4.15 Transportation Events

Transportation is defined as the physical movement of an object through components of a system and its subsystems. Transportation includes the use of aviation, highway, railroad, pipeline, and marine systems to convey objects and people. In 1967, the Department of Transportation (DOT) was created in order to administer and protect the nation's transportation systems. The National Transportation Safety Board (NTSB) was established within the DOT as an independent agency responsible for investigating transportation incidents and promoting transportation safety.

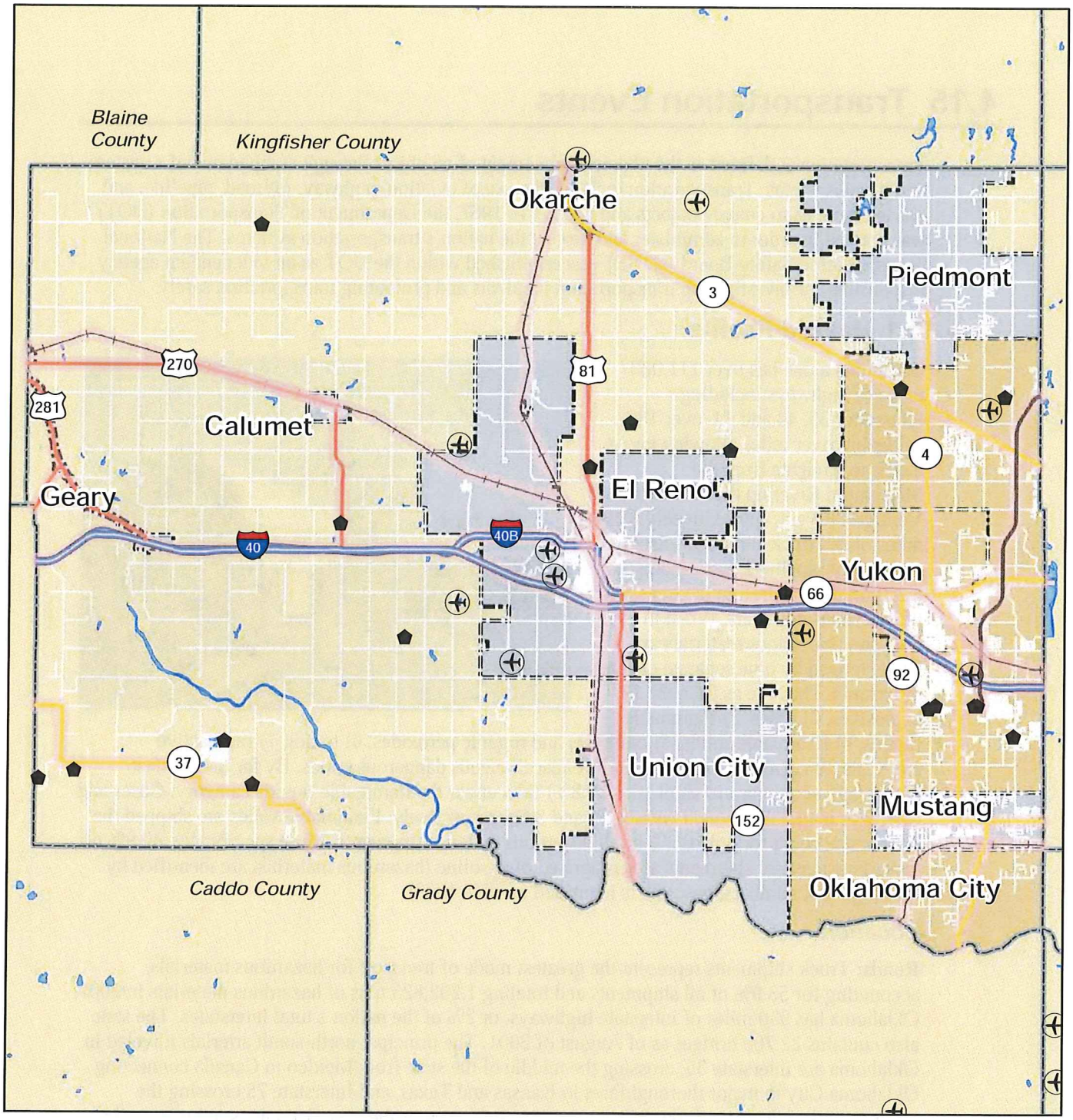
4.15.1 Hazard Profile

Oklahoma alone has over 111,000 miles of highways including Interstates 35, 40 and 44, over 180 navigable river miles allowing barge traffic to navigate from the Mississippi River up the Arkansas and Verdigris Rivers, approximately 6,000 miles of rail track and an un-disclosed quantity of pipelines. Each mode of transportation is used in the transport of hazardous materials. When in transport, hazardous materials are characterized by nine separate classes of hazards. They are as follows: 1) explosives, 2) gases, 3) flammable liquids, 4) flammable solids, 5) oxidizers and organic peroxides, 6) toxics, 7) radioactive materials, 8) corrosive materials, and 9) miscellaneous dangerous goods. By far the greatest percentage of any hazard shipment (80.8%) falls under the flammable liquids category. Gases and corrosive materials are next with 9.1% and 3.6% respectively. Flammable solids are shipped the least and account for only 0.3% of all hazardous material shipments. More specifically, 40.9% of hazardous material shipments are comprised of gasoline (hazardous materials are identified by four digit UN numbers, gasoline is identified as UN# 1203).

Location

Roads: Truck shipments represent the greatest mode of transport for hazardous materials, accounting for 53.9% of all shipments and totaling 1,202,825 tons of hazardous materials in 2007. Oklahoma has 930 miles of interstate highways, or 2% of the nation's total interstates. The state also contains 22,708 bridges as of August of 2001. The principal north-south arterials traveled in Oklahoma are Interstate 35, crossing the middle of the state from Mexico to Canada connecting Oklahoma City to major thoroughfares in Kansas and Texas, and Interstate 75 crossing the eastern third of the state through Tulsa. Interstate 44 crosses the state from the southwest to the northeast and connects the two main metropolitan areas of Tulsa and Oklahoma City to locations in Missouri and Texas. It is the modern day thoroughfare replacing the nation's first trans-continental highway, Route 66. Interstate 40 crosses through Oklahoma City and is a major national transportation route of transcontinental east-west travel.

