Safety Element

INTRODUCTION

BACKGROUND AND PURPOSE OF THE ELEMENT

In 1971, the California Legislature passed legislation requiring two new elements to be added to the general plans of all cities and counties in the State. These were the Safety Element and the Seismic Safety Element.

The impetus for this legislation was a series of natural disasters which had occurred in Southern California in the preceding two years. The winter of 1969 saw particularly heavy rains, especially during January and February. Serious flooding occurred in many areas of Southern California but especially in Ventura County. These heavy rains caused substantially increased growth in the chaparral vegetation belts of the Southern California hills and mountains. Then during thirteen days of September and October, 1970, a series of disastrous fires broke out, fanned by dry desert Santa Ana Winds. The fire burned over half a million acres of brush and timber land, destroyed 722 homes, killed 16 people and cost $233 million to control. The following winter landslides and mudslides occurred in the hills and damaged many of the structures that had escaped the fall fires.

In response to these disastrous floods, fires and landslides, the 1971 Legislature enacted Government Code Section 65302.1, which requires of each city and county general plan:

> *A safety element for the protection of the community from fires and geologic hazards including features necessary for such protection as evacuation routes, peak load water supply requirements, minimum road widths, clearances around structures, and geologic hazards mapping in areas of known geologic hazard.*

The impetus for the Seismic Safety Element was the February 9, 1971, San Fernando Valley earthquake. This earthquake of 6.6 magnitude took 65 lives and caused almost $1 billion of damage to freeway interchanges, hospitals (accounting for the greatest loss of life), utilities, dams, and public, private, commercial and industrial buildings. The earthquake also revealed major discrepancies in building design and a laxness in land use planning.

This disaster prompted the Legislature to require another element to the general plan, a Seismic Safety Element. Government Code Section 65302 (F) requires:

> *A seismic safety element consisting of an identification and appraisal of seismic hazards such as susceptibility to surface ruptures from faulting, to ground shaking, to*

ground failure or to the effects of seismically induced waves such as tsunamis and seiches. The seismic safety element shall also include an appraisal of mudslides, andslides, and slope stability as necessary geologic hazards that must be considered simultaneously with other hazards such as possible surface ruptures from faulting, ground shaking, ground failure and seismically induced waves.

Most recently, the Legislature adopted AB 2038 in 1984 which expanded the list of mandatory safety issues to be addressed within the Element. The additional concerns focused on seismic safety. Essentially, the Legislature took the issues previously considered in the seismic safety element and made them safety element requirements. At the same time, the Legislature deleted the seismic safety element from the list of mandatory general plan elements.

In order to meet the state requirements discussed above, the City of Ojai adopted the County of Ventura's existing Seismic Safety and Safety Element in 1974. This adoption of a County element is provided for in Government Code Section 65302 (g).

In 1988, the City prepared a Master Environmental Assessment (MEA) as part of a comprehensive update of its General Plan which included the Circulation, Open Space, Conservation, Recreation, and Housing Elements. The MEA includes several maps which delineate areas of flooding, fire, and seismic hazards within the City. In 1989, the County updated and completely reformatted its General Plan, doing away with the typical seven element format. In response to this reformatting of the County General Plan, the City initiated a program for updating the remaining City elements which have incorporated by reference adopted County elements. These include the Noise and Safety Elements. The City is currently in the process of updating its Noise Element.

The City of Ojai has created its own Safety Element with the text and exhibits which follow. This element is more tailored to the specific safety issues which concern the City of Ojai. One of the shortcomings in utilizing the County's Safety Element has been that it discusses certain hazards which are not a concern within the City of Ojai. The City's Safety Element therefore does not contain detailed discussions of tsunami and seiche hazards, hazards which do not occur within the City of Ojai. Tsunami and seiche hazards will only be referred to in the assumptions/definitions portion of this element. Another shortcoming of utilizing the County Element for the City is that it does not provide detailed discussions on certain conditions and policies which are unique to the City of Ojai. The City's Safety Element identifies existing conditions which are unique to the City. These include the ongoing effort to upgrade the remaining unreinforced masonry bearing

wall buildings within the City, and a detailed discussion of the level of fire service currently being provided to the City by the County.

