CANADIAN COUNTY

City of El Reno, Oklahoma

2012 Multi-Hazard Mitigation Plan Update

Flanagan & Associates, LLC
Planning Consultants

Acknowledgements

The City of El Reno Multi-Hazards Mitigation Plan Update was made possible by a Hazard Mitigation Grant through Oklahoma Emergency Management from the Federal Emergency Management Agency, and local funding from Canadian County.

The Plan was prepared under the direction of the Canadian County Commissioner's Office, with the participation and assistance of numerous agencies, organizations, and individuals, including:

El Reno City Council

Mayor ..... Matt White
Vice-Mayor ..... Kent Carder
Councilor ..... Bobby Don Stevenson
Councilor ..... James Archer
Councilor ..... Kent Myers

El Reno City Administration

City Manager ..... Tony Rivera
Assistant City Manager ..... John Dean
City Clerk ..... Lindsey Grigg
City Attorney ..... Roger Rinehart

Hazard Mitigation Advisory Committee

County Emergency Management Director .... Jerry Smith
Canadian County Floodplain
Administrator and GIS Manager ..... Amy Brandley
Former City Manager ..... Doug Henley
Former Police Chief ..... Fred Savage
Fire Chief ..... Kent Lagaly
Former Community Development ..... Robert Coleman
Community Services Director ..... Terry Floyd
Code Enforcement Director ..... Maurice Spann
Former Code Enforcement Officer ..... Clarence Sanders
Building Inspector ..... Robert Reese

F.2 El Reno

The City of El Reno is an incorporated community located in central Canadian County, shown in Locator Map Figure F.2-1. El Reno is the County Seat of Canadian County.

Section 1 Introduction

1.1 Geography

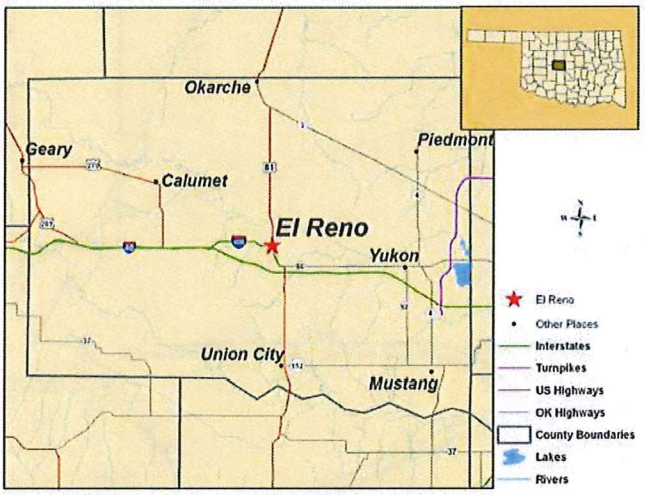
Latitude: 353156N

Longitude: 975718W

GNIS ID: 1092512

The City of El Reno is 25 miles west of Oklahoma City, almost in the geographical center of Canadian County. Although its urban center is fairly compact, the City has incorporated an area 79.98 square miles in size as shown in Figure F.2-2. At its greatest span it extends from 164th St. in the north to Reno Ave. in the south, and from Ft. Reno Rd. (2770 Rd.) in the west to Banner Rd. in the east. The landscape is gently rolling, with elevations between 1,300 to 1,420 feet. The urban core is at elevation 1,358, with the North Canadian passing through the City at elevation 1,305.

Figure F.2–1 City of El Reno Locator Map



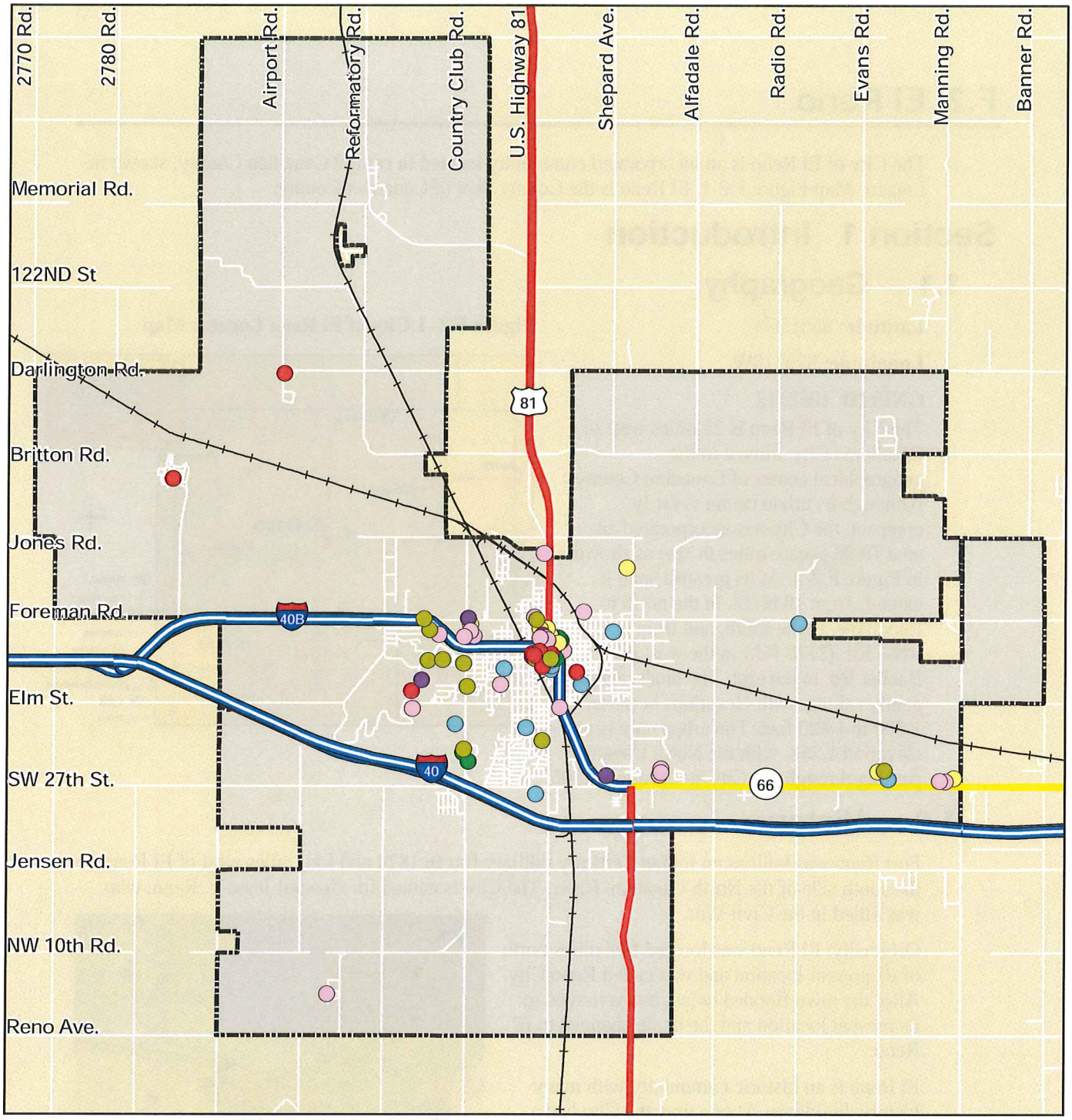
1.2 History

Fort Reno was built as an Indian Territory military fort in 1874 and four miles west of El Reno on the south side of the North Canadian River. The City is named for General Jesse L. Reno, who was killed in the Civil War.

Originally, El Reno was located five miles north of its present location and was called Reno City. After the town flooded twice, it was moved to its present location and the name changed to El Reno.

El Reno Municipal Building

El Reno is an historic community with many historic buildings. At one time the City had a terminal and repair facility for the Chicago, Rock Island and Pacific Railroad. The old Rock Island tracks from El Reno west to Watonga became the AT&L Railroad, and the tracks from El Reno east to Oklahoma City are Union Pacific, which runs five trains per week between the two cities. The UP also operates a north-south rail network which passes through El Reno.



LEGEND

- Interstate
- US Highway
- State Highway
- Turnpike
- City Limits

Critical Facilities

- City Government
- Public Schools
- County
- State
- Federal
- Financial
- Historic
- Health Care/ Child Care

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0 0.5 1 Miles

N W E S

Figure F.2-2

City of El Reno

Basemap

El Reno remains the center of a still active agricultural and oil and gas economy. In recent decades the phenomenal expansion of the Oklahoma City metropolitan area into Canadian County – in particular the growth of the upscale suburban communities of Piedmont, Yukon and Mustang – has somewhat overshadowed El Reno's own development, which, comparatively, has been slow but steady.

1.3 Demographics

The City of El Reno had a 2010 Census population of 16,749, approximately 18.5% of the County's population. Table F.2-1 provides demographic information identifying populations who may be among the community's most vulnerable weather and other hazards.

A map, showing the distribution of the population aged 65 and older, is presented in Figure F.2-3 and the distribution of individuals living in poverty in Figure F.2-4.

Table F.2–1 Town of Calumet Population

Group	2010	Percent
Total Population	16,749	100
5 years of age and younger	1,250	7.5
65 years of age and older	2,077	12.4
Individuals at or below the poverty level (2009)	2,780	16.6

Source: U.S. Census Bureau

Ethnicity

White – 12,025 (60.9%)
Native American – 1,860 (11.1%)
African American – 1,209 (7.2%)
Hispanic – 2,156 (12.9%)
Asian/Hawaiian – 96 (0.6)

1.4 Lifelines

See Chapter 1.2.6 for a description of Lifelines.

El Reno Utility Systems

Electric Service

Oklahoma Gas and Electric Company and Caddo Electric Cooperative

Water Service

El Reno draws its water from 25 wells in the alluvial and terrace aquifers of the North Canadian River with a treatment plant capacity of 6 to 8 million gallons per day, serving 16,212 residential and 3,470 wholesale customers. It also supplies water to the Federal Correctional Institution, Canadian County Rural Water Districts 4 and 5, and Union City. El Reno has a looped and valved distribution system, two water towers and surface storage with a capacity of four million gallons.

Natural Gas

Oklahoma Natural Gas Company

Wastewater Treatment

The City of El Reno has its own wastewater treatment facility.

Telephone and Internet

AT&T Oklahoma

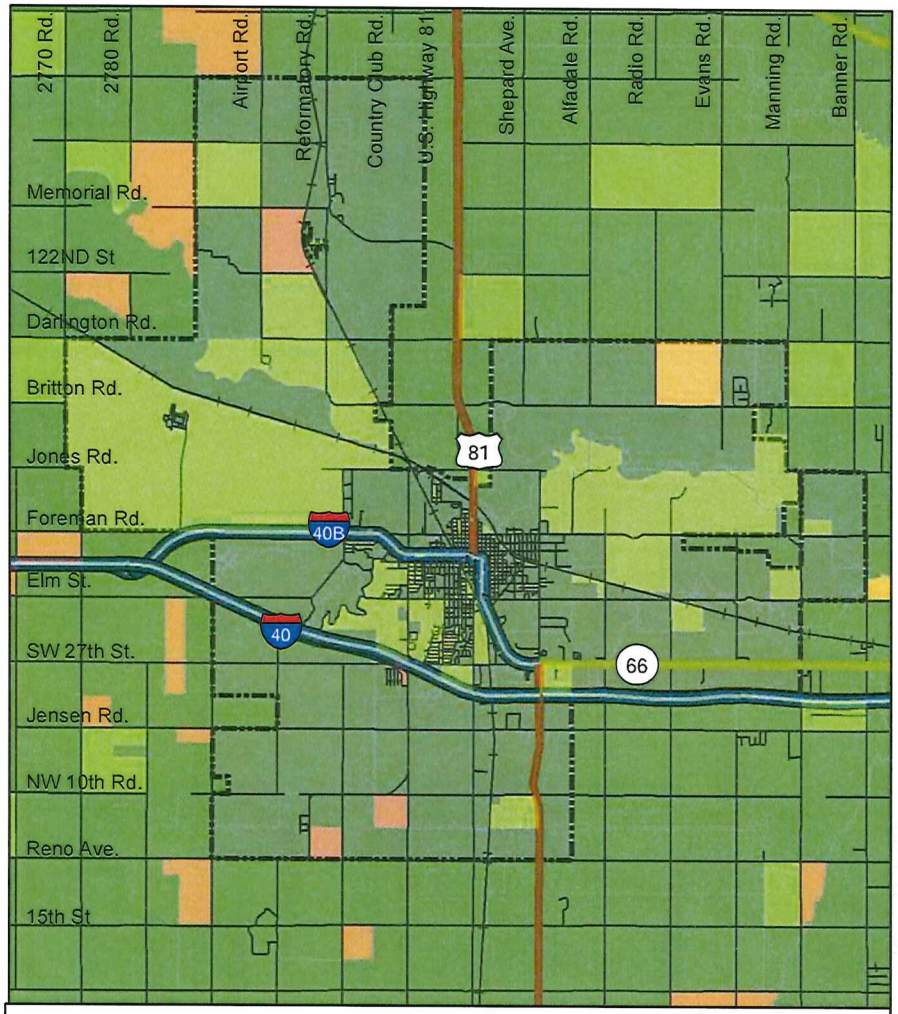


Figure F.2-3: *City of El Reno Percent of Population Over 65*

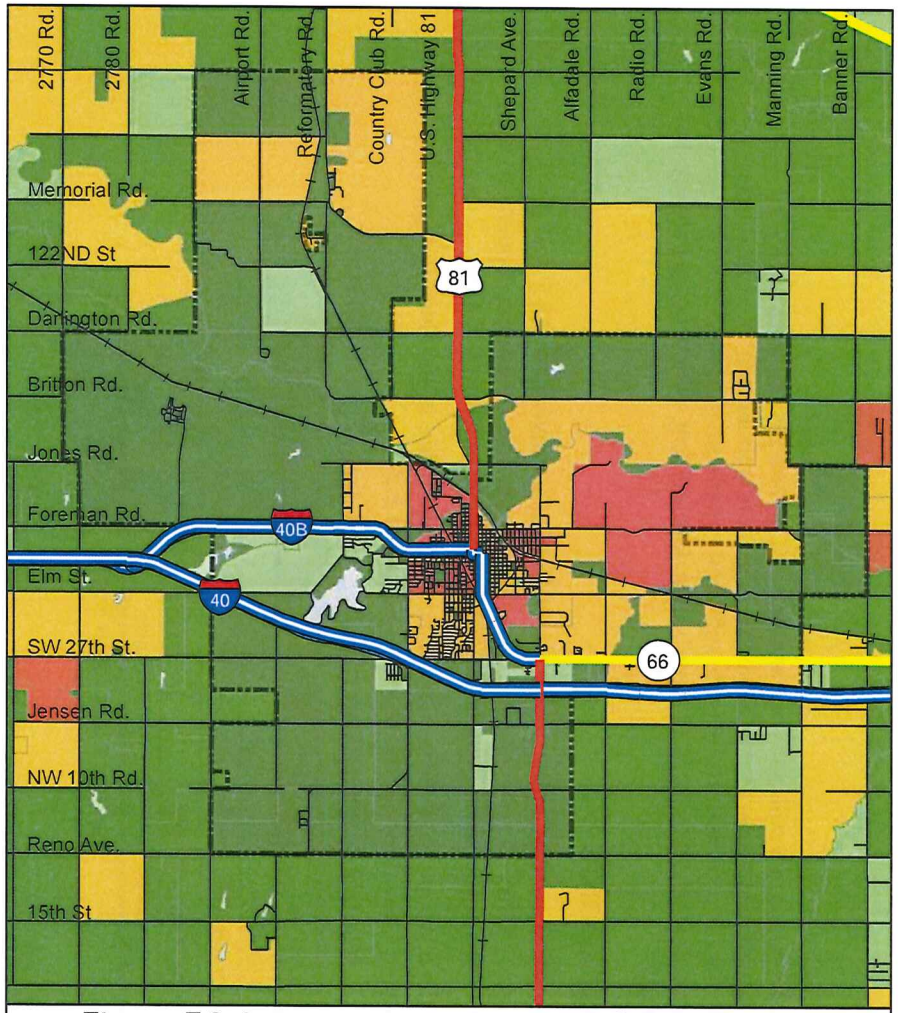


Figure F.2-4: *City of El Reno Percent of Population Under the Poverty Line*

Transportation Systems

Highways & Major Roads

Interstate 40 passes east-west through southern El Reno.

Interstate 40B begins one mile east of I-40 at the junction of U.S. Highway 81 and OK Highway 66, running north two miles into El Reno's urban core, then heads west out of the City reconnecting with I-40 about a mile west of the City Limits.

U.S. Highway 81 is a north-south highway that runs directly through El Reno's urban core, joins I-40B and becomes part of I-40B for about two miles before taking a southward direction out of the City.

OK Highway 66 enters El Reno's east City Limits and then merges with I-40B through the rest of the City.

Railroads

Union Pacific operates a north-south line through El Reno. Primary shipments out of Oklahoma include cement aggregates, wheat, paper and petroleum products. Tonnage brought into the state is predominantly coal, cement aggregates and automobiles. The Union Pacific also operates the line from El Reno to Oklahoma City that was formerly a part of the Chicago Rock Island and Pacific system. It runs about five trains a week over this link.

The western part of Canadian County is served by the AT&L Railroad. Based in Watonga in Blaine County, this Oklahoma grain hauler operates a 40-mile line from Watonga to El Reno. AT&L's operations are conducted on an "as-needed" basis, is busiest during wheat harvest season. Major products are grain, fertilizer and agricultural products.

Airports

- El Reno Regional Airport, is a publicly-owned, municipal field four miles southwest of El Reno;
- El Reno Airport F99 is a privately-owned field on the west side of Canadian Valley Technology Center;
- Harman Airport is a privately-owned field about five miles northwest of El Reno at Darlington Rd. and Brandley Rd.
- Will Rogers World Airport is on the southwest side of Oklahoma City, about 20 miles southeast of El Reno and is the major international

1.5 Economy

As of 2010, there were 12,692 people over the age of 18 in El Reno. Of these, approximately 55% were employed, 3.1% unemployed and 45% not in the labor force. Excepting that portion of Oklahoma City which extends into Canadian County, El Reno had the largest retail economy in County, with sales of $208.5 million in 2010. Major employers in El Reno are presented in Table F.2-2.

Table F.2–2 City of El Reno Major Employers

Employer	Product or Service	Employees
Exxis Aluminum Trailers	Trailer Manufacturing	800
Federal Correctional Inst.	Incarceration	500
Wal-Mart	Retail	360
Parkview Hospital	Medical Services	359
El Reno School District	Education	326

Employer	Product or Service	Employees
Canadian County Government	Local Government	180
Redlands Community College	Education	175
Dexter Axle	Trailer Axle Manufacturing	160
Gemini Coatings, Inc.	Coatings	160
Key Energy	Oilfield Services	160
Canadian Valley Technology Center	Education	150
City of El Reno	Local Government	135
Heritage Press	Printing	120
Canadian Valley Medical Solutions	Medical Services	50
Cimarron Aircraft	Aircraft Painting	30

Source: City of El Reno

1.6 Development

El Reno is the County Seat of the fastest growing county in Oklahoma. Almost all of this growth, however, has been in the eastern one-third of the County, and involves the expansion of Oklahoma City Metropolitan Area communities of Piedmont, Mustang, Yukon and Oklahoma City itself. El Reno has grown (from 16,212 in 2000 to 16,749 in 2010, or 3.3%), but not nearly at the pace of these other cities. During the 1980s, when Oklahoma City was expanding aggressively in all directions, El Reno incorporated undeveloped areas to the north, east and south, largely as a defensive measure, and to have some control over how surrounding lands were developed. As a result, it committed itself to providing police, fire, water and wastewater services to areas that were well beyond the reach of its finances and infrastructure. There have been discussions about the feasibility of disannexing some of these areas, but no action has been taken to do so, and no new areas have been incorporated.

Past Development

In 2010 El Reno had a total of 6,595 housing units, 5,845 (88.6%) were occupied and 750 were vacant (11.4%). Census data, shown in Table F.2-3, and Canadian County Assessor's Office data, shown in Table F.2-4, are structured differently and do not necessarily agree, so are shown in separate tables.