A ¼ mile buffer was placed around these transportation features, as shown in Figure 4-34, to identify vulnerable populations and critical facilities.



LEGEND

- Critical Facilities
- airports
- Quarter-Mile Buffer
- Interstate
- Water
- US Highway
- City Limits
- State Highway
- Not in Plan
- Turnpike
- Railroads

Flanagan & Associates, LLC Planning Consultants

0 2.5 5 Miles

CANADIAN COUNTY 1890 OK

Figure 4-34

Canadian County

Quarter-Mile Transport. Corridors

Air: Airports are defined into hub classes based on the number of enplaned passengers using airline services. Hubs are classified by large, medium, small, and non-hub, where large hubs see over 6.3 million passengers and non-hubs receive less than 319,451 passengers over a 12-month period. There are 72 airports in the nation considered as large hubs. These 72 airports see almost 75% of all the airline passenger traffic in the nation.

Oklahoma airports, in the year 2000, performed 61,512 departures enplaning over 3.4 million passengers. The two largest airports, Will Rogers World Airport in Oklahoma City and Tulsa International served 1.73 and 1.66 million passengers respectively, classifying both as Medium Air Traffic Hubs. Oklahoma also has several Air Force bases, including Tinker AFB in Oklahoma City, Altus AFB in Altus, and Vance AFB in Enid.

Rail: Railroad companies are categorized into four classes. Class I railroads are the U.S. Linehaul Freight Railroads with operating revenues in excess of $266.7 million. The seven Class I railroads in 2002 were: Burlington Northern and Santa Fe Railway (BNSF), CSX Transportation, Grand Trunk Corporation, Kansas City Southern Railway, Norfolk Southern Combined Railroad Subsidiaries, Soo Line Railroad, and Union Pacific Railroad (UP). Combined, these companies have 477,751 freight cars in service and operate on 123,070 miles of tracks, when trackage rights are included. Non-Class I railroads include the three sub-classes: Regional, Local Linehaul and Switching & Terminal. In 2001, there were 563 Non-Class I railroad companies operating on 45,000 miles of track.

Union Pacific coal train on its way through Oklahoma to power plants on the Gulf Coast

In Oklahoma, Class I rail carriers include BNSF, UP, and Kansas City Southern for freight. Amtrak connects Oklahoma City to an Amtrak hub in Fort Worth, Texas for passenger travel. Regional rails include the South Kansas & Oklahoma Railroad. Among Local rails are the Arkansas & Oklahoma Railroad, Inc., AT&L Railroad, De Queen & Eastern Railroad, Grainbelt Corp., Hollis & Eastern Railroad, Kiamichi Railroad Co., Sand Springs Railway Company, Stillwater Central Railroad, Inc. (SLWC), and Tulsa-Sapulpa Union Railway Co.

Water: Canadian County does not have navigable waterways. The water transport hazard will not be assessed in this Plan.

Pipelines: The pipeline network supporting energy transportation in the United States includes approximately 1.9 million miles of natural gas and hazardous liquid pipelines and more than 3,000 companies operating in all 50 states. Pipelines carry 18.4% of all hazardous materials transported in the U.S. Natural gas distribution, with over 1.8 million miles of pipelines, represents the greatest commodity transported through pipelines. Over 305,000 miles of pipelines are used in the transport of natural gas transmission and almost 160,000 miles of pipelines are used in the transport of hazardous liquids, including petroleum products. Most pipelines are installed in underground rights-of-way (ROW), which are maintained for access and marked with above ground markers and warning signs.

Crude and petroleum products represent over 40% of all hazardous material transports. Pipelines represent the greatest transportation system for petroleum and petroleum by-products. In 2001, pipelines accounted for 66.24% of all U.S. domestic petroleum products transportation. Water-borne transport accounted for 28.05%, followed by 3.54% for motor carriers and 2.17% for railroads.

Measurement

The National Transportation Safety Board (NTSB) investigates significant accidents in all forms of transportation including all civil aviation accidents, selected highway accidents, railroad accidents, major marine accidents, pipeline accidents, hazardous material releases from any form of transportation, and other transportation problems that have a recurring nature. Accident reports, safety studies, numerous databases, and historical archives are all available at the NTSB through the Freedom of Information Act.

Extent/Severity

The largest economic impact associated with hazardous material transport incidents comes from flammable and combustible liquids. In terms of incident cost, release-causing enroute accidents have the highest average cost, followed by enroute accidents in which a release does not occur. Of those enroute accidents resulting in a release, explosions have the highest per incident cost, followed by fires, and then by releases where neither a fire nor explosion ensues. Explosions result in an average cost of over $2.1 million per accident, followed by $1.2 million per accident involving fire, and accidents involving releases with no fire or explosions average slightly over $400,000. The greatest economic impact though, is associated with accidents enroute where a release does not occur, due to the higher frequency of these events.

The extent of a transportation event can be lessened by, among other measures, Reverse 9-1-1 notifications of people in the impact area, by planned and practiced notification and evacuation procedures, and by relocating hazardous material transportation routes away from populated areas and critical facilities.

Canadian County considers a minor severity Transportation incident to be one that results in inconvenience (such as traffic delays), minor injury, and some financial loss (less than $50,000), and a major severity event to be one that requires immediate intervention to save lives and property, and/or results in serious injury or death, or significant financial loss (greater than $50,000).

Canadian County Transportation Infrastructure

Canadian County has 215.4 miles of highways over which hazardous materials are carried, including 46 miles of US Interstate highways, 65.8 miles of United States highways, and 103.6 miles of Oklahoma state highways and turnpikes. The county has 74 miles of railroad track, approximately 521 miles of natural gas and hazardous material pipelines, and six airports within its boundaries.