The City's Safety Element also includes references to maps delineating existing hazards contained within the City's MEA.. The maps relevant to the issues identified in this Safety Element have been updated and included as part of the creation of this element to reflect most current 1991 environmental conditions.

The Safety Element contained within the following text and exhibits combines the State of California requirements for safety elements and seismic safety elements into one coherent document. The purpose of this Safety Element is to provide for the protection of the community from any unreasonable risks associated with the effects of seismically induced surface rupture, ground shaking, ground failure, and dam failure; slope instability leading to mudslides and landslides; subsidence and other geologic hazards known to the City; flooding; and wildland and urban fires. The Safety Element includes mapping of known seismic and other geologic hazards. It also addresses evacuation routes, peakload water supply requirements, and minimum road widths and clearances around structures, as those items relate to identified fire and geologic hazards.

The City of Ojai Safety Element achieves the following purposes:

1. To meet the requirements of State law for preparation of a Safety Element.

2. To investigate the various hazards from a regional as well as a local perspective so as to provide a more integrated picture of the hazardous conditions within the City of Ojai and Ventura County.

3. To develop a framework which will permit the investigation of all types of hazards and the resources they impact.

4. To present the information collected in a form which will allow decision makers and the public to quickly evaluate the pertinent aspects of a given hazard.

5. To offer a range of response measures from which decision makers may choose as they attempt to alleviate a given hazard.

6. To provide a framework in which future inventory and analysis can be performed.

ASSUMPTIONS/DEFINITIONS

This Safety Element has been prepared pursuant to State General Plan Guidelines for preparation of Safety Elements. It is in conformance with the overall General Plan Goals of the City of Ojai. The Element strives to provide decision makers with the information necessary to evaluate the nature of a given hazard and possible courses of action.

Base data for the Safety Element was derived from the City of Ojai Master Environmental Assessment (MEA) 1988, the Seismic Safety and Safety Element of the Ventura County Environmental Resources Agency 1974, the Updated County of Ventura General Plan (Hazards Chapter) 1989, the Ventura County Multi-Hazard Functional Plan, and applicable current Environmental Impact Reports (EIRs).

Definitions and categories of risks and hazards that are referenced throughout this Safety Element are listed below.

These are taken from the State of California's 1990 Guidelines for the Required Elements of the General Plan and from the Ventura County General Plan, Hazards Chapter.

Active Fault

A fault that has moved recently and which is likely to move again. For planning purposes, "active fault" is usually defined as one that shows movement within the last 11,000 years and can be expected to move within the next 100 years.

Area of Special Flood Hazard

The land in a flood plain subject to a one percent or greater chance of flooding in any given year; is sometimes referred to as the "base flood" or "100-year" flood area.

Critical Facility

Includes facilities housing or serving many people which may pose unusual hazards in case of damage from or malfunction during an earthquake, such as hospitals, fire, police, and emergency service facilities, utility "lifeline" facilities, such as water, electricity and gas supply, sewage disposal, and communications and transportation facilities.

Dam Failure

Structural failure may be caused by seismic activity, or by landslides flowing into a reservoir. Flooding may occur as the result of structural failure of a dam.

Debris Flow/Avalanche

Landslides involving mixture of rock fragments, gravel, sand, soil, mud, water, and minor organic debris in which flow is the dominant transport mechanism. An extremely high-velocity debris flow landslide is known as a debris avalanche.

Epicenter

A point at the earth's surface that is closest to the subterranean origin of an earthquake.

Expansive Soils

Soils which tend to expand when wet and shrink when dry due to mineralogical composition.

Fault

A fracture in the earth's crust forming a boundary between rock masses that have shifted.

Flooding

A "flood" is an overflow of water onto land that is normally dry. The most common type of flood, and the major subject of this section, is the "rainstorm-river" flood. A second major type is a "coastal" flood, resulting from a relative increase in sea level that may be caused by a storm, by a tsunami, or by subsidence. Other potential causes of floods include dam or levee failure, landslides and seiches.