Table F.2–3 City of El Reno Housing Units, By Type

Housing Unit Type	Total
Single-family	5,268
Multi-family	965
Mobile homes	275
Boat, RV, van, etc.	16
Total housing units	**6,524**

Source: US Census Bureau

According to the Canadian County Assessor's Office, there are 6,950 properties with improvements within the City of El Reno, with an independently estimated market value of $408,176,044. The numbers of properties with improvements by type and estimated improvement values, are shown in Table F.2-4

Table F.2–4 City of El Reno Property Types and Values

Property Type	Number of Properties	Total Estimated Value
Agriculture	446	15,180,451
Commercial	495	79,931,863
Residential	5,355	286,281,604
Exempt	654	26,782,126
Total	6,950	$408,176,044

Source: Canadian County Assessor's Office

Development Plans

The Oklahoma City Metropolitan Area is growing at 1.46%, generally the same as the national growth rate. Comparatively, the State of Oklahoma is growing at 1.0% annually. El Reno is experiencing a growth rate of 0.33%.

The 2010 Census data for housing values has not, as of this writing, been released. But between 1995 and 2010, El Reno's housing stock was increased by the construction of 346 single-family homes – an average of about 23 new homes per year.

An El Reno Regional Airport's connector road has been repaved and 39 acres has been purchased on SW 27th St. for a new public safety building and possibly a business park.

El Reno also has plans to partner with the University of Oklahoma to upgrade the historic Route 66 corridor on the corner of Sunset and Choctaw.

1.7 Critical Facilities

El Reno has 85 critical facilities that include City, County, State and Federal offices and agencies, schools, financial institutions, structures of historical value, and medical or health care facilities, including nursing homes and assisted living facilities. These are listed in the Table F.2-5 and presented in Figures F.2-5, F.2-6, F.2-7, and F.2-8.

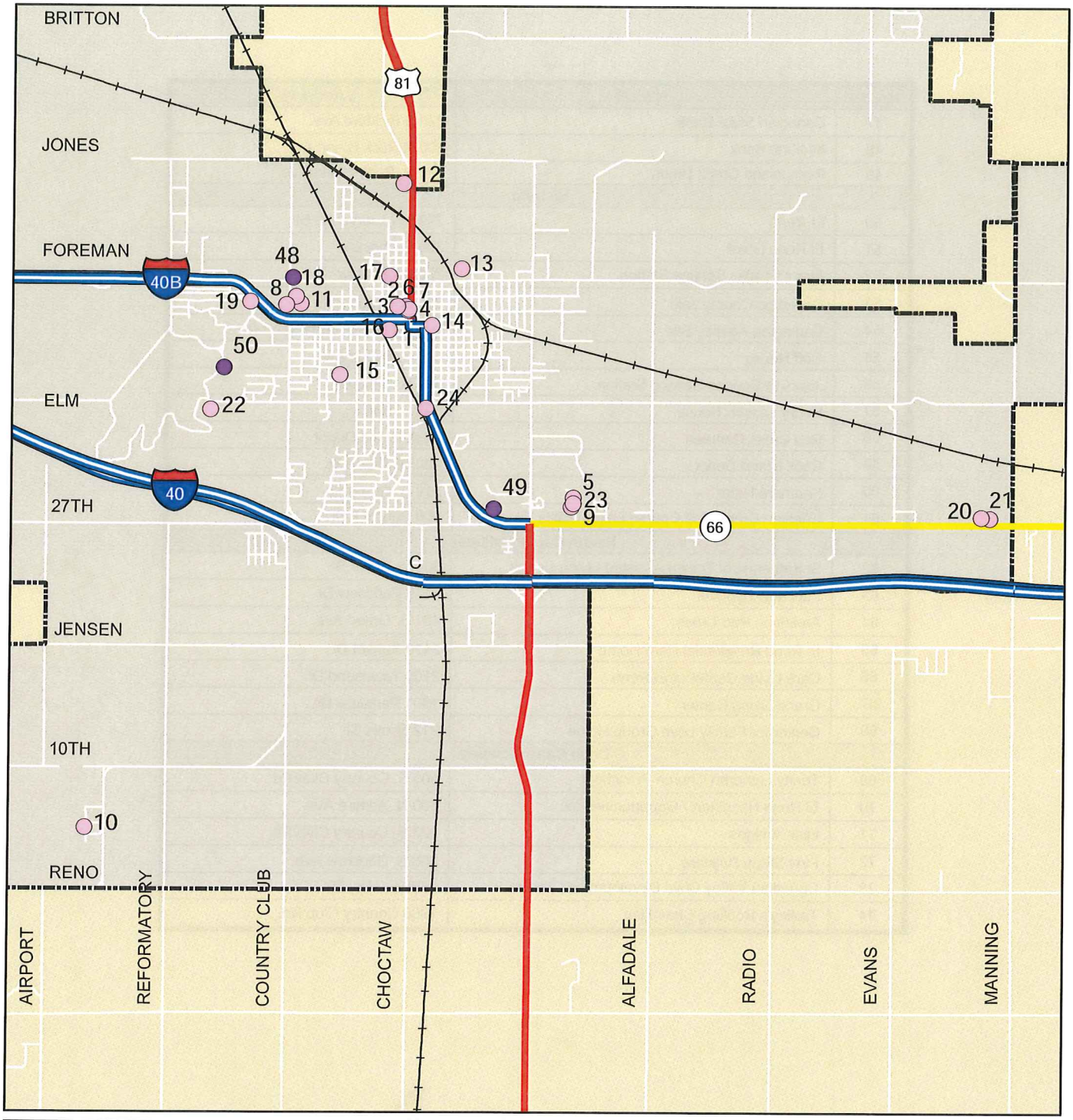
Table F.2–5 El Reno Critical Facilities

Map ID	Name	Address
	City Government	
1	El Reno City Hall	101 N Choctaw Ave.
2	El Reno Municipal Court	119 N. Choctaw Ave.
3	El Reno Public Safety Fire / Police Bldg	116 N Evans Ave.
4	El Reno Fire Department	219 W. Hayes St.
5	El Reno Fire Station # 2	2300 Spur Lane
6	El Reno Fire Department Annex Building	400 W. Hayes St.
7	El Reno Parks and Recreation Dept.	101 N. Choctaw Ave.
8	El Reno Parks and Recreation.	203 N. Country Club Rd.
9	El Reno Public Works Facility	2404 Spur Ln
10	El Reno Municipal Air Park	S. Airport Rd. and W. Reno Rd.
11	El Reno Motor Pool	212 N Country Club Rd.
12	El Reno Water Plant	1709 N Choctaw Ave
13	El Reno Wastewater Plant	901 N. Foster Rd.
14	Carnegie Library	215 E Wade St.
15	El Reno Municipal Swimming Pool Bath House	711 S Morrison Ave.
16	El Reno Senior Citizens Center	317 S. Grand Ave.

Map ID	Name	Address
17	Northwest Community Center	520 N Grand Ave.
18	Jenks Simmons Field House	214 N Country Club Rd.
19	El Reno PS Football Stadium (Memorial Stadium)	2001 Sunset Dr.
20	Youth and Family Services	7565 E Hwy 66
21	Red Rock Behavioral Health Service	7777 E Hwy 66
22	W Elm Water Tower	Babcock Dr. and W. Elm St.
23	Animal Control/Evidence	2400 Spur Ln.
24	El Reno Water Tower	Rock Island and Elm
Education		
25	Hillcrest Elementary School	1302 S. Miles
26	Lincoln Elementary School	500 S Keith
27	Rose Witcher Elementary School	900 S. Williams Ave
28	Webster Elementary School	100 N. "L"
29	Roblyer Middle School	427 SW 27th
30	Etta Dale Junior High School	601 S Choctaw Ave
31	El Reno High School	405 S Choctaw
32	El Reno Public Schools Administration	100 S Bickford
33	Riverside Public School	4800 E Foreman
34	Canadian Valley Technology Center	6505 E. Highway 66
35	Redlands Community College (RCC)	1300 S Country Club Rd
36	RCC Darlington Agriculture Education and Research Center	5005 Darlington Rd
37	RCC Royse Ranch Bovine Unit	Highway 81, north of Memorial Rd NE
38	RCC Royse Ranch Equine Center	Jones Rd., east of Highway 81
39	Media Arts Center	142 W. Coney St.
County Government		
C22	Canadian County Courthouse	201 N Choctaw Ave.
C23	Canadian County Sheriff	208 W Rogers
C24	Canadian County Assessor	200 N Choctaw
C25	Gary Miller Children's Justice Center	7095 E. US Hwy 66
C26	County Shop District No.1	1103 N Shepard
C27	County Shop District No. 2	2305 S Evans Rd
C28	Canadian County Fairgrounds	220 N Country Club Rd
C29	Canadian County DHS	7901 E. US Hwy 66
C30	Canadian County Judicial Building/ County Clerk	201 N Choctaw
C31	Canadian County Election Board	200 S Bickford
C32	Canadian County Health Department	100 S Rock Island
State Government		
40	Oklahoma Dept of Transportation Maintenance	220 N Country Club Rd
41	Natural Resources Conservation Service	1625 E Hwy 66
42	Oklahoma National Guard Armory	2600 Melone Dr.
Federal Government		
43	El Reno USPS	203 N Evans Ave
Financial Institutions		
44	Bank of Union	2000 S Country Club Rd.
45	Rose Rock Bank	2409 S Country Club Rd.
46	Rose Rock Drive Thru	121 N Rock Island

Map ID	Name	Address
47	Canadian State Bank	220 S Bickford Ave.
48	MidFirst Bank	100 N Rock Island Ave.
49	Rock Island Credit Union	320 S. Rock Island Ave.
	Historic	
50	Ft Reno	7107 W Cheyenne St
51	El Reno Hotel	300 S Choctaw
52	Avant's Cities Service Station	220 S Choctaw
53	Canadian County Jail	300 S. Evans Ave.
54	Darlington Agency Site	Darlington Rd. and Airport Rd.
55	Goff House	506 S. Evans Ave.
56	Jackson Conoco Service Station	301 S. Choctaw
57	Henry Lassen House	605 S. Hoff
58	Red Cross Canteen	Rock Island Depot
59	Rock Island Depot	400 W. Wade St.
60	Southern Hotel	319 S. Grand St.
61	Crimson Creek Golf Course Lake Facility	800 Babcock Dr.
	Health Care Facilities	
62	St Katherine of Drexel Assisted Living Center	301 W Wade St
63	Parkview Hospital	2115 Parkview Dr
64	American Red Cross	401 S. Grand Ave.
65	El Reno Residential Care Home	2410 Sunset Dr.
66	Care Living Center of El Reno	2100 Townsend Dr.
67	Grace Living Center	1901 Parkview Dr.
68	Center for Family Love Group Home	212 Scotts St.
	Child Care Facilities	
69	Trinity Lutheran Church Preschool	500 S. Country Club Rd.
70	El Reno Headstart / Opportunities Inc.	500 N. Admire Ave.
71	Little Amigos	923 S. Country Club Rd.
72	First Steps Daycare	405 S. Choctaw Ave.
73	Canadian Valley Child Development Center	6505 E. Hwy 66
74	Twilley's Rocking Chair Day	1900 Country Club Rd.

Parkview Hospital, El Reno, Oklahoma



LEGEND

- Interstate
- US Highway
- State Highway
- Turnpike
- City Government
- State
- City Limits

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Planning Consultants

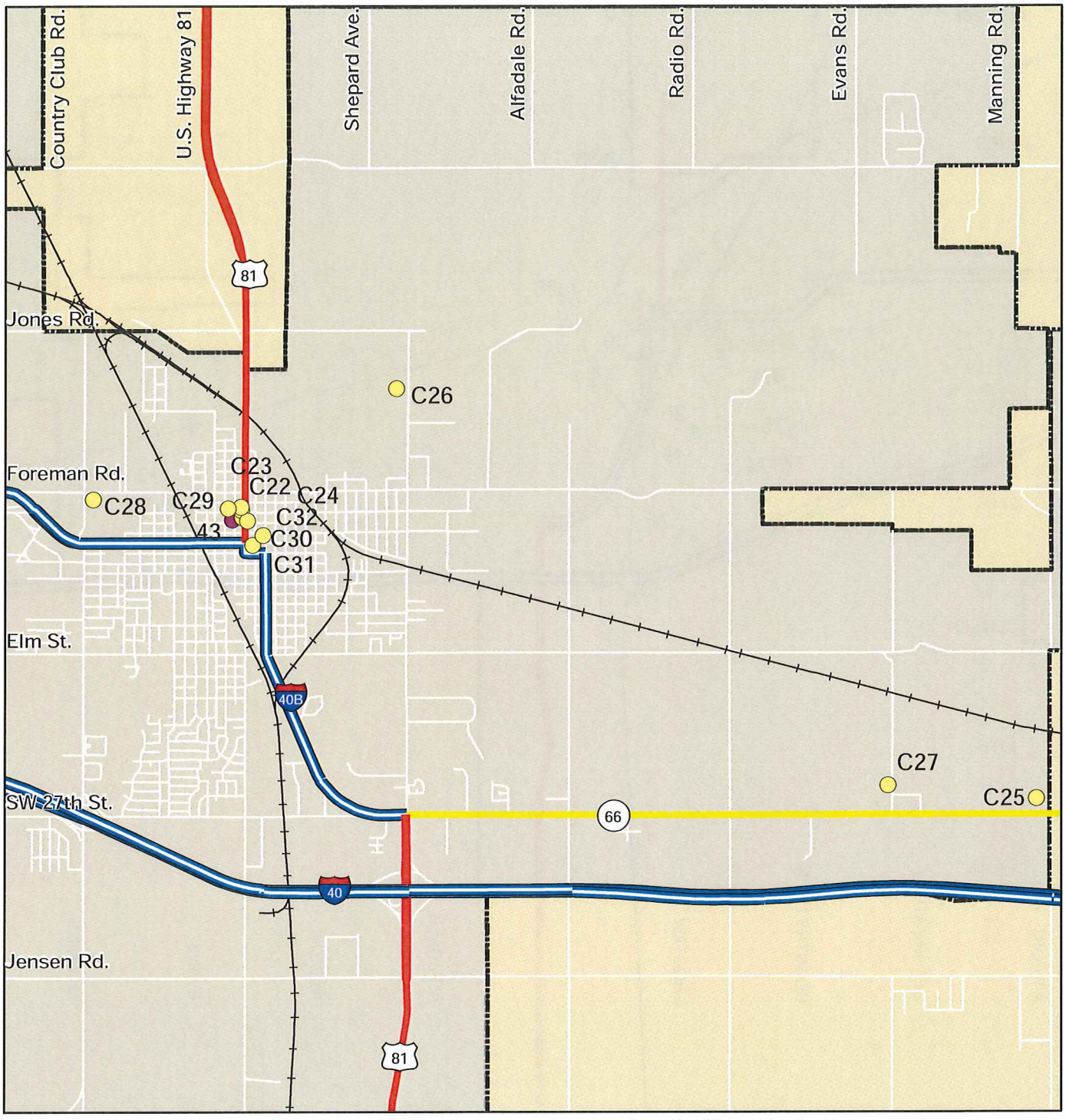
0 0.5 1 Miles

N W E S

Figure F.2-5

City of El Reno

Critical Facilities-
City and State Government



LEGEND

- Interstate
- US Highway
- State Highway
- Turnpike
- Federal
- County
- City Limits

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Planning Consultants

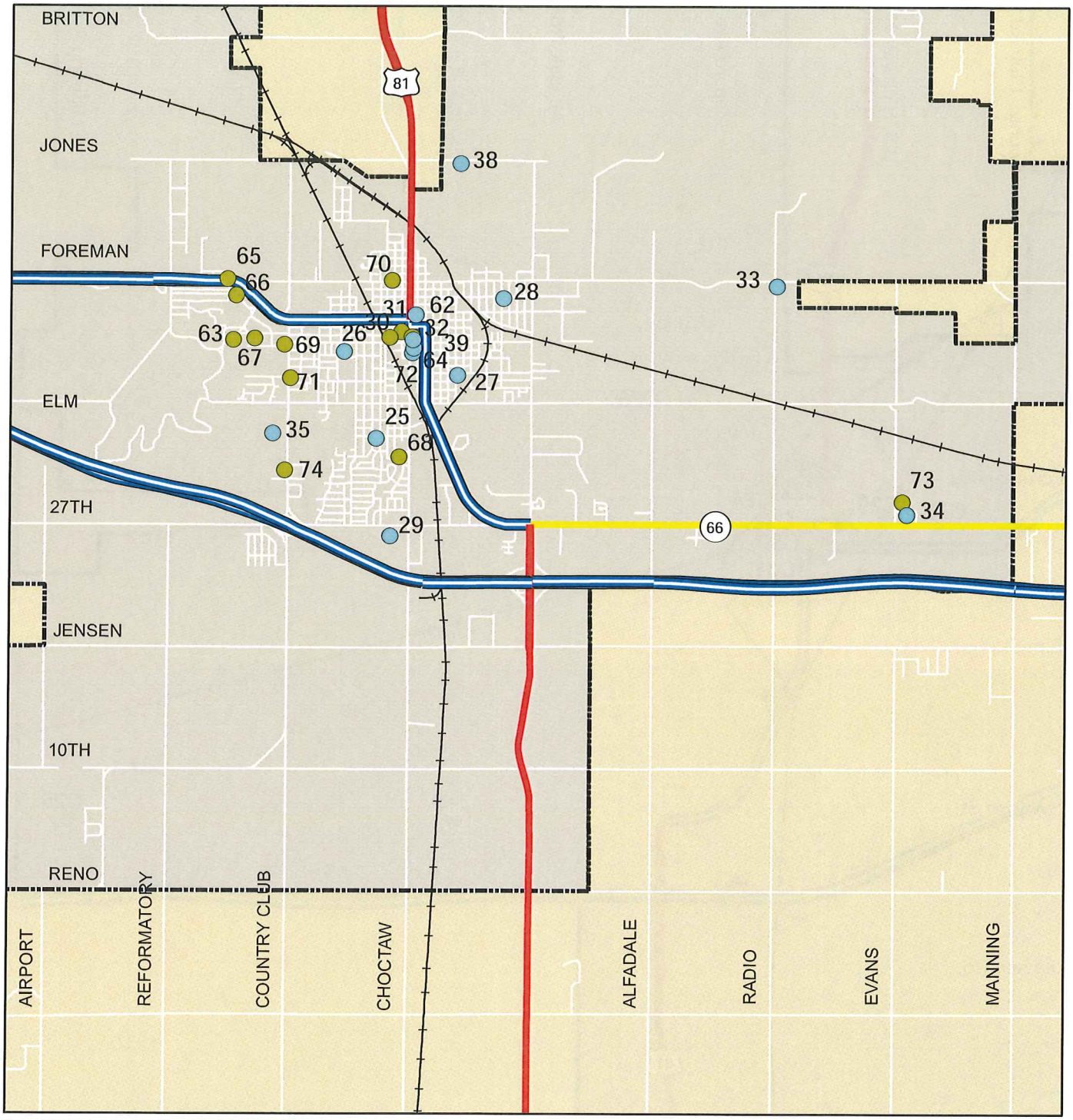
0 0.5 1 Miles

N W E S

Figure F.2-6

City of El Reno

Critical Facilities-
County and Federal Government



LEGEND

- Interstate
- US Highway
- State Highway
- Turnpike
- Child Care/ Health Care
- Public Schools
- City Limits