Roads: In Canadian County, there are a number of major highways carrying hazardous materials transport. These are listed in Table 4-46. Because of the ubiquity of oil and gas wells and storage facilities in the county, hazardous materials will likely be carried over all local, rural roads.

Table 4–46: Canadian County Highways

Highway	Miles	Description
I-40	38	Interstate 40 (I-40) is the third-longest major east–west Interstate Highway in the United States. It enters Canadian County east of Hinton, runs through the south side of El Reno and passes through Oklahoma City metro and Yukon and into Oklahoma City proper and on to Shawnee and points east.
I-40 B	8	El Reno I-40 Business Loop (formerly US-66) leaves I-40 at Exit 119, runs 8 miles through El Reno, and rejoins I-40 at Exit 125, the interchange with US Hwy 81.
Kilpatrick Tpk	12	The John Kilpatrick Turnpike is a toll road in Oklahoma City that runs from I-40 around the northwest side of the Metro area to join I-35 and I-44 (Turner Turnpike).
US Hwy 81	26	US Hwy 81 runs north-south from Ft. Worth, TX to the Canadian border. It follows generally the route of the Chisholm Trail through Canadian County.

Highway	Miles	Description
US Hwy 270	39.8	US Hwy 270 runs 643 miles from Liberal, KS to White Hall, AR, through Geary, Calumet, El Reno and Yukon. South of Calumet, at Exit 115, the highway joins I-40 and is duplexed with the Interstate through Oklahoma City to Shawnee.
OK Hwy 3	20.5	OK Hwy 3 travels diagonally through Oklahoma, from the Panhandle to the far southeastern corner of the state. It is the longest state highway in the Oklahoma road system, at a total length of 616.5 mi. It enters Canadian County at Okarche, splits off from US Hwy 81, to become a major artery in the Oklahoma City highway system, commonly known as the *Northwest Expressway*, since it serves the northwestern part of the Metro area. It skirts the northern limits of El Reno before entering the Oklahoma City limits.
OK Hwy 4	24	OK Hwy 4 begins at the western terminus of the H.E. Bailey Turnpike Spur south of f Mustang, where it joins OK Hwy 152 for 1 mile before continuing north along Mustang Rd. to I-40, Yukon and OK Hwy 3 before ending at Edmond Rd. in Piedmont.
OK Hwy 8	7.8	OK Hwy 8 runs north-south from Kiowa, KS to Cyril, in Caddo County. For 8 miles the road is duplexed with US Hwy 281 and OK Hwy 66 from Geary to Hinton Junction.
OK Hwy 37	14	OK Hwy 37 runs in a zigzag pattern through the extreme southwestern corner of Canadian County for 14 miles, beginning at Hinton in Caddo County, passing south of Niles and Cedar Lake before re-entering Caddo County and going on to Cogar, Minco, Tuttle and Moore.
OK Hwy 92	8	The northern section of OK Hwy 92 stretches from State Highway 152 in Mustang to its final terminus at OK Hwy 66 in Yukon. Part of the northern segment is known as Garth Brooks Road
OK Hwy 152	17.3	OK Hwy 152 runs through west-central Oklahoma for 149.6 miles from the Texas State Line to I-44 near Will Rogers World Airport in Oklahoma City. After crossing the Canadian River into Canadian County, duplexed with US Hwy 81, OK Hwy152 splits off from US-81 in Union City and travels east through the center of Mustang to join I-44.

Rail: Railroad service for Canadian County is provided by the Union Pacific, the Stillwater Central Railroad, and the AT&L railroad. These lines are summarized in the following table.

Table 4–47: Major Railroads in Canadian County

Railroads	Miles	Description
Union Pacific	45	Union Pacific operates a north-south line from the Texas ports north through Duncan, El Reno and Enid to the upper Midwest. Primary shipments out of Oklahoma include cement aggregates, wheat, paper and petroleum products, tonnage brought into the state is predominantly coal, followed by cement aggregates and automobiles. The rail line passes through Union City, Powers, El Reno, Concho and Okarche. The UP 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.
SLWC	7	The Stillwater Central Railroad (SLWC) operates a 275-mile line between Tulsa and Duke, Oklahoma, via Lawton, Mustang and Oklahoma City. The primary cargoes are fuel, minerals and industrial products. About 7 miles of this line are in Canadian County and pass through 4 miles of Mustang from Czech Hall Rd. east to County Line Rd.
AT&L	22	The AT&L Railroad is a short line carrier primarily of grain on a 40-mile track from Watonga via Greenfield, Geary and Calumet to El Reno, where it connects with the Union Pacific's Enid Subdivision. Major cargoes are grain, fertilizer and agricultural products.

Air: There are 6 airports in Canadian County: three in the immediate vicinity of El Reno, one between Calumet and El Reno, and two in the Oklahoma City Metro area—one of these close to Piedmont and the other near Yukon. These are summarized in table 4-48. There is also an airport at Okarche, in Kingfisher County.

Table 4–48: Airports in Canadian County

Railroads	ID	Description
El Reno Municipal	RQO	El Reno Regional Airport is a publicly-owned facility that has four runways, two of concrete and two of turf. It is open to the public, and has 12 aircraft based on the field and averages 68 operations a day.
El Reno	F99	El Reno Airport is a private field with one turf runway. There are no aircraft based on the field, which experiences about 200 operations a year, all transient.

Railroads	ID	Description
Clarence E. Page	22	Clarence E. Page Municipal airport is owned by Oklahoma City, and is located 3 miles west of Yukon. There are four runways, all concrete, two of which are lighted. There are 46 aircraft located at the field, with 68 operations a day.
Sundance Airpark	HSD	Sundance is a privately-owned field that is open to the public. It has two concrete runways. There are152 aircraft located at the field, with about 57 operations a week.
Baker Airstrip	8OK2	Baker airstrip is a private field 3 miles south of El Reno. There is one turf runway and one aircraft stationed at the field.
Harman Airport	47OK	Harman Airport is a privately-owned field 5 miles east of Calumet, at Darlington Rd. and Brandley Rd. It has two turf runways and one aircraft based on the field.
Okarche Municipal	3OK1	Okarche Airport is a private field with one turf runway and two crop-dusting aircraft stationed at the field.