Floodway

The channel of a watercourse plus any adjacent flood plain area that must be kept free of encroachment in order that the 100-year flood may be carried without substantial increases in flood heights.

Ground Failure

A general term for occurrences when seismic activity causes the ground to lose its cohesiveness, as in liquefaction, subsidence, and earthquake-related landslides.

Ground Shaking

"Ground shaking" is the physical movement of the land surface due to earthquakes. When a fault breaks, the accumulated strain energy is released as seismic waves that travel outward in all directions from the earthquake focus (the point of first release of tectonic stress located below the earth's surface on the fault plane, causing ground shaking). Seismograms (records of earthquake motion) indicate that several kinds of motions, or waves, are created by earthquakes. These waves exhibit different types and directions of movement. Each type of wave can affect buildings slightly differently depending on many diverse variables. The combined effect of these waves makes up the ground shaking component of an earthquake.

Hazardous Building

A building that may be hazardous to life in the event of an earthquake because it:

1. Was constructed prior to the adoption and enforcement of local codes requiring earthquake resistant design of buildings;

2. Is constructed of unreinforced masonry; or,

3. Exhibits any one of the following characteristics:

    - Exterior parapets and ornamentation that may fall on passers-by;

    - Exterior walls that are not anchored to the floors, roof, or foundation;

    - Sheeting on roofs or floors incapable of withstanding lateral loads;

    - Large openings in walls that may cause damage from torsional forces; or,

- Lack of an effective system to resist lateral forces.

Hazardous Material

An injurious substance, including pesticides, herbicides, toxic metals and chemicals, liquefied natural gas, explosives, volatile chemicals, and nuclear fuels.

Inactive Fault

A fault which shows no evidence of movement in recent geologic time and no potential for movement in the relatively near future.

Landslide

A general term denoting downslope movement of slope materials composed of rock, soil, fill or combinations thereof.

Liquefaction

The transportation of a saturated granular layer into a fluid state due to intense ground shaking and/or increased pore water pressure.

Lurching

A sudden roll, pitch or sway of the ground resulting directly from the release of seismic energy.

Non-Seismic Geotechnical Hazards

Geotechnical hazards not triggered by or related to seismic activity, including, but not limited to, landslides, subsidence, expansive soils and coastal stability problems.

Potentially Active Fault

(1) A fault that last moved within the Quaternary Period before the Holocene Epoch (the last 2,000,000 to 11,000 years);

(2) A fault which, because it is judged to be capable of ground rupture or shaking, poses an unacceptable risk for a proposed structure.

Seiche

A seiche is a long wave which oscillates in an enclosed or partially enclosed body of water as a result of seismic or atmospheric disturbances. Seiches typically occur in lakes and bays, and are normally caused by unusual tides, winds or currents, but can also be produced by earthquake ground motion. The shaking rocks the water back and forth, setting up seiche waves.

The City of Ojai does not contain any substantial body of water within or adjacent to the City limits which would create a primary seiche hazard. No goals, policies, or implementation programs related to seiches need to be addressed within this element.

Subsidence

Subsidence is any settling or sinking of the ground surface arising from surface or subsurface causes. Its usual form is a dish-shaped or bowl-shaped region of downward surface displacements. Some types of subsidence can be the result of natural processes, including natural compaction of loosely consolidated alluvium ("consolidation refers to the gradual compression of a soil under applied load), as well as tectonics and earthquakes. Other types of subsidence are caused by human activities. In California, four types of the latter have been identified; they are named according to the action that causes the subsidence: groundwater withdrawal subsidence, oil or gas withdrawal subsidence, hydro-compaction subsidence and peat oxidation subsidence.

Surface Rupture

A surface rupture is a break in the ground's surface and associated deformation resulting from the movement of a fault.

Tsunami

A tsunami is a traveling ocean wave generated by disturbances associated with earthquakes, volcanoes or major submarine landslides. Commonly called a tidal wave in the past, it is referred to now as a series of sea waves. These waves have a long wavelength (distance from the crest of one wave to the crest of the succeeding wave) normally over 100 miles, and a very low amplitude (height from crest to trough). As these waves approach shallow water, the speed decreases from a deep water speed of over 600 m.p.h. to less than 30 m.p.h., and their energy is transferred from wave speed (velocity) to wave height (amplitude); waves as high

as 80 feet can be formed. Although the arrival time of waves can be predicted, the intensity of the wave when it reaches shore cannot be predicted.