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Planning Consultants

0 0.5 1 Miles

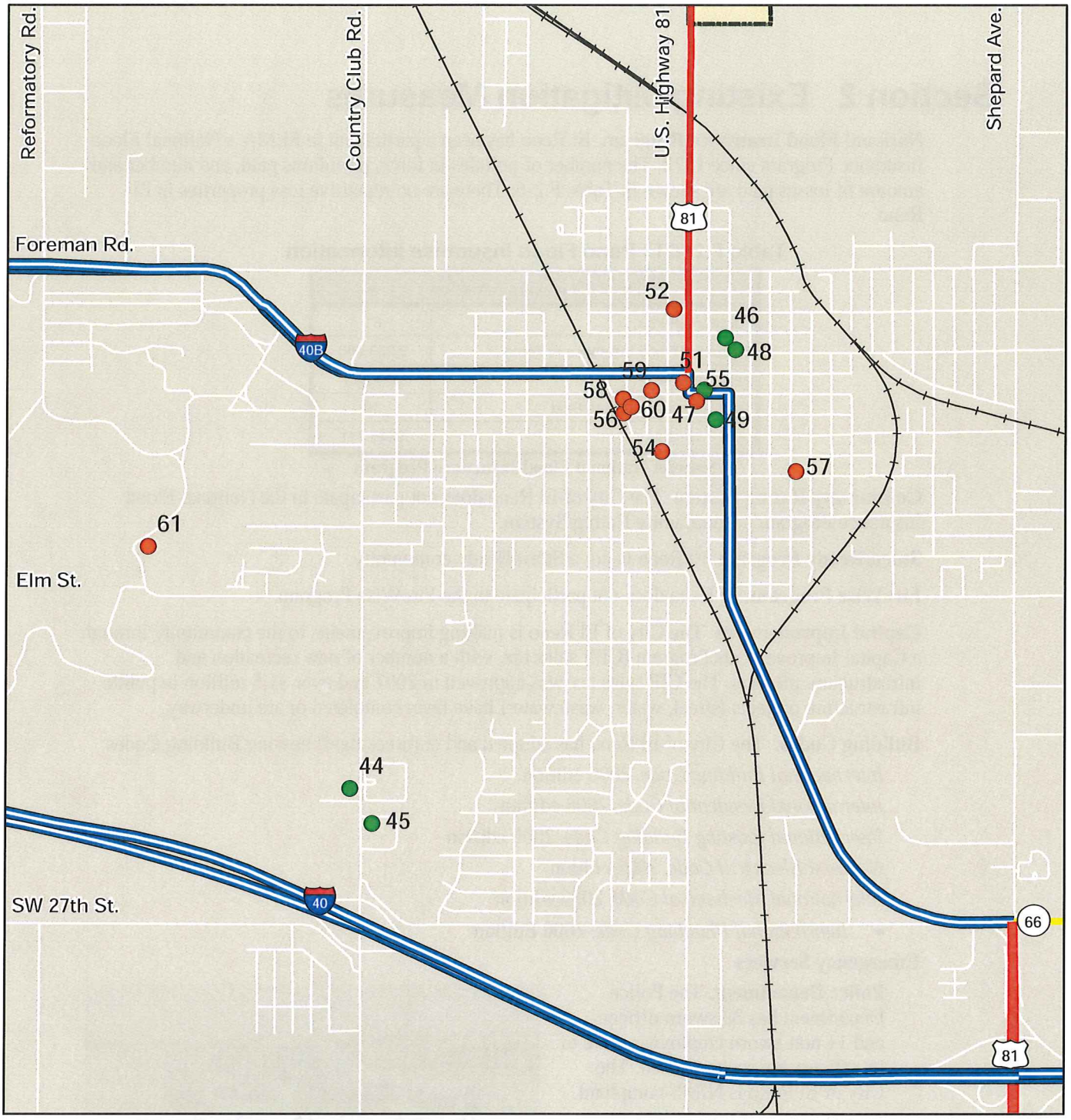
N W E S

Figure F.2-7

City of El Reno

Critical Facilities-

Public Schools and
Child Care/ Health Care



LEGEND

- Interstate
- US Highway
- State Highway
- Turnpike
- Financial
- Historic
- City Limits

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Planning Consultants

0 0.25 0.5 Miles

N W E S

Figure F.2-8

City of El Reno

Critical Facilities-
Financial and Historic

Section 2 Existing Mitigation Measures

National Flood Insurance Program. El Reno has been a participant in FEMA's National Flood Insurance Program since 1973. The number of policies in force, premiums paid, and number and amount of losses paid are shown in Table F.2-6. There are no repetitive loss properties in El Reno.

Table F.2–6 El Reno Flood Insurance Information

Flood Insurance Information	
Policies in Force	61
Amount of Flood Insurance in Force	9,223,000
Paid Premiums	$34,236
Total Number of Losses Paid	46
Loss Payments	$648,731

Source: National Flood Insurance Program

Community Rating System. The City of El Reno does not participate in the National Flood Insurance Program's Community Rating System.

StormReady Program. El Reno is not a StormReady community.

FireWise Program. El Reno does not participate in the FireWise Program.

Capital Improvements. The City of El Reno is making improvements to the community through a Capital Improvements Program (CIP) sales tax, with a number of new recreation and infrastructure projects. The CIP sales tax was approved in 2007 and over $1.5 million in public infrastructure projects (street, water, wastewater) have been completed or are underway.

Building Codes. The City of El Reno has adopted and enforces the following Building Codes:

International Building Code, 2006 edition

International Residential Code, 2006 edition

International Existing Building Code, 2006 edition

National Electrical Code, 2008 edition

International Mechanical Code, 2006 edition

- *International Plumbing Code*, 2006 Edition

Emergency Services

Police Department. The Police Department has 32 sworn officers and 11 non-sworn employees. Five of its officers are scuba-trained. The City of El Reno is NIMS compliant.

Fire Department. El Reno's Fire Department has 19 fire fighters serving the City Limits of El Reno. In addition, the Fire Department covers the 75 square mile of unincorporated area in the El Reno Fire District. The Department's ISO rating is 4, placing it among the top 5% of US departments. The El Reno Fire Department is NIMS compliant and has aggressive inspection, code enforcement and public education programs.

El Reno Fire Department Mobile Emergency Command Center

Hospitals. Parkview Hospital is a general medical and surgical hospital with 48 beds and seven physicians.

Ambulance Service. Parkview Hospital provides ambulance service to the City.

Floodplain Management. The City of El Reno has adopted and strictly enforces FEMA's SFHA floodplain maps and standards. The El Reno City Code establishes the City's Floodplain Regulations. All construction in flood hazard areas must be permitted by the City's Floodplain Manager. The City also has codified strict drainage codes, which require that any development shall not increase drainage problems either up or downstream, while encouraging natural drainage and environmental preservation.

Hazardous Materials. The City of El Reno City Code includes strict hazardous material requirements, particularly for the handling and storage of liquefied petroleum gas.

Section 3 Planning Process

The CAC/TAC met monthly during the planning process to review progress, identify issues, receive task assignments, and advise the consultants. A list of CAC, TAC, and public meetings and dates is shown in Table F.2-7. Refer to Appendix C for meeting agendas.

Supporting the CAC is the El Reno Technical Advisory Committee (TAC), which includes representatives of departments that have roles in multi-hazard planning, response, protection, and mitigation. Most of the detail work was done by management teams consisting of the following:

City of El Reno Technical and Citizens' Advisory Committees

Jerry Smith
Canadian County Emergency Management Director

Michelle Ahern
El Reno Public Schools
Federal Programs Coordinator

BS in Elementary Education from Southwestern OSU;
M.Ed. in Administration from Southwestern OSU
OEA/NEA/EEA – Member;
Main Street of El Reno – Board Member.

Amy Brandley
Canadian County
Floodplain Administrator, GIS Manager

Studies in Social relations at Cornell University;
Studies in Geography at Oklahoma University;
OFMA – Secretary;
Cameo Training; NIMS Training.

Robert Coleman
City of El Reno
Community Development Director

AA, Political Science, Redlands Community College;
BA, Sociology/Criminal Justice, University of Central Oklahoma;
MA, Political Science/Urban Affairs, University of Central Oklahoma;
Piedmont City Council;
Oklahoma Code Enforcement Assn, Past Vice President;
Canadian County CASA Board Member;
OWRB Accredited Floodplain Manager

Tom Durante
Canadian Valley Technical Center
District Safety Coordinator

Bachelors degree in Police Science from the University of Maryland;
NIMS 100-200-700, HAZWOPER, ASSE.

James Endecott
Redlands Community College

Physical Plant Coordinator.

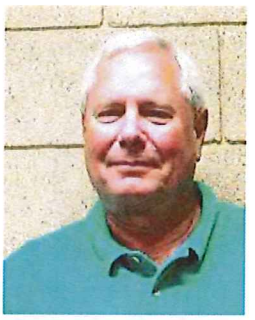
Terry Floyd
City of El Reno
Community Services Director

Bachelors degree in Mass Communications for Northwestern Oklahoma State University;
Grant writing, communications and media training.

Ronnie Funck
County Assessor, Canadian County

Bachelors Degree from Southern Nazarene University;
Vice President of Oklahoma Assessors Assn.;
American Legion; Kiwanis Secretary;
International Association of Assessing Officers;
State of Oklahoma IAAO;
PIO Training and Certificate; FEMA Certifications

Matt Goucher
El Reno Public Schools



Lonnie Hamilton
El Reno Public Schools
District Grant Coordinator

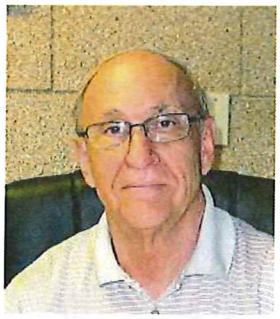
Masters degree in Education from Southwestern;
Masters degree in Counseling/Administration from Southwestern.

Jeff Johnson
El Reno Public Schools

Director of Maintenance and Operations.

Ed Lynch
Canadian Valley Technology Center
Industry Coordinator

BS in Technical Education from Oklahoma State University;
Youth and Family Services Board Member;
CERT Training.



Glenn Meriwether
Darlington School
Superintendent

Masters degree in Ed. Admin. from Oklahoma State University;

Barry Patterson
Redlands Community College
Assistant Chief of Security

In process of NIMS 100, 200, 300, 400 and 700 Certifications;
Seminars on College Safety
Seminars on Command Incident Management.

Jim Shelton
Darlington Public School
Superintendent

BS in Elementary Education from Southwestern Oklahoma State University;
MS in Educational Administration from Southwestern Oklahoma State University;
NIMS 100, 200, 700 & 800 Certifications;
VFP and other FD Training; EMT Training;

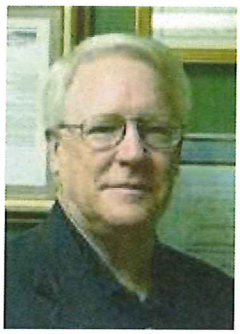
Ranet Tippins
El Reno Public Schools
Superintendent

Larry York
Banner School
Superintendent

Masters Degree in P.E. History and Sociology from Southwestern Oklahoma State University and Oklahoma State University.

Other participants:
LeAnn Tyson, *El Reno Schools*
Mendy Klepper, *El Reno Public Schools*

The TAC met periodically during the year's planning process. TAC members also attended all meetings of the CAC and meetings with elected officials.



Consultant:

Ronald D. Flanagan, CFM
Principal Planner

R.D. Flanagan & Associates
Planning Consultants
2745 E. Skelly Dr., Suite. 100
Tulsa OK 74105

Other entities involved in the development of the Mitigation Plan included:

Tulsa Partners, Inc

TPi in a Tulsa-based non-profit that has been working since 1998 to develop public / private / non-profit collaborations to help create a disaster-resistant and sustainable community and improve the community's safety and well-being by reducing deaths, injuries, property damage, environmental and other losses from natural or technological hazards. Tulsa Partners provides expertise in the areas of community education and public involvement in the planning process.

Table F.2–7 El Reno Hazard Mitigation Committee Meetings and Activities

Date	Activity
January 5, 2009	FEMA Obligation Date for Canadian County Multi-Jurisdictional Multi-Hazard Mitigation Plan Update.
February 3, 2009	Project Start Date
February 3, 2009	Introductory Meeting with Canadian County Emergency Manager/Project Manager, Jerry Smith, to discuss Project Organization.
February 18, 2009	Introductory Meeting with Canadian County Community and School Officials to discuss HM Project.
April 7 , 2009	El Reno Planning District Multi-Hazard Mitigation Team Staff Introductory/Organizational Meeting: Discuss El Reno HM Plan.
May 5, 2009	El Reno Hazard Mitigation Team Community Data Meeting: Reviewed maps and demographic data.
June 2, 2009	Meeting of TAC and CAC; Presentation, review, discussion of Lightning and Hail; Goals and Objectives; Existing Mitigation Measures, Potential additional Mitigation Measures, Hazard Priority Matrix.
September 1, 2009	Meeting of TAC and CAC; Presentation, review, discussion of Extreme Heat and Drought; Goals and Objectives; Existing Mitigation Measures, Potential additional Mitigation Measures, Hazard Priority Matrix.
October 6, 2009	Meeting of TAC and CAC; Presentation, review, discussion of Mass Communication, Earthquakes and Expansive Soils; Goals and Objectives; Existing Mitigation Measures, Potential additional Mitigation Measures, Hazard Priority Matrix.
November 4, 2009	Meeting of TAC and CAC; Presentation, review, discussion of Fires and Wildfires; Goals and Objectives; Existing Mitigation Measures, Potential additional Mitigation Measures, Hazard Priority Matrix.
December 1, 2009	Meeting of TAC and CAC; Presentation, review, discussion of Severe Winter Storms and Back-Up Generators; Goals and Objectives; Existing Mitigation Measures, Potential additional Mitigation Measures, Hazard Priority Matrix.
January 5, 2010	Meeting of TAC and CAC; Presentation, review, discussion of Hazardous Materials and Transportation Hazards; Goals and Objectives; Existing Mitigation Measures, Potential additional Mitigation Measures, Hazard Priority Matrix.

Date	Activity
February 2, 2010	Meeting of TAC and CAC; Presentation, review, discussion of Flooding and Dam Failures; Goals and Objectives; Existing Mitigation Measures, Potential additional Mitigation Measures, Hazard Priority Matrix.
March 2, 2010	Meeting of TAC and CAC; Presentation, review, discussion of Tornadoes and High Winds; Goals and Objectives; Existing Mitigation Measures, Potential additional Mitigation Measures, Hazard Priority Matrix.
April 6, 2010	Meeting of TAC and CAC; Presentation, review, discussion of Hazards Review; Goals and Objectives; Existing Mitigation Measures, Potential additional Mitigation Measures, Hazard Priority Matrix.
October 17, 2012	Meet with Canadian County and it's jurisdictions to Prioritize Mitigation Measures

Section 4 Natural and Man-Made Hazards

Hazards

General natural hazards, such as Tornadoes, High Winds, Lightning, Hail, Winter Storms, Extreme Heat, Drought, and Earthquakes affect all communities in Canadian County randomly and equally, and are addressed in Chapter 4.

The City of El Reno has identified certain facilities as critical to the health, safety and welfare of its citizens, business and economy. Table F.2-8 indicates, generally, the exposure of the critical facilities to the15 hazards covered by this Plan.

Table F.2–8 City of El Reno Critical Facilities' Hazard Exposure

Map ID	Name	Floods	Tornadoes	High Winds	Lightning	Hail	Winter Storms	Extreme Heat	Drought	Expansive Soils	Urban Fires	Wildfires	Earthquakes	Hazardous. Material Sites	Dam Failures	Transportation Hazards
1	El Reno City Hall		X	X	X	X	X	X	X		X		X	X		X
2	El Reno Municipal Court		X	X	X	X	X	X	X		X		X	X		X
3	Public Safety Fire / Police Bldg		X	X	X	X	X	X	X		X		X	X		X
4	El Reno Fire Department		X	X	X	X	X	X	X		X		X	X		X
5	Fire Station No. 2		X	X	X	X	X	X	X		X	X	X	X		X
6	El Reno Fire Department Annex		X	X	X	X	X	X	X		X		X	X	X	X
7	El Reno Parks and Recreation Dept		X	X	X	X	X	X	X		X		X	X		X
8	El Reno Parks and Recreation		X	X	X	X	X	X	X		X		X		X	X
9	El Reno Public Works Facility		X	X	X	X	X	X	X		X	X	X	X		X
10	El Reno Municipal Air Park		X	X	X	X	X	X	X	X	X		X	X		
11	El Reno Motor Pool		X	X	X	X	X	X	X		X		X		X	X
12	El Reno Water Plant		X	X	X	X	X	X	X	X	X		X		X	X
13	El Reno Wastewater Plant		X	X	X	X	X	X	X	X	X		X		X	X
14	Carnegie Library		X	X	X	X	X	X	X		X		X	X	X	X
15	El Reno Municipal Swimming Pool Bath House		X	X	X	X	X	X	X		X		X	X		
16	El Reno Senior Citizens Center		X	X	X	X	X	X	X		X		X		X	X
17	Northwest Community Center		X	X	X	X	X	X	X		X		X		X	X
18	Jenks Simmons Field House		X	X	X	X	X	X	X		X		X		X	X
19	El Reno PS Football Stadium		X	X	X	X	X	X	X		X	X	X	X	X	X
20	Youth and Family Services		X	X	X	X	X	X	X		X	X	X			X
21	Red Rock Behavioral Health Service	X	X	X	X	X	X	X	X		X	X	X			X
22	W Elm Water Tower		X	X	X	X	X	X	X		X	X	X			
23	Animal Control/Evidence		X	X	X	X	X	X	X		X	X	X	X		X
24	El Reno Water Tower		X	X	X	X	X	X	X		X		X	X		X
25	Hillcrest Elementary School		X	X	X	X	X	X	X		X		X			
26	Lincoln Elementary School		X	X	X	X	X	X	X		X		X	X	X	X
27	Rose Witcher Elementary School		X	X	X	X	X	X	X		X		X			X
28	Webster Elementary School		X	X	X	X	X	X	X		X		X		X	X

Map ID	Name	Floods	Tornadoes	High Winds	Lightning	Hail	Winter Storms	Extreme Heat	Drought	Expansive Soils	Urban Fires	Wildfires	Earthquakes	Hazardous. Material Sites	Dam Failures	Transportation Hazards
29	Roblyer Middle School		X	X	X	X	X	X	X		X	X	X			
30	Etta Dale Junior High School		X	X	X	X	X	X	X		X		X	X		X
31	El Reno High School		X	X	X	X	X	X	X		X		X	X		X
32	El Reno Public Schools		X	X	X	X	X	X	X		X		X	X		X
33	Riverside Public School		X	X	X	X	X	X	X		X		X			
34	Canadian Valley Technology Center		X	X	X	X	X	X	X		X		X	X		X
35	Redlands Community College (RCC)		X	X	X	X	X	X	X		X	X	X			
36	RCC Darlington Agriculture Education and Research Center	X	X	X	X	X	X	X	X		X	X	X			
37	RCC Royse Ranch Bovine Unit		X	X	X	X	X	X	X		X	X	X			X
38	RCC Royse Ranch Equine Center		X	X	X	X	X	X	X		X	X	X			
39	Media Arts Center		X	X	X	X	X	X	X		X		X	X		X
C22	Canadian County Courthouse		X	X	X	X	X	X	X		X		X	X	X	X
C23	Canadian County Sheriff		X	X	X	X	X	X	X		X		X	X	X	X
C24	Canadian County Assessor		X	X	X	X	X	X	X		X		X	X	X	X
C25	Gary Miller Children's Justice Center		X	X	X	X	X	X	X		X	X	X			X
C26	County Shop District No.1		X	X	X	X	X	X	X		X	X	X		X	
C27	County Shop District No. 2		X	X	X	X	X	X	X		X	X	X	X		X
C28	Canadian County Fairgrounds		X	X	X	X	X	X	X		X		X		X	
C29	Canadian County DHS		X	X	X	X	X	X	X		X		X	X	X	X
C30	Canadian County Judicial Building/ County Clerk		X	X	X	X	X	X	X		X		X	X	X	X
C31	Canadian County Election Board		X	X	X	X	X	X	X		X		X	X		X
C32	Canadian County Health Department		X	X	X	X	X	X	X		X		X		X	X
40	ODOT Maintenance Facility		X	X	X	X	X	X	X		X		X		X	
41	Natural Resources Conservation Service		X	X	X	X	X	X	X		X	X	X	X		X
42	Oklahoma National Guard Armory		X	X	X	X	X	X	X		X		X		X	
43	El Reno USPS		X	X	X	X	X	X	X		X		X	X	X	X
44	Bank of Union		X	X	X	X	X	X	X		X	X	X			
45	Rose Rock Bank		X	X	X	X	X	X	X		X		X	X		
46	Rose Rock Drive Thru		X	X	X	X	X	X	X		X		X	X	X	X
47	Canadian State Bank		X	X	X	X	X	X	X		X		X	X		X
48	MidFirst Bank		X	X	X	X	X	X	X		X		X	X	X	X
49	Rock Island Credit Union		X	X	X	X	X	X	X		X		X	X		X
50	Ft Reno		X	X	X	X	X	X	X		X		X			
51	El Reno Hotel		X	X	X	X	X	X	X		X	X	X		X	X
52	Avant's Cities Service Station		X	X	X	X	X	X	X		X		X	X		X
53	Canadian County Jail		X	X	X	X	X	X	X		X		X	X	X	X
54	Darlington Agency Site	X	X	X	X	X	X	X	X		X	X	X			

Map ID	Name	Floods	Tornadoes	High Winds	Lightning	Hail	Winter Storms	Extreme Heat	Drought	Expansive Soils	Urban Fires	Wildfires	Earthquakes	Hazardous Material Sites	Dam Failures	Transportation Hazards
55	Goff House		X	X	X	X	X	X	X		X		X			X
56	Jackson Conoco Service Station		X	X	X	X	X	X	X		X		X	X		X
57	Henry Lassen House		X	X	X	X	X	X	X		X		X			X
58	Red Cross Canteen		X	X	X	X	X	X	X		X		X		X	X
59	Rock Island Depot		X	X	X	X	X	X	X		X		X		X	X
60	Southern Hotel		X	X	X	X	X	X	X		X		X		X	X
61	Crimson Creek Golf Course and Lake		X	X	X	X	X	X	X		X	X	X			
62	St. Katherine of Drexel Assisted Living Center		X	X	X	X	X	X	X		X		X	X		X
63	Parkview Hospital		X	X	X	X	X	X	X		X	X	X		X	
64	American Red Cross		X	X	X	X	X	X	X		X		X		X	X
65	El Reno Residential Care Home		X	X	X	X	X	X	X		X		X	X	X	X
66	Care Living Center of El Reno		X	X	X	X	X	X	X		X		X	X	X	X
67	Grace Living Center		X	X	X	X	X	X	X		X		X		X	X
68	Center for Family Love Group Home		X	X	X	X	X	X	X		X		X			
69	Trinity Lutheran Church Preschool		X	X	X	X	X	X	X		X		X		X	X
70	El Reno Headstart/Opportunities		X	X	X	X	X	X	X		X		X	X	X	X
71	Little Amigos		X	X	X	X	X	X	X		X	X	X			
72	First Steps Daycare		X	X	X	X	X	X	X		X		X	X		X
73	Canadian Valley Child Development Center		X	X	X	X	X	X	X		X		X	X		X
74	Twilley's Rocking Chair Day		X	X	X	X	X	X	X		X	X	X			

Table F.2-9 displays hazard information where there is community-specific data, as shown in the maps on the following pages.