Pipeline: Canadian County is crisscrossed by a dozen pipelines carrying natural gas, crude oil and natural gas liquids. There are 276 miles of natural gas pipeline, 121 miles of crude oil pipeline, 97 miles of pipeline carrying natural gas liquids, and 27 miles of pipeline transporting carbon dioxide.

Frequency

The National Transportation Safety Board (NTSB) investigates significant accidents in all forms of transportation, including all civil aviation accidents, selected highway accidents, railroad accidents, pipeline accidents, hazardous material releases from any form of transportation. Accident reports, safety studies, numerous databases, and historical archives are all available through the NTSB.

Miscellaneous Dangerous Goods, a hazardous materials shipment class, has the highest accident and incident rate of all shipments. The gases class, more specifically, the non-flammable gases sub-class, has the lowest accident and incident rates during shipment.

In 2007, a joint commodity flow survey was undertaken with collective participation from the Bureau of the Census, U.S. Department of Commerce, the Bureau of Transportation Statistics and the U.S. Department of Transportation. Truck carriers represented 53.9% of all hazardous material transports, pipelines accounted for 28.2%, rails accounted for 5.8%, and air accounted for 0.1%.

Roads: The number of large trucks carrying hazmat that were involved in fatal traffic crashes averaged 225 per year from 1980 through 1990. Since 1991, the annual average has dropped to 203 trucks, with the number varying between 175 and 229 a year. From 1991 through 2000 there were 48,229 large trucks involved in fatal crashes, but only 2,032 (4.2 percent) of them were carrying hazardous materials. Trucks transporting hazmat accounted for 3.9 to 4.8 percent of annual fatal large truck crashes in the 10-year period. Large trucks carrying hazmat were involved in about 6,000 nonfatal crashes a year from 1996 through 2000. These trucks represented only 1.7 percent of the total large truck nonfatal crashes. The number of trucks carrying hazmat involved in nonfatal crashes averaged 4,286 a year from 1996 through 2000, accounting for 4.4 percent of the trucks involved in nonfatal crashes in that period. In summary, less than 5 percent of the trucks involved in fatal and nonfatal traffic crashes each year were carrying hazardous materials. This relatively small percentage has remained fairly constant over the past two decades.

Air: According to a 2007 commodity flow study of hazardous materials, airlines represent 0.1% of hazardous material shipments in the United States.

Rail: Coal was the dominant freight carried by rail and comprises 49% of all commodity types. Nonmetallic minerals, farm products and chemicals round out the top four commodities shipped

by rail. Chemicals and allied products total approximately 7.9% of all freights while petroleum and coke only account for 2.7%.

Pipeline: According to the Pipeline and Hazardous Materials Safety Administration, between 1991 and 2010 there were 10,120 pipeline incidents in the U.S. that resulted in 381 deaths, 1,599 injuries, $5.073 billion in property damage, and 2.578 million barrels of lost product. From 2006 through 2010, there was an average of 627 pipeline incidents per year, 16 deaths, 65 injuries, $439 million in damage, and a gross loss of 112,740 barrels of product.

Petroleum pipeline break in Jackson County

The Pipeline and Hazardous Materials Safety Administration also has statistics for "Significant Incidents," which are those which involve: fatality or injury requiring in-patient hospitalization, $50,000 or more in total costs, measured in 1984 dollars, highly volatile liquid releases of 5 barrels or more or other liquid releases of 50 barrels or more, and liquid releases resulting in an unintentional fire or explosion. The 5-year average for Significant Incidents in the U.S. from 2006 through 2010 is: 266 incidents per year, resulting in an average 15 deaths, 62 injuries, $430.85 million in damage, and 111,727 barrels of lost product.

Incidents involving a loss of product during pipeline transmission have been correlated through several studies with the age of the affected pipeline. Besides corrosion, failures are most often caused by operator error, external impacts, structural failures, mechanical defects, and natural hazards, including earthquakes, land subsidence, avalanche, flood, lightning, fire and severe winter storms.

Impact

Human casualties and releases of hazardous materials are the typical results of a transportation incident. Because of the difficulties presented by hazardous chemicals and their reactions, responses to accidents require both speed and technical expertise. Additionally, mass casualty incidents are often too large in scale for emergency responders and supporting organizations, such as local blood banks and hospitals, to handle. In general, mutual aid agreements, like those used by local fire departments, can compensate for the over-extended response capabilities. Transportation accidents also tend to interact with other forms of transportation. Often railroad bridges and highway overpasses are near each other, if not structurally connected. Municipal airports' flight paths can also overlap.

The interaction of transportation hazards does not end there. Natural disasters, particularly earthquakes, can cause hazardous material releases at fixed sites and complicate spill response activities. Tornadoes, floods, and winter storms have also been known to damage transportation systems, whether they are pipelines, railroads, water, airlines or highways. Meteorological impacts compromising vehicle safety on roads include slick bridges and overpasses from ice and rains, and heavy fog affecting visibility. Earthquakes, floods, severe thunderstorms, expansive soils, wild fires, and hazardous material incidents can also impact the integrity of the highway system. These factors, combined with heavy traffic and high speeds, facilitate accidents and occasional multi-vehicle pileups that result in injuries and fatalities.

Accidents involving aircraft can range from human error to meteorological causes. Fog, ice, thunderstorms and wind shear are conditions that can lead to difficulties in properly controlling

aircraft. Weather delays are common in air transportation and are respected to help prevent accidents. Airport runway pavement is also a concern. Deteriorated, runway pavement can cause damage to aircraft turbines, propellers, landing gear and may result in runway closure.

4.15.2 History/Previous Occurrences

Webbers Falls / I-40 Bridge Collapse

On May 27, 2002, three piers connected to an Interstate 40 bridge crossing the Arkansas River near Webbers Falls, OK were struck by a tugboat at 7:43 a.m. collapsing sections of the bridge and killing 14 motorists. The navigation channel and the highway were both subsequently closed for 35 days. Detours were up to 60 miles long for eastbound traffic.

