34:

Sec. 21-32. - Prohibited acts.

~~It shall be unlawful for any person to:~~

(a) No financial institution shall discriminate in the granting of any financial assistance sought by an applicant for the acquisition or construction of any housing unit because of race, color, religion, sex, handicap, familial status, or national origin.

~~Refuse to sell, lease, rent, assign or otherwise transfer the title or other interest in any housing or real property upon which residential housing is to be constructed to any person, or to discriminate in the terms or conditions of the sale, rental or leasing of any residential housing unit because of race, color, religion or national origin;~~

(b) No person, real estate broker, salesman or agent shall do any of the following:

(1) Refuse to sell, lease, rent, assign or otherwise transfer the title or other interest in any housing or real property upon which residential housing is to be constructed to any person, or to discriminate in the terms or conditions of the sale, rental or leasing of any residential housing unit because of race, color, religion, sex, handicap, familial status or national origin;

(2) Refuse to negotiate with any person for the sale, rental or leasing of any residential property, or to represent that such property is not available for inspection, sale, rental or lease when in fact it is so available, because of such person's race, color, religion, sex, handicap, familial status, or national origin;

~~(c)~~ (3) Solicit or induce, or attempt to solicit or induce, any person owning any interest in any residential housing to sell, rent or lease, or not to sell, rent or lease such housing to any person on the grounds of loss of value due to the present or prospective entry into the neighborhood of a person of another race, color, religion, sex, handicap, familial status, or national origin, either by direct solicitation or inducement or by the purchase of other property in the neighborhood for the purpose of such inducement, or to distribute or cause to be distributed material or make statements designed to induce a residential property owner to sell or lease his property due to such change in the neighborhood; and

~~(d)~~ (4) File a complaint alleging a violation of this division, with knowledge that such complaint is false in any material respect, or to file such complaint for the sole purpose of harassment.

Sec. 21-33. - Exemptions.

Nothing in this division shall apply:

(a) To prohibit persons from giving preference to prospective buyers or tenants for any reason other than race, color, religion, sex, handicap, familial status, or national origin;

(b) To the sale of a dwelling which is, or was at the time when first offered for sale, the residence of its owner;

(c) To the rental of rooms in an owner-occupied residence or in a dwelling used exclusively as a rooming house;
(d) To the rental or leasing of a housing unit in a building containing not more than four ~~eight~~ (4~~8~~) housing units; and
(e) To the rental or leasing of a dwelling or housing unit owned by any religious or fraternal organization, or private club used and occupied for such organizational purposes.

Sec. 21-34~~. - Violations.~~

~~No action for the violation of any of the provisions of this division shall be filed except upon the written recommendation of the fair housing board.~~

SECTION 4. REPEALER. All ordinances or parts of ordinances in conflict herewith are hereby repealed.

SECTION 5. SEVERABILITY. If any section, sentence, clause or portion of this ordinance is for any reason held to be invalid, such decision shall not affect the validity of the remaining portions of the ordinance.

PASSED AND APPROVED by the Mayor and Council of the City of Midwest City, Oklahoma, on the _____day of _____, 2019.

THE CITY OF MIDWEST CITY, OKLAHOMA

_____
MATTHEW D. DUKES, II, Mayor

ATTEST:

_____
SARA HANCOCK, City Clerk

APPROVED as to form and legality this _____ day of _____, 20__.

_____
HEATHER POOLE, City Attorney

ORDINANCE NO. _____

AN ORDINANCE AMENDING THE MIDWEST CITY MUNICIPAL CODE, CHAPTER 21, HUMAN RIGHTS, BY AMENDING ARTICLE II FAIR HOUSING, DIVISION I GENERALLY; BY REPEALING AND RESERVING SECTION 21-16, FAIR HOUSING BOARD; BY AMENDING SECTION 21-17, COMPLAINTS; BY REPEALING AND RESERVING SECTIONS 21-18, INVESTIGATION OF COMPLAINTS; 21-19, HEARINGS; 21-20, FILING OF CHARGES; BY AMENDING DIVISION 2 DISCRIMINATORY PRACTICES, TITLE; BY AMENDING SECTION 21-32, PROHIBITED ACTS; BY AMENDING SECTION 21-33, EXEMPTIONS; BY REPEALING AND RESERVING SECTION 21-34, VIOLATIONS; AND PROVIDING FOR REPEALER AND SEVERABILITY.

BE IT ORDAINED BY THE COUNCIL OF THE CITY OF MIDWEST CITY THAT:

ORDINANCE

SECTION 1. The Midwest City Municipal Code, Chapter 21, is hereby amended by repealing and reserving Sections 21-16, 21-18, 21-19, and 21-20 and by amending 21-17 to reads as follows:

Sec. 21-16. Reserved

Sec. 21-17. - Complaints.

Any person aggrieved by a discriminatory housing practice prohibited by ordinance may file a complaint in writing with the City Manager or his designee. Complaints filed under this section must be received by the federal or state agency within one (1) year of the alleged violation, so the City will consider failure to file within eleven (11) months of the alleged violation a waiver of the application of this division, however, the complainant may file directly with the appropriate federal or state office up to the one (1) year deadline. The complaint shall be signed by the person claiming to be aggrieved and shall state the name and address of the person alleged to have violated the provisions of the ordinance, and shall further set forth the particulars of the violation and may include such other information as may be required by the City Manager or his designee. The City Manager or his designee will refer such complaints to the U.S. Department of Housing and Urban Development or the Office of Civil Rights for the Attorney General of the State of Oklahoma, or to such other federal or state administrative agency that may have jurisdiction over the subject matter of the complaint.

Sec. 21-18. Reserved

Sec. 21-19. Reserved

Sec. 21-20. Reserved

SECTION 2. That the Midwest City Municipal Code, Chapter 21, Article II, Division 2, Title, is hereby amended to read as follows:

DIVISION 2. - DISCRIMINATORY HOUSING PRACTICES

SECTION 3. The Midwest City Municipal Code, Chapter 21, Sections 21-32 and 21-33 are hereby amended to read as follows and repealing and reserving Section 21-34:

Sec. 21-32. - Prohibited acts.

(a) No financial institution shall discriminate in the granting of any financial assistance sought by an applicant for the acquisition or construction of any housing unit because of race, color, religion, sex, handicap, familial status, or national origin.

(b) No person, real estate broker, salesman or agent shall do any of the following:

(1) Refuse to sell, lease, rent, assign or otherwise transfer the title or other interest in any housing or real property upon which residential housing is to be constructed to any person, or to discriminate in the terms or conditions of the sale, rental or leasing of any residential housing unit because of race, color, religion, sex, handicap, familial status or national origin;

(2) Refuse to negotiate with any person for the sale, rental or leasing of any residential property, or to represent that such property is not available for inspection, sale, rental or lease when in fact it is so available, because of such person's race, color, religion, sex, handicap, familial status, or national origin;

(3) Solicit or induce, or attempt to solicit or induce, any person owning any interest in any residential housing to sell, rent or lease, or not to sell, rent or lease such housing to any person on the grounds of loss of value due to the present or prospective entry into the neighborhood of a person of another race, color, religion, sex, handicap, familial status, or national origin, either by direct solicitation or inducement or by the purchase of other property in the neighborhood for the purpose of such inducement, or to distribute or cause to be distributed material or make statements designed to induce a residential property owner to sell or lease his property due to such change in the neighborhood; and

(4) File a complaint alleging a violation of this division, with knowledge that such complaint is false in any material respect, or to file such complaint for the sole purpose of harassment.

Sec. 21-33. - Exemptions.

Nothing in this division shall apply:

(a) To prohibit persons from giving preference to prospective buyers or tenants for any reason other than race, color, religion, sex, handicap, familial status, or national origin;

(b) To the sale of a dwelling which is, or was at the time when first offered for sale, the residence of its owner;

(c) To the rental of rooms in an owner-occupied residence or in a dwelling used exclusively as a rooming house;

(d) To the rental or leasing of a housing unit in a building containing not more than four (4) housing units; and
(e) To the rental or leasing of a dwelling or housing unit owned by any religious or fraternal organization, or private club used and occupied for such organizational purposes.

Sec. 21-34. Reserved

SECTION 4. REPEALER. All ordinances or parts of ordinances in conflict herewith are hereby repealed.

SECTION 5. SEVERABILITY. If any section, sentence, clause or portion of this ordinance is for any reason held to be invalid, such decision shall not affect the validity of the remaining portions of the ordinan

PASSED AND APPROVED by the Mayor and Council of the City of Midwest City, Oklahoma, on the _____day of _____, 2019.

THE CITY OF MIDWEST CITY, OKLAHOMA

_____
MATTHEW D. DUKES, II, Mayor

ATTEST:

_____
SARA HANCOCK, City Clerk

APPROVED as to form and legality this _____ day of _____, 20__.

_____
HEATHER POOLE, City Attorney

City Clerk
100 N. Midwest Boulevard
Midwest City, OK 73110
shancock@midwestcityok.org
Office: 405-739-1240

Memorandum

TO: Honorable Mayor and Council

FROM: Sara Hancock, City Clerk

DATE: November 12, 2019

SUBJECT: Discussion and consideration of passing and approving a resolution and proclamation authorizing the calling and holding of a primary election on February 11, 2020, if necessary, and a general election, if necessary, on April 7, 2020 in wards 2, 4, and 6 of the City of Midwest City, County of Oklahoma, State of Oklahoma, for the purpose of electing Ward 2, 4, and 6 councilmembers; enumerating the qualifications for those offices; and establishing the filing period.

The proposed election resolution and proclamation are attached for your review and approval.

Sara Hancock

Sara Hancock, City Clerk

Attachments

RESOLUTION NO. 2019-_____

A RESOLUTION OF THE CITY OF MIDWEST CITY, OKLAHOMA, AUTHORIZING THE CALLING AND HOLDING OF A PRIMARY ELECTION ON FEBRUARY 11, 2020, IF NECESSARY, AND A GENERAL ELECTION, IF NECESSARY, ON APRIL 7, 2020 IN WARDS 2, 4, AND 6 OF THE CITY OF MIDWEST CITY, COUNTY OF OKLAHOMA, STATE OF OKLAHOMA, FOR THE PURPOSE OF ELECTING WARD 2, 4 AND 6 COUNCILMEMBERS; ENUMERATING THE QUALIFICATIONS FOR THOSE OFFICES; AND ESTABLISHING THE FILING PERIOD

NOTICE OF ELECTION

BE IT RESOLVED by the city council of the home rule charter government for the City of Midwest City, for the purpose of electing councilmembers of that city, that:

1) A non-partisan primary election shall be held on the second Tuesday in February, 2020 (February 11, 2020) to nominate candidates for the offices the terms of which are expiring; provided that, if not more than one (1) person is a candidate for each office to be filled, they all shall be not only nominated, but also elected, ipso facto, and no primary or general election shall be held. If not more than one (1) person is a candidate for an office, he shall be not only nominated, but also elected, ipso facto, and his name shall not appear on the primary or general election ballot. If only two (2) persons file for an office, they shall be nominated ipso facto, and the primary election shall serve as the general election for the office for which they filed and the person receiving the majority of votes in that election shall be elected to the office for which he filed. If three (3) or more persons file for an office, the two (2) candidates for councilmember from a ward receiving the greatest number of votes in the primary election shall be nominated; provided that, if one (1) of the candidates for an office receives a majority of all votes cast for all candidates for that office, he alone shall be not only nominated, but also elected, ipso facto; and the names of the candidates for that office shall not appear on the ballot for the general election.

2) If all of the offices the terms of which are expiring in 2020 are not filled in the primary election, a non-partisan general election shall be held on the first Tuesday in April, 2020 (April 7, 2020) to elect successors for those offices. Every qualified elector of the wards in which the councilmembers' terms are expiring shall be entitled to vote for one (1) candidate to serve as councilmember in that ward. Election to council seats shall be by ward. The candidate for each office receiving the greatest number of votes for that office shall be elected.

BE IT FURTHER RESOLVED that the following officers will be elected in 2020 for four-year terms:

Ward 2	Councilmember
Ward 4	Councilmember
Ward 6	Councilmember

BE IT FURTHER RESOLVED that each candidate for office shall be a qualified elector of the City of Midwest City; shall be at least twenty-five (25) years old; shall have been a resident of the City of Midwest City for at least one (1) year preceding the election; and must at the time of the election be a resident in good faith of the respective ward from which s/he is elected.

BE IT FURTHER RESOLVED that the City of Midwest City, through the adoption of Ordinance 1872, has provided for absentee ballots to be cast in the City of Midwest City's municipal elections.

BE IT FURTHER RESOLVED that the filing period shall begin and be open on the 2nd day of December, 2019 at 8:00 a.m. and continue through the 4th day of December, 2019 at 5:00 p.m. Candidates shall file a sworn statement of candidacy with the Secretary of the Oklahoma County Election Board.

BE IT FURTHER RESOLVED that the polling places for both the primary and general elections, if held, shall be opened at 7:00 o'clock a.m. and shall remain open until and be closed at 7:00 o'clock p.m. on those days.

BE IT FURTHER RESOLVED that pursuant to Title 26, Section 13-103(c), all precincts totally or partially contained within the limits of the City of Midwest City shall be open for election, except the City authorizes Precinct 244 to be closed. Precinct 244 is only partially contained within the limits and no registered voters reside within that portion.

PASSED AND APPROVED by the mayor and council of the City of Midwest City, Oklahoma this ____ day of _____ 2019.

CITY OF MIDWEST CITY, OKLAHOMA

_____
MATTHEW D. DUKES II, Mayor

ATTEST:

_____
SARA HANCOCK, City Clerk

APPROVED as to form and legality this ____ day of November 2019.

_____
HEATHER POOLE, City Attorney

ELECTION PROCLAMATION

Pursuant to Resolution No. 2019-_____, duly adopted by the governing body of the City of Midwest City, Oklahoma, the mayor of the city, for the purpose of electing the Ward 2, 4 and 6 councilmembers to serve four-year terms, hereby calls in the City of Midwest City, County of Oklahoma, State of Oklahoma:

1) A non-partisan primary election shall be held on the second Tuesday in February, 2020 (February 11, 2020) to nominate candidates for the offices the terms of which are expiring; provided that, if not more than one (1) person is a candidate for each office to be filled, they all shall be not only nominated, but also elected, ipso facto, and no primary or general election shall be held. If not more than one (1) person is a candidate for an office, he shall be not only nominated, but also elected, ipso facto, and his name shall not appear on the primary or general election ballot. If only two (2) persons file for an office, they shall be nominated ipso facto, and the primary election shall serve as the general election for the office for which they filed and the person receiving the majority of votes in that election shall be elected to the office for which he filed. If three (3) or more persons file for an office, the two (2) candidates for councilmember from a ward receiving the greatest number of votes in the primary election shall be nominated; provided that, if one (1) of the candidates for an office receives a majority of all votes cast for all candidates for that office, he alone shall be not only nominated, but also elected, ipso facto; and the names of the candidates for that office shall not appear on the ballot for the general election.

2) If all of the offices the terms of which are expiring in 2020 are not filled in the primary election, a non-partisan general election shall be held on the first Tuesday in April, 2020 (April 7, 2020) to elect successors for those offices. Every qualified elector of the wards in which the councilmembers' terms are expiring shall be entitled to vote for one (1) candidate to serve as councilmember in that ward. Election to council seats shall be by ward. The candidate for each office receiving the greatest number of votes for that office shall be elected.

The polling places for both the primary and general elections, if held, shall be opened at 7:00 o'clock a.m. and shall remain open until and be closed at 7:00 o'clock p.m. on those days.

All registered qualified electors residing within Wards 2, 4 and 6 of the city, respectively, shall be entitled to vote for a councilmember to represent the ward in which they live to serve a four-year term in office.

DATED AND ISSUED this 12th day of November, 2019.

THE CITY OF MIDWEST CITY, OKLAHOMA

_____
MATTHEW D. DUKES II, Mayor

ATTEST:

_____
SARA HANCOCK, City Clerk

APPROVED as to form and legality this _____ day of November, 2019.

_____
HEATHER POOLE, City Attorney

CITY of MIDWEST CITY
COMMUNITY DEVELOPMENT DEPARTMENT
ENGINEERING DIVISION

Billy Harless, Community Development Director
Brandon Bundy, P.E., City Engineer

ENGINEERING DIVISION
Brandon Bundy, P.E., City Engineer
CURRENT PLANNING DIVISION
Kelly Gilles, Manager
COMPREHENSIVE PLANNER
Petya Stefanoff, Comprehensive Planner
BUILDING INSPECTION DIVISION
Christine Brakefield, Building Official
GIS DIVISION
Greg Hakman, GIS Coordinator

TO : Honorable Mayor and Council

FROM : Brandon Bundy, P.E., City Engineer

DATE : November 12th, 2019

SUBJECT : Discussion and consideration of entering into and approving an Agreement for Professional Services with RL Shears in the amount of $241,411.00 to design the expansion of the Mid-America Park. This is a General Bond Obligation project.

Over the past several months, the city has been in negotiations with RL Shears in regards to a design contract for the expansion of the Mid-America Park. This firm previously designed the Mid-America Park Master Plan accepted by council in March 27th, 2018 as well as design of the Mid-America Trail which was recently completed. The accompanying proposed agreement is for initial information, consultant's responsibilities, scope of basic services, supplemental and additional services, owner's responsibilities, cost of the work, copyrights and licenses, claims and disputes, termination or suspension, miscellaneous provisions, compensation, special terms and conditions and scope of the agreement.

This is a General Obligation Bond project approved by the vote of the people.

I am available for any additional questions.

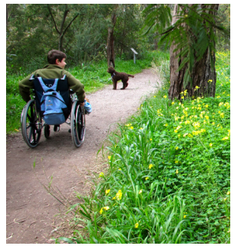
Staff recommends approval.

Brandon Bundy, P.E.,
City Engineer

Attachment

NEIGHBORHOOD PARK

NATURE PARK



INCLUSIVE PLAYGROUND

CONTACT INFORMATION

FOR MORE INFORMATION ON THE MID-AMERICA PARK MASTERPLAN

PLEASE CONTACT... AT

(XXX) XXX XXXX
OR
NAME@MIDWESTCITYOK.ORG

CITY OF MIDWEST CITY
100 N. MIDWEST BLVD
MIDWEST CITY, OK 73110

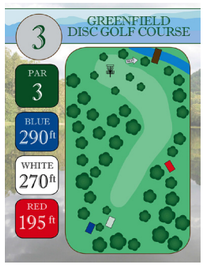
MIDWEST CITY
Where the Spirit Flies High

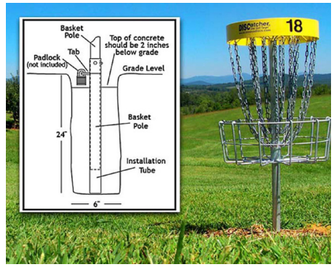
MIDWEST CITY
Parks and Recreation

MID-AMERICA PARK
MASTER PLAN

COMMUNITY PARK

CHAMPIONSHIP DISC GOLF





IMPROVEMENT PRIORITIES

A - FACILITATE BIKE TRAIL

- Trail is Funded
- Will be Open Winter 2019

B - PREPARATION AND SAFETY

- Clearing, Grading, Thinning and Pruning Trees for Visibility
- Establishing Areas for Amenities
- Shaping Wetland Pond

C - CREATING ACCESS

- Park Entrances
- Parking Lots
- Restrooms

D - PROVIDING ACTIVITIES

- Disc Golf Course
- All-Inclusive Playground
- Nature Trails
- Sports Courts

AGREEMENT BETWEEN CLIENT AND LANDSCAPE ARCHITECT

This Agreement, effective as of November 13, 2019 is between Client, City of Midwest City, OK 100 N Midwest Blvd. 73110 and Landscape Architect, R.L. Shears Company, P.C.; 1522 South Carson Avenue; Tulsa, Oklahoma 74119 for the following projects: Mid-America Park, located in Midwest City, Oklahoma

Article 1 Landscape Architect's Basic and Additional Services

A. Landscape Architect's Basic Services are:

Scope of the Project:

The project scope includes conceptual design and construction documents for improvements to Mid-America Park including an inclusive playground; sidewalks; picnic pavilion; prefabricated restrooms; shared-use trail; disc golf course; natural play area; disc golf practice area; nature trail with raised overlook; pollinator, sensory, community gardens, and athletic courts. Conceptual Design drawings will be developed to include all improvements to the park. The Conceptual Design will include topographic survey and schematic design of the park and disc golf course improvements.