Table F.2–9 El Reno Hazard Impacts

Hazard	Area (Sq. Mi.)	Improved Parcels	Estimated Value	Percent of Area Impacted	Impacted Population
Floods	14.80	470	$25,491,240	19%	324
Highly Expansive Soils	3.33	218	$5,675,079	3%	92
Very Highly Expansive Soils	8.79	447	$36,930,661	11%	405
Wildfire	75.46	2,860	$213,756,240	95%	6,345
Dam Failure	35.26	1,457	$54,169,128	44%	2,398
Tier II Hazardous Materials (¼ Mile)	4.70	1,816	$99,639,344	6%	4,488
Tier II Hazardous Materials (½ Mile)	18.83	4,392	$5,008,098	24%	11,420
Transportation Hazardous Materials - Highway	10.06	2,984	$167,281,348	13%	7,572
Transportation Hazardous Materials - Railroad	11.64	2,753	$92,171,990	15%	5,432

4.1 Flood

The North Canadian River enters Oklahoma in the panhandle, and passes north of Guymon, empties into Optima Lake, and emerges in a southeasterly direction. It flows into Canton Lake in Blaine County, the only major dam upstream from El Reno. The floodplain of the North Canadian River in El Reno is used mostly for agriculture and ranching, but also contains oil and gas fields, sandpits, and sewage disposal ponds.

Downstream view of the North Canadian River near El Reno.

Location

The major North Canadian River tributaries within El Reno are Fourmile Creek, Target Creek and Sixmile Creek, all of which drain northward into the River. Fourmile Creek drains about 11.5 square miles, Target Creek seven square miles, and Sixmile Creek 17 square miles. These creeks and their drainage areas are listed in Table F.2-10. The drainage basins affecting the City of El Reno, i.e., the combined 100-year floodplains of the North Canadian River and its tributaries comprise more than 12 square miles, or 16% of the land area within the City Limits, which is depicted in Figure F.2-9. (NOTE: The impact of the floodplains on downtown El Reno is presented in Figure F.2-10). Fourmile Creek, the most significant of these creels, drains most of the urbanized area of the City through culverts and channels. Flooding within the urban areas of the City is most likely to be caused by runoff from sudden, heavy rains, while the areas north of the City, in the North Canadian floodplain, are more vulnerable to riverine flooding. Thunderstorms can, and have, dumped up to 15 inches of rain in nearby areas in just a few hours.

Frequency

El Reno has experienced five flood events from 1995-2011. Given this frequency, the City can expect flooding every 3 years.

Extent/Severity

El Reno considers a flood event with a depth of less than three feet of water on a one story building to be a minor severity event and a flood event with a depth greater than three feet on a one story building to be a major severity event for both urban and flash flooding.

Impact

In all, 101 structures in El Reno are within the 100-year flood elevation: 25 in the basins of the North Canadian River, 64 on Fourmile Creek, and 12 on Sixmile Creek. The estimated values of parcels touched by these floodplains are listed in Table F.2-11.

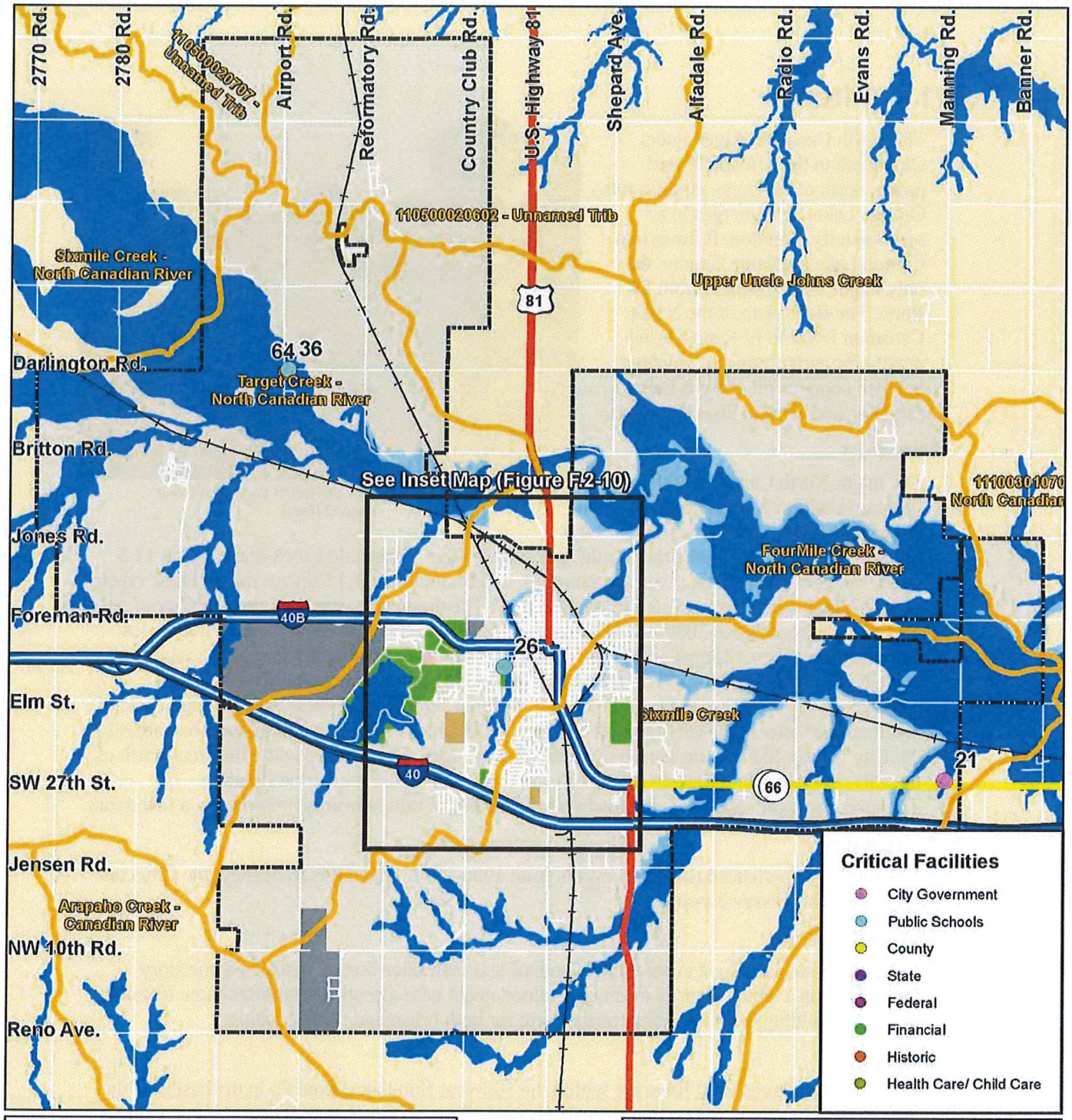


Figure F.2-9

City of El Reno

Floodplains

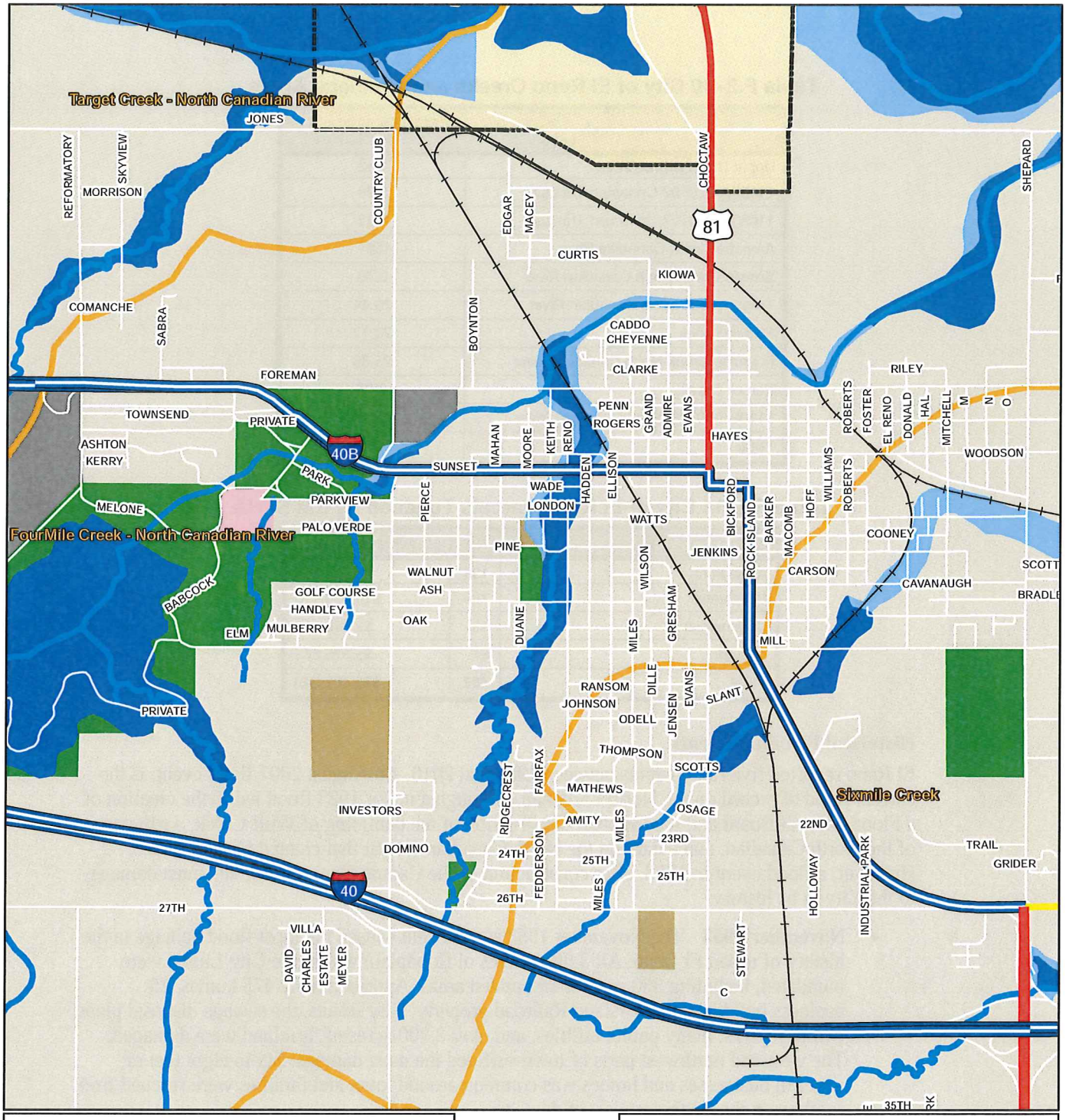


Figure F.2-10

City of El Reno

Floodplains Close-Up

Table F.2–10 City of El Reno Creeks and Drainage Areas

River/Creek	Total Drainage Area at El Reno (sq. mi.)
Upper Uncle Johns Creek	1.32
1100500020602-Unnamed Tributary	5.99
1105000020707-Unnamed Tributary	1.33
Arapaho Creek-Canadian River	0.61
Sixmile Creek-North Canadian River	0.70
Target Creek-North Canadian River	20.44
Sixmile Creek	23.12
Fourmile Creek-North Canadian River	25.36
Purcell Creek	0.06
111003010705-North Canadian River	0.83
Total	**79.76**

Table F.2–11 City of El Reno Parcels Touched by the SFHA

Type	No.	Estimated Value
Agricultural	198	$6,988,615
Residential	186	$10,360,170
Commercial	13	$2,566,215
Exempt	84	$5,575,083
Total	**482**	**$25,491,240**

Historical Flooding Events

El Reno reported five flood events between 1995 and 2010. An August 2007 flood event, is the current flood of record on the North Canadian, although a major 1923 flood led to the creation of a Flood Control Board and the eventual construction of the damming of Wolf Creek, a tributary of the North Canadian, and a dam on the North Canadian (1948) that created Canton Lake. However, a flood event in 1953, after construction of the Canton Dam, created the most damage to the City in its history.

- **November 1953** - The November 1953 storm event caused the most flood damage in the history of urban El Reno. All 3,000+ acres of floodplain within the City Limits were inundated, including 350 acres in urbanized areas. Approximately 475 homes, 25 business buildings, Rock Island Railroad property, City streets, the sewage disposal plant, two city parks, many public utilities, and over 2,700 acres of farmland were damaged. The west and northwest parts of town suffered the most damage. Six to eight feet of water in businesses and homes was common around town and families were rescued from rooftops in the northwest part of the City.
- **October 4, 1986** - The October floods of 1986, brought crests to the Canadian and North Canadian Rivers that left area communities and Canadian County devastated. The flood caused $4 million in crop damage alone (90% of the County's yearly crop harvest) in Canadian County and destroyed countless bridges, roads and structures in the flooded areas. The North Canadian River crested at 15.5 feet and the Canadian River at 11.9 feet – both rivers cresting within the same week.
- **May 1993** - Heavy rains over the Mother's Day weekend caused statewide flash floods along many of the state's major rivers, including the North Canadian. Damage was

enough to prompt a federal disaster declaration for the state. In El Reno, five inches of rain and more still in subsequent days forced the closure of several roads, inundated local recreational areas, and flooded residences.

- **August 19-20, 2007** – This is the flood of record for the North Canadian River at El Reno, with the river cresting at 23.33 feet. US Highway 81 was closed near I-40 due to high water. I-40 west of El Reno was closed for six hours by nine feet of water. Many City roads were also impassable. Numerous homes sustained at least minor damage and hospice facility sustained severe damage. Losses were estimated at $100,000.

Probability/Future Events

Currently, planning for floods is based on the "100-year flood." Depending on the extent of the rainfall, larger storms could be expected to overwhelm land, roads, bridges, buildings, and other structures in floodplains. Frequency and magnitude, along with the location of rain and the condition of the receiving systems are factors that determine the extent of risk to people and property during floods. For example, conditions such as debris in creeks could intensify flooding problems.

No probability has been assigned for other factors that can potentially impact flooding in El Reno, such as waterline breaks or snowmelt. Flooding due to events such as these cannot be predicted statistically because they do not occur with enough frequency within the City of El Reno.

Flooding hazards from dam breaks and lake releases are discussed in sections specific to these hazards.

Worst-Case Flooding Scenario

If the flood of November 1953 was the most damaging high water event in El Reno's history, greater even than the peak flood of August 2007, it is an indication that the careful management of floodplain lands by the City, along with the presence of the upriver flood control dams at Wolf Creek and Canton, have had significant beneficial results. However, a worst-case event would likely be a 2007 flood event, with flows of 33,000 cfs through the City, combined with a contemporaneous emergency release from Canton Dam of an additional 80,000 cfs. Such a combination of "worst-case" events has an extremely low probability.

Conclusion

El Reno has a High vulnerability to and High probability of the Flood Hazard. Over the past 50 years, progress has been made in protecting the lives and property of the citizens of El Reno from flooding. It is believed that because of its flooding history, El Reno has been more conservative in its development of floodplain land than other cities. El Reno has been a member of the National Flood Insurance Program since 1973. The community has reported five flood events between 1995 and 2010, and major flooding in 1923, 1953 and 2007. Given this frequency, El Reno can expect flooding every three years and catastrophic floods every 30 years

To protect citizens from flooding, this Plan has identified several flood mitigation measures to be implemented by the City. These recommended projects are discussed in Chapter 6.

4.2 Tornado

The climatological and geographical aspects of this hazard in Canadian County are discussed more fully in Chapter 4.2.

Frequency

El Reno reported six tornado events from 1995-2011. Given this frequency, the community can expect a tornado every 2.5 years.

Extent/Severity

El Reno considers a minor severity tornado to be tornado of level EF1 or lower on the Fujita Scale and major severity tornado to be a tornado greater than a level EF1 on the Fujita Scale.

Impact

Storms that generate tornadoes also have the ability to cause lightning, hail, high winds, and flooding damage. Tornadoes can result in the loss of homes, businesses, and lives. They can also damage individual and community revenues, increase the need for medical care and require government assistance to recover.

History

El Reno tornadoes are summarized briefly below.

- **May 3, 1999** – In one of the largest tornado outbreaks in Oklahoma history, several supercells spawned 58 tornadoes, three of which touched down near El Reno. The first tornado did no damage and the second caused $25,000 in damage. The third tornado formed northeast of El Reno and tracked north for 22 miles, varying in width from 100 to 500 yards. Two mobile homes were destroyed, and three other homes received F1-level damage. Total losses were $125,000.
- **April 24, 2006** – Two tornadoes (both F1) touched down southwest of El Reno. The first was on the ground for 2.5 miles and did little damage. The second tracked from five miles southwest of El Reno to the east-southeast where it passed through the El Reno Regional Airport. Two hangers and 10 aircraft were damaged. Total losses were approximately $1.5 million.
- **May 8, 2007** – An EF1 tornado, 150 yards wide and two miles long, touched down three miles southeast of El Reno and tracked through the southern edge of the City damaging dozens of buildings, billboards, power poles and trees. Losses were estimated at $3 million.
- **May 24, 2011** – Two tornadoes, one of them an EF5, touched down in southwestern Canadian County and tracked 65 miles to the northeast passing through the north side of El Reno. In El Reno the tornado damaged homes in the Skyline Addition and near US Highway 81 and Britton Rd., at Fort Reno and along Britton Rd., east of the City. The El Reno MesoNet station recorded winds of ***151 mph***. The tornado's track is shown in Figure F.2-11.

May 24, 2011 tornado damage north of El Reno

Worst-Case Tornado Scenario

For the City of El Reno, a worst-case EF5 event would damage 3,179 parcels and result in estimated losses of $138,760,631, itemized in Table F.2-12. In all, 30 critical facilities would be impacted as illustrated in Figure F.2-12.