I-40 Bridge collapse at Webbers Falls on the McClellan-Kerr Navigation System of the Arkansas River

Approximately 20,000 vehicles per day use this portion of I-40, and barges on the navigation system can carry the equivalent load of 15 railcars or 80 semi-trucks. On June 4, 2002, the Federal Highway Administration committed an initial $3 million in emergency relief funds to aid in reconstruction.

Conoco Phillips Tank Fire, Glenpool, Oklahoma

On the evening of April 8, 2003, around 9:00 p.m., a Conoco Phillips holding tank exploded at a storage and transfer facility located east of US Hwy 75 near 131st Street and Elwood Avenue, north of downtown Glenpool. The tank, which contained diesel fuel, ignited after receiving a delivery of 8,400 barrels of diesel from a pipeline that branched off the Explorer Pipeline Company's 1,400-mile main pipeline that connects the Gulf Coast to the upper Midwest.

Responders were concerned with the possibility of the fire spreading to adjacent tanks that contained highly volatile unleaded fuel. Work to contain the fire was effective and appeared under control that night. The following morning, around 5:30 a.m., live power lines melted by the flames fell onto spilled fuel in the containment basin and re-ignited the blaze. Strong northerly winds helped blow the blaze against a second tank containing naphtha, which fortunately did not explode. Environmental contamination of Coal Creek, which drains directly through the storage and transfer facility, was minimal due to a containment levee around the tank. Had the levee been compromised, areas along Polecat Creek and the Arkansas River could have been adversely impacted. The fire forced the evacuation of homes and businesses within a 1.5-mile radius of the facility and closed down U.S. 75 in both directions. Glenpool Schools were closed as a precautionary measure. The fire burned for 25 hours.

The ConocoPhillips tank fire caused the evacuation of over 400 people in the 1.5 square miles directly south and east of the storage and transfer facility

Local non-profit organizations assisted by setting up shelters for evacuated people. Firefighters from Glenpool, Jenks and Tulsa responded to the event and were supplied with a foam truck from Sun Refinery. Equipment from Conoco Phillips headquarters in Houston, Texas, was also shipped to the scene. The National Transportation Safety Board concluded that static electricity in a fuel line ignited the fire.

U.S. 75 Hazardous materials (Hydrogen) Spill near Ramona, Oklahoma

In May 2001, a tanker truck carrying 10 cylinders of hydrogen gas was pushed off the road when a vehicle traveling along side the tanker lost control and forced both vehicles into a roadside ditch. The collision broke a seal on one of the cylinders causing an initial explosion and a subsequent fire. The tanker ended upside down in the ditch, killing the driver. Several area fire departments assisted with the fire, which due to high winds cascaded into a grass fire. Emergency management remained on the scene until all ten leaking cylinders were emptied and the necessary precautions taken to keep those leaks from exploding. Because so much water was required to cool the tanks and extinguish the hydrogen leaks and grass fires, water to nearby residents was restricted for the duration of the response, and rural water districts in the area were asked to help maintain the supply of water to the fire fighters.

Explorer Pipeline Tank Fire, Glenpool Oklahoma

On June 18, 2006, just after 9 a.m., the Explorer Pipeline storage and transfer facility at Glenpool was hit by lightning, setting fire to a tank containing over 5 million gallons of unleaded gasoline. Explorer Pipeline is in the 131st & Elwood area, east of Highway 75, southwest of the City of Tulsa. Over 800,000 gallons of fuel was lost. The loss could have been greater if the company had not been able to salvage over 4.3 millions gallons by pumping it from under the area of the tank fire. The firefighters were able to keep adjacent tanks from being affected, which reduced the catastrophic effect of the blaze, unlike the 2003 fire. Responders were prepared to dam adjacent Coal Creek with sand in order to avoid run-off of foam and petroleum. Five families in the area evacuated their homes as a precautionary measure. Responders from Glenpool, Jenks, Bixby and Tulsa battled the blaze, along with responders from Sun Refinery and Williams Fire Control of Beaumont, Texas.

Explorer Pipeline tank fire

Canadian County Transportation Events

The National Response Center (NRC) lists 32 highway transportation releases, 14 railroad incidents (five involving the release of hazardous materials), and 13 pipeline releases of hazardous substances. There were no aircraft incidents reported for Canadian County in the NRC's data base. The reported transportation events for Canadian County are listed in Table 4-49.

Table 4–49: Canadian County Transportation Events 1996-2005

Date	Location	Nearest City	Suspected Responsible Party	Material
Truck/Highway Transport Spills				
04/17/10	Oil dumped by vehicles at construction site	Banner	Duit Construction	Unknown oil
04/13/09	150-200 35-gal. containers dumped near landfill	El Reno	Unknown	Sodium nitrate
03/25/09	Load shift damages drum, releasing product	OKC	SAIA Motor Freight	Benzaldehyde
03/04/09	300 gal. Sodium hypochlorite spilled from damaged tote	Calumet	Halliburton	Sodium hypochlorite