In order to accommodate project phasing, 2 separate sets of Construction Documents will be developed. Construction Documents will include 2 phases and 2 separate bid packages. The phase 1 bid package will include the inclusive playground; disc golf practice area; restrooms; pavilion; pollinator, sensory, and community gardens; sidewalks; shared-use trail; vehicular parking; and drainage improvements. The phase 2 bid package will include the disc golf course, nature trail and overlook, and a natural playground area and associated vehicular parking located in the southwest corner of the park. The phase 2 package will also include conceptual design for the athletic courts and 2nd pavilion.

Scope of Basic Services:

1. **Conceptual Design**
   a. Conduct kick-off meeting with City Staff.
   b. Conduct topographic survey of the areas shown in the attached exhibit.
   c. Conduct Tree Inventory and Photographic Inventory.
   d. Develop base map from Topographic Survey
   e. Retain the services of a professional Disc Golf Designer.
   f. Conduct site visit with Disc Golf Designer to review general characteristics of the site.
   g. Develop overall conceptual site plans showing the park improvements.
   h. Develop detail conceptual site plans.
   i. Develop preliminary conceptual routing plan of the disc golf course.
   j. Coordinate with playground equipment manufacturers and develop draft schematic layouts based on different equipment types and age groups served.
   k. Provide equipment cut sheets.
   l. Prepare color renderings of the final overall conceptual site plan.
   m. Prepare color renderings of the final detail site plans.
   n. Prepare color renderings of the inclusive park concepts.
   o. Prepare outline specifications.
   p. Work with sub-consultants to develop estimate of probable cost.

q. Submit drawings, specifications, renderings, and cut sheets in electronic format and hard copy. Hard copy final conceptual design plans and renderings will be delivered on 22"x34" color paper and mounted on foam core boards.
r. Assist City Staff in preparation of Selective Clearing Specifications. Selective Clearing will be bid and performed prior to developing the preliminary conceptual routing of the disc golf course.

2. **Summary of Conceptual Design Phase Site Visits and Meetings**
   s. One Site Visit – Attend Kick-off Meeting with City Staff and conduct tree inventory and photographic inventory.
   t. One Site Visit - Assist Disc Golf Course Designer in development of Routing Plan.
   u. Two On-Site Meetings – Preliminary and Final Conceptual Design Review Meetings with City Staff.
   v. Attend one Parks Board Meeting.
   w. Attend one City Council Meeting.
3. **Construction Documents – Phase 1** (Construction Document Phase will consist of three plan submittals, Preliminary Plans 60% Complete, Final Plans for Review 90% Complete, and Final Plans 100% Complete). The following plan sheets and services will be provided in the Phase 1 bid package.
   a. Title Sheet
   b. General Pay Item Quantities and Notes.
   c. Overall Site Plan.
   d. Detail Site Plans (Inclusive Playground, Restrooms, Pavilion).
   e. Paving Plans.
   f. Grading, Layout and Clearing Plans.
   g. Construction Details.
   h. Electrical Service and Conduit Plan – Coordinate electrical services, conduit installation and parking lot lighting with OG&E.
   i. Prefabricated Restroom Plans and Details (Including utility services).
   j. Picnic Pavilion Plan and Details including foundations.
   k. Storm Water Plans (Dry Creek Bed and Bioretention).
   l. Storm Water Details.
   m. Planting Plan.
   n. Irrigation Plan including the public services.
   o. Planting and Irrigation Details.
   p. Signage Plan and Details.
   q. Project Manual and Specifications.
4. **Construction Documents – Phase 2** – (Construction Document Phase will consist of three plan submittals, Preliminary Plans 60% Complete, Final Plans for Review 90% Complete, and Final Plans 100% Complete). The following plan sheets and services will be provided in the Phase 2 bid package.
   a. Title Sheet
   b. General Pay Item Quantities and Notes
   c. Overall Site Plan
   d. Detail Site Plans (Natural Play Area, Nature Trail Overlook, and Conceptual Design of the Athletic Courts)
   e. Paving Plans
   f. Grading and Layout Plans

g. Disc Golf Clearing and Grubbing Plan
h. Disc Golf Grassing Plan
i. Construction Details
j. Electrical Service and Conduit Plan
k. Tree Planting Plan and Details
l. Signage Plan and Details
m. Project Manual and Specifications

5. **Summary of Construction Document Meetings**
   n. 2 Site Visits with Disc Golf Designer
   o. 60% Plan Review Meeting
   p. 90% Plan Review Meeting
6. **Bidding Phase Services**
   a. Attend Pre-Bid Meeting (1 per Phase).
   b. Assist Client in preparing Addenda Items
7. **Construction Phase Services**
   a. Attend Pre-Construction Meeting (1 per phase)
   b. Assist Client with answering Contractor's RFI's (Request for Information).
   c. Construction Observation (5 Site Visits for Phase 1, 5 Site Visit for Phase 2)
   d. Attend Substantial Completion Walk Through (1 per phase)

B. Landscape Architect's Additional Services are those services not included under Basic Services, but otherwise listed, requested or determined necessary by Client and Landscape Architect. Request for Additional Services shall be confirmed in writing.

C. Excluded Services are not a part of Landscape Architect's Basic or Additional Services and are the responsibility of others. Excluded Services include, but are not limited to, the following: Subsurface conditions including unsuitable subgrade conditions; materials testing and inspections, permits; contractor's means and methods of construction.

D. Landscape Architect agrees to provide its professional services in accordance with laws set forth in 59 Oklahoma Statutes, 2001, Section 46.1, et seq., otherwise known as the Oklahoma State Architectural Act (OAC 55:10) and generally accepted standards of its profession.

Article 2 Client's Responsibilities

A. Client agrees to provide Landscape Architect with all information, surveys, reports, and professional recommendations and any other related items requested by Landscape Architect in order to provide its professional services. Landscape Architect may rely on the accuracy and completeness of these items.

B. Client agrees to advise Landscape Architect of any known or suspected contaminants at the Project site. Client shall be solely responsible for subsurface conditions and soil issues including but not limited to suitability for plant material, soil content, and level of compaction.

C. Client will obtain and pay for all necessary permits or other authorization required from regulatory agencies with jurisdiction over the Project, including but not limited to public utility suppliers and municipal, state, and federal construction permitting authorities.

D. Client agrees to provide the items described in Article 2 and to render decisions in a timely manner so as not to delay the orderly and sequential progress of Landscape Architect's services.

Article 3 Estimated Schedule and Project Budget

A. Landscape Architect shall render its services as expeditiously as is consistent with professional skill and care. During the course of the Project, anticipated and unanticipated events may impact any Project schedule.

B. Client agrees to promptly notify Landscape Architect if Client's schedule or budget changes. Client acknowledges that significant changes to the Project or construction schedule or budget or to the Project's scope may require Additional Services of Landscape Architect.

Article 4 Project Budget, Compensation and Payments

A. Project Budget: The Project budget is $2,640,000. If project budget increases, Landscape Architects fee will increase proportional.
B. Client agrees to pay Landscape Architect as follows:

1. Basic Services (Landscape Architect): The fees for the professional services as described above in Article 1A are based on a fixed fee as shown below:

Topographic Survey	$13,300.00
Conceptual Design Phase	$43,300.00
Construction Documents Phase 1	$82,300.20
Construction Documents Phase 2	$54,866.80
Bidding Phase Services Phase 1	$2,500.00
Bidding Phase Services Phase 2	$2,500.00
Construction Phase Services Phase 1	$19,822.00
Construction Phase Services Phase 2	$19,822.00
Geotechnical Investigation and Report	$3,000.00
Total Fee:	**$241,411.00**

2. Additional Services: The fees for additional services as described above in Article 1B are based on the following hourly rates and will be billed monthly:

Administrative / Clerical:	$60.00 / hour
Landscape Architect Technical I:	$80.00 / hour
Landscape Architect Technical II:	$85.00 / hour
Landscape Architect:	$95.00 / hour
Landscape Architect / Project Manager:	$105.00 / hour
Principal:	$120.00 / hour

C. Landscape Architect shall bill Client for Basic Services and Reimbursable Expenses monthly based on percentage of completion. Additional Services shall be billed once a month. All payments are due Landscape Architect upon receipt of invoice. 2% per month will be charged on all amounts due more than 30 days after the date of invoice.

Article 5 Termination

A. Either Client or Landscape Architect may terminate this Agreement upon seven days written notice.

B. If terminated, Client agrees to pay Landscape Architect for all Basic and Additional Services rendered and Reimbursable Expenses incurred up to the date of termination.

C. Upon not less than seven days' written notice, Landscape Architect may suspend the performance of its services if Client fails to pay Landscape Architect in full for services rendered or expenses incurred. Landscape Architect shall have no liability because of such suspension of services or termination due to Client's nonpayment.

Article 6 Dispute Resolution

A. Client and Landscape Architect agree to mediate claims or disputes arising out of or relating to this Agreement before initiating litigation. A party shall make a demand for mediation within fourteen (14) days after a claim or dispute arises, and the parties agree to mediate in good faith. In no event shall parties make demand for mediation after such claim or dispute would be barred by applicable law. Mediation does not toll the statue of Limitations.

B. The mediation shall be conducted by a mediation service mutually agreed upon by Client and Landscape Architect and shall have particular knowledge and experience in construction law and professional services.

C. Mediation fees shall be allocated as follows: In the event that one party is assigned liability, fees and cost shall be allocated to that party; in the event that the mediation service declares the matter irreconcilable, inconclusive, or assigns neither party liability, fees and cost shall be shared equally by parties; and in the event that both parties are found to share liability, fees shall be allocated to each party in an amount proportional to assigned liability.

Article 7 Ownership and Reuse of Documents

A. Documents, including original drawings, estimates, specifications, field notes and data shall become and remain the property of the Client. All Documents prepared under this contract are intended to be used for the project area described herein and shall not be used for other purposes without the Landscape Architect's written permission.

Article 8 - Insurance

A. During the performance of the SERVICES under this AGREEMENT, LANDSCAPE ARCHITECT shall maintain the following insurance:

(1) General Liability Insurance with bodily injury and property damage limits of not less than One Million Dollars ($1,000,000.00) coverage for all damages arising out of bodily injury, death and property damages and with limits of not less than One Hundred Seventy-Five Thousand Dollars ($175,000.00) for each claimant and with an aggregate limit of not less than Two Million Dollars ($2,000,000.00). Said

insurance policy to protect the LANDSCAPE ARCHITECT against claims and suits in law or equity, alleging negligence on the part of said LANDSCAPE ARCHITECT, his agents or employees and demands for compensation for damages to either persons or property;

(2) Automobile Liability Insurance with bodily injury limits of not less than One Million Dollars ($1,000,000.00) for each person and not less than One Million Dollars ($1,000,000.00) for each accident and with property damage limits of not less than One Hundred Seventy-Five Thousand Dollars ($175,000.00) for each accident;

(3) Worker's Compensation Insurance in accordance with the statutory requirements of the State of Oklahoma;

The LANDSCAPE ARCHITECT shall not cause any insurance policy to be canceled or permit it to lapse and all insurance policies shall include an endorsement to the effect that the insurance policy or certificate shall not be subject to cancellation or to a reduction in the required limits of liability or amounts of insurance until notice has been mailed to THE CLIENT, stating the date when such cancellation or reduction shall be effective, which date shall not be less than ten (10) days after such notice.

LANDSCAPE ARCHITECT shall furnish CLIENT certificates of insurance, which shall include a provision that such insurance shall not be canceled without at least thirty (30) days written notice to CLIENT. LANDSCAPE ARCHITECT shall name CLIENT as certificate holders on their certificate of insurance for the PROJECT, and shall be required to indemnify CLIENT to the same extent. LANDSCAPE ARCHITECT shall be held responsible to submit certificates of insurance for sub-consultants to CLIENT prior to the sub-consultant's release to commence work.

Article 9 - IMMIGRATION COMPLIANCE

9.1 LANDSCAPE ARCHITECT shall demonstrate that he:

9.1.1 Has complied, and shall at all times during the term of this Contract, comply in all respects with all immigration-related laws, statutes, ordinances and regulations including without limitation, the Immigration and Nationality Act, as amended, the Immigration Reform and Control Act of 1986, as amended, and the Oklahoma Taxpayer and Citizen Protection Act of 2007 (Oklahoma HB 1804) and any successor laws, ordinances or regulations (collectively, the Immigration Laws"); and

9.1.2 Has properly maintained, and shall at all times during the term of this Agreement, maintain any and all employee records required by the U.S. Department of Homeland Security ("DHS"), including, without limitation, properly completed and maintained Form I-9s for each of the Consultant's employees; and

9.1.3 Has verified the employment eligibility for all employees hired on or after July 1, 2008 through DHS's E-Verify system, and shall at all times continue to verify the employment eligibility of all employees hired during the term of this Contract; and

9.1.4 Has required, and will at all times during the term of this Contract, require any sub-contractor utilized, hired or sub-contracted for by LANDSCAPE ARCHITECT for the completion or undertaking of any duties, tasks or responsibilities under this Agreement, to comply the requirements and obligations imposed by the Immigration Laws and set forth in Paragraph (I), parts (a), (b) and (c), above, with regards to each of the sub-consultant's employees.

9.2 LANDSCAPE ARCHITECT will indemnify, defend and hold harmless CLIENT against any loss, cost, liability, expense (including, without limitation, costs and expenses of litigation and reasonable attorney's fees) demands, claims, actions, causes of action, liabilities, suits, damages, including special and consequential damages that arise from or in connection with, directly or indirectly, LANDSCAPE ARCHITECT's failure, deliberate or negligent, to fulfill its obligations and representations regarding verifying the employment eligibility of its employees and the employees of any subcontractor utilized by LANDSCAPE ARCHITECT as set forth more fully in Paragraph 9.1 above.

Article 10 Miscellaneous Provisions.

A. This Agreement is governed by the laws of the State of Oklahoma, Oklahoma County.

B. This Agreement is the entire and integrated agreement between Client and Landscape Architect and supersedes all prior negotiations, statements or agreements, either written or oral. The parties may amend this Agreement only by a written instrument executed by both Client and Landscape Architect.

C. In the event that any term or provision of this Agreement is found to be unenforceable or invalid for any reason, the remainder of this Agreement shall continue in full force and effect, and the parties agree that any unenforceable or invalid term or provision shall be amended to the minimum extent required to make such term or provision enforceable and valid.

D. Neither Client nor Landscape Architect shall assign this Agreement without the written consent of the other.

E. Irrespective of any other term in this Agreement, Landscape Architect shall not control or be responsible for construction means, methods, techniques, schedules, sequences or procedures; or for construction safety or any other related programs; or for another parties' errors or omissions or for another parties' failure to complete their work or services in accordance with Landscape Architect's documents.

F. Client agrees to indemnify, defend and hold Landscape Architect harmless from and against any and all claims, liabilities, suits, demands, losses, costs and expenses, including but not limited to reasonable attorneys' fees, expert witnesses, and all legal expenses and fees incurred through appeal, and all interest thereon, accruing or resulting to any and all persons, firms or any other legal entities on account of any damages or losses to property or persons, including injuries or death, or economic losses, arising out of the Project and/or this Agreement, except that the Landscape Architect shall not be entitled to be indemnified to the extent such

damages or losses are found by a court or forum of competent jurisdiction to be caused by or contributed to Landscape Architect's negligent errors or omissions.

G. Should any legal proceeding be commenced between the parties to this Agreement seeking to enforce any of its provisions, including but not limited to fee provisions, the prevailing party in such proceeding shall be entitled, in addition to such other relief as may be granted, to a reasonable sum for attorneys' and expert witnesses' fees, which shall be determined by the court or forum in such a proceeding or in a separate action brought for that purpose.

H. Client and Landscape Architect waive consequential damages for any claims, disputes or other matters in question arising out of or relating to this Agreement. Landscape Architect's waiver of consequential damages, however, is contingent upon the Client requiring contractor and its subcontractors to waive all consequential damages against Landscape Architect for claims, disputes or other matters in question arising out of or relating to the Project.

I. To the extent damages are covered by property insurance during construction, Client and Landscape Architect waive all rights against each other and against the contractors, consultants, agents and employees of the other for such damages. Client or Landscape Architect, as appropriate, shall require of the contractors, consultants, agents and employees of any of them similar waivers in favor of the other parties described in this paragraph.

J. Client acknowledges and agrees that proper Project maintenance is required after the Project is complete. A lack of or improper maintenance may result in damage to property or persons. Client further acknowledges and agrees that, as between the parties to this Agreement, Client is solely responsible for the results of any lack of or improper maintenance.

K. Nothing in this Agreement shall create a contractual relationship for the benefit of any third party.

L. If Client fails to execute and return this Agreement to Landscape Architect within 30 days of the effective date, the offer to perform the described services may, in Landscape Architect's sole discretion, be withdrawn and be null and void.

M. Landscape Architect shall provide client Final Plans in both hard copy and electronic format. Electronic form shall be submitted in PDF and AutoCAD.