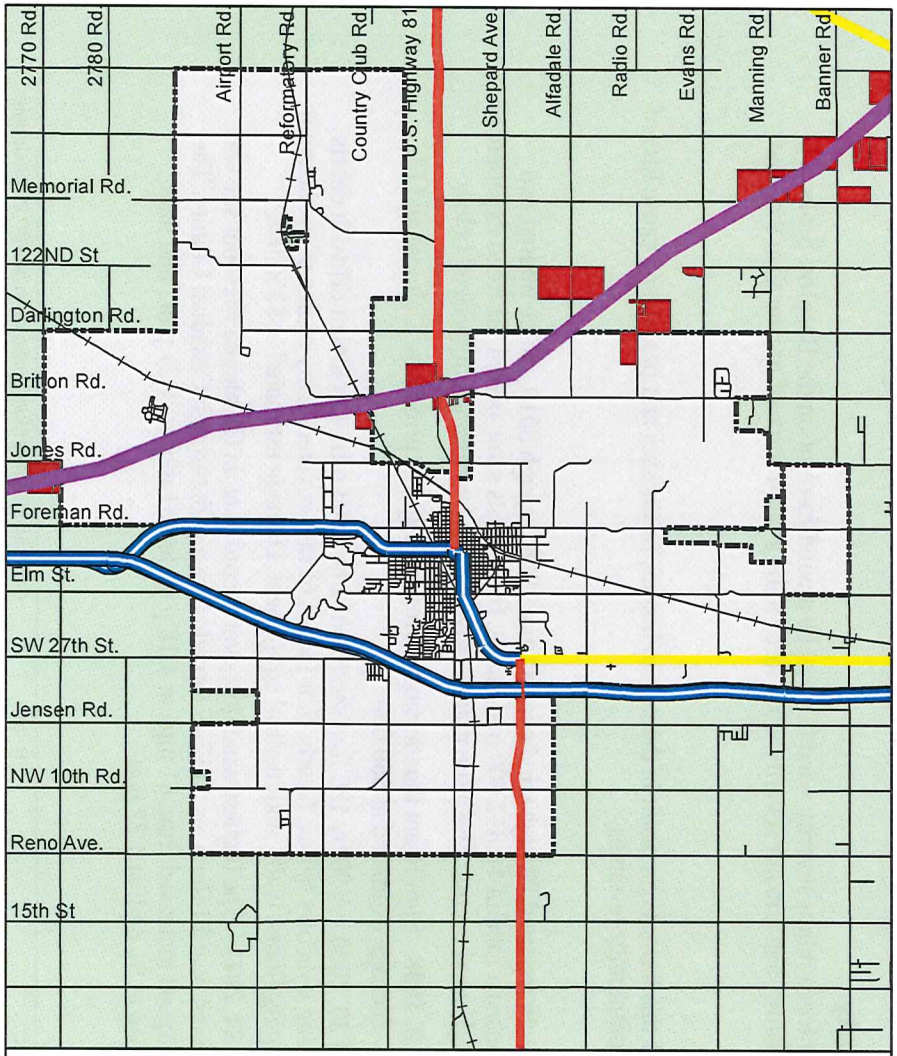


Figure F.2-11: *City of El Reno 2011 Tornado Track*

Flood
- 2011 Tornado Track
- Parcel Damaged

Boundaries
- El_Reno_City_Limits
- Canadian County
- Statewide Counties

Transportation
- Interstate
- US Highway
- State Highway
- Turnpike
- Local or Rural Road
- Railroads

Flanagan & Associates, LLC

0 1.5 3 Miles

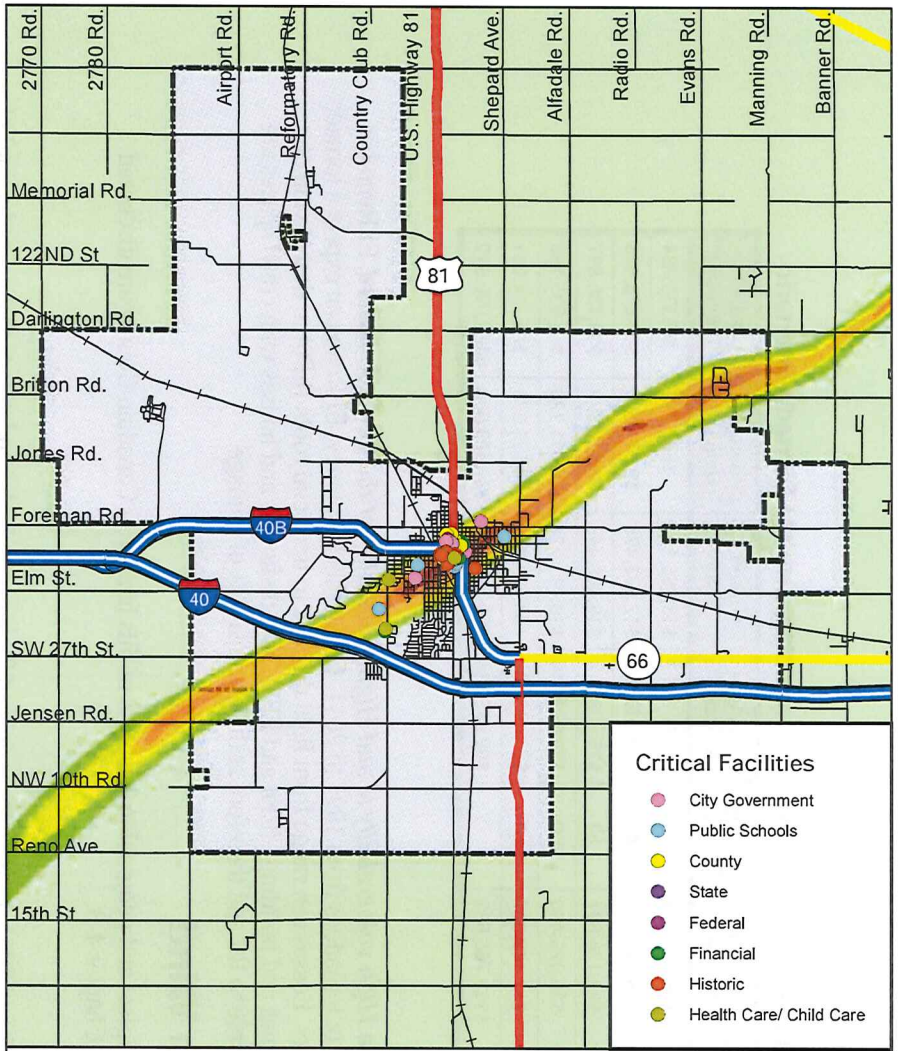


Figure F.2-12: *City of El Reno Tornado Scenario*

Tornado Scenario
- F-Scale 1
- F-Scale 2
- F-Scale 3
- F-Scale 4
- F-Scale 5

Boundaries
- El_Reno_City_Limits
- Canadian County
- Statewide Counties

Transportation
- Interstate
- US Highway
- State Highway
- Turnpike
- Local or Rural Road
- Railroads

Flanagan & Associates, LLC

0 1.5 3 Miles

Table F.2–12 City of El Reno, Canadian County Tornado Scenario

EF Scale	Estimated Market Value	Damage Factor	Structure Damage	Contents Value	Contents Damage	Total Damage
1	$26,710,271	.10	$2,671,027	$13,355,136	$667,757	$3,338,784
2	$25,746,956	.40	$10,298,782	$12,873,478	$2,574,696	$12,873,478
3	$33,136,897	.80	$26,509,518	$16,568,449	$6,627,379	$33,136,897
4	$36,023,440	1.0	$36,023,440	$18,011,720	$18,011,720	$54,035,160
5	$17,143,067	1.0	$17,143,067	$8,571,534	$8,571,534	$25,714,601
Totals	$138,760,631		$92,645,834	$69,380,316	$36,453,085	$129,098,919

Conclusion

El Reno has a High vulnerability to and High probability of the Tornado hazard. El Reno has experienced six tornadoes from 1995 to 2011. Given this frequency, El Reno can expect a tornado every 2.5 years. Losses can range from light damage to trees and roofs (EF0) to destruction of well-built homes and buildings (EF4 and EF5). Mobile homes and houses with crawl spaces are more susceptible to lift and therefore at the greatest risk of damage.

4.3 High Wind

The climatological and geographical aspects of this hazard in Canadian County are discussed more fully in Chapter 4-3.

Frequency

Between 1995 and 2011, El Reno experienced 26 separate high wind events that caused a total of $523,000 in damage. Based on this data, El Reno can expect about 1.7 high wind events each year that cause an average of $20,115 damage per event, or annual damages of $34,866.

Extent/Severity

El Reno considers a minor severity wind force to be a wind force of on the Beaufort Scale of 9 (55 mph) or below, and a major severity wind force to be a wind force of greater than 9 on the Scale.

Impact

The impact of this hazard can result in damage to homes, businesses and people and cause loss of income and community revenues.

History

Canadian County reported 73 high wind events from 1995 through 2010, which injured two people and caused a total of $6,812,000 in damage. During this same period, El Reno experienced 26 separate high wind events. The more noteworthy of these events are summarized below.

- **June 8, 1998** - Significant thunderstorm wind damage occurred near Calumet and El Reno. Damage estimated at $50,000.
- **April 30, 2000** - A 90 by 120 foot section of a hospital roof was blown off with debris breaking windows below. Nearly four inches of rain covered many rooms of the hospital damaging floors, walls, and medical equipment. Damage estimated at $350,000.
- **May 24, 2011** - The highest wind gust ever recorded at an Oklahoma Mesonet site was measured near El Reno, as an EF-5 tornado tore a path through Canadian County. The wind speed increased from 61 mph at 4:18 p.m. to 151 mph at 4:21 p.m., and then dropped to 91 mph at 4:22 p.m.

Worst Case High Wind Event

For the City of El Reno, a worst-case high wind event would impact 3,115 residences, 289 businesses, and 21 agricultural properties, and result in total estimated losses of $586,805.75 as is presented in Table F.2-13.

Table F.2–13 El Reno High Wind Worst Case Scenario Damages

EF Scale	Parcel Count	Damage Factor	Averaged Damage	Hospital Cost Factor	Hospital Costs	Debris Factor	Averaged Debris (yds.)	Utility Loss Factor	Utility Loss
Residential Properties with Estimated Improvement Values									
0	2,339	$159.68	$373,491.52	$4.39	$10,268.21	4.77	11,157.03	$2.49	$5,824.11
1	776	$159.68	$123,911.68	$4.39	$3,406.64	4.77	3,701.52	$2.49	$1,932.24
Total	3,115	$159.68	$497,403.20	$4.39	$13,674.85	4.77	14,858.55	$2.49	$7,756.35
Commercial Properties with Estimated Improvement Values									
0	275	$159.68	$43,912.00	$4.39	$1,207.25	4.77	1,311.75	$2.49	$684.75
1	14	$159.68	$2,235.52	$4.39	$61.46	4.77	66.78	$2.49	$34.86
Total	289	$159.68	$46,147.52	$4.39	$1,268.71	4.77	1,378.53	$2.49	$719.61
Agricultural Properties with. Estimated Improvement Values									
0	21	$159.68	$3,353.28	$4.39	$92.19	4.77	100.17	$2.49	$52.29
1	0	$159.68	$0.00	$4.39	$0.00	4.77	0	$2.49	$0.00
Total	21	$159.68	3,353.28	$4.39	$92.19	4.77	100.17	$2.49	$52.29
Totals									
-	3,425	-	$546,904.00	-	$15,035.75	-	16,337.25	-	$8,528.25

Conclusion

El Reno has a High vulnerability to and High probability of the High Wind hazard. The City can expect about 1.7 events each year that cause an average of $20,115 damage. The factors that contribute most to wind-related deaths, injuries, and property damage are the structure type, quality of construction, and the state of deterioration of the buildings in which people work or reside. Mobile homes, older homes, and poorly designed and constructed buildings are the most vulnerable. Uniform building codes for wind-resistant construction and local government advocacy for better quality construction practices would result in buildings being less susceptible to high winds.

4.4 Lightning

The climatological and geographical aspects of this hazard in Canadian County are discussed more fully in Chapter 4-4.

Frequency

Canadian County reported nine damaging lightning events from 1995 through 2005, two of them in El Reno that caused a total of $35,000 damage. Given this data, El Reno can expect a damaging lightning strike every five years that results in $17,500 damage.

Extent/Severity

Based on the information provided by the National Weather Service, Chapter 4, El Reno considers a negative cloud-to-ground flash with multiple return strokes, that causes no loss of life or injury and less than $1,000 in property damage, to be a minor severity lightning event; and a

positive cloud-to-ground flash with a continuous or high peak current, that causes loss of life and/or injury and more than $1,000 property damage, to be a major severity lightning event.

Impact

The impact of this hazard could result in people injured or killed, being displaced from their homes, businesses being closed, and financial loss due to urban fire, wildfire and damaged electronic equipment and data files.

History

El Reno reported two lightning strikes between 1995 and 2005, which are summarized below.

- **June 24, 2000** – A lightning strike caused $10,000 in equipment damage at the El Reno Police Department.
- **June 11, 2003** – Lightning caused $25,000 damage to the Masonic Temple, El Reno's oldest building.

Worst-Case Lightning Scenario

A worst-case lightning event for El Reno would be one that interrupts the electrical system – either temporarily or for an extended period – and incapacitates electronics at one or more of the City's primary critical facilities.

Conclusion

El Reno has a High vulnerability to and High probability of the Lightning hazard. El Reno can expect to experience about nine severe thunderstorm events a year, any one of which can carry potentially damaging lightning. Between 1995 and 2005, El Reno reported two lightning strikes that caused a total of $35,000 in damage. Electronic equipment, from personal computers to enterprise-level communications systems, can be seriously damaged by power surges from lightning. Surge protection should be included in all critical facility electronic system to minimize the risk of damage from lightning.

4.5 Hail

The climatological and geographical aspects of this hazard in Canadian County are discussed more fully in Chapter 4-5.

Frequency

Between 1995 and 2010 El Reno reported 20 hail events with stones ranging in size from 0.75 to 2.75 inches. No damage amounts have been reported for these events. Given this frequency, El Reno can expect about 1.3 hail events each year.

Extent/Severity

El Reno considers a minor severity hail storm to be a hail storm of H2 or lower on the Combined NOAA/ TORRO Hailstorm Intensity Scale (See Chapter 4.5), and a major severity hail storm to be a hail storm greater than H2 on the Combined NOAA/ TORRO Hailstorm Intensity Scale.

Impact

Hail can damage cars, shred roof coverings, and lead to water damaged ceilings, walls, floors, appliances, and personal possessions. Large hailstones can also cause serious bodily injury. As a general rule, hail damage increases sharply when stones reach 1.75 inches (H5) in diameter and higher, accompanied by high winds. The impact of this hazard remains mainly financial, although during the harvest season damage to crops can be substantial to farmers and the local economy.

History

El Reno reported 20 separate hail events from 1995 through 2010, for an average of 1.3 events per year. Hail stones for these events ranged in size from 0.75 inches to 2.75 inches, with two storms having stones 1.25 inches in diameter, one with 1.75-inch stones, and one with 2.75-inch hail. No damage reports are available for any of these events, three of which are summarized below.

- **April 30, 1961** – Hail seven inches in size fell about one mile southwest of El Reno.
- **April 27, 1994** – Hail 1.75 inches in diameter was reported six miles northeast of El Reno.
- **April 24, 2006** – 2.75-inch hail reported one mile north of El Reno.
- **March 30, 2008** – Hail 1.75 inches in size fell five miles north of El Reno.

Worst-Case Hail Scenario

The worst case scenario for El Reno would be a repeat of the May 29, 2004 at Okarche. (See Chapter 4.5)

Conclusion

El Reno has a High vulnerability to and High probability of the Hail hazard. El Reno has been hit by hail 20 times in the period 1995 through 2010, with hail ranging from 0.75 to 2.75-inches in diameter. As a general rule, hail damage increases sharply when stones reach 1.75 inches and higher, driven by high winds. El Reno experienced three potentially damaging hail events between 1994 and 2009. Given this measure, El Reno can expect a potentially damaging hail event every 5.3 years.

4.6 Severe Winter Storm

The climatological and geographical aspects of this hazard in Canadian County are discussed more fully in Chapter 4-3.

Frequency

During the period 1995 through 2010, Canadian County reported 35 ice and snow events, or an average of 2.3 winter storms per year. It is assumed that El Reno has experienced the same number of storms. Only three of the NCDC narratives for ice and snow events mention El Reno specifically, for a power outage and two highway deaths on I-40 during different ice storms.

Extent/Severity

El Reno considers a minor severity winter storm to be a Level 2 event or below (ice accumulation of less than ¼ inch—see Table 4-21), and a major severity event to be Level 3 and above (ice accumulation above ¼ inch) resulting in personal injury or death, water or power outages, travel disruptions, damage to private property and public infrastructure.

Impact

The impact of a severe winter storm can affect a region for weeks and even months. People and livestock are susceptible to frostbite and death from exposure. Houses, roads, electrical poles and lines, water systems, are all vulnerable to severe winter storms. Houses are damaged from the weight of snow or ice, roads buckle and/or become slick and hazardous, electrical poles and lines break, and electricity and heat are disrupted, water lines freeze and burst, and people and livestock have no water.

History

Only three of the NCDC narratives for ice and snow events in Canadian County between 1995 and 2010 mention El Reno specifically: one for a power outage and two separate highway deaths on I-40 during different ice storms.

Worst-Case Winter Storm Scenario

A worst-case sever winter storm for El Reno is described Chapter 4.6.4 for this hazard.

Conclusion

El Reno has a High vulnerability to and High probability of the Winter Storm hazard. In part because Oklahoma is not a northern tier state and regularly subjected to prolonged winter storms, its communities are often unprepared for extreme ice and snow storms, particularly prolonged conditions of that nature.

4.7 Extreme Heat

The climatological and geographical aspects of this hazard in Canadian County are discussed more fully in Chapter 4-7.

Frequency

Canadian County reported four extreme heat events for the period 1996 through 2011, or an average of one every 3.7 years. There is one NCDC report that mentions El Reno specifically. It is assumed that El Reno experienced the same number of events.

Extent/Severity

El Reno considers minor severity extreme heat to register 95°F or less on the NOAA National Weather Service Heat Index and major severity extreme heat to register 95°F on the NOAA Heat Index that lasts for more than two weeks.

Impact

The impact of extreme heat is primarily the danger to people and the increased risk of wildfire and drought, power outages and water shortages. Muscle cramps, nausea, heat exhaustion, heat stroke, and death frequently result from extended periods of extremely high temperatures.

History

During the period 1996 through 2011, Canadian County experienced four extreme heat events or an average of one every 3.7 years. Only one of the NCDC narratives for these events mentions El Reno specifically.

- **August 17, 1999** – Two heat fatalities were reported in central Oklahoma. Both fatalities were in homes with inoperable air conditioners.

Worst-Case Extreme Heat Scenario

A worst-case scenario for El Reno would be a repeat of the extreme heat event of 2011, but lasting three months, preceded by a period of drought, and complicated by high winds, wildfire, and blackouts due to widespread power failures. The possibility of heat-related fatalities, wildfires and water shortages during such an extended period of high heat are High.

Conclusion

El Reno has a High vulnerability to and High probability of the Extreme Heat hazard. Because Oklahoma summers are almost always hot and humid, heat is something the citizens of Canadian County expect. However, extreme heat summers like 2011, when the average high temperature was a record 86.8°F, worsened by drought and failed crops, are unusual even for Oklahomans and

can result in heat-related illness, water shortages, electric grid failures, and staggering economic losses. The hazard can be mitigated by notifications and warnings to vulnerable populations, the establishment of cooling rooms, utility cost assistance and air conditioner loan programs, back-up electric generation for critical facilities, Medical Reserve Corps training, and similar measures.

4.8 Drought

The climatological and geographical aspects of this hazard in Canadian County are discussed more fully in Chapter 4.8.

Location

El Reno is a mixed agricultural and oil and gas industry community. El Reno's vulnerability to drought is moderated somewhat by its location along the North Canadian River, as the City's water is drawn from the basin's relatively prolific and stable alluvial and terrace aquifers.

Frequency

El Reno has experienced four droughts from 1996 through 2011.

Extent/Severity

El Reno considers a minor severity drought to be a drought greater than a -2 on the Palmer Drought Index and a major severity drought to be -2 or lower on the Index. The Index goes from -4 to +4, with lower numbers indicating greater drought. See Tables and Figures in Chapter 4.8.1 for a discussion of drought indexes.

Impact

The most direct impact of drought is economic rather than loss of life or immediate destruction of property. Drought affects water levels for use by communities, industry, agriculture, and individual consumers. During droughts crops do not mature, wildlife and livestock are undernourished, land values decrease, unemployment increases, and tax revenues decline. In addition, water shortages affect fire-fighting capabilities. Drought can also affect power production and costs. Most droughts also increase the danger of wildland fires.

History

Along with Canadian County, El Reno has experienced four droughts from 1996 to 2011. No details are given about El Reno for these events in the NCDC data base, but given the widespread nature of the hazard, it can be assumed that these events impacted El Reno as well.

Agricultural photos from the 2011 drought indicate that Canadian County was severely impacted. Most communities in central Oklahoma, including Oklahoma City and El Reno, were forced to resort to some form of rationing during the 2011 drought. See Chapter 4-8 for additional detail on this hazard.

Worst-Case Drought Scenario

A worst-case scenario would be a drought as severe as that of 2011 extended over a two- or three-year period, combined with low flows on the North Canadian River and significantly reduced aquifer recharge.