Date	Location	Nearest City	Suspected Responsible Party	Material
10/20/08	Open vent valve on truck from operator error	Mustang	Hamm & Phillips	Oily water
03/18/08	20 gal. spilled into ditch from tank due to pump failure	Yukon	BCM Oklahoma	Diesel fuel
08/13/07	15 gal. spilled from portable tank onto roadway	Piedmont	Sonoco Pipeline	Crude oil
12/23/05	Converted bus blew engine spilling oil	El Reno	Private party	Motor oil
06/26/05	20 gal. spilled onto roadway	El Reno	Cal-Cleve, Ltd.	Misc. paints, varnishes
06/22/05	Trucks dumping oil from equipment	El Reno	Cactus Drilling	Unknown oil
06/21/05	Eight 55-gal. drums with unknown chemical dug up	Mustang	Unknown	Unknown chemical
11/25/03	Tote fell from truck and was struck by another truck	Union City	Schlumberger	Friction reducer
12/26/02	2 barrels spilled onto gravel due to equipment failure	OKC	Enogex	NG condensate
12/05/02	Weld on acid tank failed, spilling 150 gallons of acid	OKC	OG&E	Sulfuric acid
07/06/02	5 gal. container and 2 batteries dumped on ground	Mustang	Superior Ready Mix	Battery acid
09/18/01	Truck turns over rupturing saddle tank	Mustang	Marathon Transport	Oil, fuel
07/21/01	3 gal. spilled onto roadway from portable tank	Yukon	Consolid.ated Freightway	Cleaning liquid
07/01/01	22 gal. spilled onto roadway	El Reno	Cal-Cleve, Ltd.	Misc. paints, varnishes
06/01/01	1 gal. flammable liquids spilled onto roadway	El Reno	Cal-Cleve, Ltd.	Flammable liquid
04/07/01	1 gal. spilled onto roadway	El Reno	Cal-Cleve, Ltd.	Misc. paints, varnishes
10/18/00	Valve on ammonia storage tank releasing material	Union City	El Reno Grain	Anhydrous ammonia
07/17/00	Truck spilled gasoline from fuel tank	Yukon	Leroy Lightle Trucking	Unleaded gasoline
05/01/00	Car collides with truck causing spill of 200 gal.	El Reno	Domino Transport	Unleaded gasoline
06/14/99	10 gal. paint and varnishes spilled onto roadway	El Reno	Jevic Transport.	Misc. paints, varnishes
12/29/98	5 gal. spilled from truck	Calumet	YRC Inc.	Dichloromethane
10/16/98	84 gal. spilled onto roadway	El Reno	Koch Pipeline	Crude Oil
07/07/98	1,335 gal. spilled from tanker truck hit by car	Mustang	Red Rock Distrib.	Gasoline
03/05/98	42 gal. spilled onto roadway	El Reno	Koch Pipeline	Crude oil
09/12/96	Tanker truck, one vehicle accident	OKC	Oklahoma Tank Line	Oil, diesel
01/26/96	168 gal. spilled from portable tank on truck	El Reno	Koch Resources	Crude oil
09/07/95	3 gal. wood preservative spilled onto roadway	El Reno	Consolidated Freightway	Wood preservative
Railroad Release				
07/28/09	Truck and train collision, truck driver killed	Union City	Union Pacific	Oil, diesel fuel
06/20/09	Truck and train collision causes releases from both	El Reno	Union Pacific	Oil, diesel
12/06/06	Lubrication oil discharged from train in Jones yard	El Reno	Union Pacific	Misc. oil
05/15/06	Train and car collision at railroad crossing	Yukon	Union Pacific	Non-release
04/20/06	Train derailment	El Reno	Union Pacific	Non-release
03/07/06	Train/vehicle collision at crossing, derailment, 1 fatality	Yukon	Union Pacific	Oil, diesel fuel
12/02/05	Locomotive and 10 cars derailed, causes unknown	Union City	Union Pacific	Unknown
02/15/05	Train and car collision at Woodson St. crossing	El Reno	Union Pacific	Non-release
02/25/02	Unknown number of cars derailed from freight train	Union City	Union Pacific	Sulfuric acid
10/18/01	10 cars derailed from a train carrying rock	Concho	Union Pacific	Aggregate
12/31/99	23 empty rail cars derailed	Concho	Union Pacific	Non-release
03/13/99	Car collides with train at Morgan Rd. crossing	OKC	Union Pacific (?)	Non-release
08/14/98	11 cars derailed from freight train	El Reno	Union Pacific (?)	Non-release
12/12/96	Southbound train and car collision	El Reno	Union Pacific (?)	Non-release
Pipeline Spills				
10/11/07	Third party strikes 16" pipeline with digger	OKC	Centurion Pipeline	Crude oil
04/23/07	Pipeline corrosion causes leak into pond	Geary	Plains Pipeline	Crude oil
05/23/06	10" pipeline leaks into dry creek	Okarche	Duke Field Serv.	Condensate, water
02/06/06	Equipment failure releases 20 barrels into North Canadian tributary	Geary	Plains Pipeline	Crude oil, water
01/10/05	Pin hole leak in 6" pipeline due to corrosion	El Reno	ONEOK Field Serv.	Crude oil, NG condensate
07/30/04	Pipeline break	El Reno	Enogex	Natural gas
02/28/03	Frozen pipe causes break and release	OKC	Duke Field Serv.	Crude oil, water
03/07/02	Backhoe damages pipeline	Yukon	Unknown	Carbon dioxide
01/10/01	Release from natural gas pipeline	El Reno	ONEOK Field Serv.	NG condensate

Date	Location	Nearest City	Suspected Responsible Party	Material
07/17/00	Third party cuts into 4" plastic pipeline	OKC	OK Natural Gas	Natural gas
05/14/99	Corrosion results in pipeline leak	Piedmont	GPM Gas Corp.	Natural gas
10/08/97	Fire in NG distribution line during maintenance	Canadian Co.	GPM Gas Corp.	NG condensate
07/18/97	Slop oil storage tank hit by lightning	Piedmont	GPM Gas Corp.	NG condensate

Probability/Future Events

Canadian County is vulnerable to transportation incidents, and therefore its vulnerability is a constant and widespread threat. Transportation incidents can, and do occur in all months of the year at all hours of the day, so it is important that even when not responding to an incident, education and preparations continue to take place.

Canadian County, its communities and public school systems have a Moderate probability of a future Transportation event, unless otherwise specified in Appendix F or Appendix G.

4.15.3 Vulnerability

This section summarizes information about Canadian County's vulnerability to Transportation hazards, including the impact on people, structures and buildings, critical facilities, and infrastructure. This information, as well as information provided by the County, incorporated communities and public schools, was used to determine the Vulnerability Criteria identified in Tables 4-2 and 4-3. Canadian County was determined to be at moderate risk to the Transportation hazard. (See Table 4-2 Hazard Risk Analysis, and Table 4-3, Summary of Hazard risk Analysis Ranking Criteria for an explanation of how the rankings were derived.) Appendices F and G identify where the incorporated communities and public school systems differ from the County as a whole.

