



# Section 13. Lightning

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## Why Lightning Is a Threat

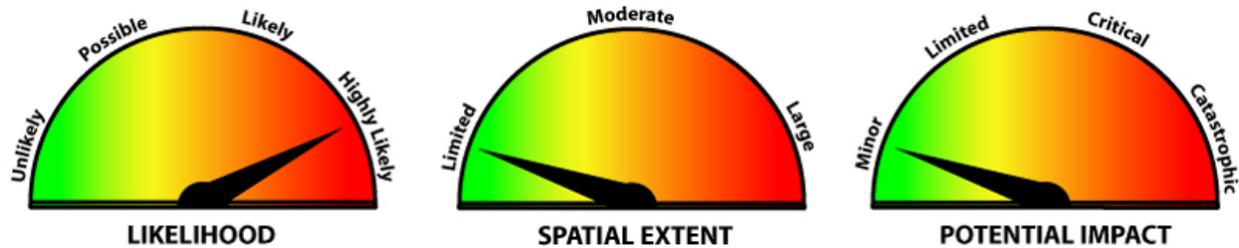
Thunderstorm and lightning events are generated by atmospheric imbalance and turbulence due to the combination of the following conditions: unstable warm air rising rapidly into the atmosphere; sufficient moisture to form clouds and rain; and upward lift of air currents caused by colliding cold and warm weather fronts, sea breezes or mountains.

Lightning is generated by the buildup of charged ions in a thundercloud, and the discharge of a lightning bolt interacts with the best conducting object or surface on the ground. The air channel of a lightning strike reaches temperatures higher than 50,000 degrees Fahrenheit. The rapid heating and cooling of the air near the channel causes a shock wave, which produces thunder.

Lightning damage can result in electrocution of humans and animals; vaporization of materials along the path of the strike; fire caused by the high temperature produced by the strike, and a sudden power surge that can damage electrical and electronic equipment. Millions of dollars of direct and indirect damages result from lightning strikes on electric utility substations and distribution lines. While property damage is the major hazard associated with lightning, it should be noted that lightning strikes kill nearly 100 people each year in the United States. Richard Kithil, President and CEO of the National Lightning Safety Institute, says that “accurate information [about lightning-induced damage] is elusive” but that “on-going research suggests realistic lightning costs and losses may reach \$4-5 billion per year” due to lightning’s role in forest fires, structure fires, hazardous materials storage incidents, aircraft-related in-flight mishaps, airline delays, power outages and electrical infrastructure malfunctions.



# Hazard Profile



**Figure 13-1. Lightning Hazard Profile Summary for the City of Plano**

The frequency, or likelihood, of a high winds in the City of Plano is “Highly Likely”, with an event probable in the next year. Most thunderstorms and resulting lightning events occur during the spring (March, April, May and June) and, at a lesser intensity, during the fall (September, October, and November). Thunderstorms form when warm, moist air collides with cooler, drier air. Often these masses tend to come together during the transition from summer to winter. Warning time for lightning is minimal.

The spatial extent of lightning is “Limited,” expected to affect less than ten percent of property the City of Plano. The potential impact of lightning is “Minor” resulting in few, if any, injuries. There is only minor property damage and minimal disruption to the quality of life. Shutdown of facilities is temporary.

## Location of Hazardous Areas

There is no distinct geographic boundary to lightning. Lightning can occur in every area of the City and of the North Central Texas region equally.

## History of Lightning

Thunderstorms and lightning strikes occur nearly everywhere in the United States. Florida has the highest occurrence of lightning strikes due to the frequency of thunderstorms in the area, followed by Southern Alabama, Northeastern New Mexico and Northern Arizona.

Texas recorded 150, 115, and 107 deaths due to lightning in the 1960s, 1970s, and 1980s respectively. Between 1959 and 1994, 334 injuries were reported in Texas, ranking the state eighth in the country.



As an example of the kind of impacts that lightning can have on the City of Plano and the North Central Texas region, one needs to look no further than Tuesday, August 12, 2003. On that evening, lightning associated with a violent thunderstorm wreaked havoc in Fort Worth. Lightning strikes were responsible for starting four major structure fires in the city. Additionally, a 19-year-old man was killed by a lightning strike in southwest Fort Worth when he attempted to go jogging soon after the rain from the thunderstorm had passed.

Historic lightning event data are available from the private sector only at considerable expense. The one publicly available lightning dataset, the NOAA Storm Events database, is extremely limited. It lists only 62 recorded lightning events in the NCTCOG region between 1996 and 2003 and only six lightning events in the City of Plano from 1950 to 2005. Given the limited resources of this current planning cycle and the limited availability of public data, a quantitative assessment of lightning magnitude and frequency was not feasible. Instead, a simple, qualitative approach was used in order to acknowledge the obvious fact that lightning hazards occur throughout the City of Plano and the entire North Central Texas region.

According to NOAA's Storm Event database, there have been only six lightning events reported in Plano, Texas between 01/01/1950 and 04/30/2005. This is considered to be vastly under-reported. The reported events are listed in Table 13-1.

**Table 13-1. Reported Lightning Events in the City of Plano, according to the National Oceanic and Atmospheric Administration, January 1, 1950 to April 30, 2005**

Event	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
<b>City of Plano</b>						
Lightning	Plano	07/18/1995	0	0	20K	0
Lightning	Plano	07/23/1996	0	0	80K	0
Lightning	Plano	05/19/1997	0	0	50K	0
Lightning	Plano	12/12/1999	0	0	30K	0
Lightning	Plano	03/10/2000	0	0	25K	0
Lightning	Plano	02/16/2001	0	0	750K	0

## People and Property at Risk

There is no defined geographic boundary for lightning events. All population, buildings, critical facilities, infrastructure and lifelines and hazardous materials facilities are considered exposed to the lightning hazard and could potentially be impacted. As a result, the lightning hazard deserves mitigation consideration by the City of Plano.

