

Chapter 10: Fire

Fire is the largest single cause of property loss in the nation. Over the past ten years, fire has caused \$120 billion in direct damages and much more in indirect losses. Furthermore, each year building fires injure more than 20,000 Americans and another 3,000 die in building fires.⁸⁸

Development can impact a community's ability to prevent fires in two principle ways. First, by placing homes, businesses, and other structures in fire-prone areas without adequate protection measures. Second, by stretching fire protection capabilities beyond reasonable limits.

FIRE-PRONE AREAS

According to statistics on the National Interagency Fire Center website, from 1960 to 2003 there were an average of 133,565 fires which burned an average of 4 million acres each year.⁸⁹ Scientists at the U.S. Geological Survey and the U.S. Forest Service have developed a Fire Potential Index which shows that generally the portions of the nation west of the Mississippi are at the greatest risk, though Florida and a number of other eastern states are also at the higher end of the Fire Potential Index.⁹⁰ The issue of wildfire and growth is compounded by the irony that the areas prone to wildfire are also where most people want to live. For example, only 2% of New Mexico lies in fire prone areas yet 80% of New Mexican households are located in these same areas.⁹¹

The National Fire Protection Association has developed a *Wildland Fire Risk and Hazard Severity Assessment Form*.⁹² The assessment can be applied to an individual home or a community. The assessment consists of eight categories of factors and 19 specific factors. The rating goes from low hazard to moderate hazard to high hazard to extreme hazard. The eight categories are:

- **Means of Access** addresses the likelihood that fire fighting personel and their equipment can quickly reach a home or community. Specific factors include the number roads leading into

⁸⁸ These statistics come from ISO which provides data services to property and casualty insurance companies. For further detail see the ISO website: http://www.iso.com/studies_analyses/ppc_program/index.html

⁸⁹ For further detail visit the National Interagency Fire Center website at: <http://www.nifc.gov/stats/wildlandfirestats.html>

⁹⁰ To view a map showing the Fire Potential Index throughout the nation see the USGS publication available for download at: <http://www.usgs.gov/themes/Wildfire/>

⁹¹ *Risk doesn't deter growth in fire-prone areas*, USA Today (2/4/2004), available for viewing at: <http://www.usatoday.com/>

⁹² The *Wildland Fire Risk and Hazard Severity Assessment Form* is contained in *NFPA 1144 Standard for Protection of Life and Property from Wildfire*, which can be ordered from the National Fire Protection Association website: <http://www.nfpa.org/>

and out of a community, road width, whether roads are passable all seasons of the year, the presence of places where large equipment can turn around, and the presence of street signs.

- **Vegetation** addresses the susceptibility of vegetation to fire and the amount of “defensible” space around each building in the community. Grasses and other light vegetation receive the lowest wildfire hazard severity rating with the highest rating going to dense brush, timber, hardwoods, and timber harvest residues (slash). The lowest wildfire hazard severity rating goes to communities where highly-combustible vegetation has been cleared within 100 feet of all buildings. The cleared area reduces the likelihood of fire spreading up to the house and it provides fire fighters with sufficient room to work.
- **Topography** - the steeper the slopes adjoining a home(s) the higher the wildfire hazard severity rating.
- **Additional Rating Factors** - increases the wildfire hazard severity rating if an area: a) has rough topography with steep canyons, b) a history of higher fire occurrence, c) is periodically exposed to severe fire weather and strong, dry winds, and d) how well buildings are separated, which plays a key role in determining the likelihood of fire spread.
- **Roofing Material** - is assigned to Class A, B, or C which are defined by the American Society of Testing Materials⁹³ (ASTM) as:

Class A roof coverings are not readily flammable, are effective against severe fire exposures, and do not carry or communicate (i.e., spread) fire.

Class B roof coverings are not readily flammable, are effective against moderate fire exposures, and do not readily carry or communicate fire.

Class C roof coverings are not readily flammable, are effective against light fire exposures, and do not readily carry or communicate fire.

A roof meeting the definition of Class A, usually tile or metal, receives the lowest wildfire hazard severity rating.

- **Existing Building Construction** - a building with noncombustible siding and deck receives the lowest wildland fire risk and hazard severity rating while one with wood siding and a wood deck gets the highest rating. Also, a building set back at least 30 feet from slopes of 30% or more is rated safer than one where the separation is less than 30 feet. A slope of 30% rises or falls 30 feet for every 100 feet of horizontal distance.

⁹³ For further detail, visit the ASTM website at: <http://www.astm.org/>

- **Available Fire Protection** addresses the availability of water for fire fighting, proximity to fire stations, and sprinklers systems. The lowest wildland risk and hazard severity rating goes to communities where fire hydrants are present every 1,000 feet or less and each hydrant can produce a minimum of 500 gallons per minute. For communities lacking a system of fire hydrants the lowest risk and hazard severity rating is assigned where an offsite water source is capable of producing 250 gallons per minute (gpm) or more. Additionally, a higher risk and hazard rating occurs when a home or community is more than a half-mile from a fire station. Finally, structures fitted with a sprinkler system receive a lower risk and hazard rating.
- **Gas & Electric** - the lowest wildland fire risk and hazard severity rating is assigned when all of a community's gas and electric lines are below ground; the highest when both are above ground throughout the community.