The City of Ojai is located several miles inland from the County of Ventura's tsunami hazard zone, which extends two miles upstream from the mouth of the Ventura and Santa Clara Rivers and Calleguas Creek. No goals, policies, or implementation programs related to tsunamis need to be addressed within this element.

Wildland Fires

Fires occurring in a non-urban, natural area which contains uncultivated lands, timber, watershed, brush, or grasslands.

LEGAL AUTHORITY

Under State Law (Section 65302.1) a City is required to adopt a Safety Element "for the protection of the community from fires and geologic hazards including features necessary for such protection as evacuation routes, peak load water supply requirements, minimum road widths, clearances around structures, and geologic hazards mapping in areas of known geologic hazard."

A City is also required to adopt a Seismic Safety Element. Government Code Section 65302 (F) requires that a seismic safety element consist of:

> *An identification and appraisal of seismic hazards such as susceptibility to surface ruptures from faulting, to ground shaking, to ground failure or to the effects of seismically induced waves such as tsunamis and seiches. This seismic safety element shall also includes an appraisal of mudslides, landslide, and slope stability as necessary geologic hazards that must be considered simultaneously with other hazards such as possible surface ruptures from faulting, ground shaking, ground failure, and seismically induced waves.*

The City of Ojai has combined the requirements for both the Safety and Seismic Elements into a Safety Element in accordance with the California State code in order to sufficiently detail the appropriate polices and programs for the City's planning area. This element has been submitted in accordance with State Code to the California Division of Mines and Geology of the Department of Conservation.

Safety Element

ISSUES AND NEEDS

OVERVIEW

Public safety issues in Ojai are numerous. The area is surrounded by topographical features which create geologic, seismic, flood, and fire hazards. Types of hazards are defined and categorized in the previous section for reference. Historically, Ojai and the surrounding area has experienced damaging earthquakes, landslides, floods, dam failures and disastrous brush fires. In addition, the area is isolated from other regions of the County due to limited vehicular access created by topographical barriers. If roads and bridges leading to the City are cut off by an earthquake, flood, or mud slides, then medical, fire, and other emergency response would be severely restricted.

The constant threat to life and property from these hazards creates a need to protect the community through sound planning, development, and maintenance practices, as well as through disaster education and preparedness programs.

The General Plan inventory and analysis of public safety hazards is divided into five issue areas. The five areas include seismic and geologic hazards (below), flood hazards (page 27), fire hazards (page 29), hazardous materials and waste (page 32), and disasters (page 33). These issue areas are discussed below and in the following pages. Goals, Policies and Implementing Programs for the City of Ojai related to safety issues are listed beginning on page 37.

SEISMIC AND GEOLOGIC HAZARDS

The City of Ojai is exposed to various geologic and seismic hazards as a result of the general topography of the area. Ojai is situated in a relatively narrow valley surrounded by dramatic mountains with numerous faults traversing the region.

The following seismic and geologic hazards are known to exist in the Ojai area:

Seismic Hazards

Surface Rupture
Ground Shaking
Subsidence
Ground Failure
Liquefaction
Dam Failure

Other Geologic Hazards

Landslides
Expansive Soils
Erosion

Seismic Hazards

The City of Ojai has not directly experienced a devastating earthquake. Although the historic record shows little evidence for strong earthquakes or surface displacement along faults in the southern area of Ventura County, the likelihood of the occurrence of one or more such events within 50 to 100 years is not remote.

Only two historic earthquakes might have been devastating to present day populated areas of the County, but they occurred in December 1812 and January 1857, before there was any semblance of population in the region. The earthquake of 1812 severely damaged missions from present-day Santa Maria on the west, to San Fernando on the east, for a total of 116 miles. The 1857 earthquake is the first historical earthquake of California to be described as a "great" earthquake. It is estimated at 8.25 on the Richter Scale because it apparently ruptured ground from Fort Tejon to at least 100 miles in each direction along the San Andreas Fault from Fort Tejon.

