

CHAPTER ELEVEN

SAFETY/HAZARDS

Section 65302(g) of the California Government Code requires that general plans adopted by planning agencies include "A safety element for the protection of the community from any unreasonable risks associated with the effects of seismically induced surface rupture, ground shaking, ground failure, tsunami, seiche, and dam failure; slope instability leading to mudslides and landslides; subsidence, liquefaction and other seismic hazards identified pursuant to Chapter 7.8 (commencing with Section 2690) of the Public Resources Code, and other geologic hazards known to the legislative body; flooding; and wild land and urban fires." Existing conditions associated with these risks to public safety, as well as related issues, are discussed below.

As required by Section 65302(g), the City of Grass Valley consulted with the Department of Conservation, Division of Mines and Geology (DMG) and the Governor's Office of Emergency Services (OES) prior to completing the Safety Element to obtain information known by and available to these agencies.

SEISMICITY

Generally, the degree of earthquake hazard is based on the interrelationships between faults, weak geologic materials, and human activity. Faults within California are divided into three categories; prequaternary (older than two million years), quaternary (younger than two million years), and historic (less than 200 years). Faults in the County's western half are prequaternary. Quaternary and historic active faults are found in the eastern portion of the County near Truckee.

The western half of the County, in which Grass Valley is located, is in the low intensity zone for earthquake severity.

Grass Valley is not within an Alquist-Priolo zone as defined in DMG Special Report 42 (DMG 1997); the closest active fault is the Cleveland Hill fault near Oroville. However, ground movement can be felt in Grass Valley from earthquakes at intermediate distances (i.e., The Truckee quake of 1968 and from distant earthquakes (i.e., the Winters-Vacaville 1892 event) (Sydnor 1998).

SUBSIDENCE AND LIQUEFACTION

A substantial portion of the Study Area is underlain by an extensive labyrinth of abandoned mine shafts. The Empire Mine tunnels alone extend some 365 miles beneath the City of Grass Valley. The susceptibility of mine shafts to subsidence or cave-ins during an earthquake would depend on distance from the epicenter, water content of the soil, and depth and physical condition of the shaft. Generally, in hard rock areas such as Grass Valley, the likelihood of shaft collapse is reduced by the solidarity of the bedrock material (City of Grass Valley 1980); However, the Old Brunswick shaft of the Idaho-Maryland Mine Complex near Grass Valley collapsed during the 1998 storm season (Figure 11-1). Due to the geology of the area, liquefaction is not a significant problem in the Grass Valley area (Colburn 1998).

SLOPE INSTABILITY

Unstable soils and geologic conditions have historically resulted from vegetation removal associated with wildfires, timber harvesting, mining, and grading as part of road and building and site development. Depending on local topographic, geologic and hydrogeologic conditions, significant precipitation can exacerbate unstable conditions, resulting in landslides and mudslides. Any area adjacent to a hydraulically mined area is subject to landslide activity due to the removal of supporting rock and soil. Under such conditions, earthquakes or heavy rains can initiate slide activity.

Landslides are events in which surface masses of slope-forming earth move outward and downward from their underlying and stable floors in response to the force of gravity. Unstable or potentially unstable slopes are susceptible to slide, falls, creeps, or mud flows. Although slope movements can occur in any type of rock material, certain bedrock formations exhibit a high susceptibility to such movement. This type of formation is generally not found in the western portion of the County (County of Nevada 1995), but could occur on a local basis. Figure 11-2 depicts known areas of unstable soils.

FLOOD HAZARDS

100-YEAR FLOOD AREAS

As indicated by Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM), the City of Grass Valley and the General Plan Planning Area are relatively well drained (Figure 11-3). The 100-year flood designations are generally confined to narrow bands along local drainages. Major transportation corridors do not appear to be susceptible to flooding in a 100-year flood event. Idaho-Maryland Road east of SR 49/20 and South Auburn Street south of Whiting Street will be flooded during a 100-year flood. To the extent culverts and storm drains are not maintained, other localized flooding could occur. Homes located in the flood hazard areas would be subject to flooding in a 100-year flood event unless special mitigation is employed.

FIRE DANGER

The Grass Valley region has a generally high potential for wildland fires of devastating intensity. This is due to the presence, particularly in less urban settings, of heavier timber, woodland and brush, the occurrence of steep slopes, dry weather conditions, and human activity. Generally, vegetative areas of over 8% slope are considered as fire hazardous (County of Nevada 1995).

FIRE PROTECTION AGENCIES

Fire protection agencies in the City of Grass Valley General Plan Planning Area include the City of Grass Valley Fire Department, which provides service within the City, the Nevada County Consolidated Fire District, which serves the area generally north, west and south of the City, and the Ophir Hill Fire District, which serves lands east of the City.