A number of states and local jurisdictions have enacted laws requiring special protection measures for development in fire prone area. For example, California requires 30 feet of clearance around buildings in high risk areas along with a roof meeting Class C standards or better. Further detail is provided in the State of California *Fire Hazard Zoning Field Guide*, which can be viewed at: <http://osfm.fire.ca.gov/zoning.html>

A number of other states and localities throughout the United States have adopted measures to minimize the risk of wildfire to their residents. A search of measures in your area can be made using the *National Database of State & Local Wildfire Hazard Mitigation Programs*, sponsored by the U.S. Forest Service, accessible online at: <http://www.wildfireprograms.com/index.html>

FIRE PREVENTION CAPABILITIES

The quality of fire protection services has been rated for more than 45,000 fire service districts in the United States. The rating is called a *Public Protection Classification* (PPC) which is represented by a number ranging from 1 to 10, with 1 being the best quality and 10 equals very poor fire protection service.

The PPC rating is based upon the *Fire Suppression Rating Schedule* published by ISO.⁹⁴ The rating assigned to each fire district is based upon the quality of the following three broad categories of variables:

- the fire alarm and communications system;
- fire department equipment, staffing, training, and distribution of companies; and
- the water supply system.

⁹⁴ Insurance Service Organization (ISO) which provides data services to property and casualty insurance companies. For further detail see the ISO website: http://www.iso.com/studies_analyses/ppc_program/index.html

The *Rating Schedule* contains nearly 80 variables divided among these three categories. The values for each variable are entered into equations for computing the PPC rating for a fire district. To illustrate the simpler of PPC rating criteria, a fire district is assigned a rating of 10 if it lacks both:

- At least one piece of fire apparatus that has a pump with a rated capacity of 250 gallons per minute (gpm) or more under a pressure of 150 pounds per square inch (psi) and a water supply system capable of delivering 250 gpm or more for a period of 2 hours, plus consumption at the maximum daily rate at a fire location; AND
- At least one piece of fire apparatus that has a pump with a capacity of 50 gpm or more at 150 psi and at least a 300-gallon water tank.

So how do PPC rating equate to fire protection in the real world? Well, according to ISO, on average, homeowners in fire districts with the worst PPC rating had twice the losses of those residing in districts with the best PPC rating. Commercial fire losses are three times higher in the districts with the poorest PPC rating when compared to districts rated 1. At the end of year 2000, the PPC rating for 45,504 fire districts broke down as follows:

- 0.1% (42) of the fire districts had the best rating - 1;
- 3% of the districts had the worst rating - 10;
- 34% of the districts had the second worst rating - 9; and
- 23% were rated between 2 and 5⁹⁵.

Insurance companies use PPC ratings to compute fire insurance premiums. An analysis of the benefits of upgrading 839 rural Arkansas fire districts to PPC 7 showed that homeowners in these districts would save an average of \$235 per year per household through reduced property insurance premiums⁹⁶. PPC ratings can be even more significant for commercial insurance rates. A study of where new manufacturing plants located in Georgia in the late 1980s showed that of 11 variables, the fire protection rating exerted the greatest positive influence.⁹⁷ Plant owners rejected those counties with lower PPC ratings to avoid higher insurance rates.

A number of local governments require minimum levels of fire protection service for new development. Frequently, the requirements are part of an Adequate Public Facilities test. Usually the test is in the form of a minimum response time. For example, Prince George's County, MD uses

⁹⁵ *ISO's PPC Program: Helping To Build Effective Fire-Protection Services*, available for viewing online at: http://www.iso.com/studies_analyses/ppc_program/index.html

⁹⁶ Ibid

⁹⁷ *Assessing Development Potential in Main Street Renewal: A Handbook* edited by Roger L. Kemp, McFarland & Company, Inc.

a guideline of a minimum 5.25-minute travel time from the nearest fire station. Columbus, OH requires a four minute fire response time.⁹⁸

If a proposed development is beyond these minimum response times, then the applicant may be required to implement a number of mitigation measures. For instance, a sprinkler system may be required for each home or other building, though sprinklers do not substitute for fire apparatus and trained personnel. Instead, sprinklers can put out very small fires. Sprinklers also slow the progression of more intense fires so occupants can escape and to buy the additional time required for the arrival of fire apparatus. The applicant may also be required to take other steps. In rural areas of Prince George's County, MD officials may require the installation of a 30,000 gallon buried water supply tank along every 3,000 feet of roadway.

FIRE QUALITY OF LIFE PRESERVATION CHECKLIST

To minimize the impact of development on the quality of fire protection services in your community:

1. Determine if measures, such as an Adequate Public Facilities Ordinance, are in place to ensure that proposed development will not jeopardize the quality of fire protection services and that the proposed development will be adequately served by these services..
2. If proposed development would cause a decline in the *Public Protection Classification* (PPC) for your community then:
 - a. The developer(s) should be required to cover the cost of measures essential to maintaining the current PPC. Building permit issuance should be delayed until these measures are fully in place; or
 - b. If local government has plans to make the necessary upgrades in fire protection services, then building permit issuance should be delayed until these measures are fully in place; or
 - c. Development approval should be denied.
3. Development should not be allowed where individual homes or communities would be at a high hazard or extreme hazard from wildland fire.
4. Development regulations should require, at a minimum, the roofing materials, setback distances, minimum turnaround areas, and other safety measures specified by the National Fire

⁹⁸ For further detail on City of Columbus Adequate Public Facility for fire and other services see: <http://www.asu.edu/caed/proceedings97/derodes.html#ABOUTAUTHOR>

Protection Association or by the State fire marshal, whichever standards provide the highest degree of protection.

For assistance with any of these quality of life preservation measures, contact Community & Environmental Defense Services at 800-773-4571 or help@ceds.org.