R. L. Shears Company, P.C.	City of Midwest City
LANDSCAPE ARCHITECT	CLIENT
By: Robert Shears, ASLA	By: _____
Title: President	Title: _____
SIGNED: 	SIGNED: _____
DATED: 11.4.19	DATED: _____

PHASE 1

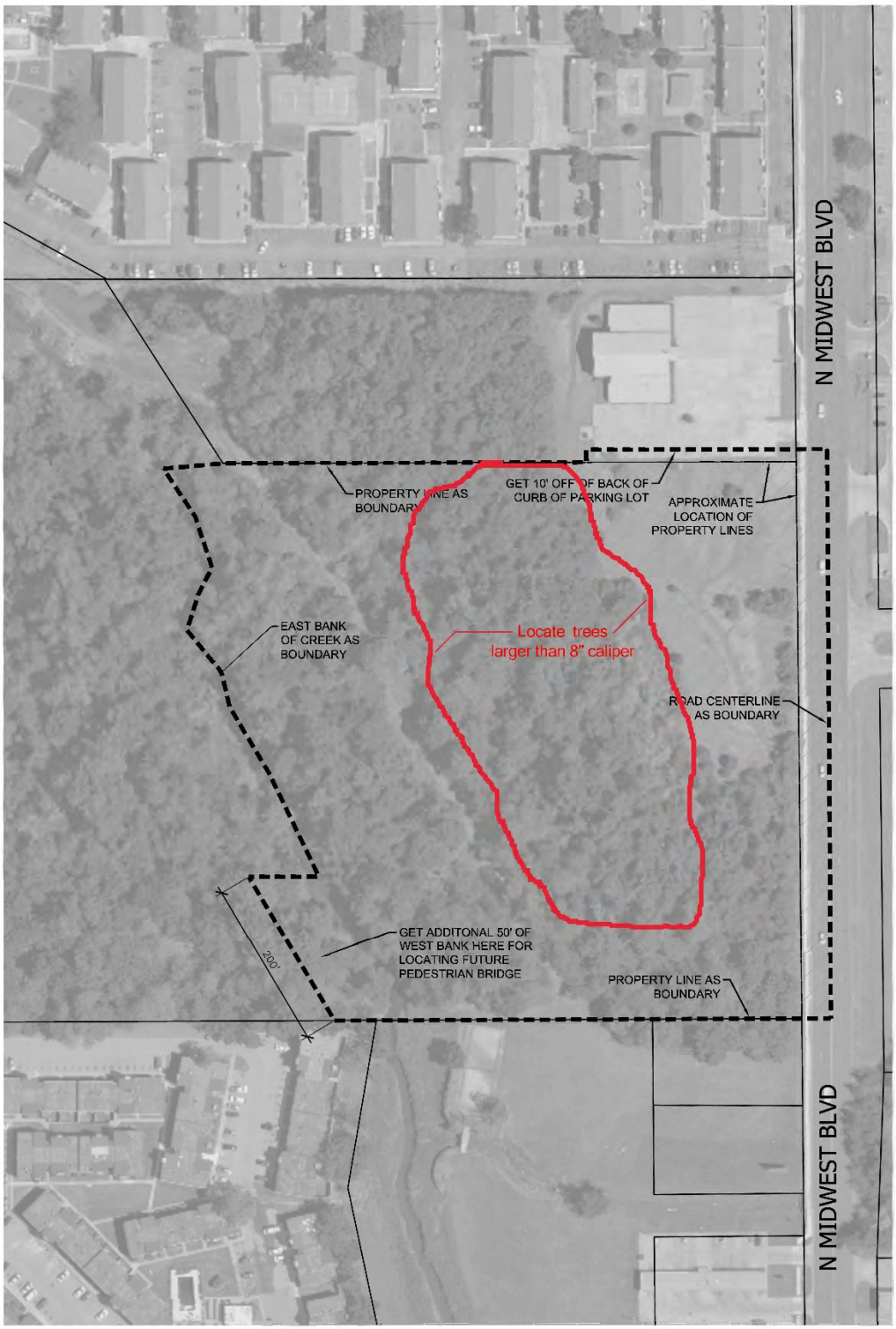
PHASES 1 & 2

PHASE 2

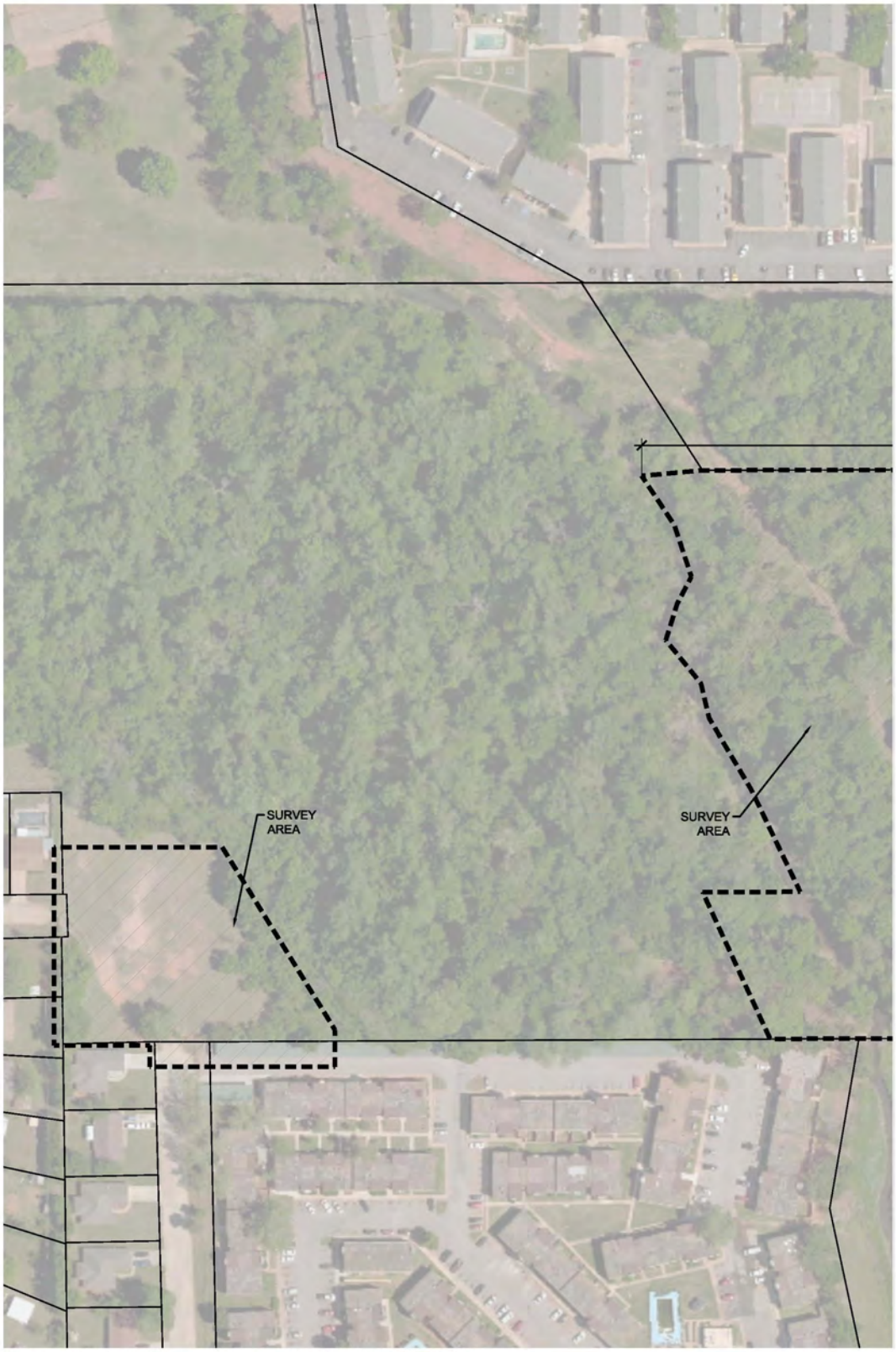
MIDWEST CITY MID-AMERICA PARK
PHASING EXHIBIT

0 50 100 200 300
SCALE: 1"=200'-0"

EXIHIBIT 1 - SURVEY AREA LIMITS



MIDWEST CITY MID-AMERICA PARK
SURVEY AREA EXHIBIT



MIDWEST CITY MID-AMERICA PARK
SURVEY AREA EXHIBIT 2

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 12/13/2018

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME:	
Teena Hillburn(0810228) 9717 E 42nd St Ste 130 Tulsa OK 74146-3677	PHONE (A/C, NO, EXT): 918-622-1515	FAX (A/C, NO): 918-622-5891
	E-MAIL ADDRESS: thillburn@farmersagent.com	

INSURED	INSURER(S) AFFORDING COVERAGE	NAIC #
R.L. SHEARS CO., P.C. 1522 S CARSON TULSA OK 74119	INSURER A: Truck Insurance Exchange	21709
	INSURER B: Farmers Insurance Exchange	21652
	INSURER C: Mid Century Insurance Company	21687
	INSURER D:	
	INSURER E:	
	INSURER F:	

COVERAGES | CERTIFICATE NUMBER: | REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAME ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDTL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
B	X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE / X OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: X POLICY / PROJECT / LOC OTHER:	Y	N	602663548	12/26/2018	12/26/2019	EACH OCCURRENCE	$ 1,000,000
							DAMAGE TO RENTED PREMISES (Ea Occurrence)	$ 75,000
							MED EXP (Any one person)	$ 5,000
							PERSONAL & ADV INJURY	$ 1,000,000
							GENERAL AGGREGATE	$ 2,000,000
							PRODUCTS - COMP/OP AGG	$ 1,000,000
								$
B	AUTOMOBILE LIABILITY ANY AUTO OWNED AUTOS ONLY / SCHEDULED AUTOS X HIRED AUTOS ONLY / X NON-OWNED AUTOS ONLY			602663548	12/26/2018	12/26/2019	COMBINED SINGLE LIMIT (Ea accident)	$ 1,000,000
							BODILY INJURY (Per person)	$
							BODILY INJURY (Per accident)	$
							PROPERTY DAMAGE (Per accident)	$
								$
	UMBRELLA LIAB / OCCUR EXCESS LIAB / CLAIMS-MADE DED / RETENTION $						EACH OCCURRENCE	$
							AGGREGATE	$
								$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/ EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N If yes, describe under DESCRIPTION OF OPERATIONS below	N/A					PER STATUTE / OTHER	$
							E.L. EACH ACCIDENT	$
							E.L. DISEASE - EA EMPLOYEE	$
							E.L. DISEASE - POLICY LIMIT	$

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
1522 S CARSON, TULSA, OK 74119

CERTIFICATE HOLDER

[redacted]

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Teena Hillburn

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 07/08/2019

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER

CorRisk Solutions
1 Huntington Quadrangle Suite 4N20
Melville, NY 11747

CONTACT NAME: Tracey Donohue
PHONE (A/C, No, Ext): 516-986-5295 FAX (A/C, No, Ext): 631-756-2500
E-MAIL ADDRESS: traceyd@corrisksolutions.com

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A: New Hampshire Insurance Company	23841
INSURER B:	
INSURER C:	
INSURER D:	
INSURER E:	
INSURER F:	

INSURED

R.L. Shears Company, P.C.
1522 S. Carson Avenue
Tulsa, OK 74119

COVERAGES CERTIFICATE NUMBER: REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADD'L INSRD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
	GENERAL LIABILITY COMMERCIAL GENERAL LIABILITY CLAIMS MADE OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: POLICY PROJECT LOC			DOES NOT APPLY			EACH OCCURANCE DAMAGE TO RENTED PREMISES (Ea occurance) MED EXP (Any one person) PERSONAL & AND INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	
	AUTOMOBILE LIABILITY ANY AUTO ALL OWNED AUTOS SCHEDULED AUTOS HIRED AUTOS NON-OWNED AUTOS			DOES NOT APPLY			COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	
	UMBRELLA LIAB OCCUR EXCESS LIAB CLAIMS MADE DED RETENTION $			DOES NOT APPLY			EACH OCCURANCE AGGREGATE	
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICE/MEMBER EXCLUDED? (Mandatory in NH) Y/N If yes, describe under DESCRIPTION OF OPERATIONS below	N/A		DOES NOT APPLY			WC STATU-TORY LIMITS OTHER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	
A	Professional Liability			064991121-03	01/06/19	01/06/20	Per Occurrence: $1,000,000 Annual Aggregate: $1,000,000	

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACCORD 101, Additional Remarks Schedule, if more space is required)

Mid-America Park

CERTIFICATE HOLDER

City of Midwest City
100 N Midwest Blvd.

Midwest City, Oklahoma 7311

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 11/01/2019

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME: CompSource Mutual Insurance Company
	PHONE (A/C, No, Ext): (405) 232-7663 ext. 5102 / FAX (A/C, No):
	E-MAIL ADDRESS:

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : CompSource Mutual Insurance Company	36188
INSURER B :	
INSURER C :	
INSURER D :	
INSURER E :	
INSURER F :	

INSURED

R L SHEARS COMPANY PC
1522 S CARSON AVE
TULSA, OK 74119

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
	COMMERCIAL GENERAL LIABILITY						EACH OCCURRENCE	$
	☐ CLAIMS-MADE ☐ OCCUR						DAMAGE TO RENTED PREMISES (Ea occurrence)	$
							MED EXP (Any one person)	$
							PERSONAL & ADV INJURY	$
	GEN'L AGGREGATE LIMIT APPLIES PER:						GENERAL AGGREGATE	$
	☐ POLICY ☐ PRO-JECT ☐ LOC						PRODUCTS - COMP/OP AGG	$
	OTHER:							$
	AUTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident)	$
	☐ ANY AUTO						BODILY INJURY (Per person)	$
	☐ OWNED AUTOS ONLY ☐ SCHEDULED AUTOS						BODILY INJURY (Per accident)	$
	☐ HIRED AUTOS ONLY ☐ NON-OWNED AUTOS ONLY						PROPERTY DAMAGE (Per accident)	$
								$
	☐ UMBRELLA LIAB ☐ OCCUR						EACH OCCURRENCE	$
	☐ EXCESS LIAB ☐ CLAIMS-MADE						AGGREGATE	$
	☐ DED ☐ RETENTION $							$
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y / N ANYPROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? ☐ **(Mandatory in NH)** If yes, describe under DESCRIPTION OF OPERATIONS below	N / A		03076334 19 1	11/01/2019	11/01/2020	X PER STATUTE ☐ OTH-ER	
							E.L. EACH ACCIDENT	$ 1,000,000.00
							E.L. DISEASE - EA EMPLOYEE	$ 1,000,000.00
							E.L. DISEASE - POLICY LIMIT	$ 1,000,000.00

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

30 Day Third Party Notice

Reference: Mid-America Park

CERTIFICATE HOLDER

City of Midwest City
100 N. Midwest Blvd.
Midwest City, OK 73110

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

AGREEMENT BETWEEN

LANDSCAPE ARCHITECT AND DISC GOLF DESIGNER

THIS AGREEMENT, R.L. Shears Company, P.C. (LANDSCAPE ARCHITECT) and The HBC Group, LLC (DISC GOLF DESIGNER);

W I T N E S S E T H :

WHEREAS, The LANDSCAPE ARCHITECT has entered into an agreement dated November 13, 2019 (Prime Agreement), with the City of Midwest City (OWNER), to complete design services for the Mid-America Park, (PROJECT); and,

WHEREAS, LANDSCAPE ARCHITECT requires certain services in connection with the PROJECT hereinafter referred to as the SERVICES; and,

WHEREAS, DISC GOLF DESIGNER is prepared to provide such SERVICES;

NOW THEREFORE, in consideration of the promises contained in this Agreement, LANDSCAPE ARCHITECT and DISC GOLF DESIGNER agree as follows:

ARTICLE 1 - EFFECTIVE DATE
The effective date of this Agreement shall be November 13, 2019.

ARTICLE 2 - GOVERNING LAW
This AGREEMENT shall be governed by the laws of the State of Oklahoma and venue for any action concerning this Agreement shall be in the District Court of Tulsa County, Oklahoma.

ARTICLE 3 - SERVICES TO BE PERFORMED BY DISC GOLF DESIGNER
DISC GOLF DESIGNER shall perform the Services described in Attachment A, Scope of Services. Specifications, drawings, schedules, and other material pertinent to DISC GOLF DESIGNER'S Services under this Agreement will be furnished to DISC GOLF DESIGNER as they become available to LANDSCAPE ARCHITECT.

DISC GOLF DESIGNER recognizes that the Services of LANDSCAPE ARCHITECT and others involved in the Project are dependent upon the timely performance of DISC GOLF DESIGNER'S Services. Unless otherwise provided in this Agreement, DISC GOLF DESIGNER shall perform such Services in the same character, timing, and sequence, as LANDSCAPE ARCHITECT is required to perform the Services under the Prime Agreement. DISC GOLF DESIGNER'S failure to perform in a timely manner shall be considered a material breach of this Agreement.

ARTICLE 4 - COMPENSATION
4.1 Method of Payment. LANDSCAPE ARCHITECT shall pay DISC GOLF DESIGNER in accordance with Attachment B, Compensation.

4.2 Time of Payment. DISC GOLF DESIGNER shall submit periodic statements for Services rendered. If LANDSCAPE ARCHITECT objects to any statement submitted by DISC GOLF DESIGNER, LANDSCAPE ARCHITECT shall so advise DISC GOLF DESIGNER in writing

giving reasons therefore within seven days of receipt of such statement. If no such objection is made, LANDSCAPE ARCHITECT will consider the statement acceptable.

LANDSCAPE ARCHITECT shall bill OWNER on account of DISC GOLF DESIGNER'S Services and shall pay DISC GOLF DESIGNER within fourteen days of the time LANDSCAPE ARCHITECT receives payment from OWNER on account thereof. It is intended that payments to DISC GOLF DESIGNER will be made as OWNER pays LANDSCAPE ARCHITECT. Payments to the DISC GOLF DESIGNER will be reduced by any amounts withheld by the OWNER. Upon the release to LANDSCAPE ARCHITECT of any amount which includes payments due DISC GOLF DESIGNER, LANDSCAPE ARCHITECT will forward to DISC GOLF DESIGNER its portion of such payment.

ARTICLE 5 - STANDARD OF CARE

DISC GOLF DESIGNER shall perform the SERVICES undertaken in a manner consistent with the prevailing accepted standard for similar services with respect to projects of comparable function and complexity, and with the applicable state laws, as well as the specific codes, regulations, design criteria and construction specifications adopted by the owner and other governing policies published and generally considered authoritative by DISC GOLF DESIGNER'S profession that are in effect at the time of performance of these SERVICES. DISC GOLF DESIGNER is obligated to perform professional services in accordance with the foregoing standard with respect to the laws, codes, regulations, design criteria and construction specifications that are applicable pursuant to this AGREEMENT.

ARTICLE 6 - LIABILITY AND INDEMNIFICATION

6.1 Indemnification. DISC GOLF DESIGNER shall defend, indemnify, and hold harmless LANDSCAPE ARCHITECT and Owner from and against all claims, losses, damages, and expenses to the extent such claims, losses, damages, or expenses are caused by or alleged to be caused by any negligent act, intentional act, error, or omission of DISC GOLF DESIGNER or any person or organization for whom DISC GOLF DESIGNER is legally liable.

6.2 Employee Claims. DISC GOLF DESIGNER shall indemnify Owner and LANDSCAPE ARCHITECT against liability for damages arising out of claims by DISC GOLF DESIGNER'S employees. LANDSCAPE ARCHITECT shall indemnify DISC GOLF DESIGNER against liability for damages arising out of claims by LANDSCAPE ARCHITECT'S employees.

6.3 Consequential Damages. LANDSCAPE ARCHITECT shall not be liable to DISC GOLF DESIGNER for any special, indirect, or consequential damages resulting in any way from the performance of the SERVICES such as, but not limited to, loss of use, loss of revenue, or loss of anticipated profits.

6.4 Survival. Upon completion of all Services, obligations, and duties provided for in this Agreement, or in the event of termination of this Agreement for any reason, the terms and conditions of this Article shall survive.

ARTICLE 7 - INDEPENDENT CONTRACTOR

DISC GOLF DESIGNER undertakes performance of the Services as an independent contractor and shall be wholly responsible for the methods of performance. LANDSCAPE ARCHITECT shall be the general administrator and coordinator of DISC GOLF DESIGNER'S Services and shall facilitate the exchange of information among the independent DISC GOLF DESIGNERS employed by LANDSCAPE ARCHITECT as necessary for the coordination of their Services.

Owner and LANDSCAPE ARCHITECT shall have the right to observe performance of the Services. All communications shall be through the LANDSCAPE ARCHITECT.

ARTICLE 8 - COMPLIANCE WITH LAWS

In performance of the Services, DISC GOLF DESIGNER shall comply with applicable regulatory requirements including federal, state, and local laws, rules, regulations, orders, codes, criteria, and standards. DISC GOLF DESIGNER shall procure the permits, certificates, and licenses necessary to allow DISC GOLF DESIGNER to perform the Services. DISC GOLF DESIGNER shall not be responsible for procuring permits, certificates, and licenses required for any construction unless such responsibilities are specifically assigned to DISC GOLF DESIGNER in Attachment A, Scope of Services.

ARTICLE 9 - INSURANCE

During the performance of the SERVICES under this AGREEMENT, SURVEYOR shall maintain the following insurance:

(1) General Liability Insurance with bodily injury and property damage limits of not less than One Million Dollars ($1,000,000.00) coverage for all damages arising out of bodily injury, death and property damages and with limits of not less than One Hundred Seventy-Five Thousand Dollars ($175,000.00) for each claimant and with an aggregate limit of not less than Two Million Dollars ($2,000,000.00). Said insurance policy to protect the SURVEYOR against claims and suits in law or equity, alleging negligence on the part of said SURVEYOR, his agents or employees and demands for compensation for damages to either persons or property;

(2) Automobile Liability Insurance with bodily injury limits of not less than One Million Dollars ($1,000,000.00) for each person and not less than One Million Dollars ($1,000,000.00) for each accident and with property damage limits of not less than One Hundred Seventy-Five Thousand Dollars ($175,000.00) for each accident;

(3) Worker's Compensation Insurance in accordance with the statutory requirements of the State of Oklahoma;

The DISC GOLF DESIGNER shall not cause any insurance policy to be canceled or permit it to lapse and all insurance policies shall include an endorsement to the effect that the insurance policy or certificate shall not be subject to cancellation or to a reduction in the required limits of liability or amounts of insurance until notice has been mailed to the LANDSCAPE ARCHITECT, stating the date when such cancellation or reduction shall be effective, which date shall not be less than ten (10) days after such notice.

DISC GOLF DESIGNER shall furnish LANDSCAPE ARCHITECT certificates of insurance, which shall include a provision that such insurance shall not be canceled without at least thirty (30) days written notice to OWNER. DISC GOLF DESIGNER shall name OWNER and LANDSCAPE ARCHITECT as certificate holders on their certificate of insurance for the PROJECT, and shall be required to indemnify OWNER and LANDSCAPE ARCHITECT to the same extent. DISC GOLF DESIGNER shall be held responsible to submit certificates of insurance for sub-consultants to LANDSCAPE ARCHITECT prior to the sub-consultant’s release to commence work.