Communities and Schools close to highway, railroad, pipeline and air transportation systems are at risk from vehicle or facility accidents and possible subsequent hazardous material events. Canadian County has 215.4 miles of highways, including 46 miles of US Interstate highways, 65.8 miles of United States highways, and 103.6 miles of Oklahoma state highways and turnpikes. The county has 74 miles of railroad track, approximately 521 miles of natural gas and hazardous material pipelines, and six airports within its boundaries.

Population

Although Canadian County is not a major highway or railway transportation hub, with only one Interstate (I-40) and three US Hwys (US Hwy 81, 270 and 281) and a stretch of the Kilpatrick Turnpike within its jurisdiction, it is a significant hub for pipeline transport. Since volatile petroleum products move over its highways, county roads, railways and through its pipelines, the jurisdiction is at Moderate risk to the Transportation hazard. All populations living and working within ¼ mile of a transportation corridor are exposed to accidents involving hazardous materials.

Populations of Canadian County schools located in ¼ mile of a transportation route are also vulnerable to the transportation hazard. Students, faculty, and staff with mobility issues or severe illnesses that would limit their ability to evacuate or shelter in place quickly are particularly vulnerable to a transportation event. Education and drills reinforcing procedures for sheltering in place vs. evacuating in the event of a hazardous materials incident, particularly for schools in identified risk areas should occur

Approximately 5,116 residents live in unincorporated Canadian County, approximately 359 residents (or 7%) of this population live within ¼ The transportation corridor as a whole (highways and railroads) covers a total of approximately 117 square miles.

Table 4–50: Transportation Corridor Statistics

Name	Area (sq. mi)	Transport Buffer Area (sq. mi)	% of Area	Total Pop.	Pop. in ¼ mi Buffer	% of Pop. In 1/4 mi Buffer
Unincorporated Canadian County	547	44	8%	5,785	445	8%
Calumet	1.26	0.73	58%	507	355	70%
El Reno	80	19	24%	16,746	10,195	61%
Mustang	12	5	42%	17,395	8,222	47%
Okarche	1.84	1.24	67%	1,067	818	77%
Piedmont	42.30	1.10	3%	5,685	260	5%
Union City	57	8	14%	1,642	176	11%
Non included areas	164	38	23%	66,714	15,794	24%
Total	**905**	**117**	**13%**	**115,541**	**36,265**	**31%**

Structures/Buildings

Structures and schools alongside the major traffic ways are at high risk from the transport of explosive or highly flammable products by highway, rail or pipeline. Most vulnerable are structures where loading and unloading of hazardous materials occurs, including pipeline facilities.

Critical Facilities

Critical facilities located next to major traffic corridors are at high risk to the transportation hazard. As the following table illustrates, Canadian County has moderate vulnerability to transportation hazards, with 17 out of 28 (61%) County critical facilities located in at least one transportation or pipeline corridor, including 30 County schools. (Schools in transportation corridors are broken out in Table 4-54.) Only 11 out of Canadian County's 28 critical facilities (39%) are situated outside of a transportation or pipeline corridor.

Table 4–51: Canadian County Critical Facilities in Transportation Corridors

Map ID	Facility Name	Address	Type	Community
C05	Canadian County Rurual Water District #1 Water Tower and Booster Station	Hwy 270 amd N Karns Rd	COUNTY	Unincorporated
C06	Cedar Lake Volunteer Fire Dept #1	Mounds and Erickson	CITY	Unincorporated
C08	Cedar Lake Volunteer Fire Dept #3	20000 S Ok 37	CITY	Unincorporated
C09	County Shop District No 3	1205 Calumet Rd.	COUNTY	Unincorporated
C10	Darlington Public School	4408 N Hwy 81	SCHOOLS	Unincorporated
C11	Federal Correctional Institution	4205 OK Hwy 66	FEDERAL	Unincorporated
C12	Maple Public Schools	904 S Maple Rd	SCHOOLS	Unincorporated
C14	Mustang Creek Elementary	10821 SW 15th St	SCHOOLS	Unincorporated
C18	Northwood Elementary	14100 Northwood Ave	SCHOOLS	Unincorporated
C22	Canadian County Courthouse	201 N Choctaw	County	El Reno
C23	Canadian County Sheriff	208 W Rogers	County	El Reno
C24	Canadian County Assessor	200 N Choctaw	County	El Reno
C25	Gary Miller Children's Justice Center	7905 E Hwy 66	County	El Reno
C27	County Shop District No 2	2305 S Evans Rd	County	El Reno
C29	Canadian County DHS	7901 E. US Hwy 66	County	El Reno

Map ID	Facility Name	Address	Type	Community
C30	Canadian County Judicial Building/ County Clerk	201 N Choctaw	County	El Reno
C31	Canadian County Election Board	200 S. Bickford Ave.	County	El Reno
C32	Canadian County Health Department	100 S. Rock Island	County	El Reno

Infrastructure

Canadian County roads, bridges, railways and pipelines can themselves become hazardous due to deterioration and insufficient maintenance. Although Canadian County transportation facilities are in good condition, private rail and pipeline networks require oversight to ensure that these do not become hazardous to surrounding populations. Specifically, aging pipelines are subject to corrosion and equipment failure.

4.15.4 Transportation Scenario

The worst-case scenario for a catastrophic transportation event would be a Union Pacific train accident in the south of El Reno that resulted in the release of liquid chlorine. In this scenario, a tank car carrying 100,000 gallons of liquid chlorine is derailed and ruptures on the south side of El Reno, with calm to very light wind coming out of the south-southeast. See Figure 4-35 for a map showing the results from this scenario.

4.15.5 Future Trends

Future development areas in Canadian County are at moderate risk to transportation events. Much of the planned development will be centered on existing transportation corridors, which makes them vulnerable to the impacts of transportation hazards and cascading events.