In 1998, an Automatic Aid agreement was reached among these agencies, which provides for a response by a minimum of two pieces of equipment anywhere in the City within four minutes, 24 hours/day (Burke 1998). Otherwise, mutual aid from agencies state-wide is provided pursuant to the California Fire Service and Rescue Emergency Mutual Aid System via its Mutual Aid Plan (OES 1988).

The City of Grass Valley maintains the following fire-fighting facilities:

- Brighton Street Fire House, Station No. 1
- Eagle Fire House, Station No. 2
- Reliance Fire House, Station No. 3
- Satellite Fire House, Station No. 4

Station No. 1 houses an aerial ladder truck (75' ladder) and three engines (1,000 gallon pumpers, minimum). Funding is available to replace the 75' ladder truck with a new 100' aerial ladder truck by 2000. As a rule, engines are replaced on a 20-year basis (Burke 1998). Stations 2, 3, and 4 have one engine each. Fire Station No. 4 is a temporary facility located on private property. The City's current average response time is 4.0 minutes¹ and an ISO rating of 4 (City of Grass Valley 1997).

The five-year plan is to consolidate the four fire facilities to two locations: Fire Station No. 1 at its existing location to serve the west portion of the City and Fire Station No. 2, a new station to be located near the Sierra College Campus, to serve the east portion of the City. Station No. 2 is projected to be in operation by November 1999, and will be capable of holding six pieces of fire equipment, which initially will be comprised of a truck, engine and a support unit (Burke 1998). This will give access to the Glenbrook Basin, Morgan Ranch and Alta Sunset areas. A third station may be proposed in the southern portion of the Planning Area near North Star Drive to be co-located with the Watt Park Station No. 91. A fourth station could be located within the Nevada County Airpark Industrial Area if or when this area is annexed (City of Grass Valley 1997). Additional information regarding the Fire Department is found in Chapter Six, Public Facilities and Services.

The California Department of Forestry and Fire Protection (CDF) provides fire protection for wildland areas, and is legally responsible only for wildland fires - not structural fires - during the fire season. Thus, structures in areas outside the service areas of urban fire protection agencies have no year-round fire protection.

Existing standards for development that are expected to provide adequate access, fire flows, and other facilities to maintain an appropriate level of fire protection will continue to derive from the California Building Code, the California Fire Code, and the California Mechanical Code.

¹ Response time is defined as average response from notification to service provision at incident location.

PEAK LOAD WATER SUPPLY REQUIREMENTS FOR FIREFIGHTING

The City's municipal water system serves the majority of the City's incorporated boundaries, or approximately 1,357 acres and approximately 60 percent of the current incorporated area. A few properties outside the City are served, such as the Nevada County Fair Grounds.

Under a current agreement, the City purchases raw water from NID and then treats and distributes the water. Of the 330,000 acre feet of water available to NID, about 170,000 acre feet are currently used. There appears to be sufficient water for future regional urban demands to accommodate future growth within the City's Sphere of Influence. The City's treatment facility has the capacity to treat five times the amount of water currently processed. Limitations exist on expansion of the City's water service due to topographical constraints and location of the treatment facility (City of Grass Valley 1997).

Due to the location of most reservoirs at 100-200 feet in elevation above the City, the City of Grass Valley water system provides excellent pressure and flows for firefighting purposes. There are isolated areas of inadequate piping and areas that are non-hydranted. These areas are being upgraded as the City develops (Burke 1998). As the City has expanded its geographic limits, areas served by NID have been incorporated.

Suggested fire flow requirements from area fire departments are presented in the individual community Water Master Plans. Table 11-1 summarizes the suggested fire flows for different types of land uses.

**TABLE II-I
FIRE FLOW SUMMARY**

Land Use	Fire Flow* (gpm)	Duration (hours)
Residential Low Density	500	2
Urban Single Family	500	2
Urban Medium Density	1,000	2
Urban High Density	1,000-2,000	2
Commercial	1,000-2,000	2-4
Industrial	1,500-3,500	2-4
School	2,000	4

*Fire flow used for projection purposes is 2,000 gpm times 3-hour duration which equals 360,000 gpd.
Source: Nevada County General Plan, 1995

EMERGENCY EVACUATION ROUTES

The City currently maintains approximately 38 miles of roadways, excluding state highways (e.g., State Route (SR) 49 and SR 20). Over \$10.5 million has been identified in the City's Capital Improvement Program (CIP) for significant reconstruction of these roadways and signalization of key intersections over the next 20 years. A list of these improvements is provided in the CIP. The CIP also outlines improvements and additions to the City's off-street

parking facilities, such as rehabilitation of existing parking lots and the addition of one or two multi-level parking facilities to increase the available parking in the downtown area (City of Grass Valley 1997).