The relatively recent 1971 San Fernando earthquake occurred along a fault having little historic record of activity. Several of the faults within the southern half of Ventura County are similar in structure. They are subject to comparable tectonic forces as those associated with the San Fernando earthquake. A map showing the County's major earthquake locations and intensities between 1928 and 1971 is illustrated in Exhibit GEO-2 of the MEA.

Most of the land in Ventura County is encompassed by the Transverse Range geographic province of California. The province is distinct from other provinces in that the nature of its prevailing linear trend is west to east instead of northwest to southeast (which is the case from most geologic trends in the state). The province is bounded by three major faults, including the northwest trending San Andreas Fault zone, which cuts the northeast corner of the County; the west trending Big Pine Fault, which joins the San Andreas and forms the northern boundary of the province; and the Malibu Coast Fault, which forms the southern boundary of the province where the fault extends offshore to the west of the County boundary. Each of these faults constitute a potential major earthquake hazard. The following paragraphs outline each known hazard.

Surface Rupture

The major direct effect of earthquake faulting is surface rupture. This is when faulting causes actual rupturing of the earth's surface.

Nearly all man-made structures are susceptible to damage ranging from severe to total when affected by displacement along faults passing beneath their foundations. The San Fernando Earthquake of 1971 has shown that no structures designed under present standards are safe from severe damage or destruction as a result of surface fault displacement of foundations. It is widely acknowledged that design of most structures, such as single-family homes or larger structures, roads, bridges, pipelines, or other conduits, to resist fault displacement is generally not feasible. Only massive earth structures such as earthfill dams can be designed to remain functional after several feet of displacement along an underlying fault.

Permanent effects of surface displacement along faults also can include:

1. Abrupt elevation or depression of ground surfaces of several feet for distances of many hundreds of feet along the fault;

2. Disruption of surface drainage;

3. Changes in groundwater levels in wells;

4. Blockage and surface seepage of groundwater flow;

5. Changes in survey benchmark elevations;

6. Dislocations of street alignments and property lines of many feet if lateral (horizontal) displacement also occurs along a fault;

7. Displacement of drainage channel and drains.

Secondary effects of surface displacements along faults within an urban area could include:

1. Disruption of movement along roadways due to abrupt depressions or elevation of pavement surfaces;

2. Possible flooding due to disruption of drainage channel and storm drain flow;

3. Disruption of utility services such as water, gas, fuel, telephone and electric power lines;

4. Temporary impact on industry and commerce similar to that

resulting from the occurrence of most kinds of regional natural catastrophic events such as hurricanes or floods.

The State Division of Mines and Geology (Urban Geology Master Plan for California, 1973, Bulletin 198) indicates that on a statewide basis the potential hazard to structures from the surface displacement of faults is low compared to such geologic phenomena as earthquake shaking and landsliding. Historically, major losses due to fault displacement have been limited to the San Fernando Earthquake of 1971. Structural losses due to fault displacement in the 26 other major earthquakes in California are unknown but were probably small. Most of the losses incurred during the 1906 San Francisco Earthquake and 1952 Tehachapi Earthquake were caused by ground shaking and ensuing fires.

The greatest potential for fault activity is along any of the faults which lie within the several major fault systems which transect the County from east to west. The 1971 San Fernando Earthquake which occurred along one of these major fault systems illustrates the high level of activity that some faults within these systems may have, and foretells the occurrence of other such earthquakes in the Los Angeles, Ventura-Santa Barbara regions.

The San Fernando earthquake of 1971 may be an example of the typical type which could occur along some of the east-west trending faults which transect the County. Based upon that earthquake, it is most likely that a surface fault displacement within the County will be sudden, occurring over a period of less than one minute. The displacement would be accompanied by sharp ground shaking lasting perhaps several tens of seconds.

Many of the faults in the County are associated with major fault systems extending beyond County boundaries. Several of these faults and fault systems are considered to be active, but a great deal of additional information must be assembled to determine the potential for, as well as the nature of, activity of most of the faults including those presently considered to be active.