Conclusion

El Reno has a High vulnerability to and Moderate probability of the Drought hazard. The City's water is drawn from groundwater wells, drilled into various alluvial and terrace aquifers of the North Canadian River. These groundwater resources have proven remarkably stable in the past. However, in recent years there have been significant declines in water flows in the upper North Canadian, largely due to irrigation, stock ponds, and reservoirs. El Reno has joined other

communities in forming the Central Oklahoma Water Resource Authority whose task is to find long-term solutions to the area's water needs.

4.9 Expansive Soils

Expansive soils swell when subjected to moisture and shrink during droughts or extended periods of high heat and low precipitation. Such soils usually contain clay minerals that attract and absorb water. Expansive soils can damage structures and infrastructure, such as water and sewer mains. This hazard is discussed more fully in Chapter 4.9.

Location

About 75% of El Reno's incorporated area is underlain by moderate to very high shrink/swell soils. Generally, low shrink/swell soils are in the northern part of the City and the North Canadian River floodplain. Almost all of El Reno's urbanized area, and all but one of its critical facilities are south of the river and built upon moderately expansive soils. There are some patches of highly and very highly expansive soils in the eastern and southern parts of El Reno's incorporated area. The east is largely undeveloped except for El Reno Regional Airport.

The Town of El Reno has identified areas of expansive soils that are classified as High and Very High. Table F.2-14 shows the breakdown of soil types in El Reno. A map of El Reno's expansive soils is presented in Figure F.2-13.

Table F.2–14 City of El Reno Expansive Soils

Expansive Potential	Area (sq. mi)	Percent of Land Area
Very High	8.79	11%
High	3.33	4%
Moderate	42.40	53%
Low	23.55	30%
Water	1.65	2%

Frequency

There is no data concerning damage incurred within the City of El Reno due to expansive soils.

Extent/Severity

El Reno considers a shrink-swell level of Moderate and below based upon NRCS soil survey database (See Chapter 4.9) to be of minor severity and a shrink-swell level of High or Very High based upon NRCS soil survey database to be of major severity.

Impact

The impact of this hazard occurs over time and affects structures and infrastructure. As a rule, houses and one-story structures are more vulnerable to damage than multi-story buildings, as the latter have enough mass to counter swelling soils. In El Reno, most of the residential structures are located on soils with Moderate shrink/swell potential; some are located on soils with Very High shrink/swell potential; all residential structures underlain by soils with Moderate to Very High shrink/swell potential face potential damages. Expansive soils can result in costly repairs and reduce the value of the buildings that are affected. Normally, expansive soils do not cause injury or death, unless a structure weakened by cracks in foundation or walls were to collapse during an earthquake or other event. Critical facilities underlain by soils with Moderate shrink/swell potential are less likely to be impacted than if they were underlain by soils with High to Very High shrink swell potential. Much of the vulnerability of these structures depend on the

age of the facility as well, it is likely the soil type was considered when these structures were built.

History

There have been no reports of damage from expansive soils in the City of El Reno.

Worst-Case Expansive Soils Scenario

El Reno's greatest vulnerability to expansive soils is its aging infrastructure – particularly its water and sewer lines - during times of extended drought. The extended drought of 2011 kept City crews busy repairing broken water and sewer mains. A worst-case scenario for the City would be the extension of an extreme drought, like that of 2011, into two or more years. The impact would not be catastrophic, but constant and financially draining.

Conclusion

El Reno has a Moderate vulnerability to and Moderate probability of the Expansive Soils hazard. The City's Comprehensive Plan requires that all future infrastructure development be environmentally responsible and economically sound. Although expansive soils are not specifically mentioned in that context in

the Comprehensive Plan, City planners and those issuing building permits must exercise due diligence in monitoring development in the areas with highly and very highly expansive soils – and even more so since most are also located in the floodplains of Sixmile Creek and the North Canadian River.

4.10 Urban Fire

El Reno's Fire Department has 19 fire fighters operating within its City Limits, constituting just over 79 square miles. Its ISO rating is an excellent 4. The Department has aggressive inspection and code enforcement programs. Urban Fire is more thoroughly discussed in Chapter 4.10

Location

Most of El Reno's older housing stock in located in its urban core. In order to contain urban sprawl, the City encourages infill and the removal of dilapidated structures in the urban core. According to the Census Bureau, 23% of El Reno's residential structures were built prior to 1939, and 0.3% were being heated using wood heat as a source.

Frequency

El Reno can expect about 19 single family home fires, three apartment fires, one mobile home fire, two in office/commercial facilities, and 3.4 in industrial/warehouse structures with estimated damage of $416,000 annually. The City can also expect about two fires in critical facilities that resulting in $21,436 in estimated damage.

Extent/Severity

El Reno considers a minor severity structure fire to be a structure fire that results in no loss of life or injury and/or $5,000 or less in damages, and a major severity structure fire to a structure fire that causes loss of life or injury and/or more than $5,000 in damages.

Impact

The impact of urban fire can be death and injury to civilians or emergency personnel, the loss of homes and businesses, and the loss of employment and local revenue streams.

History

From 2000 through 2009, El Reno had 188 single family residential fires, 13 fires in mobile homes, 18 office fires, and 34 industrial/warehouse fires that caused $4,162,820 in damage. These

events are summarized in Table F.2-15. During these years, there were four civilian deaths, 13 civilian injuries and 12 fire fighter injuries. (The Fire Marshall data does not specify the cause of fire injuries or deaths in its data base, so it is unknown whether these were from structure fires, wildfires, or traffic accidents.)

Table F.2–15 El Reno Urban Fire Damages 2000-2009

Year	Single Family		Apartment		Mobile Homes		Other Residential		Office/ Commercial		Warehouse/ Industrial		Total	
	No.	Dmg	No.	Dmg	No.	Dmg	No.	Dmg	No.	Dmg	No.	Dmg	No.	Dmg
2000	21	$177,700	2	$325	2	$30,000	1	$0	3	$150,000	1	$600	30	$358,625
2001	20	$249,300	3	$15,000	3	$1,050	1	$0	2	$2,500	5	$5,500	34	$273,350
2002	34	$326,350	2	$0	1	$40,000	0	$0	1	$10,000	6	$39,000	44	$415,350
2003	20	$558,000	3	$1,000	1	$5,000	1	$10,000	1	$700,000	3	$10,000	29	$1,284,000
2004	15	$94,675	4	$2,500	0	$0	0	$0	5	$0	6	$37,500	30	$134,675
2005	16	$215,150	3	$3,060	2	$12,500	0	$0	1	$15,000	5	$67,500	27	$313,210
2006	12	$74,400	6	$83,500	2	$26,000	1	$4,100	2	$20,000	5	$27,730	28	$235,730
2007	15	$394,830	2	$310,000	0	$0	0	$0	2	$2,000	0	$0	19	$706,830
2008	18	$308,300	1	$3,500	1	$1,000	0	$0	0	$0	1	$0	21	$312,800
2009	17	$109,750	4	$1,500	1	$1,000	0	$0	1	$1,000	2	$15,000	25	$128,250
Totals	188	$2,508,455	30	$420,385	13	$116,550	4	$14,100	18	$900,500	34	$202,830	287	$4,162,820

Source: Oklahoma State Fire Marshal

Conclusion

El Reno has a Moderate vulnerability to and High probability of the Urban Fire hazard. Despite a relatively compact urban core with an aging housing stock, the City has a skilled fire department, adequate water supply and hydrants throughout the community. The fire department has mutual aid agreements with neighboring fire departments.

4.11 Wildfire

Wildfires are an increasing hazard in Oklahoma due to the popularity of residential living in the wildland/urban interface. Chapter 4.11 examines the nature of Wildfires.

Location

Figure F.2-14 presents the levels of concern regarding wildfire for the City of El Reno.

Frequency

From 2000 to 2009, El Reno's Fire Department responded to an average of 26.7 wildfires a year that burned and average 1,188 acres and caused $6,261 in damage annually.

Extent/Severity

El Reno considers a reading of Moderate and below on the Fire Danger Rating system to be a minor severity wildfire condition, and a rating of above Moderate on the Fire Danger Rating system to be a major severity wildfire condition.

Impact

The impact of the Wildfire hazard can increase during times of drought, high wind and extreme heat. Wildfire can cause loss of life, homes and businesses, and devastating economic impacts to homeowners, ranchers and farmers, and to the community as a whole. As shown on the map in Figure F.2-14, the wildfire Level of Concern in El Reno ranges from 0 to 6 on the LOC Index. A List of critical facilities located in Low to High wildfire LOC areas is included in Table F.2-16.

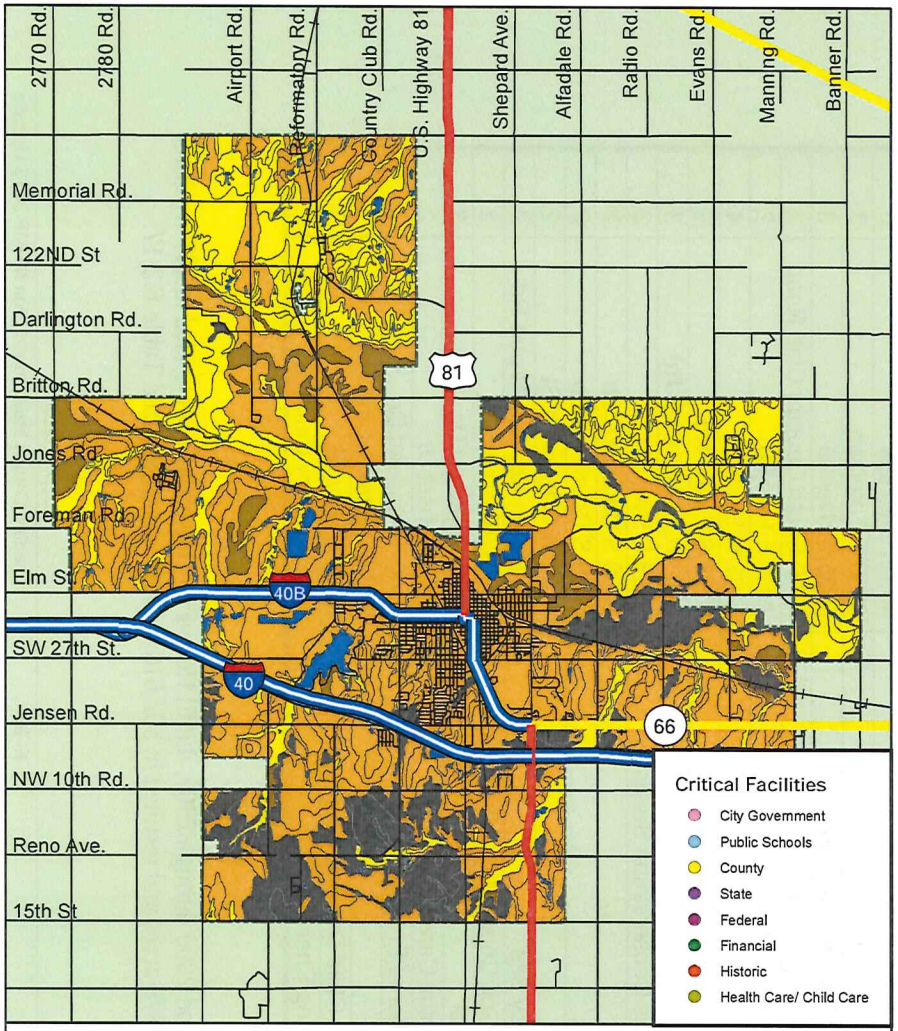


Figure F.2-13:

City of El Reno Expansive Soils

Expansive Soils
- Low
- Moderate
- High
- Very High
- Water

Boundaries
- El_Reno_City_Limits
- Canadian County
- Statewide Counties

Transportation
- Interstate
- US Highway
- State Highway
- Turnpike
- Local or Rural Road
- Railroads

Flanagan & Associates, LLC

0 1.25 2.5 Miles

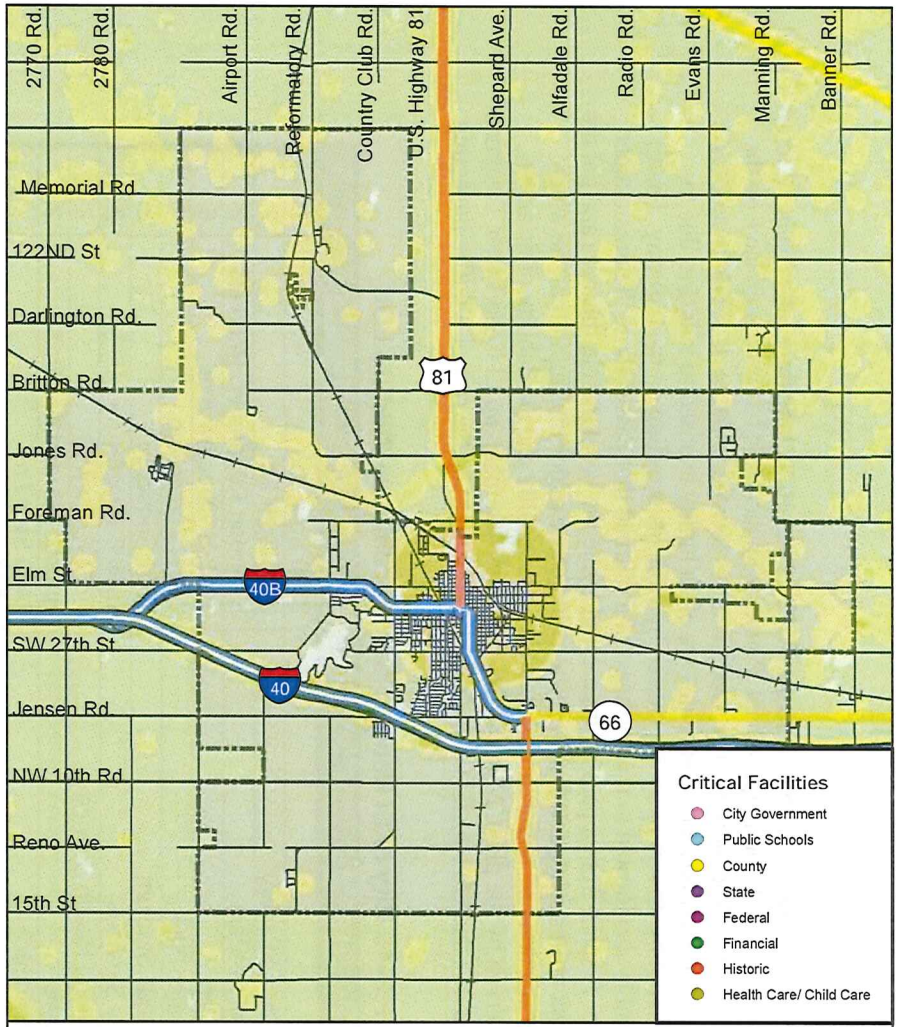


Figure F.2-14:

City of El Reno Wildfire LOC

Level of Concern Index
<VALUE>
- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Boundaries
- El_Reno_City_Limits
- Canadian County
- Statewide Counties

Transportation
- Interstate
- US Highway
- State Highway
- Turnpike
- Local or Rural Road
- Railroads

Flanagan & Associates, LLC

0 1.5 3 Miles

In El Reno, the facilities most vulnerable to the Wildfire hazard include the Water Plant, Hillcrest Elementary School and El Reno High School. Potential impacts this hazard would have on the schools are addressed in Appendix G. The Water Plant is located to the west of Highway 81. As mentioned, areas close to transportation routes are often highly exposed to wildfires due to cigarettes thrown out by drivers or sparks caused by vehicles traveling on the highway. The El Reno Water Plant is also located to the northeast of a railroad that passes through unmaintained low lying shrubs. A spark from a passing train could ignite the vegetation in this area and put the water plant at risk of being impacted. A wildfire could cause major interruption of the water plants ability to function and therefore threaten the water quality and availability of drinking water to those served by the plant. Much of the structures that make-up El Reno Water Treatment Plant are located on concrete which lessens but does not eliminate the risk of wildfire impacting the facility.

Table F.2–16 City of El Reno Critical Facilities in Wildfire LOC

ID	Fac_Name	Address	LoC
5	Fire Station #2	2300 Spur Ln.	2
9	El Reno Public Works Facility	2404 Spur Ln.	2
10	El Reno Municipal Air Park	S. Airport Rd. and W. Reno Rd	2
12	El Reno Water Plant	1709 N. Choctaw Ave.	6
13	El Reno Wastewater Plant	901 N Foster Ave	4
19	El Reno PS Football Stadium	2001 Sunset Dr	3
20	Youth and Family Services	7565 E Hwy 66	2
21	Red Rock Behavioral Health Service	7777 E. Hwy 66	2
22	W Elm Water Tower	Babcock Dr and W Elm St	2
23	Animal Control/Evidence	2400 Spur Ln.	2
25	Hillcrest Elementary School	1302 S. Miles	6
29	Roblyer Middle School	427 SW 27th	2
31	El Reno High School	405 S Choctaw	6
33	Riverside Public School	4800 E Foreman	3
34	Canadian Valley Technology Center	6505 E Hwy 66	3
35	Redlands Community College	1300 South Country Club Road	2
40	Gary Miller Children's Justice Center	7905 E Hwy 66	2
41	County Shop Dist. 1	1103 N Shepard	4
42	County Shop District No 2	2305 S Evans Rd	3
48	ODOT Barn	220 N Country Club Rd	3
49	Natural Resouces Conservation Service	1625 E Hwy 66	3
52	Bank of Union	2000 S Country Club	2
53	Rose Rock Bank	2409 S Country Club	2
58	Ft Reno	7107 W Cheyenne St	2
62	Darlington Agency Site	Darlington Rd. and Airport Rd	2
69	Crimson Creek Golf Course Lake Facility	801 S. Babcock Dr.	2
71	Parkview Hospital	2115 Parkview Dr	3
73	El Reno Residential Care Home	2410 Sunset Dr	2
74	Care Living Center of El Reno	2100 Townsend Dr	2
79	Little Amigos	923 S. Country Club Rd.	3
81	Canadian Valley Child Development Center	6505 E Hwy 66	3
82	TwilleyÆs Rocking Chair Day	1900 Country Club Rd	2

History

During the period 2000 through 2009, the El Reno Fire Department responded to 267 wildfires that burned 11,879 acres and resulted in $62,610 damage as summarized Table F.2-17.

Table F.2–17 El Reno Wildfires 2000-2009

Year	Runs	Acres Burned	Damages
2000	52	119	$3,200
2001	39	107	$34,300
2002	42	60	$7,375
2003	54	354	$10,380
2004	48	70	$290
2005	55	104	$0
2006	60	658	$1,165
2007	36	114	$1,000
2008	67	180	$4,350
2009	41	10,113	$250
Totals	267	11,879	$62,310

Source: Oklahoma State Fire Marshal

El Reno has encouraged infill for new home construction rather than suburbanization, in large part for reasons of greater economy and efficiency in the provision of services and infrastructure. Another advantage of this approach is the reduction of the Wildfire hazard. By limiting rural estate development, the City reduces the chances of wildfires.

Worst-Case Wildfire Scenario for El Reno

A worst-case wildfire for the community would be a wildfire that resulted in injury or death to civilians or firefighters, economic damage to homes, schools, businesses, farms or oil and gas industry facilities.

Conclusion

El Reno has a Moderate vulnerability to and High probability of the Wildfire hazard. El Reno's location on a rolling prairie that is subject to thunderstorms, lightning, high winds, drought and prolonged periods of extreme heat, make it an ideal environment for wildfires. The many square miles of undeveloped land within the City Limits, crossed by railroads and highways, can become a tinderbox from late summer into winter, especially in times of drought. As a rule, farmland is less vulnerable than ranchland, as it is usually plowed and planted during the worst part of the wildfire season. An additional concern is the presence of Eastern Red Cedar in the North Canadian River floodplain.

Wildfire on OK Highway 66 in El Reno, May 2011

4.12 Earthquake

General natural hazards, such as Tornadoes, High Winds, Lightning, Hail, Winter Storms, Extreme Heat, Drought, and Earthquakes affect all communities in Canadian County randomly and equally, and are addressed in Chapter 4.

Location

El Reno is located in an area of considerable low-level seismicity, west of the recently active Wilzetta fault in Lincoln County and north of the historically active Meers fault in southwestern Caddo County.