ARTICLE 10 – LANDSCAPE ARCHITECT'S RESPONSIBILITIES
LANDSCAPE ARCHITECT shall perform the following in a timely manner so as not to delay the Services of DISC GOLF DESIGNER:

(1) Provide criteria and information pertinent to DISC GOLF DESIGNER'S Services as to Owner's and LANDSCAPE ARCHITECT'S requirements for the Project, including design objectives and constraints, space, capacity, and performance requirements, flexibility and expandability, and any budgetary limitations; and furnish copies of all design and construction standards which Owner and LANDSCAPE ARCHITECT will require to be included in the drawings and specifications to be furnished by DISC GOLF DESIGNER under this Agreement, if any.

(2) Make available to DISC GOLF DESIGNER drawings, specifications, schedules, and other information, interpretations, and data which are prepared by LANDSCAPE ARCHITECT, or by others, which LANDSCAPE ARCHITECT knows are reasonably available to DISC GOLF DESIGNER'S responsibilities under this Agreement.

(3) Request Owner to arrange for access to and make all provisions for DISC GOLF DESIGNER to enter upon public and private property as required for DISC GOLF DESIGNER to perform the Services under this Agreement.

(4) Give prompt notice to DISC GOLF DESIGNER whenever LANDSCAPE ARCHITECT observes or otherwise becomes aware of any development that affects the scope or timing of DISC GOLF DESIGNER'S Services.

The information and services to be provided by LANDSCAPE ARCHITECT under this Article will be without cost to DISC GOLF DESIGNER.

ARTICLE 11 - TERMINATION AND SUSPENSION
11.1 This Agreement will terminate automatically upon termination of the Prime Agreement. LANDSCAPE ARCHITECT will promptly notify DISC GOLF DESIGNER of such termination.

11.2 LANDSCAPE ARCHITECT or DISC GOLF DESIGNER upon written notice may terminate this Agreement in the event of substantial failure by the other party to perform in accordance with the terms of this Agreement through no fault of the party initiating the termination. In the event of such termination, DISC GOLF DESIGNER will be paid for the Services performed in accordance with this Agreement to the date of termination.

11.3 LANDSCAPE ARCHITECT may terminate or suspend performance of this Agreement for LANDSCAPE ARCHITECT'S's convenience upon written notice to DISC GOLF DESIGNER. Upon receipt of notice, DISC GOLF DESIGNER shall terminate or suspend performance of the Services on a schedule acceptable to LANDSCAPE ARCHITECT and may submit a statement for the Services performed and reasonable termination or suspension expenses. Upon restart of a suspended project, equitable adjustment shall be made to DISC GOLF DESIGNER'S compensation.

ARTICLE 12 - NONDISCLOSURE OF PROPRIETARY INFORMATION
12.1 DISC GOLF DESIGNER shall consider all information provided by LANDSCAPE ARCHITECT and Owner and all drawings, reports, studies, design calculations, specifications, and other documents resulting from the DISC GOLF DESIGNER'S performance of the Services

to be proprietary. The DISC GOLF DESIGNER shall not publish or disclose proprietary information for any purpose other than the performance of the Services without the prior written authorization of LANDSCAPE ARCHITECT.

12.2 The preceding restriction shall not apply to information which is in the public domain, was previously known to DISC GOLF DESIGNER, was acquired by DISC GOLF DESIGNER from others who have no confidential relationship to LANDSCAPE ARCHITECT with respect to same, or which, through no fault of DISC GOLF DESIGNER, comes into the public domain. DISC GOLF DESIGNER shall not be restricted in any way from releasing information, including proprietary information, in response to a subpoena, court order, or other legal process. DISC GOLF DESIGNER shall not be required to resist such subpoena, court order, or legal process, but shall promptly notify LANDSCAPE ARCHITECT in writing of the demand for information before DISC GOLF DESIGNER responds to such demand. LANDSCAPE ARCHITECT may, at its sole discretion, seek to quash such demand.

ARTICLE 13 - COMMUNICATIONS

Any communication required by this Agreement shall be made in writing to the address specified below:

DISC GOLF DESIGNER:	The HBC Group, LLC 2637 Lost Cove Court Bowling Green, KY 42104 Contact: HB Clark Email: hb_clark@bellsouth.net
LANDSCAPE ARCHITECT:	President, R.L. Shears Company, P.C. 1522 South Carson Avenue Tulsa, Oklahoma 74119 Contact: Robert Shears ASLA Email: rshears@rlshearsco.com

All project communications shall be made through or with the prior written approval of the LANDSCAPE ARCHITECT. Nothing contained in this Article shall be construed to restrict the transmission of routine communications between representatives of LANDSCAPE ARCHITECT and DISC GOLF DESIGNER.

ARTICLE 14 - DELAY IN PERFORMANCE

Neither LANDSCAPE ARCHITECT nor DISC GOLF DESIGNER shall be considered in default of this Agreement for delays in performance caused by circumstances beyond the reasonable control of the nonperforming party. For purposes of this Agreement, such circumstances include, but are not limited to, abnormal weather conditions; floods; earthquakes; fire; epidemics; war, riots, and other civil disturbances; strikes, lockouts, work slowdowns, and other labor disturbances; sabotage; judicial restraint; and inability to procure permits, licenses, or authorizations from any local, state, or federal agency for any of the supplies, materials, accesses, or services required to be provided by either LANDSCAPE ARCHITECT or DISC GOLF DESIGNER under this Agreement.

Should such circumstances occur the nonperforming party shall, within a reasonable time of being prevented from performing, give written notice to the other party, describing the circumstances preventing continued performance and the efforts being made to resume performance of this Agreement.

ARTICLE 15 - WAIVER
A waiver by either LANDSCAPE ARCHITECT or DISC GOLF DESIGNER of any breach of this Agreement shall be in writing. Such a waiver shall not affect the waiving party's rights with respect to any other or further breach.

ARTICLE 16 - SEVERABILITY
The invalidity, illegality, or unenforceability of any provision of the Agreement or the occurrence of any event rendering any portion or provision of this Agreement void shall in no way affect the validity or enforceability of any other portion or provision of this Agreement. Any void provision shall be deemed severed from this Agreement, and the balance of this Agreement shall be construed and enforced as if this Agreement did not contain the particular portion or provision held to be void. LANDSCAPE ARCHITECT and DISC GOLF DESIGNER further agree to amend this Agreement to replace any stricken provision with a valid provision. The provisions of this Article shall not prevent this entire Agreement from being void should a provision, which is of the essence of this Agreement, be determined void.

ARTICLE 17 - INTEGRATION
This Agreement represents the entire and integrated agreement between the LANDSCAPE ARCHITECT and DISC GOLF DESIGNER. It supersedes all prior and contemporaneous communications, representations, and agreements, whether oral or written, relating to the subject matter of this Agreement. Only a written instrument signed by both the LANDSCAPE ARCHITECT and DISC GOLF DESIGNER may amend this Agreement.

ARTICLE 18 - SUBCONTRACTING
DISC GOLF DESIGNER shall not employ independent DISC GOLF DESIGNERS, associates, or subcontractors to assist in the performance of DISC GOLF DESIGNER'S Services without the prior written consent of LANDSCAPE ARCHITECT.

ARTICLE 19 - SUCCESSORS AND ASSIGNS
LANDSCAPE ARCHITECT and DISC GOLF DESIGNER each binds itself and its directors, officers, partners, successors, executors, administrators, assigns, and legal representatives to the other party to this Agreement and to the directors, officers, partners, successors, executors, administrators, assigns, and legal representatives of such other party, in respect to all provisions of this Agreement.

ARTICLE 20 - ASSIGNMENTS
DISC GOLF DESIGNER shall not assign any rights or duties under this Agreement without the prior written consent of LANDSCAPE ARCHITECT. Unless otherwise stated in the written consent to an assignment, no assignment will release or discharge the DISC GOLF DESIGNER from any obligation under this Agreement.

ARTICLE 21 - THIRD PARTY RIGHTS
Nothing in this Agreement shall be construed to give any rights or benefits to anyone other than Owner, LANDSCAPE ARCHITECT, and DISC GOLF DESIGNER.
ARTICLE 23 – NOT USED

ARTICLE 24 - IMMIGRATION COMPLIANCE

24.1 DISC GOLF DESIGNER shall demonstrate that he:

24.1.1 Has complied, and shall at all times during the term of this Contract, comply in all respects with all immigration-related laws, statutes, ordinances and regulations including without limitation, the Immigration and Nationality Act, as amended, the Immigration Reform and Control Act of 1986, as amended, and the Oklahoma Taxpayer and Citizen Protection Act of 2007 (Oklahoma HB 1804) and any successor laws, ordinances or regulations (collectively, the Immigration Laws"); and

24.1.2 Has properly maintained, and shall at all times during the term of this Agreement, maintain any and all employee records required by the U.S. Department of Homeland Security ("DHS"), including, without limitation, properly completed and maintained Form I-9s for each of the Consultant's employees; and

24.1.3 Has verified the employment eligibility for all employees hired on or after July 1, 2008 through DHS's E-Verify system, and shall at all times continue to verify the employment eligibility of all employees hired during the term of this Contract; and

24.1.4 Has required, and will at all times during the term of this Contract, require any sub-contractor utilized, hired or sub-contracted for by DISC GOLF DESIGNER for the completion or undertaking of any duties, tasks or responsibilities under this Agreement, to comply the requirements and obligations imposed by the Immigration Laws and set forth in Paragraph (I), parts (a), (b) and (c), above, with regards to each of the sub-consultant's employees.

24.2 DISC GOLF DESIGNER will indemnify, defend and hold harmless LANDSCAPE ARCHITECT against any loss, cost, liability, expense (including, without limitation, costs and expenses of litigation and reasonable attorney's fees) demands, claims, actions, causes of action, liabilities, suits, damages, including special and consequential damages that arise from or in connection with, directly or indirectly, DISC GOLF DESIGNER's failure, deliberate or negligent, to fulfill its obligations and representations regarding verifying the employment eligibility of its employees and the employees of any subcontractor utilized by DISC GOLF DESIGNER as set forth more fully in Paragraph 24.1 above.

IN WITNESS WHEREOF, LANDSCAPE ARCHITECT and DISC GOLF DESIGNER have executed this Agreement.

The HBC Group, LLC DISC GOLF DESIGNER	R.L. Shears Company, P.C. LANDSCAPE ARCHITECT
By(Print)_____	By (Print) Robert L. Shears, ASLA
Signed:_____	Signed:_____
Title:_____	Title: President
Date:_____	Date:_____

ATTACHMENT A
TO
AGREEMENT
BETWEEN
R.L. Shears Company, P.C., LANDSCAPE ARCHITECT
AND
The HBC Group, LLC, DISC GOLF DESIGNER
FOR
Mid-America Park

SCOPE OF SERVICES

The following project understanding and scope of services shall be made a part of the Agreement dated November 13, 2019.

DESCRIPTION OF PROJECT: The City of Midwest City, hereinafter called the OWNER, plans to construct the **Mid-America Park,** hereinafter called the PROJECT, a city park including an inclusive playground; sidewalks; picnic pavilion; prefabricated restrooms; shared-use trail; Disc golf course; natural play area; Disc golf practice area; nature trail with raised overlook; pollinator, sensory, and community gardens, and athletic courts. R.L. Shears Company, P.C., hereinafter called the LANDSCAPE ARCHITECT, has been selected for the landscape architectural design services the PROJECT.

PROJECT UNDERSTANDING: LANDSCAPE ARCHITECT understands that the Mid-America Park Project consists of Conceptual Design, Construction Documents, and Bidding and Construction Phase Services.

SCOPE OF DISC GOLF DESIGNER'S SERVICES: Upon written authorization to proceed for each respective phase, the Basic Services to be performed by the DISC GOLF DESIGNER will consist of the following general items as detailed in the following paragraphs:

CONCEPTUAL DESIGN PHASE

1. Develop course flow layout for best traffic flow and exposure.
2. Minimize and safety concerns with existing or future planned activities on site.
3. Provide for safe distances between disc golf fairways.
4. Determine course distances and pars, as well as any other needed feature (Out of Bounds, mandatory fairway needs, etc.).
5. Provide course map for inclusion in overall project plans.
6. Provide planning budget based on design variables (alternate tees, alternate pin positions, walk bridges or stairs needed in fairways, etc.).

CONSTRUCTION DOCUMENT PHASE

1. Provide construction drawings with typical details needed to complete project build.
2. Provide onsite markings to finalize equipment locations.
3. Provide course signage content and specifications for manufacturing of equipment.
4. Provide vendor contacts for equipment needs.
5. Coordinate with owner for future maintenance needs.

CONSTRUCTION PHASE SERVICES

1. Re-mark course layout in the field. Includes pin/tee locations and marking of foliage removal required.
2. Meet with contractor to review construction methods and procedures.
3. Be onsite for up to 10 working days over 2 site trips.

ATTACHMENT B
TO
AGREEMENT
BETWEEN
R.L. Shears Company, P.C., LANDSCAPE ARCHITECT
AND
The HBC Group, LLC, DISC GOLF DESIGNER
FOR
Mid-America Park

COMPENSATION AND SCHEDULE

The following compensation provisions shall be made a part of the Agreement dated November 13, 2019.

I. PAYMENTS FOR SERVICES AND EXPENSES OF THE DISC GOLF DESIGNER:

The services described herein will be performed and compensated on fixed fee and shown below.

Conceptual Design Phase:	$4,152.00
Construction Document Phase:	$4,152.00
Construction Phase:	$5,404.00
Total:	$13,708.00

AGREEMENT BETWEEN

LANDSCAPE ARCHITECT AND SURVEYOR

THIS AGREEMENT, R.L. Shears Company, P.C. (LANDSCAPE ARCHITECT) and Keystone Engineering and Surveying (SURVEYOR);

W I T N E S S E T H :

WHEREAS, The LANDSCAPE ARCHITECT has entered into an agreement dated November 13, 2019 (Prime Agreement), with the CITY OF MIDWEST CITY (OWNER), to complete design services for Mid-America (PROJECT); and,

WHEREAS, LANDSCAPE ARCHITECT requires certain services in connection with the PROJECT hereinafter referred to as the SERVICES; and,

WHEREAS, SURVEYOR is prepared to provide such SERVICES;

NOW THEREFORE, in consideration of the promises contained in this Agreement, LANDSCAPE ARCHITECT and SURVEYOR agree as follows:

ARTICLE 1 - EFFECTIVE DATE
The effective date of this Agreement shall be November 13, 2019

ARTICLE 2 - GOVERNING LAW
This AGREEMENT shall be governed by the laws of the State of Oklahoma and venue for any action concerning this Agreement shall be in the District Court of Tulsa County, Oklahoma.

ARTICLE 3 - SERVICES TO BE PERFORMED BY SURVEYOR
SURVEYOR shall perform the Services described in Attachment A, Scope of Services. Specifications, drawings, schedules, and other material pertinent to SURVEYOR'S Services under this Agreement will be furnished to SURVEYOR as they become available to LANDSCAPE ARCHITECT.

SURVEYOR recognizes that the Services of LANDSCAPE ARCHITECT and others involved in the Project are dependent upon the timely performance of SURVEYOR'S Services. Unless otherwise provided in this Agreement, SURVEYOR shall perform such Services in the same character, timing, and sequence, as LANDSCAPE ARCHITECT is required to perform the Services under the Prime Agreement. SURVEYOR'S failure to perform in a timely manner shall be considered a material breach of this Agreement.

ARTICLE 4 - COMPENSATION
4.1 Method of Payment. LANDSCAPE ARCHITECT shall pay SURVEYOR in accordance with Attachment B, Compensation.

4.2 Time of Payment. SURVEYOR shall submit periodic statements for Services rendered. If LANDSCAPE ARCHITECT objects to any statement submitted by SURVEYOR, LANDSCAPE ARCHITECT shall so advise SURVEYOR in writing giving reasons therefore within seven days

of receipt of such statement. If no such objection is made, LANDSCAPE ARCHITECT will consider the statement acceptable.

LANDSCAPE ARCHITECT shall bill OWNER on account of SURVEYOR'S Services and shall pay SURVEYOR within fourteen days of the time LANDSCAPE ARCHITECT receives payment from OWNER on account thereof. It is intended that payments to SURVEYOR will be made as OWNER pays LANDSCAPE ARCHITECT. Payments to the SURVEYOR will be reduced by any amounts withheld by the OWNER. Upon the release to LANDSCAPE ARCHITECT of any amount which includes payments due SURVEYOR, LANDSCAPE ARCHITECT will forward to SURVEYOR its portion of such payment.

ARTICLE 5 - STANDARD OF CARE

SURVEYOR shall perform the SERVICES undertaken in a manner consistent with the prevailing accepted standard for similar services with respect to projects of comparable function and complexity, and with the applicable state laws, as well as the specific codes, regulations, design criteria and construction specifications adopted by the owner and other governing policies published and generally considered authoritative by SURVEYOR'S profession that are in effect at the time of performance of these SERVICES. SURVEYOR is obligated to perform professional services in accordance with the foregoing standard with respect to the laws, codes, regulations, design criteria and construction specifications that are applicable pursuant to this AGREEMENT.

ARTICLE 6 - LIABILITY AND INDEMNIFICATION

6.1 Indemnification. SURVEYOR shall defend, indemnify, and hold harmless LANDSCAPE ARCHITECT and Owner from and against all claims, losses, damages, and expenses to the extent such claims, losses, damages, or expenses are caused by or alleged to be caused by any negligent act, intentional act, error, or omission of SURVEYOR or any person or organization for whom SURVEYOR is legally liable.

6.2 Employee Claims. SURVEYOR shall indemnify Owner and LANDSCAPE ARCHITECT against liability for damages arising out of claims by SURVEYOR'S employees. LANDSCAPE ARCHITECT shall indemnify SURVEYOR against liability for damages arising out of claims by LANDSCAPE ARCHITECT'S employees.

6.3 Consequential Damages. LANDSCAPE ARCHITECT shall not be liable to SURVEYOR for any special, indirect, or consequential damages resulting in any way from the performance of the SERVICES such as, but not limited to, loss of use, loss of revenue, or loss of anticipated profits.

6.4 Survival. Upon completion of all Services, obligations, and duties provided for in this Agreement, or in the event of termination of this Agreement for any reason, the terms and conditions of this Article shall survive.

ARTICLE 7 - INDEPENDENT CONTRACTOR

SURVEYOR undertakes performance of the Services as an independent contractor and shall be wholly responsible for the methods of performance. LANDSCAPE ARCHITECT shall be the general administrator and coordinator of SURVEYOR'S Services and shall facilitate the exchange of information among the independent SURVEYORS employed by LANDSCAPE ARCHITECT as necessary for the coordination of their Services. Owner and LANDSCAPE

ARCHITECT shall have the right to observe performance of the Services. All communications shall be through the LANDSCAPE ARCHITECT.

ARTICLE 8 - COMPLIANCE WITH LAWS
In performance of the Services, SURVEYOR shall comply with applicable regulatory requirements including federal, state, and local laws, rules, regulations, orders, codes, criteria, and standards. SURVEYOR shall procure the permits, certificates, and licenses necessary to allow SURVEYOR to perform the Services. SURVEYOR shall not be responsible for procuring permits, certificates, and licenses required for any construction unless such responsibilities are specifically assigned to SURVEYOR in Attachment A, Scope of Services.

ARTICLE 9 - INSURANCE
During the performance of the SERVICES under this AGREEMENT, SURVEYOR shall maintain the following insurance:

(1) General Liability Insurance, with a combined single limit of $1,000,000 for each occurrence and $1,000,000 in the aggregate;

(2) Automobile Liability Insurance, with a combined single limit of not less than $1,000,000 for each person, not less than $1,000,000 for each accident and not less than $1,000,000 for property damage;

(3) Professional Liability Insurance, with a limit of $1,000,000 annual aggregate.

(4) Worker's Compensation Insurance in accordance with statutory requirements and Employers Liability Insurance with limits of not less than $100,000.00 for each occurrence.