Population

Canadian County will continue to be at Moderate risk to the Transportation hazard. The exposure to risk could be reduced by new transport technologies. For example, the Union Pacific Railroad has instituted rate reductions for shippers of chlorine, anhydrous ammonia, and other poisons, if improved tank cars, which meet new Department of Transportation specifications, are used for the transport.

Structures/Buildings

Structures alongside the major traffic ways will continue to be at high risk from the transport of explosive or highly flammable products by highway, rail and pipeline. Most vulnerable are structures where loading and unloading of hazardous materials occurs. In addition, pipelines carrying highly flammable petroleum products, such as crude oil, are exposed to lightning-caused fires, as in the Explorer Pipeline tank fire of June 18, 2006.

Critical Facilities

Critical facilities located next to major traffic corridors will continue to be at high risk to the transportation hazard. This includes all 127 critical facilities listed in Table 4-52 and 4-53, above. Future siting and construction of critical facilities along major traffic ways should be analyzed for this hazard, and minimum offsets from the corridor considered.

Infrastructure

The highway, rail and pipeline transportation infrastructure, itself, is subject to wear and deterioration from the traffic it carries, and if not maintained, can increase the likelihood of catastrophic accidents. Many, if not most, pipeline toxic spills are due to deteriorated facilities, as are many railroad accidents. In a period of economic downturn, maintenance of roads, bridges,

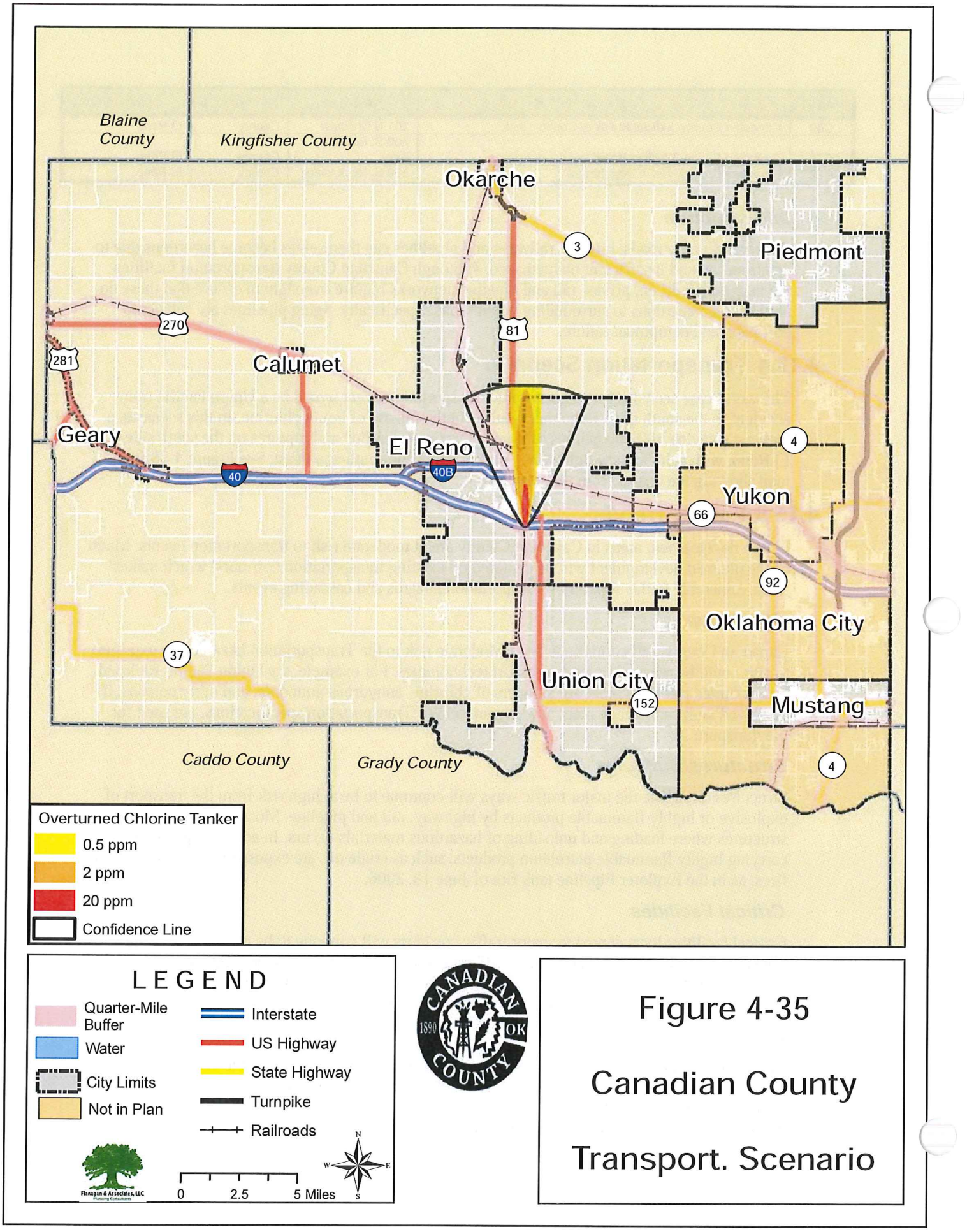


Figure 4-35

Canadian County

Transport. Scenario

railroads and pipelines are in danger of being reduced to meet fiscal requirements of both the public and private transportation networks.

4.15.6 Conclusion

The United States has the most productive transportation systems in the world. These operating systems include roads, rail, air and pipelines. These systems make possible a high level of personal mobility and freight activity for the nation's residents and business establishments. Although the source and location of transportation accidents can vary, the effects are typically the same. Accidents often involve human injury or death and/or the release of hazardous materials.

Based on the information and analysis presented above, Canadian County is considered to have a moderate vulnerability to Transportation hazards, primarily pipeline and storage tank incidents.

Update Changes

Identified significant changes made from previous Multi-Hazard Mitigation Plans from Canadian County, Calumet, El Reno, Mustang, Piedmont, and Union City are outlined in Appendix E. Changes are based on criteria outlined for Plan Updates in the Local Multi-Hazard Mitigation Planning Guidance document of July 1, 2008.

4.15.7 Sources

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