Frequency

Canadian County recorded 28 earthquakes between 1995 and 2009, followed by cluster of 11 quakes on March 11-12, 2010. Thirteen of these events were within El Reno or very close to its boundaries. Only three of these were "felt" events. Given this frequency, El Reno can expect about one nearby tremor every year.

Extent/Severity

El Reno considers a minor severity earthquake to be a reading of 4.8 magnitude and below on the Richter Scale and a major severity earthquake with to be an earthquake with a reading of above 4.8 magnitude on the Richter Scale.

Impact

The impact of this hazard depends on the intensity of the earthquake. A 5.7 magnitude event centered on the Nemaha fault in the El Reno area would cause minor damage to some structures and infrastructure, similar to the Lincoln County earthquake of 2011.

History

As stated above, the El Reno area recorded 13 earthquakes between 1995 and 2009, only a few of them "felt" events. El Reno was the epicenter of the second most severe documented earthquake in the state's history – a 5.5 magnitude event in 1952.

Conclusion

The City of El Reno has a Low vulnerability to and Low probability of the Earthquake hazard. Evidence suggests that seismic activity may be on the increase in the Nemaha/Wilzetta faults area. A 5.6 magnitude earthquake occurred in Lincoln County, Oklahoma in August 2011. As a rule earthquakes of this magnitude and lower cause little damage.

4.13 Hazardous Materials

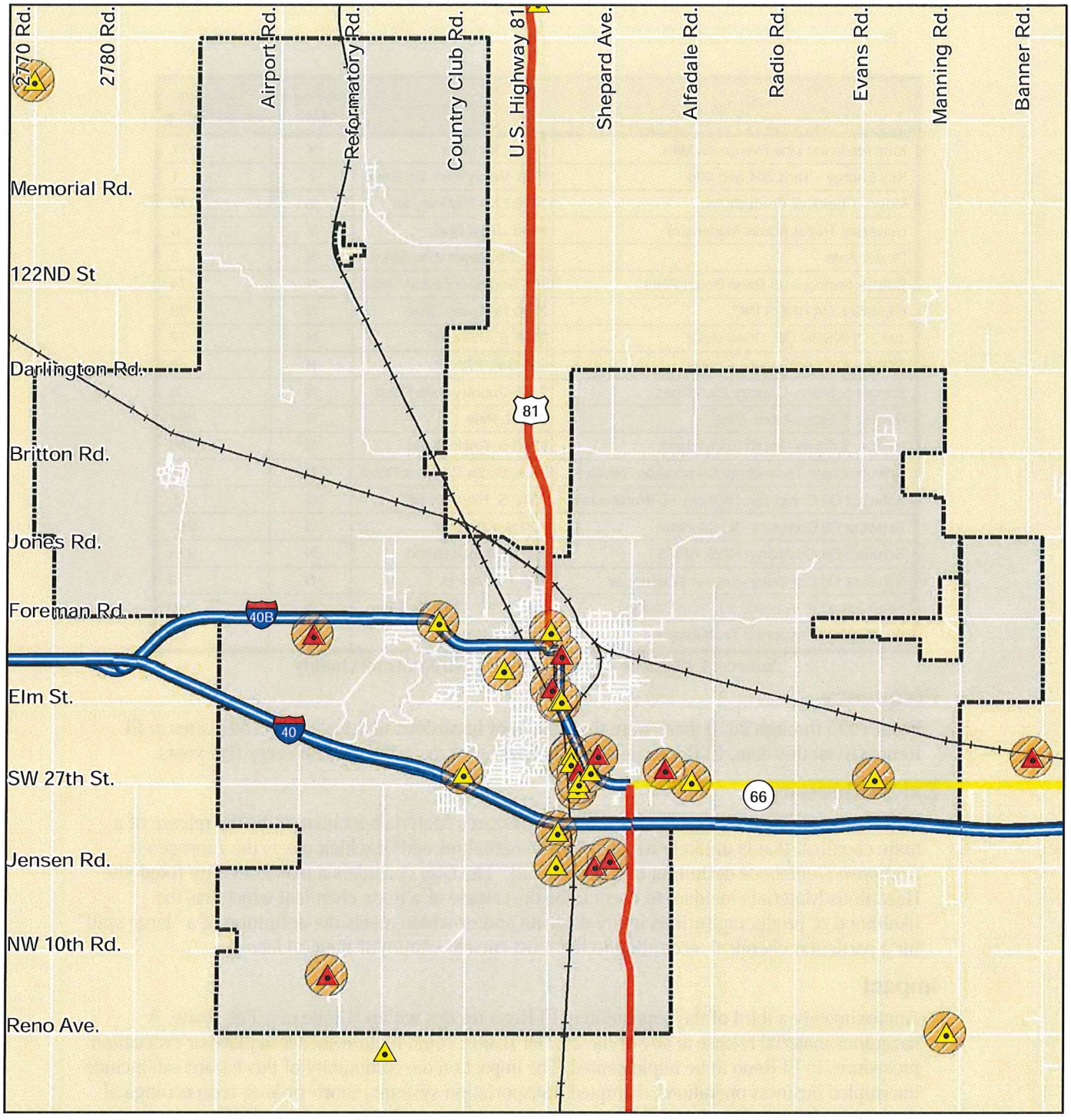
Hazardous materials are chemical substances that, if released or misused, can pose a threat to human health or the environment. These chemicals are used in industry, agriculture, medicine, research, and consumer goods. Hazardous materials come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials, and can be released from fixed-sites or as a result of transportation accidents. In this Plan, pipelines are considered as part of the Nation's transportation network and covered under Transportation hazard, including above-ground metering and booster facilities. Refer to Chapter 4.13 for additional detail.

Location

There are 24 Tier II facilities within the boundaries of El Reno, nine of which contain extremely hazardous substances (EHS). Approximately 5,500 people live within a quarter mile of one or more of theses sites. El Reno's Tier II sites are listed in Table F.2-17 and depicted in Figure F.2-15.

Table F.2–18 City of El Reno Tier II Sites

Facility	Address	Contains EHS	Population Within ¼ mile
AT&T of Oklahoma - El Reno CO - R61103	319 S Rock Island Ave	Y	608
Cimarron Aircraft	El Reno Airpark; Hangar 4	Y	0
Federal Correctional Institution - El Reno	4205 Highway 66 West	Y	1,465
Helena Chemical Company	310 E Jensen Road	Y	1
Heritage	2517 Holloway Drive	Y	0



LEGEND

- Interstate
- US Highway
- State Highway
- Turnpike
- City Limits
- 2009 EHS Tier 2
- 2009 non EHS Tier 2
- Tier2 1/4mi Buffer

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0 1 2 Miles

N W E S

Figure F.2-15

City of El Reno

Fixed Site Hazardous Materials

Facility	Address	Contains EHS	Population Within ¼ mile
Kent feeds Inc Dba Evergreen Mills	920 S. Bickford	Y	677
Key Energy - Yard 204 and 206	3801 Valley Park Dr. Ste B	Y	1
Mayco Chemical Products Inc.	1936 East Highway 66	Y	175
Universal Trailer (Exiss Aluminum)	900 E. Trail Blvd.	Y	0
Dexter Axle	500 Southeast 27th Street	N	3
Dolese Brothers--El Reno Batch Plant	305 Southwest 22nd Street	N	74
GEMINI COATINGS INC.	2300 Holloway Drive	N	38
JIM JOHNSON OIL COMPANY	2501 E. HWY. 66	N	72
OG&E--El Reno Service Center	601 S.E. 27th St.	N	3
Ranger S Store--Country Club Road	2506 Country Club Road	N	0
Ranger S Store--North Pine	213 N. Pine	N	894
Ranger S Store--South Rock Island	1220 S. Rock Island	N	368
Schlumberger Technology Corporation Sanitized	3535 South Choctaw Road	N	35
Schwarz Oil Company--Highway 66 Warehouse	1610 S. Highway 66	N	0
Schwarz Oil Company--N. Choctaw	220 N. Choctaw	N	651
Schwarz Oil Company--Rock Island	1201 S. Rock Island	N	418
Schwarz Oil Company--Sunset Warehouse	200 1/2 Sunset	N	3
SemGroup LP- Amoco - El Reno Station	Sec. 13- T 12 N - R 7 E	N	0
Weatherford Fracturing Technologies	901 Jensen	N	8

Source: Oklahoma Department of Environmental Quality

Frequency

From 1995 through 2010 there were three spills of hazardous materials from fixed sites in El Reno. Given this data, El Reno can expect a hazardous materials release every five years.

Extent/Severity

El Reno considers a minor severity fixed-site Hazards Materials incident to be the release of a toxic chemical that is unlikely to cause severe casualties and/or which meets the *Emergency Response Guidebook* definition of a "small spill" The City considers a major severity fixed-site Hazardous Materials incident to event to be the release of a toxic chemical which has the likelihood of producing serious injury or death and/or which meets the definition of a "large spill" for a particular chemical, according to the most current edition of the *Guidebook.*

Impact

Approximately a third of the population in El Reno resides within ¼ mile of a Tier II site. A hazardous material release at any of the 24 Tier II sites could require shelter in place or evacuation procedures in El Reno to be implemented. The impact on the community of this hazard can include interrupted business operations, disrupted transportation systems, short- or long-term ecological damage or degradation, diminished emergency response, and injury or loss of life.

History

As stated above, there were three hazardous materials releases from fixed sites from 1995 through 2010. These are summarized in Table F.2-19.

Table F.2–19 El Reno Hazardous Materials Releases

Date	Incident	Locations	Responsible Party	Medium Affected	Released Material
06/08/95	Drums of oil found in creek	3606 E. Elm St.	Unknown	Water	Methanol
06/26/01	House explosion	704 S. Mayhan	Unknown	Air	Natural gas
05/09/07	Tornado damaged transformer	2300 Holloway Ave.	OG&E	Water	Polychlorinated Biphenyls

Worst-Case Hazardous Materials Release Scenario

A worst-case hazardous material release for El Reno would involve a major fire at one of its EHS industrial facilities on the south side of the City.

Conclusion

El Reno is considered to be at Moderate vulnerability to and Moderate probability of the Fixed-Site Hazardous Materials hazard. El Reno has 24 fixed hazardous materials sites within its boundaries. The three incidents that have occurred have not been from manufacturing facilities.

4.14 Dam Failure

The Oklahoma Water Resources Board has identified two high-hazard dams whose failure would significantly impact the city of El Reno: Canton Lake Dam and El Reno Lake Dam. Chapter 4.14 includes a thorough discussion of the Dam Failure hazard.

Location

El Reno is situated on the south side of the North Canadian River, at elevation 1,320. Upstream are two dams that impound the North Canadian River or its tributaries: Fort Supply Lake Dam (on Wolf Creek) and Canton Lake Dam. Within El Reno itself, El Reno Lake Dam impounds Fourmile Creek on the west side of the City.

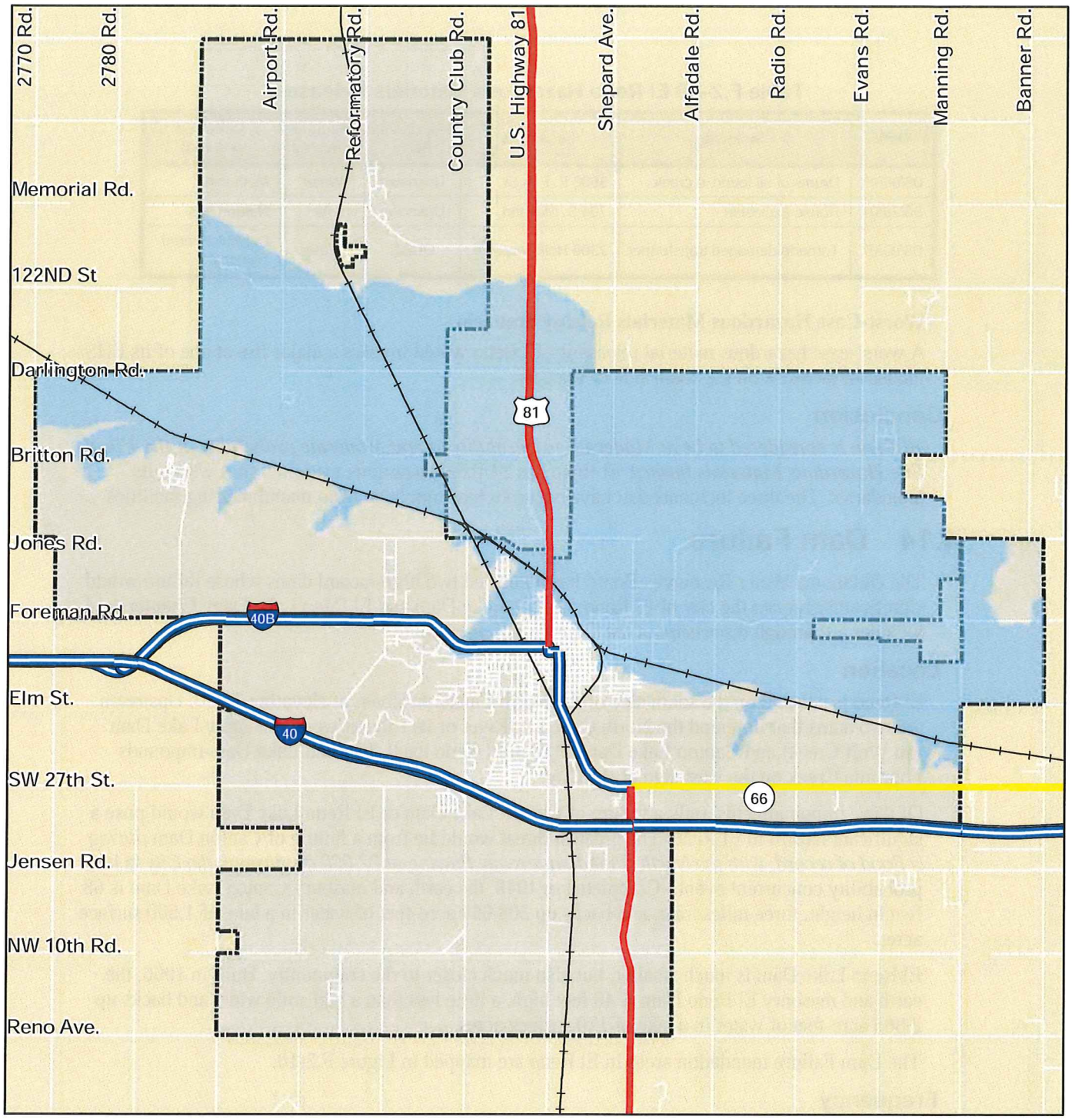
Of these impoundments, only a failure of Canton Lake Dam or El Reno Lake Dam would pose a significant hazard to El Reno. The greatest threat would be from a failure of Canton Dam *during a flood of record, with the North Canadian already flowing at 22,000 cfs through the City* (a low probability concurrent event.) Completed in 1948, the earth and masonry Canton Lake Dam is 68 feet in height, three miles long, and backs up 208,664 acre-feet of water in a lake of 1,500 surface acres.

El Reno Lake Dam is much smaller, but also much closer to the community. Built in 1966, the earth and masonry El Reno Dam is 40 feet high, a little less than a half-mile wide, and backs up 2,865 acre-feet of water in a lake of 170 surface acres.

The Dam Failure inundation areas in El Reno are mapped in Figure F.2-16.

Frequency

There have been no dam failures on the North Canadian River system. However, emergency releases have taken place, such as in May 1951, when Canton Lake filled to capacity, forcing the US Army Corps of Engineers to release of 80,000 cfs into the River. While an actual failure of Canton Dam is not expected, heavy rains from storms originating in the Gulf of Mexico or Gulf of California do occur regularly at unpredictable intervals, and could result in another massive emergency release similar to that of 1951.



LEGEND

- Interstate
- US Highway
- State Highway
- Turnpike
- Inundation Area
- City Limits

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0 1 2 Miles

N W E S

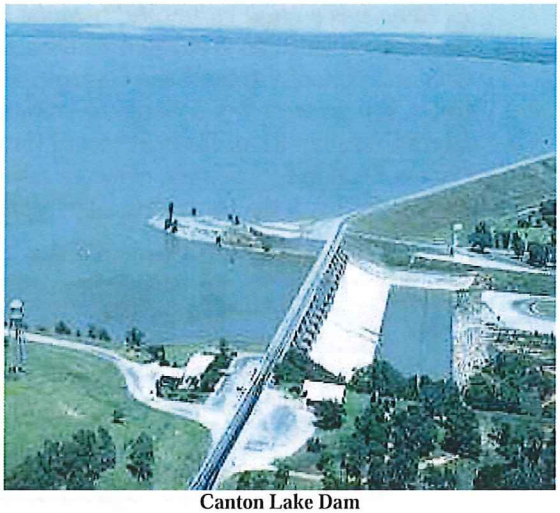
Figure F.2-16

City of El Reno

Canton Lake Dam Failure Inundation Area

Extent/Severity

El Reno considers a minor severity dam failure to be a dam failure that would release a surge that results in less than three feet of flooding on a one story building, and a major severity dam event to be a breach or failure that exceeds the capacity of the Dam's downstream riverbed immediately downstream from the dam and/or equates to (or exceeds) a 100- or 500-year flood and results in a depth of three feet of flooding or more on a one story building.



Canton Lake Dam

Impact

A dam failure or emergency release can injure or kill people downstream, and damage or destroy homes, businesses, agriculture, and infrastructure. Failure can take place over a prolonged period, giving people time to prepare for the flood surge, or can be sudden with little to no warning time. In El Reno, the areas most likely to be impacted as a result of a breach of Canton Lake Dam are those areas north of the railroad that runs roughly northwest to southeast. The inundation area continues just south of the railroad but does not pass Interstate 40B. Approximately 1,457, with a value, estimated for fair market, of $54,169,128, are located in the Dam inundation area. It is estimated that 2,398 people would be impacted or 44% of the total population. A Dam Failure scenario is included in Table F.2-20.

History

During the October 1923 flood on the North Canadian, the highest documented flood event at El Reno, the estimated flow at the future Canton Lake Dam site was 87,800 cfs. At El Reno the River reached 31 feet – six feet higher than the current flood of record of 2007. There have been several emergency releases from Canton Dam. The most significant of these was that of May 1951, mentioned above, when 80,000 cfs was released into the river.

Worst-Case Canton Dam Failure Scenario

Given the ongoing work to strengthen Canton Dam, a likely worst-case dam failure event for El Reno would be a massive emergency release during peak flood conditions, with about 33,000 cfs flow already in the River at El Reno. Such an event would likely result in significant damage to low-lying parts of the City. If the river were already in flood downstream, the release surge at El Reno would rival the 1923 flood. An emergency release of this size would take 83 hours to reach the City.

In the most catastrophic Canton Lake Dam break scenario, complete failure, releasing 208,000 acre-feet into the North Canadian River, the flood surge would reach El Reno in 15.3 hours. Estimated damages are shown in Table F.2-19 and areas of impact illustrated in Figure F.2-16.

Worst-Case El Reno Lake Dam Failure Scenario

El Reno Lake Dam, only about 1/8th the size of Canton Lake Dam, is hazardous because of its close proximity to the City. No hydrological study has delineated what the inundation area would be in El Reno from the dam's failure.

Conclusion

El Reno has a High vulnerability to the Dam Failure hazard, but a Low probability of occurrence. El Reno is situated on the south side of the North Canadian River, at elevation 1,320. Only a failure of Canton Lake Dam or El Reno Lake Dam would pose a significant hazard to El Reno. The greatest threat would be from an improbable failure of Canton Dam coincident with a North Canadian River flood of record flowing at 22,000 cfs through the City. Improvements to Canton Dam in recent years make an actual failure of Canton Dam unlikely, but do not rule out the possibility of the need for a major emergency release.

Table F.2–20 Canton Lake Dam Failure Scenario for El Reno

Buildings Impacted by Dam Failure	Number or Estimated Value
Buildings in the Dam Failure Area	732
Value of Affected Buildings	$42,539,200
Value of Contents	$25,447,800
Total Value of Buildings in the Dam Inundations Areas	$67,987,000
Damages Due to Dam Failure	**Number or Estimated Value**
Damage to Buildings from Dam Failure	$25,517,520
Damage to Contents from a Dam Failure	$11,197,032
Total Damages from the Dam Failure	$36,714,552

4.15 Transportation

There four hazardous transportation corridors in El Reno: Highways, Railroads, Pipelines and Airports. These corridors are discussed in the following paragraphs and mapped in Figure F.2-17. An enhanced discussion of the Transportation hazard may be found in Chapter 4.15.