Similar to most foothill towns, the City of Grass Valley has comparatively narrow streets in older developed areas. Improvements to roadways, intersections, and off-street parking facilities cited above help alleviate congestion and improve fire access in these areas. Hilly roads slow response times, particularly in snow conditions, although the Grass Valley Fire Department is equipped to deal with these conditions. Nationally recognized standards are used in planning for new development to prevent access constraints to fire equipment and improve emergency evacuation capabilities (Burke 1998).

AIRPORTS

The Nevada County Airpark lies to the east of Grass Valley. The Federal Aviation Administration (FAA) defines the most critical areas as those immediately beyond the runway ends—the initial climb out and final approach sectors. It is within these approach/departure sectors that the concentration of aircraft accidents occur. In addition, there are studies indicating that about half of all airport accidents occur on airport property and an additional 15% of accidents occur within one mile outside the airport property. This suggests that areas immediately off the ends of the runway and under the airport traffic pattern should be carefully evaluated for developed land use.

The Foothill Airport Land Use Commission designates airport safety areas. Safety areas for Nevada County Airpark are bordered, but not encroached upon, on the north and south sides by residential developments or industrial buildings. All other safety areas at the airport are surrounded by open space (County of Nevada 1995).

HAZARDOUS MATERIALS

The significance of environmental or human exposure to hazardous materials depends on the type, location, and quantity of the material released. In the Grass Valley area, hazardous materials may be transported via roadways, railways, and airways. Industrial facilities that use, store, or dispose of hazardous materials present the greatest potential to toxic exposure due to accidental release. However, most of the hazardous waste stream in Nevada County, including Grass Valley, is generated by "small quantity generators." Hazardous materials and wastes are regulated by federal and state laws and are required to be recycled or properly disposed. Transport of hazardous materials is also heavily regulated. However, illegal storage and disposal and unintentional releases of hazardous materials from leaks and accidents can still occur.

Where hazardous materials are found to be illegally stored or otherwise accidentally released, the initial response is provided by the local fire agencies. Site assessment and cleanup is conducted by the Marysville Fire Department, which is operated by CDF. When discovered, fuel storage tank leaks are cleaned up under the jurisdiction of the California Regional Water Quality Control Board, Central Valley Region.

There are seven sites listed on the Comprehensive Environmental Response, Compensation, Liability Information System (CERCLIS) database in the Grass Valley area. CERCLIS is a database used by the U.S. Environmental Protection Agency (EPA) to track activities conducted under the Comprehensive Environmental Response and Liability Act (CERCLA 1980) and the Superfund Amendments and Reauthorization Act (SARA) (1986). Sites included are identified primarily by Treat, Storage, and Disposal (TSD) facility hazardous substances reporting requirements and releases larger than specific Reportable Quantities (RQ) established by EPA. None of the sites listed are Superfund sites, and all seven sites are "No Further Remedial Action Planned Sites" (NFRAP). NFRAP sites may be sites where, following an initial investigation, no contamination was found, contamination was removed quickly without the site being placed on the National Priority List (NPL), or the contamination was not serious enough to require Federal Superfund action or NPL consideration.

Ten sites are listed in the Solid Waste Facilities, Sites, and Operations Database for the Grass Valley area. These sites include closed as well as operating solid waste landfills compiled by the California Integrated Waste Management Board.

The above waste sites are regulated by the State and Nevada County; however, their locations should be considered in making land use decisions to avoid the potential for impacts to public health or safety. Specific information regarding the type and locations of hazardous waste sites is on file at the Nevada County Planning Department.

NATURALLY OCCURRING ASBESTOS

Asbestos is a term used for several types of naturally occurring fibrous minerals found in many parts of California. The most common type of asbestos is chrysotile, but other types are also found in the state. Serpentine rock, which has a grayish-green to bluish-black color and an often shiny appearance, often contains chrysotile asbestos and is abundant in the Sierra foothills. Figure 11-4 indicates that a general occurrence of serpentine rock passes through the Grass Valley region.

Asbestos is not found in all serpentine rock, but when it does occur, it is typically present in amounts ranging from less than 1 percent up to about 25 percent or more. Asbestos is released from serpentine rock when it is broken or crushed. This can happen when cars drive over unpaved roads or driveways surfaced with serpentine rock, when land is graded for building purposes, or at quarrying operations. It is also released naturally through weathering and erosion. Once released from the rock, asbestos can become airborne and may stay in the air for long periods of time (ARB 1998).

Given the proximity of Grass Valley to potential serpentine deposits, it is possible that construction activities and road surfacing could involve asbestos-containing serpentine rock or soils.

All types of asbestos are hazardous and may cause lung disease and cancer. The longer a person is exposed to asbestos and the greater the intensity of exposure, the greater the chances for a health problem. The Air Resources Board (ARB) adopted a statewide control measure which

prohibits use of serpentine rock for surfacing applications if it has more than 5 percent asbestos, and requires testing of serpentine material that is sold (ARB 1990).