SURVEYOR shall furnish LANDSCAPE ARCHITECT certificates of insurance, which shall include a provision that such insurance shall not be canceled without at least thirty (30) days written notice to OWNER. SURVEYOR shall name OWNER and LANDSCAPE ARCHITECT as certificate holders on their certificate of insurance for the PROJECT and shall be required to indemnify OWNER and LANDSCAPE ARCHITECT to the same extent. SURVEYOR shall be held responsible to submit certificates of insurance for sub-consultants to LANDSCAPE ARCHITECT prior to the sub-consultant’s release to commence work.

ARTICLE 10 – LANDSCAPE ARCHITECT’S RESPONSIBILITIES
LANDSCAPE ARCHITECT shall perform the following in a timely manner so as not to delay the Services of SURVEYOR:

(1) Provide criteria and information pertinent to SURVEYOR'S Services as to Owner's and LANDSCAPE ARCHITECT’S requirements for the Project, including design objectives and constraints, space, capacity, and performance requirements, flexibility and expandability, and any budgetary limitations; and furnish copies of all design and construction standards which Owner and LANDSCAPE ARCHITECT will require to be included in the drawings and specifications to be furnished by SURVEYOR under this Agreement, if any.

(2) Make available to SURVEYOR drawings, specifications, schedules, and other information, interpretations, and data which are prepared by LANDSCAPE ARCHITECT, or by others, which LANDSCAPE ARCHITECT knows are reasonably available to SURVEYOR'S responsibilities under this Agreement.

(3) Request Owner to arrange for access to and make all provisions for SURVEYOR to enter upon public and private property as required for SURVEYOR to perform the Services under this Agreement.

(4) Give prompt notice to SURVEYOR whenever LANDSCAPE ARCHITECT observes or otherwise becomes aware of any development that affects the scope or timing of SURVEYOR'S Services.

The information and services to be provided by LANDSCAPE ARCHITECT under this Article will be without cost to SURVEYOR.

ARTICLE 11 - TERMINATION AND SUSPENSION

11.1 This Agreement will terminate automatically upon termination of the Prime Agreement. LANDSCAPE ARCHITECT will promptly notify SURVEYOR of such termination.

11.2 LANDSCAPE ARCHITECT or SURVEYOR upon written notice may terminate this Agreement in the event of substantial failure by the other party to perform in accordance with the terms of this Agreement through no fault of the party initiating the termination. In the event of such termination, SURVEYOR will be paid for the Services performed in accordance with this Agreement to the date of termination.

11.3 LANDSCAPE ARCHITECT may terminate or suspend performance of this Agreement for LANDSCAPE ARCHITECT'S's convenience upon written notice to SURVEYOR. Upon receipt of notice, SURVEYOR shall terminate or suspend performance of the Services on a schedule acceptable to LANDSCAPE ARCHITECT and may submit a statement for the Services performed and reasonable termination or suspension expenses. Upon restart of a suspended project, equitable adjustment shall be made to SURVEYOR'S compensation.

ARTICLE 12 - NONDISCLOSURE OF PROPRIETARY INFORMATION

12.1 SURVEYOR shall consider all information provided by LANDSCAPE ARCHITECT and Owner and all drawings, reports, studies, design calculations, specifications, and other documents resulting from the SURVEYOR'S performance of the Services to be proprietary. The SURVEYOR shall not publish or disclose proprietary information for any purpose other than the performance of the Services without the prior written authorization of LANDSCAPE ARCHITECT.

12.2 The preceding restriction shall not apply to information which is in the public domain, was previously known to SURVEYOR, was acquired by SURVEYOR from others who have no confidential relationship to LANDSCAPE ARCHITECT with respect to same, or which, through no fault of SURVEYOR, comes into the public domain. SURVEYOR shall not be restricted in any way from releasing information, including proprietary information, in response to a subpoena, court order, or other legal process. SURVEYOR shall not be required to resist such subpoena, court order, or legal process, but shall promptly notify LANDSCAPE ARCHITECT in

writing of the demand for information before SURVEYOR responds to such demand. LANDSCAPE ARCHITECT may, at its sole discretion, seek to quash such demand.

ARTICLE 13 - COMMUNICATIONS
Any communication required by this Agreement shall be made in writing to the address specified below:

SURVEYOR:	Keystone Engineering & Surveying 913 Lowry Street Stillwater, Oklahoma 74076 Contact: Carey E. Harris, PLS
LANDSCAPE ARCHITECT:	R.L. Shears Company, P.C. 1522 South Carson Avenue Tulsa, Oklahoma 74119 Contact: Robert Shears ASLA

All project communications shall be made through or with the prior written approval of the LANDSCAPE ARCHITECT. Nothing contained in this Article shall be construed to restrict the transmission of routine communications between representatives of LANDSCAPE ARCHITECT and SURVEYOR.

ARTICLE 14 - DELAY IN PERFORMANCE
Neither LANDSCAPE ARCHITECT nor SURVEYOR shall be considered in default of this Agreement for delays in performance caused by circumstances beyond the reasonable control of the nonperforming party. For purposes of this Agreement, such circumstances include, but are not limited to, abnormal weather conditions; floods; earthquakes; fire; epidemics; war, riots, and other civil disturbances; strikes, lockouts, work slowdowns, and other labor disturbances; sabotage; judicial restraint; and inability to procure permits, licenses, or authorizations from any local, state, or federal agency for any of the supplies, materials, accesses, or services required to be provided by either LANDSCAPE ARCHITECT or SURVEYOR under this Agreement.

Should such circumstances occur the nonperforming party shall, within a reasonable time of being prevented from performing, give written notice to the other party, describing the circumstances preventing continued performance and the efforts being made to resume performance of this Agreement.

ARTICLE 15 - WAIVER
A waiver by either LANDSCAPE ARCHITECT or SURVEYOR of any breach of this Agreement shall be in writing. Such a waiver shall not affect the waiving party's rights with respect to any other or further breach.

ARTICLE 16 - SEVERABILITY
The invalidity, illegality, or unenforceability of any provision of the Agreement or the occurrence of any event rendering any portion or provision of this Agreement void shall in no way affect the validity or enforceability of any other portion or provision of this Agreement. Any void provision shall be deemed severed from this Agreement, and the balance of this Agreement shall be construed and enforced as if this Agreement did not contain the particular portion or provision

held to be void. LANDSCAPE ARCHITECT and SURVEYOR further agree to amend this Agreement to replace any stricken provision with a valid provision. The provisions of this Article shall not prevent this entire Agreement from being void should a provision, which is of the essence of this Agreement, be determined void.

ARTICLE 17 - INTEGRATION
This Agreement represents the entire and integrated agreement between the LANDSCAPE ARCHITECT and SURVEYOR. It supersedes all prior and contemporaneous communications, representations, and agreements, whether oral or written, relating to the subject matter of this Agreement. Only a written instrument signed by both the LANDSCAPE ARCHITECT and SURVEYOR may amend this Agreement.

ARTICLE 18 - SUBCONTRACTING
SURVEYOR shall not employ independent SURVEYORS, associates, or subcontractors to assist in the performance of SURVEYOR'S Services without the prior written consent of LANDSCAPE ARCHITECT.

ARTICLE 19 - SUCCESSORS AND ASSIGNS
LANDSCAPE ARCHITECT and SURVEYOR each binds itself and its directors, officers, partners, successors, executors, administrators, assigns, and legal representatives to the other party to this Agreement and to the directors, officers, partners, successors, executors, administrators, assigns, and legal representatives of such other party, in respect to all provisions of this Agreement.

ARTICLE 20 - ASSIGNMENTS
SURVEYOR shall not assign any rights or duties under this Agreement without the prior written consent of LANDSCAPE ARCHITECT. Unless otherwise stated in the written consent to an assignment, no assignment will release or discharge the SURVEYOR from any obligation under this Agreement.

ARTICLE 21 - THIRD PARTY RIGHTS
Nothing in this Agreement shall be construed to give any rights or benefits to anyone other than Owner, LANDSCAPE ARCHITECT, and SURVEYOR.

ARTICLE 23 – NOT USED

ARTICLE 24 - IMMIGRATION COMPLIANCE

24.1 SURVEYOR shall demonstrate that he:

24.1.1 Has complied, and shall at all times during the term of this Contract, comply in all respects with all immigration-related laws, statutes, ordinances and regulations including without limitation, the Immigration and Nationality Act, as amended, the Immigration Reform and Control Act of 1986, as amended, and the Oklahoma Taxpayer and Citizen Protection Act of 2007 (Oklahoma HB 1804) and any successor laws, ordinances or regulations (collectively, the Immigration Laws"); and

24.1.2 Has properly maintained, and shall at all times during the term of this Agreement, maintain any and all employee records required by the U.S. Department of Homeland Security

("DHS"), including, without limitation, properly completed and maintained Form I-9s for each of the Consultant's employees; and

24.1.3 Has verified the employment eligibility for all employees hired on or after July 1, 2008 through DHS's E-Verify system, and shall at all times continue to verify the employment eligibility of all employees hired during the term of this Contract; and

24.1.4 Has required, and will at all times during the term of this Contract, require any sub-contractor utilized, hired or sub-contracted for by SURVEYOR for the completion or undertaking of any duties, tasks or responsibilities under this Agreement, to comply the requirements and obligations imposed by the Immigration Laws and set forth in Paragraph (I), parts (a), (b) and (c), above, with regards to each of the sub-consultant's employees.

24.2 SURVEYOR will indemnify, defend and hold harmless LANDSCAPE ARCHITECT against any loss, cost, liability, expense (including, without limitation, costs and expenses of litigation and reasonable attorney's fees) demands, claims, actions, causes of action, liabilities, suits, damages, including special and consequential damages that arise from or in connection with, directly or indirectly, SURVEYOR's failure, deliberate or negligent, to fulfill its obligations and representations regarding verifying the employment eligibility of its employees and the employees of any subcontractor utilized by SURVEYOR as set forth more fully in Paragraph 24.1 above.

IN WITNESS WHEREOF, LANDSCAPE ARCHITECT and SURVEYOR have executed this Agreement.

Keystone Engineering & Surveying SURVEYOR	R.L. Shears Company, P.C. LANDSCAPE ARCHITECT
By (Print) Carey E. Harris	By (Print) Robert L. Shears, ASLA
Signed:	Signed:
Title:	Title: President
Date:	Date:

ATTACHMENT A
TO
AGREEMENT
BETWEEN
R.L. Shears Company, P.C., LANDSCAPE ARCHITECT
AND
KEYSTONE ENGINEERING AND SURVEYING, SURVEYOR
FOR
Mid-America Park

SCOPE OF SERVICES

The following project understanding and scope of services shall be made a part of the Agreement dated November 13, 2019

DESCRIPTION OF PROJECT: The Oklahoma Department of Transportation, hereinafter called the OWNER, plans to construct the **Mid-America Park,** hereinafter called the PROJECT. R.L. Shears Company, P.C., hereinafter called the LANDSCAPE ARCHITECT, has been selected for the landscape architectural design services the PROJECT.

PROJECT UNDERSTANDING: LANDSCAPE ARCHITECT understands that the **Mid-America Park Project** consists of three design phases Preliminary Plans (60%), Final Plans for Review (90%), Final Plans (100%).

SCOPE OF PROJECT: The project scope includes conceptual design and construction documents for improvements to Mid-America Park including an inclusive playground; sidewalks; picnic pavilion; prefabricated restrooms; shared-use trail; disc golf course; natural play area; disc golf practice area; nature trail with raised overlook; pollinator, sensory, and community gardens, and athletic courts. Conceptual Design drawings will be developed to include all improvements to the park. The Conceptual Design will include topographic survey and schematic design of the park and disc golf course improvements.

In order to accommodate project phasing, 2 separate sets of Construction Documents will be developed. Construction Documents will include 3 phases and 2 separate bid packages. The phase 1 bid package will include the inclusive playground, disc golf practice area, restrooms, pavilion, sidewalks, shared-use trail, vehicular parking, and drainage improvements. The phase 2 bid package will include the disc golf course, nature trail and overlook, and a natural playground area and associated vehicular parking located in the southwest corner of the park. The phase 2 package will also include conceptual design for the athletic courts and 2nd pavilion.

SCOPE OF SURVEYING SERVICES:

The following scope of services shall be made a part of the Agreement.

TOPOGRAPHIC SURVEY

1. Establish Horizontal and Vertical Control outside of work zone, every 500'
   - Control will be provided on NAD 83 (2011) for horizontal and NAVD 88 for vertical.
2. Boundary Survey
   - Locate enough property corners to accurately tie down certified plats and R/W's as filed at the County Clerk's office.
   - Show existing easements off said plats
3. Miscellaneous Items
   - OKIE One-call to locate underground utilities
   - Current parcel ownership information provided by county assessor.
   - Trees 8" diameter and larger

All data will be delivered in AutoCAD Civil 3D file format, unless otherwise requested and utilizing Keystone surveying and CAD standards. All work will be performed for a lump sum basis.

ATTACHMENT B
TO
AGREEMENT
BETWEEN
R.L. Shears Company, P.C., LANDSCAPE ARCHITECT
AND
KEYSTONE ENGINEERING AND SURVEYING, SURVEYOR
FOR
Mid-America Park

COMPENSATION AND SCHEDULE

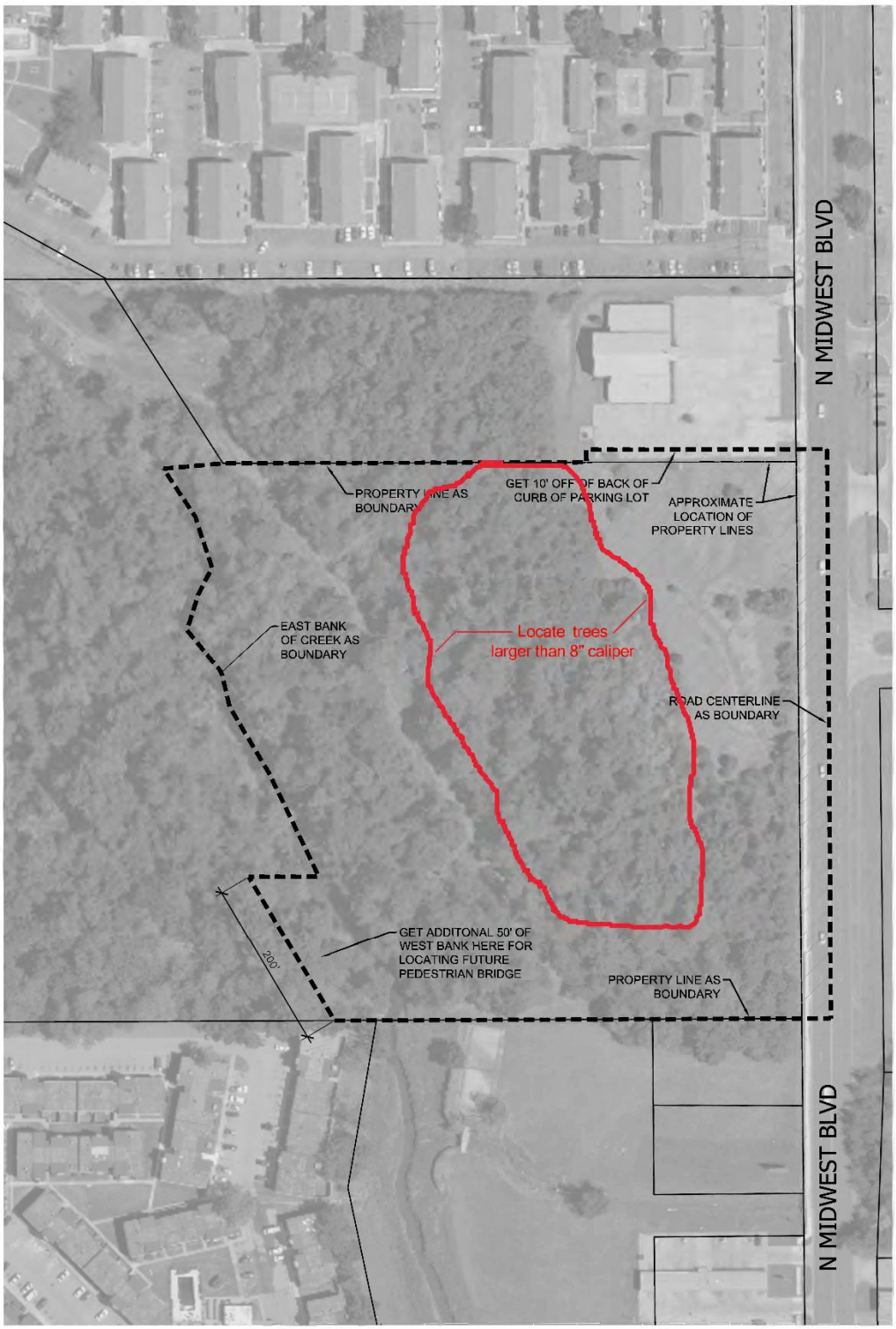
The following compensation provisions shall be made a part of the Agreement dated November 13, 2019

I. PAYMENTS FOR SERVICES AND EXPENSES OF THE SURVEYOR:

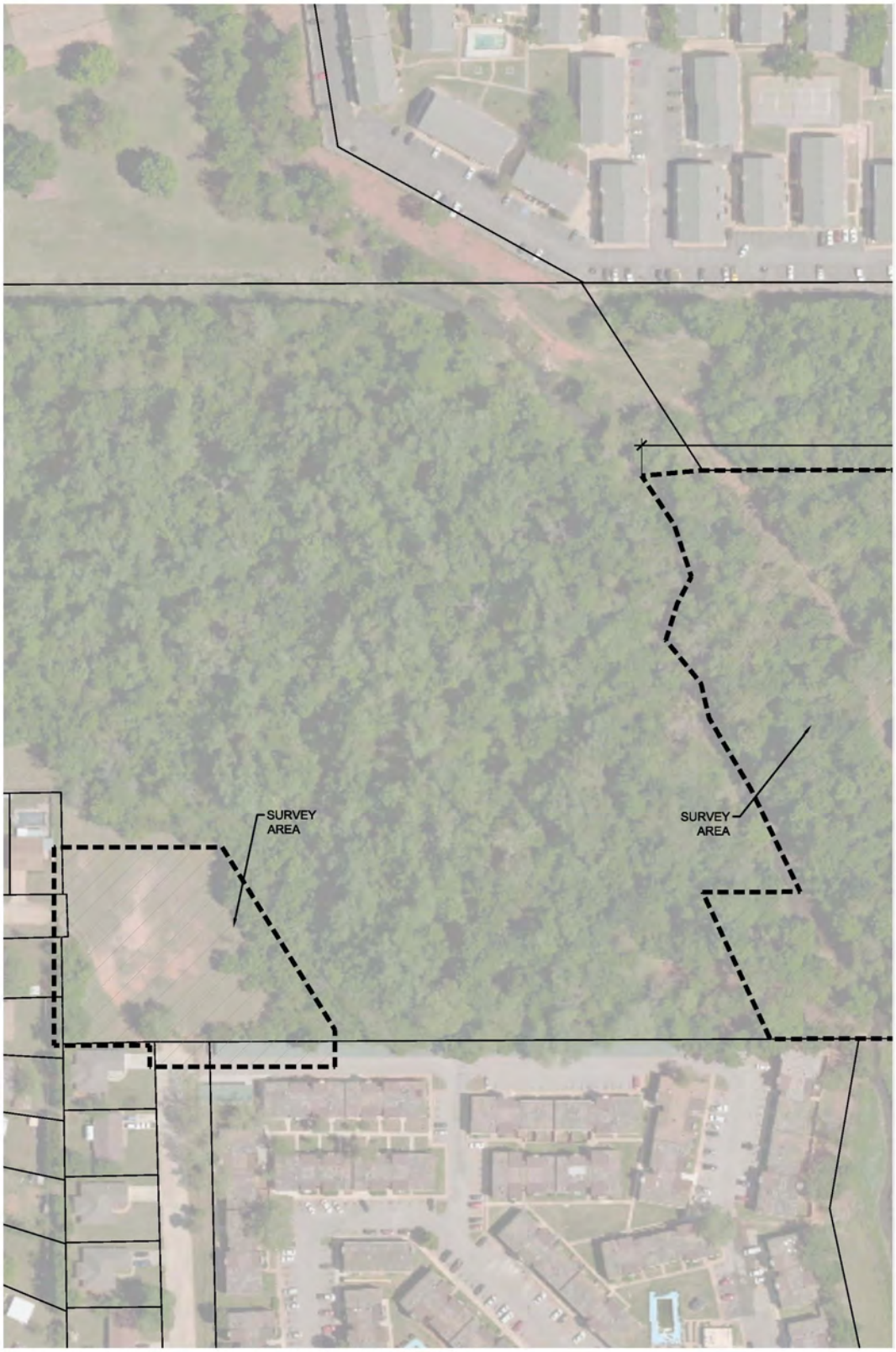
The services described herein will be performed and compensated on fixed fee and shown below.