Location

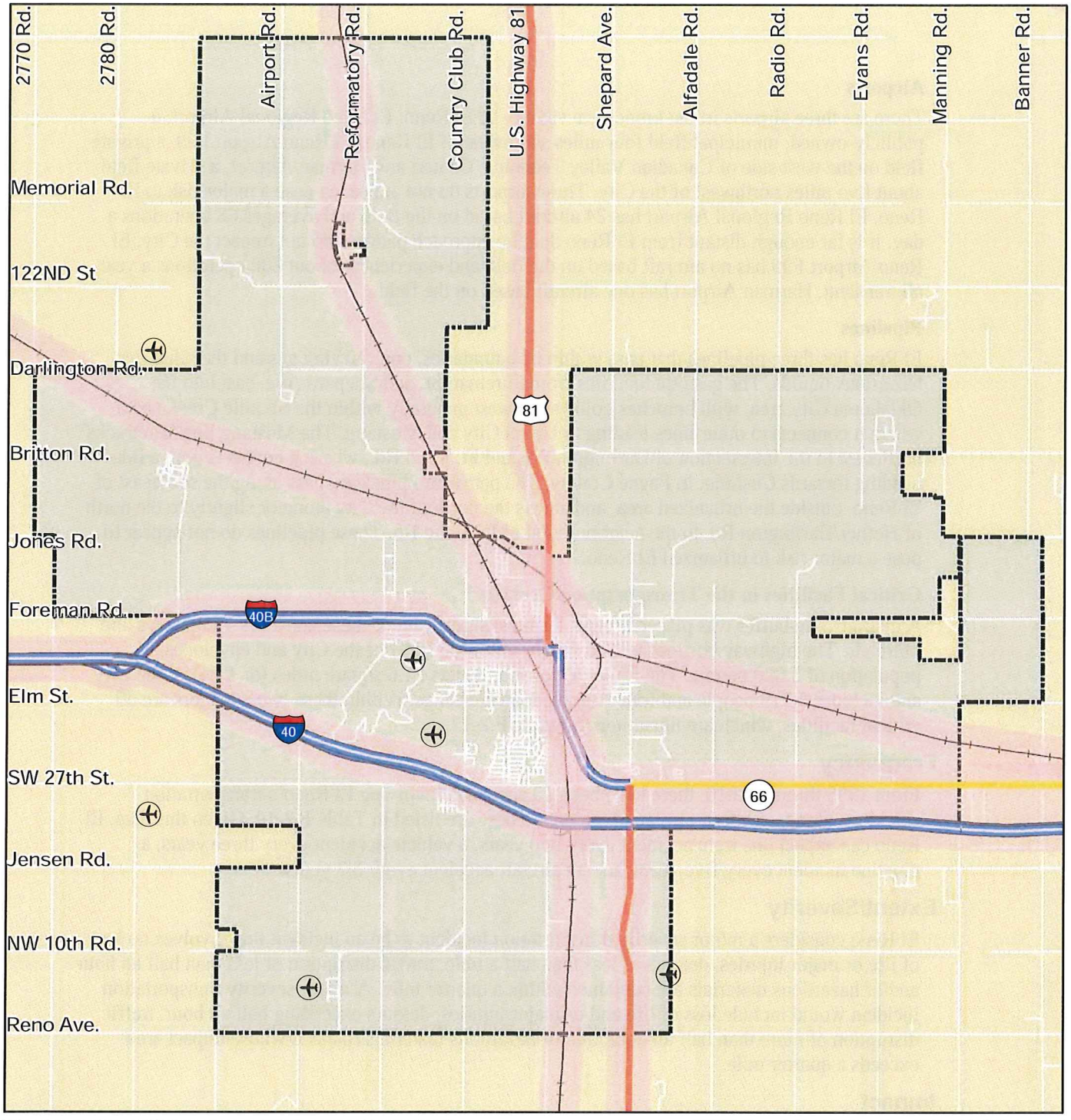
El Reno is intersected by I-40/US Highway 270, I-40B US Highway 81 and OK Highway 66. It is on the Union Pacific railroad, and the eastern terminus of the AT&L railroad. There are a number of airports in the vicinity, both commercial and private, and several pipelines. These are discussed in the following paragraphs.

Highways

The Highway Hazard consists of 24.7 miles of highways: Interstate 40/US Highway 270, which passes south of the urbanized area, from east to west; I-40-B which runs north from the US Highway 81/OK Highway 66 junction approximately two miles before turning west as I-40B/OK 66 and rejoining I-40 five miles to the west; US 81, a four-lane north to south thoroughfare that joins I-40B/OK 66 for about two miles, intersects I-40 and continues south out of the City.

Railroads

The Railroad Hazard consists of the north-south Union Pacific line through El Reno, a Union Pacific branch line east from El Reno to Yukon and Oklahoma City, and the AT&L tracks west toward Calumet. There are 25.2 miles of railroad track within the City. Major cargos on the UP system are wheat and food grains, aggregate, paper, coal, petroleum and petroleum products, non metallic minerals and plastics. AT&L cargos are wheat and food grains.



LEGEND

- Interstate
- US Highway
- State Highway
- Turnpike
- City Limits
- airports
- Quarter Mile Buffer

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0 1 2 Miles

N W E S

Figure F.2-17

City of El Reno

Transportation Corridors

Airports

There are three airports in the immediate vicinity of El Reno: El Reno Regional Airport, a publicly-owned, municipal field four miles southwest of El Reno; El Reno Airport F99, a private field on the west side of Canadian Valley Technical Center; and Harman Airport, a private field about five miles northwest of the City. These airports do not appear to pose a major risk to El Reno. El Reno Regional Airport has 24 aircraft based on the field and averages 68 operations a day. It is far enough distant from El Reno that the approach patterns do not impact the City. El Reno Airport F99 has no aircraft based on the field and experiences about 200 operations a year, all transient. Harman Airport has one aircraft based on the field.

Pipelines

El Reno has three pipelines that pass within its boundaries, one carrying gas and the other two hazardous liquids. The gas pipeline runs from Foreman St. and Shepard Ave. east into the Oklahoma City area, with branches going southwest generally within the Sixmile Creek basin where it connects to other lines leading to Union City and Mustang. The Mustang line also tracks northwest to the intersection of Darlington Rd. and Ft. Reno Rd., where it connects with a line heading towards Cushing, in Payne County. The petroleum pipelines pass along the southeast of El Reno, outside the urbanized area, and across the north of the City along or slightly to the north of Hefner/Darlington Rd. to the neighborhood of Ft. Reno Rd. These pipelines do not appear to pose a major risk to urbanized El Reno.

Critical Facilities in the Transportation Corridor

A quarter-mile buffer was placed around the most significant of these corridors – highways and railroads. The highway corridor is 10.3 square miles (or 13%) of the City and envelopes a population of 5,020 people. The Railroad corridor covers 11.6 square miles (or 15%) of the City and includes 5,719 people and four at-grade road crossings. Within these two corridors are 30 critical facilities, which are illustrated in Figure F.2-17.

Frequency

From 1995 through 2010, there have been 10 accidents involving El Reno's transportation corridors, along with four airplane accidents. These are listed in Table F.2-19. Given this data, El Reno can expect one train accident every two years, a vehicle accident every three years, a pipeline incident every five years, and an aircraft accident every 3.7 years.

Extent/Severity

El Reno considers a minor severity transportation incident to be an incident that involves no loss of life or major injuries, detours of less than half a mile, traffic disruption of less than half an hour and/or hazardous materials are contained within a quarter mile. A major severity transportation incident would include loss of life and/or major injuries, detours exceeding half an hour, traffic disruption of more than half an hour, and/or hazardous materials releases whose impact area exceeds a quarter mile.

Impact

In El Reno, nearly 50 percent of the population resides within ¼ mile transportation corridor of the railroad or highway. A total of 7,572 residents live within ¼ mile of a major Highway in El Reno. Approximately 2,984 improved parcels with a value, estimated for fair market, of $167,281,348 are located within ¼ mile of the Highway corridor. There are approximately 5,432 persons residing within ¼ mile of the railway in El Reno and 2,753 improved parcels with a value, estimated for fair market, of $92,171,990. The impact of transportation events may include injuries and sometimes even loss of life, highway disruptions and lost revenue. Transportation accidents are frequently a "cascade" disaster, especially during storms. Storms cause streets to

become slick, which increases the risk of transportation hazards. Excessive speed, exhaustion and other causes also increase the risk.

History

Transportation Accidents

Freight trains, tanker trucks and pipelines all carry hazardous materials through El Reno. From 1995 through 2010, there were five railroad accidents, four airplane crashes, three highway transport events, and two pipeline releases. These are listed in Table F.2-20.

Table F.2–21 Transportation Accidents

Date	Incident	Location	Type	Material
08/14/98	Freight train with 11 cars derailed	El Reno	Railroad	None
10/09/99	Non-fatal forced-landing airplane crash	El Reno	Aircraft	None
05/01/00	Car struck 8000 gal. tractor trailer causing spill, fire and fatality	I-40	Highway	Gasoline
01/10/01	Leak of natural gas liquid from 8-inch pipeline into creek from unknown causes	Jensen Rd. and Choctaw Rd.	Pipeline	Natural gas condensate
07/18/04	Non-fatal airplane crash during landing	El Reno	Aircraft	None
01/11/05	Crude oil from pin-hole leak in 6-inch pipe due to corrosion	10th and Choctaw	Pipeline	Crude oil, natural gas liquid
02/15/05	Freight train struck vehicle at grade crossing	E. Woodson St.	Railroad	None
06/22/05	Waste oil dumped from truck onto land	US Hwy 66 and Evans Rd.	Highway	Waste oil
09/22/05	Non-fatal airplane crash, practicing emergency landing	El Reno	Aircraft	None
12/23/05	Converted bus blew engine in parking lot, spilled oil	2400 S. Country Club Rd.	Highway	Engine oil
04/20/06	Train derailment	El Reno	Railroad	None
12/06/06	Locomotive discharged lube oil onto ground	Jones St. Rail Yard	Railroad	Lubricating oil
06/09/07	Agricultural airplane collision with unmarked pole	El Reno	Aircraft	None
06/29/09	Union Pacific Train collision with tractor trailer truck	Elm St.	Railroad	Oil, diesel fuel

Worst-Case Transportation Event

There have been two train derailments and two collisions of trains with vehicles at grade crossings in El Reno. A worst-case event would be a train collision with a tanker truck carrying volatile liquids at one of these crossings, resulting in an explosion, fire and/or toxic spill.

An at-grade railroad crossing at Watts and Grand Streets in El Reno.

Conclusion

El Reno has a Moderate vulnerability to and High probability of the Transportation hazard. For a City of its size, El Reno is a busy transportation interconnection, crossed by a heavily travelled east-west Interstate highway, a major railroad, three pipelines and several airfields. The community's greatest vulnerability is likely where the railroads and highways intersect, because both are

corridors for the transport of hazardous and volatile materials. The Union Pacific railroad and US 81 pass through the heart of El Reno. However, given the slow speed with which vehicles on these UP and US 81 corridors move within the City Limits, they likely pose less a hazard than I-40. Noteworthy are the railroad grade crossings within the City, at Elm St., 27th St., Watts St. and Woodson St. where accidents involving hazardous materials are more likely.

4.16 Hazards Summary

Hazards that impact the entire county randomly and more or less equally include Tornadoes, High Winds, Urban Fires, Extreme Heat, Drought, Lightning, Hail, and Earthquakes are addressed in Chapter 4.Site-specific hazards, unique to El Reno, identified and mapped in this section, include Floods, Dam Failures, Expansive Soils, Wildfires, Hazardous Materials sites, and Transportation Hazards.The Hazards Composite Map, shown in Figure F.2-18, summarizes the areas of the community potentially impacted by these site-specific hazards.

There are many areas for future growth that are relatively free of such hazards – generally south of I-40, west of Country Club Rd. between Foreman Rd. and the AT&L railroad, north of Darlington Rd. between Reno Rd. and Country Club Rd., as well as land on the east side of El Reno that is not in the floodplains of the North Canadian, Sixmile Creek and Purcell Creek. The Floodplain areas, shown in blue in Figure F.2-18 should be avoided and remain in open-space. Highly Expansive Soils areas are also located in the floodplains. The wildland/urban interface areas will likely remain vulnerable to Wildfires – and perhaps increase in exposure as rural residential development pushes west from the Oklahoma City metropolitan area. Much of El Reno is vulnerable to Transportation Hazards from I-40, US Highway 81, OK Highway 66 and the railroads.

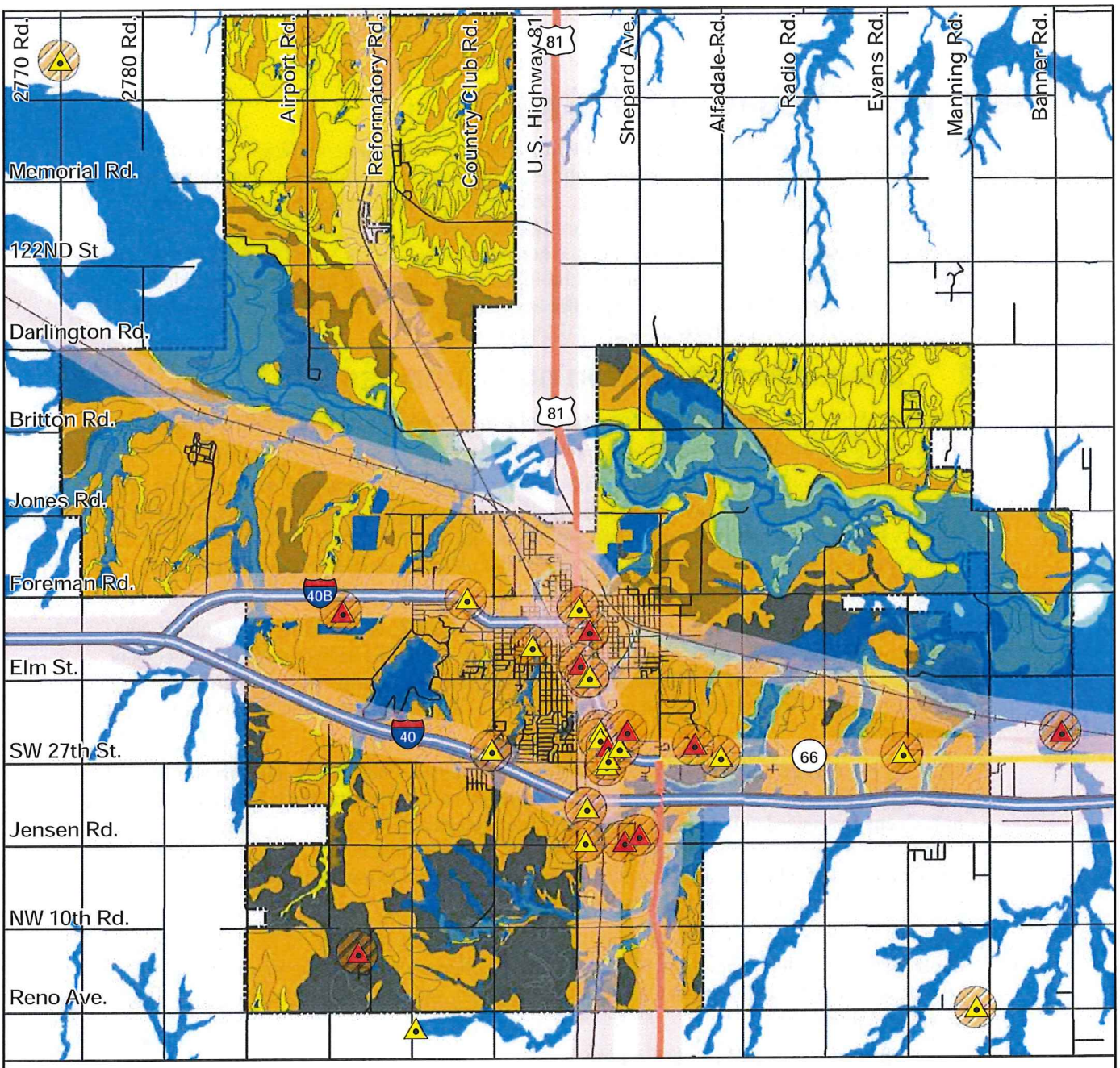

Figure F.2-18:

City of El Reno Hazard Analysis

Hazard Overlays

- 2009 EHS Tier 2
- 2009 non EHS Tier 2
- Tier2 1/4mi Buffer
- 1/4mi Transport Buffer
- 100yr Floodplain
- 500yr Floodplain

Expansive Soil Hazard

- Low
- Moderate
- High
- Very High
- Water

Boundaries

- City Limits

Transportation

- Interstate
- US Highway
- State Highway
- Turnpike
- Local or Rural Road
- Railroads

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0 1.5 3 Miles

N W E S

Section 5 Mitigation Strategy

This section provides a description of El Reno's ability to reduce potential losses, identified in Section 4, based on existing authorities, policies, programs, and resources, and its ability to expand on and improve these existing tools. Included in this section is a process by which El Reno incorporates the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvements, when appropriate. Goals and objectives of the City of El Reno to reduce or avoid long-term vulnerabilities to the identified hazards are included in Chapter 5. A comprehensive range of specific actions and projects being considered to reduce the effects of each hazard are listed in Chapter 6, *Action Plan.*

5.1 Integration into Planning Mechanisms

The City of El Reno, Oklahoma described the following process for implementing its hazard mitigation plan through existing planning mechanisms:

Upon formal adoption of the *Canadian County Multi- Hazard Mitigation Plan,* mitigation goals will be incorporated into future versions of the El Reno Emergency Operations Plan. Meetings of the City Council and public hearings will provide an opportunity for local officials to report back on the progress made on the integration of mitigation planning elements into City planning documents and procedures.

A Capital Improvements Program "CIP" was passed by the citizens of El Reno to enhance the quality of life and focus on the bright future of El Reno. Work has been done to improve water systems, streets, parks and recreation facilities. *The Canadian County Multi-Hazard Hazard Mitigation Plan* will be reviewed in coming up with a set of CIP recommendations for the next budget cycle.

The City has drafted and maintains an Emergency Operations Plan (EOP). The director of civil defense has the powers to, and shall, prepare comprehensive plans for the civil defense of the city in both enemy-caused and natural emergencies, such plans and programs to be integrated and coordinated with the plans and programs of the federal government, of the government of Oklahoma and of other public and private agencies and organizations empowered to act in either enemy-caused or natural emergencies, or both.

The director of civil defense has the ability to establish, within the limits of funds available, a public warning system, composed of sirens, horns or other acceptable warning devices. Such activities have been identified in Chapter 6, *Action Plan,* and this mitigation strategy for future implementation.

Integration of Previous Mitigation Plan

The *City of El Reno Multi-Hazard Mitigation Plan* (2003) incorporated all pertinent existing plans during the update process. Action items from the *Hazard Mitigation Plan* have been integrated into the *City of El Reno Capital Improvements Plan* in order to prioritize funding for hazard mitigation projects. In addition, the *Multi-Hazard Mitigation Plan* has also been integrated with the following plans and codes:

- City of El Reno Building Code
- *Canadian County Emergency Operations Plan*
- *El Reno Public Schools Emergency Operations Plan*

Integration Highlights:

Ensuring consistency between the *Multi-Hazard Mitigation Plan* and existing plans.

Updating mitigation strategy goals and objectives to incorporate ideas from the *El Reno Capital Improvement Plan.*

5.2 Prioritization Process of Mitigation Measures

The City of El Reno identified 42 mitigation measures, specific to their jurisdiction, during the *Canadian County Multi-Hazard Mitigation Plan Update* process. The mitigation measures will be prioritized using the STAPLEE process as recommended by FEMA, included in Chapter 5, Table 5-1. Complete detailed information for each mitigation measure is included in Chapter 6.

Changes in Hazard Mitigation Priorities

The City of El Reno identified and prioritized mitigation measures in the previously adopted *City of El Reno Hazard Mitigation Plan (2003).* In the previous plan, mitigation measures addressing the winter storm hazard were of top priority to the City of El Reno. Since the approval of the last plan update, priorities in El Reno have changed due to post-disaster conditions. On May 24, 2011 an EF 5 tornado caused devastation through Canadian County. The tornado caused significant damages in El Reno, injured many, and took the lives of two El Reno residents. As a result of this event, the El Reno HMPC placed tornado mitigation at highest priority, just under public education and outreach addressing all hazards, as to hopefully prevent the level of damage, lost of life, and injury during future tornado events. A complete description of the May 24, 2011 event can be found in Section 4, *Hazards.*