The present level of knowledge of the recency of surface or near surface movement along the faults within Ventura County is not sufficient on which to base a firm determination of the "degree" of activity of most of these features. There is some evidence that some of the known faults have displaced at least late Quaternary terrace sediments, indicating possible movement as recent as 11,000 years ago. This is the primary basis for designating the most recently active faults, as these could have the higher potential of future movement.

There are many places other than the San Andreas fault where faulting occurs. A

series of related faults is called a fault zone or a fault system. There are several faults and fault zones located near the City of Ojai. In the event of surface displacement along these fault zones, loss of life and property damage in the unincorporated and incorporated areas of Ojai could be significant. These zones are described below and illustrated in Exhibits GEO-1 and GEO-3 of the City of Ojai MEA.

SANTA ANA/ARROYO PARIDA FAULT ZONE

This fault extends from Montecito to the Ventura River and along the south side of the Ojai Valley. This fault system is an eastward extension of the Mission Ridge Fault in the Santa Barbara area and extends to the southeast end of the Ojai Valley where San Cayetano zone apparently begins. The fault roughly parallels the southern boundary of the City of Ojai. The Santa Ana Fault has raised the Upper Ojai Valley relative to the Ojai Valley. The fault forms a groundwater barrier in the alluvium beneath the Ventura River. One school lies in the fault zone and sewer mains and water transmission lines from Lake Casitas and Ventura to the Ventura area cross this fault zone. This system is considered potentially active.

LION MOUNTAIN FAULT

This fault is encompassed by the Lion Canyon Fault Zone which extends from Santa Paula Creek along the south edge of Upper Ojai Valley through the Lion Canyon area and possibly to Oak View and beyond to Lake Casitas. The fault itself does not enter the City of Ojai. The actual Lion Mountain fault is located between Lake Casitas and the San Cayetano fault zone, east of Ojai. The Lion Mountain Fault Zone contains a major portion of the Oak View community and the southern section of the Ojai community. Major electrical transmission lines, gas mains, water transmission lines and sewer mains between Oak View and Ojai transverse this zone. Local geologic formations show relatively recent activity. This fault is considered potentially active.

POSSIBLE FAULTS

In addition to the above mentioned vicinity faults there is evidence that faults, to date unmapped, may extend across the north part of the Ojai Valley area and link the San Cayetano Fault zone to the east with faults and possible faults to the west of Ventura River.

SPECIAL STUDIES ZONES

In 1972 the California State Legislature enacted the Alquist-Priolo Geologic Hazard Zones Act. Pursuant to this act the "State geologist shall delineate . . . special studies zones to encompass all potentially and recently active traces of the San Andreas, Calaveras, Hayward, and San Jacinto Faults, and such other faults . . . as to constitute a potential hazard to structures from surface faulting or fault creep." (Alquist-Priolo Act).

Two special studies zones briefly enter the City of Ojai's western boundary near the Villanova school. Please refer to Exhibit GEO-3 in the City of Ojai MEA.

The intent of the zone is to provide for public safety from the hazard of fault rupture by avoiding, to the extent possible, the construction of structures for human occupancy astride hazardous faults. However, the precise location and identification of hazardous faults within or near a zone of potentially active faults can be determined only through detailed geologic investigations. Therefore the State Mining and Geology Board has adopted policies and criteria for the implementation of these zones.

The most significant criteria within the act is that no structure may be built across the trace of an active fault. Furthermore, the area within fifty feet of an active fault shall be assumed to be underlain by active branches and therefore, before any structure can be built within the zone, a geologic investigation and submission of a report by a geologist registered by the State of California are required. In addition, any city or county may require more restrictive policies.

Ground Shaking

The physical movement of the land surface due to earthquakes is known as ground shaking. When a fault breaks, the accumulated strain energy is released as seismic waves that travel outward in all directions from the epicenter. Unlike a surface rupture, ground shaking can occur great distances from an actual known fault. The intensity of ground shaking/seismicity during an earthquake depends largely on geologic foundation conditions of the materials comprising the upper several hundred feet of the earth's surface. The greatest amplitudes and longest durations of ground shaking occur on thick, water-saturated, unconsolidated alluvial sediments. Ground shaking can also cause ground failure or surface rupturing due to lurching and liquefaction.