FIXED FEE: $13,300.00

EXIHIBIT 1 - SURVEY AREA LIMITS



MIDWEST CITY MID-AMERICA PARK
SURVEY AREA EXHIBIT



MIDWEST CITY MID-AMERICA PARK
SURVEY AREA EXHIBIT 2

The City Of Midwest City
Neighborhood Services Department

Neighborhoods in Action • Code Enforcement • Neighborhood Initiative
8726 SE 15th Street, Midwest City, OK 73110
(405) 739-1005

Date: November 12, 2019

To: Honorable Mayor and City Council

From: Mike S. Stroh, Neighborhood Services Director

Subject: Public hearing with discussion and consideration of a resolution declaring the structure located at 1205 Loftin Drive, a dilapidated building as defined in Title 11 Oklahoma State Statutes Section 22-112(C) (1) and setting dates to demolish and remove the structure from the site.

Title 11 Section 22-112 (C) (1) of Oklahoma State Statutes defines a dilapidated building as:

a. a structure which through neglect or injury lacks necessary repairs or otherwise is in a state of decay or partial ruin to such an extent that the structure is a hazard to the health, safety, and welfare of the general public,
b. a structure which is unfit for human occupancy due to the lack of necessary repairs and is considered uninhabitable or is a hazard to the health, safety, and welfare of the general public,
c. a structure which is determined by the municipal governing body or administrative officer of the municipal governing body to be an unsecured building, as defined by Section 22-112.1 of this title, more than three times within any twelve-month period,
d. a structure which has been boarded and secured, as defined by Section 22-112.1 of this title, for more than eighteen (18) consecutive months, or
e. a structure declared by the municipal governing body to constitute a public nuisance;

1. The property is vacant, the exterior of the structure has not been maintained over a long period of time and is the property is a public nuisance.

2. The deteriorating condition of the structure is a safety hazard due to broken windows, open and unsecured doors, and an unfinished addition which is compromising the integrity of the structure's structural condition.

3. The last time there was an established utility account for this address with the City was August 2011.

4. The owner of record passed in 1993.

The structure meets the definition of a dilapidated building as defined in Title 11 Oklahoma State Statute Section 22-112 (C) (1) and has become detrimental to the health, safety and welfare of the general public.

If the council concurs with staff's opinion and finds that a nuisance does in fact exist, staff recommends requiring ten (10) days within which someone with the proper authority to act on behalf of the owner must begin demolition and thirty (30) days for someone with the proper authority to act on behalf of the property owner to complete the removal of the structure.

Mike S. Stroh

Mike S. Stroh, Neighborhood Services Director

RESOLUTION NO. 2019-_____

A RESOLUTION DECLARING THE STRUCTURE LOCATED AT 1205 LOFTIN DRIVE A DILAPIDATED BUILDING AS DEFINED IN TITLE 11 OKLAHOMA STATE STATUTE SECTION 22-112(C); AND SETTING DATES TO DEMOLISH AND REMOVE THE STRUCTURE FROM THE SITE

WHEREAS, Title 11 Oklahoma State Statute Section 22-112 (C) establishes procedures for declaring and abating a public nuisance within the corporate limits of Midwest City; and

WHEREAS, the City Council of the City of Midwest City, after proper notice was mailed to the property owner at the address indicated in the County Assessor's records and notice was posted at the property, conducted a public hearing regarding the structure located at 1205 LOFTIN DRIVE; and

WHEREAS, during the hearing the City Council reviewed the information on the condition of the property; and

WHEREAS, notice of the hearing was mailed to the property owner at the address indicated in the County Assessor's record by regular mail and posting pursuant to Title 11 Oklahoma State Statute Section 22-112 (1);

NOW, THEREFORE, BE IT RESOLVED BY THE COUNCIL OF THE CITY OF MIDWEST CITY, OKLAHOMA COUNTY, OKLAHOMA:

That the property located at 1205 LOFTIN DRIVE is dilapidated and has become detrimental to the health, safety, or welfare of the general public and the community, and/or if the property creates a fire hazard which is dangerous to other property;

That someone with the proper authority to act on behalf of the property owner must begin to demolish and remove the structure from the site located at 1205 LOFTIN DRIVE within a reasonable time of the date of this resolution i.e.10 days of the date of this resolution and have the repairs or demolition completed within 30 days of the date of this resolution. If someone with the proper authority to act on behalf of the property owner fails to demolish and remove the structure within 30 days of the date of this resolution, the City Council hereby directs the city manager to remove and abate the public nuisance and charge the abatement to someone with the proper authority to act on behalf of the owner of the property.

PASSED AND APPROVED by the Mayor and Council of the City of Midwest City, Oklahoma this 12th day of November, 2019.

CITY OF MIDWEST CITY, OKLAHOMA

_____
MATTHEW D. DUKES II, Mayor

ATTEST:

_____
SARA HANCOCK, City Clerk

APPROVED: as to form and legality this 12th day of November, 2019.

_____
HEATHER POOLE, City Attorney


2019-10-28 11:08:11 AM


2019-10-28 11:08:34


2019-10-28 11:09:54


2019-10-28 11:10:06 AM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2019-10-28 11:14:35 AM

City Manager
100 N. Midwest Boulevard
Midwest City, OK 73110
tlyon@midwestcityok.org
Office: 405.739.1201
www.midwestcityok.org

MEMORANDUM

TO: Honorable Mayor and Council

FROM: Tim Lyon, City Manager

DATE: November 12, 2019

SUBJECT: Discussion and Consideration approving Amendment No. 1 to the construction management contract with CMS Willowbrook, Inc. for the Reed Conference Center 2019 Renovations for additional meeting room space in an amount not to exceed $797,916.35.

On May 14th, the Council Approved a construction management contract with CMS Willowbrook, Inc., for an addition to the Reed Conference Center and the property improvement plan and brand conversion of the Midwest City Sheraton Hotel.

We are proposing to glass in the south patio in order to create approximately 2,300 square feet of additional meeting room space. The Reed Center has multiple groups who rent the entire facility and need this additional meeting room space to continue using our facility. One example of these groups is Tinker in the Primes.

CMS Willowbrook has gone out to bid and is asking for the attached Amendment No. 1 (Base Bid Plus Alternate 2) to be approved by the Council. Included in the contract is the guaranteed maximum price not to exceed of $797,916.35, subject to additions and deductions by Change Order as provided in the Contract Documents. The bid tabs are listed in the attachment.

Funds are a part of the construction budget and will be made available through a revenue bond.

Tim L. Lyon

TIM LYON, City Manager

AIA® Document A133™ – 2009 Exhibit A

Guaranteed Maximum Price Amendment

for the following PROJECT:
(Name and address or location)

November 12, 2019
Amendment No. 1 – (Base Bid plus Alternate 2)

Reed Conference Center
2019 Renovations

THE OWNER:
(Name, legal status and address)

City of Midwest City
100 N. Midwest Blvd
Midwest City, Oklahoma 73110

THE CONSTRUCTION MANAGER:
(Name, legal status and address)

CMSWillowbrook, Inc.
3108 S. 9th Street
Oklahoma City, Oklahoma 73105

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

AIA Document A201™–2007, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

ARTICLE A.1
§ A.1.1 Guaranteed Maximum Price
Pursuant to Section 2.2.6 of the Agreement, the Owner and Construction Manager hereby amend the Agreement to establish a Guaranteed Maximum Price. As agreed by the Owner and Construction Manager, the Guaranteed Maximum Price is an amount that the Contract Sum shall not exceed. The Contract Sum consists of the Construction Manager's Fee plus the Cost of the Work, as that term is defined in Article 6 of this Agreement.

§ A.1.1.1 The Contract Sum is guaranteed by the Construction Manager not to exceed Seven Hundred Ninety-seven Thousand, Nine Hundred Sixteen Dollars and Thirty-five Cents ($ 797,916.35), subject to additions and deductions by Change Order as provided in the Contract Documents.

§ A.1.1.2 Itemized Statement of the Guaranteed Maximum Price. Provided below is an itemized statement of the Guaranteed Maximum Price organized by trade categories, allowances, contingencies, alternates, the Construction Manager's Fee, and other items that comprise the Guaranteed Maximum Price.
(Provide below or reference an attachment.)

See Exhibit A, Attachment No. 1 – Detail of Clarifications, Assumptions, Allowances

§ A.1.1.3 The Guaranteed Maximum Price is based on the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:

(State the numbers or other identification of accepted alternates. If the Contract Documents permit the Owner to accept other alternates subsequent to the execution of this Amendment, attach a schedule of such other alternates showing the amount for each and the date when the amount expires.)

Alternates NOT included in the GMP and will expire Thursday, November 28, 2019 are:
Alternate No. 1: Floor Receptacles

§ A.1.1.4 Allowances included in the Guaranteed Maximum Price, if any:
(Identify allowance and state exclusions, if any, from the allowance price.)

Item	Price ($0.00)
Structural Steel	$15,000.00
Flooring	$20,000.00
Signage	$500.00
Floor Boxes	$15,000.00
MEP	$5,000.00
Misc. Steel	$2,000.00
Roofing & Sealants	$3,000.00
Clean Glass	$2,000.00
Patch/Repair Finishes	$7,500.00
Sod/Landscaping	$4,500.00
Protect Existing	$4,000.00
Wood Trim	$2,500.00
Pocket Doors	$3,500.00
Access Panels	$1,500.00
Testing	$1,000.00

§ A.1.1.5 Assumptions, if any, on which the Guaranteed Maximum Price is based:

See Attachment No. 5 – Assumptions and Clarifications

§ A.1.1.6 The Guaranteed Maximum Price is based upon the following Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
Specification Book	Project Manual	September 2019	All
Addendum	No. 1	October 23, 2019	All
Clarification	No. 1	October 28, 2019	All
Clarification	No. 2	October 29, 2019	All

§ A.1.1.7 The Guaranteed Maximum Price is based upon the following Specifications:
(Either list the Specifications here, or refer to an exhibit attached to this Agreement.)

See Attachment No. 2 – Index of Documents and Drawings

Section	Title	Date	Pages

§ A.1.1.8 The Guaranteed Maximum Price is based upon the following Drawings:
(Either list the Drawings here, or refer to an exhibit attached to this Agreement.)

See Attachment No. 2 – Index of Documents and Drawings

Number	Title	Date

§ A.1.1.9 The Guaranteed Maximum Price is based upon the following other documents and information:
(List any other documents or information here, or refer to an exhibit attached to this Agreement.)

See Attachment No. 3 – Recommendation of Bids
See Attachment No. 4 – Bid Qualifications

ARTICLE A.2
§ A.2.1 The anticipated date of Substantial Completion established by this Amendment:

June 30, 2020

OWNER *(Signature)*	**CONSTRUCTION MANAGER** *(Signature)*
Matt Dukes, Mayor *(Printed name and title)*	Cary DeHart, CEO *(Printed name and title)*
OWNER *(Signature)*	**OWNER** *(Signature)*
Sara Hancock, City Clerk *(Printed name and title)*	Heather Poole, City Attorney *(Printed name and title)*

BID PACKAGE	DESCRIPTION	BASE BID	ALTERNATE 1 FLOOR BOXES	ALTERNATE 2 LIGHT FIXTURES	TOTAL (BASE BID + ALTERNATE 2)	CONTRACTOR	NOTES
	General Requirements	$ 24,539.00	$ -	$ -	$ 24,539.00		
	General Conditions	$ 98,261.00	$ -	$ -	$ 98,261.00		
1	Demolition	$ 21,500.00	$ -	$ -	$ 21,500.00	Howard Construction Services LLC	
2	Concrete	$ 43,830.00	$ -	$ -	$ 43,830.00	Discovery Construction Co., Inc	
3	Structural Steel	$ 15,000.00	$ -	$ -	$ 15,000.00	ALLOWANCE	#1
4	Rough Carpentry	$ 9,500.00	$ -	$ -	$ 9,500.00	CMSWillowbrook Inc	
5	Glass & Glazing	$ 148,585.00	$ -	$ -	$ 148,585.00	Advantage Glass LLC	
6	Framing, Drywall & Ceilings	$ 14,330.00	$ -	$ 250.00	$ 14,580.00	Wiljo Interiors Inc	
7	Flooring - Allowance	$ 20,000.00	$ -	$ -	$ 20,000.00	ALLOWANCE	#1
8	Painting	$ 7,200.00	$ -	$ -	$ 7,200.00	Advanced Commercial Painting LLC	
9	Signage	$ 500.00	$ -	$ -	$ 500.00	ALLOWANCE	#1
10	Operable Partitions	$ 17,120.00	$ -	$ -	$ 17,120.00	Murray Womble Inc	#2
11	Window Treatments	$ 19,880.00	$ -	$ -	$ 19,880.00	Russell Interiors	
12	Fire Suppression	$ 13,930.00	$ -	$ -	$ 13,930.00	Mac Systems Inc	
13	Mechanical	$ 83,000.00	$ -	$ -	$ 83,000.00	Nicoma Park Sheet Metal & Air Conditioning Co., Inc	
14	Electrical	$ 143,000.00	$ 31,500.00	$ (30,000.00)	$ 113,000.00	Advanced Quality Electric Inc	
	Allowance - Floor Boxes	$ 15,000.00	$ -	$ -	$ 15,000.00		
	Allowance - MEP	$ 5,000.00	$ -	$ -	$ 5,000.00		#1
	Allowance - Misc. Steel	$ 2,000.00	$ -	$ -	$ 2,000.00		#1
	Allowance - Roofing & Sealants	$ 3,000.00	$ -	$ -	$ 3,000.00		#1
	Allowance - Clean Glass	$ 2,000.00	$ -	$ -	$ 2,000.00		#1
	Allowance - Patch/Repair Finishes	$ 7,500.00	$ -	$ -	$ 7,500.00		#1
	Allowance - Sod/Landscaping	$ 4,500.00	$ -	$ -	$ 4,500.00		#1
	Allowance - Protect Existing	$ 4,000.00	$ -	$ -	$ 4,000.00		#1
	Allowance - Wood Trim	$ 2,500.00	$ -	$ -	$ 2,500.00		#1
	Allowance - Pocket Doors	$ 3,500.00	$ -	$ -	$ 3,500.00		#1
	Allowance - Access Panels	$ 1,500.00	$ -	$ -	$ 1,500.00		#1
	Allowance - Testing	$ 1,000.00	$ -	$ -	$ 1,000.00		#1
						Bid Recommendations	#3
	Subtotal	$ 731,675.00	$ 31,500.00	$ (29,750.00)	$ 701,925.00		
	CM Contingency	$ 36,583.75	$ 1,575.00	$ (1,487.50)	$ 35,096.25		
	Bonds	$ 7,067.98	$ 304.29	$ (287.39)	$ 6,780.60		
	Builders Risk Insurance	$ 3,101.31	$ 133.52	$ (126.10)	$ 2,975.21		
	General Liability Insurance	$ 6,227.42	$ 268.10	$ (253.21)	$ 5,974.22		
	Subtotal	$ 784,655.46	$ 33,780.91	$ (31,904.19)	$ 752,751.27		
	CM Fee	$ 47,079.33	$ 2,026.85	$ (1,914.25)	$ 45,165.08		
	TOTAL ESTIMATED CONSTRUCTION COST	$ 831,734.79	$ 35,807.76	$ (33,818.44)	$ 797,916.35	<<<<<< GMP (Base Bid + Alt. 2)	#4
	Pre-Construction Fee (Not included in GMP)	$ 8,317.35	$ 358.08	$ (338.18)	$ 7,979.16		

Note #1: Final costs that are under/over this allowance will increase/decrease the CM's contingency amount. Any remaining portion of the CM's contingency will be returned to the Owner by a deduct chang order at the end of the project.

Note #2: Bid qualifications

Note #3: The bids have been solicited on the basis of award within 30 days.

Note #4: This GMP excludes A/E fee, CM Pre-construction fee, Owner Contingency, FF&E, sales tax, 3rd party commissioning of mechanical or electrical systems, items provided by Owner, any requirements by the Authority Having Jurisdiction that are not specifically depicted or indicated on the Contract Documents, temprorary & permanent utility cost during construction start-up, test and occupy the building.

Reed Conference Center 2019 Renovations

Exhibit "A"

SUMMARY OF FUNDS AS ISSUED TO CMSWILLOWBROOK

(Includes all approved change orders)

	DATE		AMOUNT		EXTENDED AMOUNT
Pre-Construction Fee	11/12/19	$	7,979.16	$	7,979.16
Amendment No. 1 - 2019 Renovations (Base Bid + Alternate 2)	11/12/19				
GENERAL REQUIREMENTS		$	24,539.00		
GENERAL CONDITIONS		$	98,261.00		
Bid Package #1 - Demolition - Howard Construction Services LLC		$	21,500.00		
Bid Package #2 - Concrete - Discovery Construction Co., Inc		$	43,830.00		
Bid Package #3 - Structural Steel (Mat'l & Erection) - ALLOWANCE		$	15,000.00		
Bid Package #4 - Rough Carpentry - CMSWillowbrook, Inc.		$	9,500.00		
Bid Package #5 - Glass & Glazing - Advantage Glass LLC		$	148,585.00		
Bid Package #6 - Framing, Drywall & Ceilings - Wiljo Interiors Inc.		$	14,580.00		
Bid Package #7 - Flooring - ALLOWANCE		$	20,000.00		
Bid Package #8 - Painting - Advanced Commercial Painting LLC		$	7,200.00		
Bid Package #9 - Signage - ALLOWANCE		$	500.00		
Bid Package #10 - Operable Partitions - Murray Womble Inc		$	17,120.00		
Bid Package #11 - Window Treatments - Russell Interiors Inc		$	19,880.00		
Bid Package #12 - Fire Suppression - Mac Systems Inc		$	13,930.00		
Bid Package #13 - Mechanical - Nicoma Park Sheet Metal & Air Conditioning Co., Inc.		$	83,000.00		
Bid Package #14 - Electrical - Advanced Quality Electric		$	113,000.00		
Allowance - Floor Boxes		$	15,000.00		
Allowance - MEP		$	5,000.00		
Allowance - Misc. Steel		$	2,000.00		
Allowance - Roofing & Sealants		$	3,000.00		
Allowance - Clean Glass		$	2,000.00		
Allowance - Patch/Repair Finishes		$	7,500.00		
Allowance - Sod/Landscaping		$	4,500.00		
Allowance - Protect Existing		$	4,000.00		
Allowance - Wood Trim		$	2,500.00		
Allowance - Pocket Doors		$	3,500.00		
Allowance - Access Panels		$	1,500.00		
Allowance - Testing		$	1,000.00		
CM Contingency		$	35,096.25		
Bonds		$	6,780.60		
Builders Risk Insurance		$	2,975.21		
General Liability Insurance		$	5,974.22		
CM Fee		$	45,165.08		
		$	797,916.35	$	805,895.51

INDEX OF DOCUMENTS AND DRAWINGS

SPECIFICATIONS, dated September 2019, consisting of:

Table of Contents (TOC)

Construction Manager TOC consisting of: Division 0 – Contract and Bidding Documents

Architectural TOC consisting of: Division 1 through 12

Mechanical/Electrical Engineer TOC consisting of: Division 23 and 26

PLANS, dated September 25, 2019, consisting of:

ARCHITECTURE

A-100	Title Sheet
A-101	Site Plan
A-102	First Floor Plan
A-103	Foundation Plan
A-104	Exterior Elevations & Wall Sections
A-105	Reflected Ceiling Plan
A-106	Partial Roof Plan & Partial 2nd Floor Plan
A-107	Exterior Aluminum Storefronts, Room Finish Schedules, Product Legend Code

MEP

E-1	Electrical Cover Sheet
E-2	Electrical Floor Plan
E-3	Electrical System Details
M-1	Mechanical Plan

ADDENDUM

Addendum No 1, dated October 23, 2019
Clarification No 1, dated October 28, 2019
Clarification No 2, dated October 29, 2019

END OF SECTION

Reed Conference Center
2019 Renovations
Bid Recommendations

BID RECOMMENDATIONS (Base Bid + Alternate 2)

Sealed bids were opened and read aloud in accordance with the Advertisement for Bids at 2:00 PM on October 29, 2019 for the following:

BIDDER NAME	Base Bid	Alt 1 - Floor Receptacles	Alt 2 - Lighting Fixtures	Total
1 - DEMOLITION				
Howard Construction Services LLC	$ 21,500.00			$ 21,500.00
Total Demolition Services LLC	$ 24,722.00			$ 24,722.00
Midwest Wrecking Co.	$ 28,635.00			$ 28,635.00
M&M Wrecking Inc	$ 32,900.00			$ 32,900.00
RECOMMENDATION: Award the base bid to the low responsible bidder, Howard Construction Services LLC, for a total amount of $21,500.00.				
2 - CONCRETE				
Discovery Construction Co., Inc	$ 43,830.00			$ 43,830.00
CMSWillowbrook	$ 47,770.00	$ 1,275.00		$ 49,045.00
RECOMMENDATION: Award the base bid to the low responsible bidder, Discovery Construction Co., Inc., for a total amount of $43,830.00.				
3 - STRUCTURAL STEEL (Matls & Install)				
No bids received				
Title 61; Section 119.1 Certain Contract to be Negotiated When No Bid is Received; Subsection A states; If no timely bid is received after bid notices have been published on any proposed public construction contract which does not exceed Fifty Thousand Dollars ($50,000.00): 1. The governing body of a county, city, town or school district may direct its employees or agents to negotiate the contract with a prospective contractor.				
RECOMMENDATION: No bids were received on this package. As per Title 61, Section 119.1, the Owner may negotiate up to $50,000.00; therefore, we recommend receiving solicitations of competitive quotes for procurement of this bid package.				
4 - ROUGH CARPENTRY				
CMSWillowbrook Inc	$ 9,500.00			$ 9,500.00
Red Mountain Company	$ 12,800.00			$ 12,800.00
RECOMMENDATION: Award the base bid to the low responsible bidder, CMSWillowbrook, Inc., for a total amount of $9,500.00.				
5 - GLASS & GLAZING				
Advantage Glass LLC	$ 148,585.00			$ 148,585.00
Associated Glass Company	$ 179,600.00			$ 179,600.00
RECOMMENDATION: Award the base bid to the low responsible bidder, Advantage Glass LLC, for a total amount of $148,585.00.				

Reed Conference Center
2019 Renovations
Bid Recommendations

BID RECOMMENDATIONS (Base Bid + Alternate 2)

Sealed bids were opened and read aloud in accordance with the Advertisement for Bids at 2:00 PM on October 29, 2019 for the following:

BIDDER NAME	Base Bid	Alt 1 - Floor Receptacles	Alt 2 - Lighting Fixtures	Total
6 - FRAMING, DRYWALL & CEILINGS				
WilJo Interiors Inc	$ 14,330.00		$ 250.00	$ 14,580.00
Midwest Commercial LLC	$ 28,474.00			$ 28,474.00
RECOMMENDATION: Award the base bid plus alternate 2 to the low responsible bidder, Wiljo Interiors Inc., for a total amount of $14,580.00.				
7 - FLOORING				
FloorCo Inc	$ 29,841.00	$ 200.00		$ 30,041.00
Andeco Flooring & Blinds	$ 29,900.00			$ 29,900.00
Bryans Flooring,LLC	$ 30,755.00			$ 30,755.00
Title 61; Section 119 **Rejection of Bids;** By majority action of the governing board of the awarding public agency or the chief administrating officer of an awarding public agency without a governing board, the awarding public agency shall have the right to reject any or all bids and solicit bidders again as herein provided if, in the opinion of the governing body of the public agency, the best interests of the people of the State of Oklahoma would be best served by so doing.				
RECOMMENDATION: Reject all bids for this bid package. Establish an allowance of $20,000.00 for this scope of work.				
8 - PAINTING				
Advanced Commercial Painting LLC	$ 7,200.00			$ 7,200.00
RECOMMENDATION: Award the base bid to the low responsible bidder, Advanced Commercial Painting LLC, for a total amount of $7,200.00.				
9 - SIGNAGE				
No bids received				
Title 61; Section 119.1 Certain Contract to be Negotiated When No Bid is Received; Subsection A states; If no timely bid is received after bid notices have been published on any proposed public construction contract which does not exceed Fifty Thousand Dollars ($50,000.00): 1. The governing body of a county, city, town or school district may direct its employees or agents to negotiate the contract with a prospective contractor.				
RECOMMENDATION: No bids were received on this package. As per Title 61, Section 119.1, the Owner may negotiate up to $50,000.00; therefore, we recommend receiving solicitations of competitive quotes for procurement of this bid package.				
10 - OPERABLE PARTITIONS				
Murray Womble Inc	$ 17,120.00			$ 17,120.00
Best Companies Inc	$ 21,659.00			$ 21,659.00
RECOMMENDATION: Award the base bid to the low responsible bidder, Murray Womble Inc., for a total amount of $17,120.00.				
11 - WINDOW TREATMENT				
Russell Interiors Inc	$ 19,880.00			$ 19,880.00
Contract Drapery & Blind Inc	$ 20,954.00			$ 20,954.00
RECOMMENDATION: Award the base bid to the low responsible bidder, Russell Interiors Inc., for a total amount of $19,880.00.				

Reed Conference Center
2019 Renovations
Bid Recommendations

BID RECOMMENDATIONS (Base Bid + Alternate 2)

Sealed bids were opened and read aloud in accordance with the Advertisement for Bids at 2:00 PM on October 29, 2019 for the following:				
BIDDER NAME	**Base Bid**	**Alt 1 - Floor Receptacles**	**Alt 2 - Lighting Fixtures**	**Total**
12 - FIRE SUPPRESSION				
Mac Systems Inc	$ 13,930.00			$ 13,930.00
Frazier Fire LLC (OKC)	$ 17,309.00			$ 17,309.00
RECOMMENDATION: Award the base bid to the low responsible bidder, Mac Systems Inc., for a total amount of $13,930.00.				
13 - MECHANICAL				
Nicoma Park Sheet Metal & Air Conditioning Co., Inc	$ 83,000.00			$ 83,000.00
DeHart Air Conditioning & Electronics Inc	$ 88,700.00			$ 88,700.00
SE Hardesty Co., dba Hardesty Team	$ 91,669.00			$ 91,669.00
Air Engineering Inc	$ 93,704.00			$ 93,704.00
Waggoners Heating & Air Conditioning Inc	$ 96,173.00			$ 96,173.00
RECOMMENDATION: Award the base bid to the low responsible bidder, Nicoma Park Sheet Metal & Air Conditioning Inc., for a total amount of $83,000.00.				
14 - ELECTRICAL				
Advanced Quality Electric Inc	$ 143,000.00	$ 31,500.00	$ (30,000.00)	$ 113,000.00
Metro Tech Electrical Contractors Inc	$ 159,000.00	$ 25,800.00	$ (37,700.00)	$ 147,100.00
Prime Electric Company Inc	$ 160,139.00	$ 26,630.00	$ (30,385.00)	$ 156,384.00
Oklahoma Media Technology (a/v Only)	$ 47,960.80			$ 47,960.80
RECOMMENDATION: The low bidder did not provide a complete scope of work and considered non-responsive; therefore, we recommend awarding the base bid plus alternate 2 to the low responsible bidder, Advanced Quality Electric Inc., for a total amount of $113,000.00.				

CMSWillowbrook
Construction Management

620 NE 36th Street
Oklahoma City, OK 73105
405.224-1554 tel
405.224-5995 fax
www.cmswillowbrook.com

Attachment No. 4 – Bid Qualifications

Bid Package 10 Operable Partitions – Murray Womble Inc

MURRAY WOMBLE, INC.
8150 North 116th East Avenue
P.O. Box 958
Owasso, OK 74055

SALES QUOTATION

10/24/2019

Phone: (918) 272-6977
Fax: (918) 272-6122
Cell: (918) 600-9286

TO: Reed Conference Center

PROJECT: Reed Conference Center 2019 Renovations

ATTN: Delmus Gobble

PROVIDE AND INSTALL: OPERABLE PARTITIONS shall be manufactured by ***Kwik-Wall:***

Bid Package:	10 – OPERABLE PARTITIONS
Section:	10650 – Operable Partitions
Location:	Meeting Room 100/101
Model:	2030, manual paired panels
Openings:	(1)
STC:	51
Panel thickness:	3"
Panel Face & Frame:	Steel panel faces and frames .
Panel Edges:	Trim less
Track Type:	#425 Aluminum track system
Top & Bottom Seals:	Operable top and bottom seals
Final Closure:	Expander closure
Pass Doors:	None
Pocket doors:	(1) Double Lap
Surfacing Material:	Basics Ribbed Carpet

INCLUSIONS: Installation, freight, and a **5-year warranty**. We acknowledge Addendum #1.

EXCLUSIONS: Sales tax. Please note that all steel supports shall be provided by others and pre-punched by others per our shop drawings. We exclude any and all costs for field sound testing by others.

TOTAL PRICE: $17,120.00

DELIVERY: Submittals 2-3 weeks ARO, Track 2-3 weeks. Partitions 4 to 5 weeks after field measure (at time of quote).

Terms: Materials 30 days net to be billed on shipment from manufacturer. Sales and Use Taxes not included unless specifically stated. All orders, contracts, and deliveries subject to credit approval. Quotation is made for acceptance within 60 days of the date of quotation and subject to price change causes beyond our control. Upon acceptance, price is valid for 6 months from date of order. Murray Womble, Inc. reserves the right to increase prices for orders that exceed this duration. Deliveries are contingent on strikes, accidents, delays of common carriers or other causes beyond our control. Our standard insurance coverage limits apply. All coverage limits above our standard limits are excluded. We exclude all liquidated damages. Contractor assumes responsibility for approval of voluntary alternate products quoted if used by contractor to bid job.

ACCEPTED BY: _____

P.O./CONTRACT #_____

DATE ACCEPTED_____

Murray Womble, Inc.

Timm Smith

Clarification and Assumptions
November 12, 2019

We have listed below the assumptions and clarifications that we have considered so that we both fully understand what is and what is not included in the Guaranteed Maximum Price (GMP). Where actual events on the project differ from the assumptions and clarifications listed below, the GMP will require adjustments for the resulting additional costs and expenses. These assumptions and clarifications are specifically used to establish the basis of the GMP and as such are intended to clarify and take precedence over details or items shown on Contract Documents, in the event there is a discrepancy between or among any of them.

General Assumptions

1. This Guaranteed Maximum Price is based on the 100% Final Bid Documents for the Reed Conference Center 2019 Renovations, as prepared by Quinn & Associates, dated September 2019, and the following Assumptions and Clarifications.
2. The bids have been solicited on the basis of award within 30 days.
3. The Guaranteed Maximum Price is based on an assumed construction start in December 2019 and completed by June 30, 2020.
4. All off-site permits are not included and shall be paid by the Owner.
5. Any requirements by the Midwest City Municipal Authority, City of Midwest City or the State Fire Marshal that are not specifically depicted or indicated on the Contract Documents referenced above have not been included in the Guaranteed Maximum Price.
6. This GMP assumes that Owner furnished items will be on-site in accordance with the Construction Manager's schedule.
7. The costs of construction testing and inspection services are included in this Guaranteed Maximum Price proposal.
8. It is assumed that the Contract Documents are in compliance with all required codes, including, local, state and federal requirements, so no monies are included for changes to the Contract Documents necessary to comply with the aforementioned codes and requirements.
9. The schedule format to be used is Smartsheet.
10. This GMP is based on CM utilizing the Construction Managers cloud based management software for project administration including the processing of submittals, RFIs, emails, etc.
11. This GMP is based on all awarded low bidders entering and executing a contract with CM upon GMP approval.
12. This GMP is based on Design team will provide necessary CAD files to CM for various shop drawings and submittals at no additional costs.
13. A Construction Managers construction contingency is included in the Guaranteed Maximum Price. This contingency is intended to cover the scope of work, including but not limited to events such as listed below. The construction contingency shall be the exclusive use of the Construction Manager.
    a. Unforeseen and/or unknown field conditions.
    b. Including mitigation of weather impact, such as abnormal inclement weather.

c. Losses, expenses or damages not covered by insurance, including any deductible amount.

d. Subcontractor failures not covered by a subcontractor performance and payment bond.

e. Increases in quantity or quality, which should have been reasonably inferable from the Contract Documents but not specifically shown therein.

f. Items not properly coordinated or left out of the Bid Package scope of work.

g. Underestimating

h. It is understood by the Parties that this contingency is not to be allocated to costs due to errors and omissions in the Contract Documents (CD's) or to remedy, correct or resolve any inconsistencies, ambiguities, errors or omissions contained with the Architect's work product on which the Construction Manager's Guaranteed Maximum Price was based.

i. Overtime, including unexcused schedule delays due to subcontractor work, performance or schedule.

j. Any use of the contingency is to be approved by the owner's representative prior to its use.

k. Any unused construction contingency will be returned to the Owner by a deduct change order at the end of the project.

14. An Owner contingency is not included in the GMP.

15. The order of precedence of the documents in the event that there is a conflict between documents is:

    a. Future change orders.

    b. These Assumptions and Clarifications dated November 12, 2019.

    c. Agreement between Owner and Construction Manager.

    d. Addenda as issued by the Architect.

    e. Contract drawings and specifications, as prepared by the Architect.

16. General Conditions and Requirements amount is a lump sum and shall be billed on an equivalent monthly basis throughout project duration, beginning in December 2019.

17. The following items are **NOT INCLUDED** in the Guaranteed Maximum Price: A/E fees, CM PreConstruction Fee, Owner contingency, Furniture, Fixtures and Equipment, Sales Tax, 3rd Party Commissioning of Mechanical and Electrical systems, Items provided by Owner, any requirements by the Authority Having Jurisdiction that are not specifically depicted or indicated on the Contract Documents, temporary & permanent utility cost during construction start-up, test and occupy the building.

18. Preconstruction services are not part of the Guaranteed Maximum Price and will be billed separately.

19. The Owner will provide temporary and permanent utility cost during construction for start-up, test and occupy the new building.

20. The Guaranteed Maximum Price included allowances for costs not fully determined at time of GMP issue. These allowances are identified on the cost report.

MIDWEST CITY

Where the Spirit Flies High

NEW BUSINESS/ PUBLIC DISCUSSION

MIDWEST CITY

Where the Spirit Flies High

FURTHER INFORMATION

Copies of the agenda for this meeting were posted at City Hall, accessible to the public for at least 24 hours in advance of the meeting.

MINUTES OF MIDWEST CITY PARK LAND REVIEW COMMITTEE MEETING

October 15, 2019 - 4:00 p.m.

This meeting of the Midwest City Park Land Review Committee was held in the Community Development conference room, Midwest City, Oklahoma County, Oklahoma, on October 15, 2019 at 4:00 p.m., with the following members present:

Present:	Carolyn Burkes Grace Sullivan Casey Hurt Jess Huskey
Absent:	Todd Issac
Staff present:	Kellie Gilles, Planning Manager

A. CALL TO ORDER:

The meeting was called to order by Chairperson Burkes at 4:00 p.m.
Chairperson Burkes asked that member Sullivan preside over the meeting.

B. MINUTES:

1. A motion was made by Huskey, seconded by Hurt to approve the minutes of the March 8, 2019. Voting Aye: Huskey, Hurt, Sullivan and Burkes. Absent: Issac. Motion carried.

C. NEW MATTERS:

1. (PC –2032) Discussion and consideration of a request to submit a fee in lieu of park land as allowed by the Subdivision Regulations for the proposed Ryan's Ridge Preliminary Plat located in the SW/4 of Section 6, T-11-N, R-1-W, addressed as 10332 SE 10th Street.

Staff presented a brief overview of this request. The applicant, Kevin Ergenbright, was present. There was general discussion about the item. Mr. Ergenbright stated that he would rather pay a fee in lieu of the park land dedication due to the design of the subdivision and the location of the creek bisecting the lot. A motion was made by Burkes, seconded by Hurt, to recommend approval of the request to pay a fee in lieu of the park land dedication. Voting aye: Hurt, Burkes, Sullivan and Huskey. Nay: None. Motion passed.

C. COMMITTEE DISCUSSION: Staff advised the committee that the Council can be requested to appoint a new member to replace Todd Isaac due to excessive absences from meetings and lack of communication.

E. Adjournment: A motion was made by Hurt, seconded by Huskey to adjourn the meeting. Voting aye: Hurt, Sullivan, Huskey and Burkes. Nay: None. Motion passed.

The meeting adjourned at 4:28 p.m.

_____

KG

MIDWEST CITY
MUNICIPAL AUTHORITY
AGENDA FOR
November 12, 2019

The 6:00 PM meetings will be shown live on Channel 20 and streamed live on the City of Midwest City - Government Facebook page.

The recorded video will be available on YouTube and the City's website within 48 hours: Bit.ly/youtubemwc.

The meeting minutes and video can be found on the City's website in the Agenda Center: https://midwestcityok.org/AgendaCenter.

To make a special assistance request, call 739-1213 or email bbundy@midwestcityok.org no less than 24 hours prior to the start of a meeting. If special assistance is needed during a meeting, call 739-1388.

The Trustees will go directly into the City meetings down in the Council Chambers of City Hall at 6:00 PM. However, they will informally gather at or after 5:00 PM in the second floor conference room for dinner, but no Trustee business will be discussed or acted upon and the room will be open to the public. Meals will only be provided to the Trustees and staff.

CITY OF MIDWEST MUNICIPAL AUTHORITY AGENDA

City Hall - Midwest City Council Chambers, 100 N. Midwest Boulevard

November 12, 2019 – 6:01 PM

A. CALL TO ORDER.

B. DISCUSSION ITEM.

1. Discussion and consideration of approving the minutes of the regular October 22, 2019 meeting, as submitted. (Secretary - S. Hancock)

C. NEW BUSINESS/PUBLIC DISCUSSION. The purpose of the "Public Discussion Section" of the Agenda is for members of the public to speak to the Authority on any Subject not scheduled on the Regular Agenda. The Authority shall make no decision or take any action, except to direct the City Manager to take action, or to schedule the matter for discussion at a later date. Pursuant to the Oklahoma Open Meeting Act, the Authority will not engage in any discussion on the matter until that matter has been placed on an agenda for discussion. THOSE ADDRESSING THE AUTHORITY ARE REQUESTED TO STATE THEIR NAME AND ADDRESS PRIOR TO SPEAKING TO THE AUTHORITY.

D. FURTHER INFORMATION.

1. Discussion and Consideration to make changes to Curbside Recycling Services. (Public Works - R. Paul Streets)

E. ADJOURNMENT.

MIDWEST CITY

Where the Spirit Flies High

DISCUSSION ITEM

A notice for the regular Midwest City Municipal Authority was filed for the calendar year with the City Clerk of Midwest City. Public notice of this agenda was accessible at least 24 hours before this meeting at City Hall and on the Midwest City website (www.midwestcityok.org).

Midwest City Municipal Authority Minutes

October 22, 2019 – 6:01 PM

This meeting was held in the Midwest City Council Chamber in City Hall, 100 N. Midwest Boulevard, Midwest City, County of Oklahoma, State of Oklahoma.

Chairman Matt Dukes called the meeting to order at 7:46 PM with the following members present: Trustees, Pat Byrne, Españiola Bowen, Sean Reed, and Christine Allen with Secretary Sara Hancock, City Attorney Heather Poole, and City Manager Tim Lyon. Absent: Susan Eads and Jeff Moore.

CONSENT AGENDA. Allen made a motion to approve the consent agenda as submitted, seconded by Byrne. Voting aye: Byrne, Bowen, Reed, Allen, and Chairman Dukes. Nay: none. Absent: Eads and Moore. Motion carried.

1. Discussion and consideration of approving the minutes of the regular September 24, 2019 meeting, as submitted.

2. Discussion and consideration of restricting public vehicular access to Morris McGee Drive from October 23, 2019 to January 10, 2020 only that associated with Holiday Lights Spectacular.

3. Discussion and consideration of accepting the report on the current financial condition of the Sheraton Midwest City Hotel at the Reed Center for the period ending September 30, 2019.

NEW BUSINESS/PUBLIC DISCUSSION.

There was no new business or public discussion.

ADJOURNMENT.

There being no further business, Chairman Dukes closed the meeting at 7:46 PM.

_____
MATTHEW D. DUKES II, Chairman

ATTEST:

_____
SARA HANCOCK, Secretary

MIDWEST CITY

Where the Spirit Flies High

NEW BUSINESS/ PUBLIC DISCUSSION

MIDWEST CITY

Where the Spirit Flies High

FURTHER INFORMATION

MIDWEST CITY
Where the Spirit Flies High
www.midwestcityok.org

Public Works Administration
Paul Streets, Director
pstreets@midwestcityok.org
8730 Southeast 15th St,
Midwest City, OK. 73110
Office: (405) 739-1061
Fax: (405) 739-1090

M E M O

TO: **Honorable Chairman and Trustees**

FROM: **Paul Streets, Public Works Director**

DATE: **November 12, 2019**

SUBJECT: **Changes to Curbside Recycling in Midwest City**

The City Manager recently received a letter from Republic Services, the contractor providing curbside single-stream recycling to Midwest City residents. In that letter Republic Services informed Midwest City of changes that will affect customers in Midwest City, Edmond and Norman, when they make a choice to recycle at home. Starting November 1, 2019, plastic bottles or containers marked #3 through #7, as well as glass bottles or containers, will no longer be on the list of "acceptable recyclable items". Republic Services had communicated these changes might be coming due to worldwide and domestic recycling market conditions. However, we had expected to have more time to push the information out to our constituents before the policies took effect.

Republic Services decided to start the process of reeducating customers immediately because they were informed by Batliner, the Materials Recovery Facility (MRF) that processes our single-stream recycling, that any plastics other than #1 and #2 would be considered trash. Additionally, glass bottles and containers would also be considered trash. This change will create additional costs which by contract will be passed on to the City. Therefore, the sooner we as customers can make the appropriate changes, the better the recycling audit by Batliner of each city's recycled materials in January 2020 will be. By communicating the changes in the curbside recycling program now, we hope to see positive results by the time the New Year arrives.

To that end, Republic has produced a new curbside recycling educational flyer that will be delivered by mail to every customer in Midwest City. This flyer has been reviewed by staff at Midwest City, Norman, and Edmond to insure that all three communities are satisfied with the new message. A copy of this flyer will also be available on Midwest City's website and upon request in Customer Service or Public Works Administration.

If you have any questions or need additional information, please don't hesitate to contact me.

Respectfully,

Paul Streets
Public Works Director

REPUBLIC SERVICES

7540 SW 59th Street, Oklahoma City, OK 73179
o 405-317-9945 republicservices.com

October 1, 2019

Mr. Tim Lyon
City Manager
Midwest City
8730 S.E. 15th Street
Midwest City, OK 73110

RE: Recycling Collection in Midwest City;

Dear City Manager,

As you know we were anxious about the long-term circumstances surrounding the national and worldwide recycle environment when we last spoke. The situation has become even more complex since we last met.

The global recycling crisis spurred by China has led communities across the country - including many of your neighboring surrounding municipalities – to recognize that today's recycling business model is broken. Contamination has become rampant through local recycling programs. And, these factors jeopardize the future of our local recycling programs.

Consumers play an important role in understanding what to recycle and how to avoid recycling contamination, or unwanted substances such as residual food or liquid that can be harmful to the recycling process. Recycling contamination can be anything other than what is intended to be collected and recycled. A contaminated item placed in the recycling container can come into contact with other recyclables, and potentially contaminate the entire truckload of recyclables.

As a leader in the recycling industry, Republic Services is committed to recycling and to bringing simple solutions to customers in an effort to help preserve local recycling programs. We're devoted to our customers throughout Central Oklahoma, and passionate about providing simple solutions to their emerging recycling needs.

Republic Services is partnering with its local municipal partners to design a more durable, sustainable recycling business model. This means acknowledging the true cost of recycling, which includes the collecting and processing of recycled material,

disposing of residual material and the sale of processed materials to buyers around the world.

Based on the unprecedented circumstances in the recycling environment Republic Services will be requesting the acceptable list of recycling materials included in the program be changed, November 1, 2019, to no longer accepting; plastic bags, plastic #3 - #7 and glass bottles & containers.

Unfortunately, our expenses are exceeding our revenues on this agreement do to the commodities. We must try and right side this agreement. Per the July 1st, 2018 agreement section "7.4 *Disposal Costs*. *If any Recyclable Material commodity collected by Company hereunder becomes unmarketable or is not accepted at the recycling facility and must therefore be disposed of at a Disposal Site, the City shall pay any such disposal costs to Company and shall eliminate that commodity from the Recyclable Materials program and this Agreement. Company does not guarantee the existence of a market or a commodity buyer at any time for any Recyclable.* " Per this section of the agreement we are able to charge for disposal cost that are associated with unmarketable material; but at this time we are not going to move forward with that charge.

We apologize for the inconvenience and appreciate your support in partnering with us to build a durable Recycling model that will be beneficial for our environment.

Sincerely,

Modesto Dominguez
Republic Services
General Manager

BATLINER RECYCLING
A Pioneer Industries International Co.

320 McCormick Avenue
Oklahoma City, OK 73127

Phone: 405.200.1205
Fax: 405.917.9793

Batliner Recycling, Oklahoma City

Crystal,

10-04-19

As we discussed last month the market for most commodities has continued to decline. I wanted to address the questions you had regarding several items that are currently coming through the curbside recycling program.

#3 - #7 Plastic

All of the 3-7 plastic is currently going into the trash. The reason we are not capturing it is because there is virtually no market for this material. Even if we could get an order the price would be zero or we may even be charged to ship it.

Plastic Bags

With China exiting the market there is no demand for MRF film. We are currently baling it and putting it in the trash. There is no market for this grade. If you could find a place to ship it you would be charged to do so.

Glass

While glass is recyclable it is a negative revenue item. The price we receive for glass doesn't even cover the freight to ship it. In addition, the glass plants are now adding on a charge for batteries found in the glass. We are subject to this charge as batteries are common in single stream glass.

I hope this clears up any confusion regarding these items. Please do not hesitate to contact me with any further questions.

Sincerely,

Scot Stonebraker
General Manager
Batliner Recycling

How can we make recycling better together?

New Recycling Information

Please recycle only the items below:

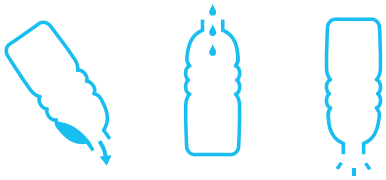
✓ **PLASTICS**
Recycle **plastics #1 and #2**. Look on the bottom of containers for a number inside the recycling arrows.

✓ **METAL & ALUMINUM CANS**
Recycle all food and beverage metal cans — steel, tin & bi-metal.

✓ **CARDBOARD, NEWSPAPER & MAGAZINES**
Recycle newspaper inserts, catalogs, paperback books, phone books & brochures.

✓ **PAPER FOOD CONTAINERS**
Recycle food boxes & cereal & pasta boxes.

✓ **PAPER**
Recycle envelopes, office paper, junk mail, greeting cards & file folders. Shredded paper should be put in a paper bag.



Empty. Clean. Dry.®

Please make sure your recyclables are **empty, clean and dry** before placing them in your recycling container.

Recycling Made Easy

- ✓ Please be sure your recycling container is at the curb by 7 a.m. on your collection day.
- ✓ All your recyclables can be placed together in the recycling container. Place your recycling container 2 feet away from the street so it can easily be seen from the street.

How to Recycle Properly

- ✓ All types of recyclables may be placed together in your recycling container.
- ✓ If it looks like rain, be sure to close the container lid Wet paper products cannot be recycled.
- ✓ Rinse plastic and aluminum and remove lids.
- ✓ Rinse aluminum and metal cans.

Cannot Accept

Appliances
Batteries
Bubble wrap
Glass bottles/jars
Plastics #3 - #7
Aluminum foil
Christmas lights
Coat hangers
Electrical cords
Stuffed animals
Polystyrene foam
Syringes/razor blades
Tires
Waxed cartons
Wood/yard waste
Food waste
Food wrap
Garden hoses
Plastic bags
Rubber balls
Sports equipment

REPUBLIC SERVICES

We'll handle it from here.®

Recycling Service Guide

Frequently Asked Questions:

How does my waste collection work?

Roll your container to the curb by 7 a.m. on your collection day. The container is emptied mechanically from inside a Republic Services® vehicle cab. The driver uses a joystick, much like those used in video games, to operate the automated arm that picks up the container and empties the garbage into the truck. The container is set back in place, and the Republic Services truck moves on to the next stop.

When should I set out my waste?

Be sure your container is at the curb by 7 a.m. on your collection day to ensure collection. Or, you may set your container out the night before, if you wish.

What can I put in my container?

Only the acceptable recycling items (listed on the first page) may be placed in your recycling container.

What happens if I put something in my container that does not belong?

The container will need to be sorted out and then sent to the landfill, causing the cost to rise. It can also cause acceptable items to be thrown away.

Why did plastics #3 - #7 get removed from the acceptable list?

Unfortunately there is no longer a market for, or a way to responsibly recycle, plastics #3-#7. We can still accept #1 and #2 plastics.

Why was glass removed from the acceptable list?

The carbon footprint to collect, transport and recycle glass now exceeds the benefit of recycling it. It is no longer environmentally responsible to recycle glass. We are always evaluating the benefits as well as the overall impact of recycling in order to ensure that our program is efficient and environmentally friendly.

When In Doubt, Throw It Out!

For more information, visit RepublicServices.com.

REPUBLIC SERVICES

We'll handle it from here.®

MIDWEST CITY
MEMORIAL HOSPITAL AUTHORITY
AGENDA FOR
NOVEMBER 12, 2019

The 6:00 PM meetings will be shown live on Channel 20 and streamed live on the City of Midwest City - Government Facebook page.

The recorded video will be available on YouTube and the City's website within 48 hours: Bit.ly/youtubemwc.

The meeting minutes and video can be found on the City's website in the Agenda Center: https://midwestcityok.org/AgendaCenter.

To make a special assistance request, call 739-1215 or email bbundy@midwestcityok.org no less than 24 hours prior to the start of a meeting. If special assistance is needed during a meeting, call 739-1388.

The Trustees will go directly into the City meetings down in the Council Chambers of City Hall at 6:00 PM. However, they will informally gather at or after 5:00 PM in the second floor conference room for dinner, but no business will be discussed or acted upon and the room will be open to the public. Meals will only be provided to the Trustees and staff.

MIDWEST CITY MEMORIAL HOSPITAL AUTHORITY AGENDA

City Hall - Midwest City Council Chambers, 100 N. Midwest Boulevard

November 12, 2019 - 6:02 PM

A. CALL TO ORDER.

B. DISCUSSION ITEMS.

1. Discussion and consideration of approving the minutes of the regular October 22, 2019 meeting, as submitted. (Secretary - S. Hancock)

2. Discussion and consideration of action to reallocate assets, change fund managers or make changes in the Statement of Investment Policy, Guidelines and Objectives. (Finance Director - C. Barron)

C. NEW BUSINESS/PUBLIC DISCUSSION. The purpose of the "Public Discussion Section" of the Agenda is for members of the public to speak to the Authority on any Subject not scheduled on the Regular Agenda. The Authority shall make no decision or take any action, except to direct the City Manager to take action, or to schedule the matter for discussion at a later date. Pursuant to the Oklahoma Open Meeting Act, the Authority will not engage in any discussion on the matter until that matter has been placed on an agenda for discussion. THOSE ADDRESSING THE AUTHORITY ARE REQUESTED TO STATE THEIR NAME AND ADDRESS PRIOR TO SPEAKING TO THE AUTHORITY.

D. ADJOURNMENT.

MIDWEST CITY

Where the Spirit Flies High

DISCUSSION ITEMS

A notice for the regular Midwest City Memorial Hospital Authority was filed for the calendar year with the City Clerk of Midwest City. Public notice of this agenda was accessible at least 24 hours before this meeting at City Hall and on the Midwest City website (www.midwestcityok.org).

Midwest City Memorial Hospital Authority Minutes

October 22, 2019 – 6:02 pm

This meeting was held in the Midwest City Council Chambers at City Hall, 100 North Midwest Boulevard, Midwest City, County of Oklahoma, State of Oklahoma. Chairman

Chairman Matt Dukes called the meeting to order at 7:46 PM with the following members present: Trustees: Pat Byrne, Españiola Bowen, Sean Reed, and Christine Allen with Secretary Sara Hancock, City Attorney Heather Poole, and City Manager Tim Lyon. Absent: Susan Eads and Jeff Moore.

CONSENT AGENDA. Allen made a motion to approve the Consent Agenda, as submitted, seconded by Byrne. Voting Aye: Byrne, Bowen, Reed, Allen, and Chairman Dukes. Nay: none. Absent: Eads and Moore. Motion carried.

1. Discussion and consideration of approving the minutes of the regular October 8, 2019 meeting, as submitted.

2. Discussion and consideration of an agreement with Schwarz Paving Company for temporary staging of construction equipment at 8826 and 8828 SE 29th Street, for an approximate term of 6 months, payment for use will be $1,200 worth of borrow soil and/or crushed concrete.

DISCUSSION ITEM.

1. **Discussion and consideration of action to reallocate assets, change fund managers or make changes in the Statement of Investment Policy, Guidelines and Objectives.** No action was needed.

NEW BUSINESS/PUBLIC DISCUSSION.

There was no new business or public discussion.

ADJOURNMENT.

There being no further business, Chairman Dukes adjourned the meeting at 7:47 PM.

_____

MATTHEW D. DUKES II, Chairman

ATTEST:

_____

SARA HANCOCK, Secretary

Midwest City Memorial Hospital Authority
100 North Midwest Boulevard
Midwest City, Oklahoma 73110
Office (405) 739-1207/Fax (405) 739-1208
www.midwestcityok.org

MEMORANDUM

To: Honorable Chairman and Trustees

From: Christy Barron, Finance Director

Date: November 12, 2019

Subject: Discussion and consideration of action to reallocate assets, change fund managers or make changes in the Statement of Investment Policy, Guidelines and Objectives.

Jim Garrels, President, Fiduciary Capital Advisors, asked staff to put this item on each agenda in the event the Hospital Authority's investments need to be reallocated, an investment fund manager needs to be changed or changes need to be made to the Statement of Investment Policy on short notice.

Action is at the discretion of the Authority.

Christy Barron
Finance Director

MIDWEST CITY

Where the Spirit Flies High

NEW BUSINESS/ PUBLIC DISCUSSION

MIDWEST CITY SPECIAL ECONOMIC DEVELOPMENT AUTHORITY

AGENDA FOR

NOVEMBER 12, 2019

The 6:00 PM meetings will be shown live on Channel 20 and streamed live on the City of Midwest City - Government Facebook page.

The recorded video will be available on YouTube and the City's website within 48 hours: Bit.ly/youtubemwc.

The meeting minutes and video can be found on the City's website in the Agenda Center: https://midwestcityok.org/AgendaCenter.

To make a special assistance request, call 739-1213 or email bbundy@midwestcityok.org no less than 24 hours prior to the start of a meeting. If special assistance is needed during a meeting, call 739-1388.

The Trustees will go directly into the City meetings down in the Council Chambers of City Hall at 6:00 PM. However, they will informally gather at or after 5:00 PM in the second floor conference room for dinner, but no Trustee business will be discussed or acted upon and the room will be open to the public. Meals will only be provided to the Trustees and staff.

MIDWEST CITY SPECIAL ECONOMIC DEVELOPMENT AUTHORITY AGENDA

City Hall - Midwest City Council Chambers, 100 N. Midwest Boulevard

November 12, 2019 - 6:03 PM

A. CALL TO ORDER.

B. DISCUSSION ITEM.

1. Discussion and consideration of approving the minutes of the special October 22, 2019 meeting, as submitted. (City Clerk - S. Hancock)

C. NEW BUSINESS/PUBLIC DISCUSSION.

D. EXECUTIVE SESSION.

1. Discussion and consideration of 1) entering into executive session, as allowed under 25 O.S. § 307(C)(11), to confer on matters pertaining to economic development, including the transfer of property, financing or the creation of a proposal to entice a business to remain or to locate within the City, and 2) in open session, authorizing the general manager/administrator to take action as appropriate based on the discussion in executive session. (City Manager - T. Lyon)

E. ADJOURNMENT.

MIDWEST CITY

Where the Spirit Flies High

DISCUSSION ITEM

A notice for the special Economic Development Authority meeting was filed with the City Clerk of Midwest City 48 hours prior to the meeting. Public notice of this agenda was accessible at least 24 hours before this meeting at City Hall and on the Midwest City website (www.midwestcityok.org).

Special Midwest City Economic Development Authority Meeting Minutes

October 22, 2019 – 6:04 pm

This meeting was held in the Midwest City Council Chambers at City Hall, 100 North Midwest Boulevard, Midwest City, County of Oklahoma, State of Oklahoma. Chairman Matt Dukes called the meeting to order at 7:48 PM with the following members present: Trustees: Pat Byrne, Españiola Bowen, Sean Reed, and Christine Allen with Secretary Sara Hancock, City Attorney Heather Poole, and City Manager Tim Lyon. Absent: Trustees Susan Eads and Jeff Moore.

DISCUSSION ITEM.

1. **Discussion and consideration of approving the minutes of the special September 24, 2019 meeting, as submitted.** Allen made a motion to approve the minutes, as submitted, seconded by Byrne. Voting aye: Byrne, Bowen, Reed, Allen, and Mayor Dukes. Nay: none. Absent: Eads and Moore. Motion carried.

NEW BUSINESS/PUBLIC DISCUSSION. There was no new business or public discussion.

EXECUTIVE SESSION.

1. **Discussion and consideration of 1) entering into executive session as allowed under 25 O.S. Section 307 (C) (11), for purposes of conferring on matters pertaining to economic development, including the transfer of property, financing, or the creation of a proposal to entice a business to locate within their jurisdiction if public disclosure of the matter discussed would interfere with the development of products or services or if public disclosure would violate the confidentiality of the business; and 2) in open session, authorizing the City Manager to take action as appropriate based on the discussion in executive session.** At 7:49 PM, Allen made a motion to enter into executive session, seconded by Byrne. Voting aye: Byrne, Bowen, Reed, Allen, and Mayor Dukes. Nay: none. Absent: Eads and Moore. Motion carried.

   At 8:53 PM, Reed made a motion to return to open session, seconded by Allen. Voting aye: Byrne, Bowen, Reed, Allen, and Mayor Dukes. Nay: none. Absent: Eads and Moore. Motion carried.

   No Action was needed.

ADJOURNMENT. There being no further business, Chairman Dukes adjourned the meeting at 8:53 PM.

ATTEST: _____
MATTHEW D. DUKES II, Chairman

_____
SARA HANCOCK, Secretary

MIDWEST CITY

Where the Spirit Flies High

NEW BUSINESS/ PUBLIC DISCUSSION

MIDWEST CITY

Where the Spirit Flies High

EXECUTIVE SESSION

City Manager
100 N. Midwest Boulevard
Midwest City, OK 73110
tlyon@midwestcityok.org
Office: 405.739.1201
www.midwestcityok.org

MEMORANDUM

TO: Honorable Chairman and Trustees

FROM: T. Lyon, City Manager

DATE: November 12, 2019

SUBJECT: Discussion and consideration of 1) entering into executive session, as allowed under 25 O.S. § 307(C)(11), to confer on matters pertaining to economic development, including the transfer of property, financing or the creation of a proposal to entice a business to remain or to locate within the City, and 2) in open session, authorizing the general manager/administrator to take action as appropriate based on the discussion in executive session.

Appropriate information will be dispersed during the meeting. Action is at the Trustee's discretion.

Tim Lyon, City Manager