Ground shaking can cause disruption of surface drainage, blockage of surface seepage and groundwater flow, changes in groundwater flow, dislocation of street

alignments, displacement of drainage channels and drains, destruction or damage to buildings and property and possibly loss of life. Seismic shaking can renew movement of old landslides as well as result in the formation of new slides. The intensity of shaking within 10 miles of the epicenter focus point of the earthquake, in areas underlain by deep alluvium, would likely be in the range of VII to VIII Modified Mercalli intensity, and VI to VII in areas underlain by firm ground bedrock (Please refer to Table A). Higher intensities would be experienced immediately adjacent to the epicentral area.

The State Division of Mines and Geology in their publication entitled, "Urban Geology" 1973, Bulletin 149, indicates that on a state-wide basis, the potential hazard to structures from ground shaking is higher than any other hazard. Approximately one dozen unreinforced masonry buildings are located within the City of Ojai. In order to reduce the risk of structural damage to these buildings in the event of an earthquake, the City has recently adopted an ordinance to provide seismic strengthening provisions for unreinforced masonry bearing wall buildings. The ordinance identifies 12 unreinforced masonry buildings, sets time limits for these structures to meet current seismic code, and specifies the allowable design criteria which is required.

The State Division of Mines and Geology has also indicated that the Ventura County area could experience relatively high earthquake activity. It has been estimated that within the next year there is a 3% to 4% chance of occurrence for a major earthquake measuring at least 7.0 on the Richter Scale; within the next fifty years, it is estimated that there is a 50% to 90% chance of an earthquake of this magnitude. The source of this anticipated earthquake is the 650-mile long San Andreas fault.

TABLE A

RELATIONSHIP OF RICHTER MAGNITUDE AND MODIFIED MERCALLI INTENSITY SCALES TO EXPECTED EARTHQUAKE DAMAGE

RICHTER MAGNITUDE	MODIFIED MERCALLI MAXIMUM INTENSITY (AT EPICENTER)	EXPECTED EARTHQUAKE DAMAGE
2	I-II	Usually detected only by instruments.
3	III	Felt indoors. May not be recognized as earthquake.
4	IV - V	Felt by most people; structure shake; windows and dishes rattle; wooden walls and frame creak; slight damage to unsecured objects.
5	VI - VII	Felt by all; many frightened and run outdoors; glassware breaks; items fall off shelves; furniture moves; cracks in unreinforced masonry; fall of chimneys, cornices and other unreinforced architectural ornament; some small slides can occur.
6	VII -VIII	Difficult to stand; steering of autos is affected; potentially moderate to major structures; frame houses move off foundations if not bolted; branches broken off trees; collapse of elevated structure such as chimneys, water towers.
7	IX - X	General panic; Major total damage to masonry structures; underground pipes broken; frame structures seriously damaged; cracks in ground; large landslides likely; serious damage to dams, dikes, embankments.
8+	X - XII	Major and total damages to buildings and infrastructure.

Source: California Division of Mines and Geology, "CDMG Notes," after Charles F. Richter, 1958, Elementary Seismology.

Subsidence

Subsidence and differential settlement (the uneven lowering of the ground surface) constitute minor natural hazards in the City of Ojai. Local subsidence may be caused by extracting more groundwater than is replaced by the natural hydrologic cycle. The results from this drawdown are empty pore spaces in the soil, which are compacted from the weight of overlying material.

Subsidence, defined as the sinking or lowering of a part of the earth's surface, can occur as a result of or independent of earthquakes. Seismically-induced subsidence can be either a direct or an indirect result of an earthquake. Direct tectonic displacement of bedrock can result from strong earthquakes causing either subsidence or uplift of up to several feet over relatively large areas of ground surface. Indirect subsidence resulting from compaction of gradual soil layers caused by ground shaking is more common. Such shaking causes subsidence by compressing the soil deposit so that pore space formerly filled by groundwater or air is eliminated. There must be an outlet for evacuation of these pore spaces in order for subsidence to occur.

Differential settlement is a more common hazard often occurring when buildings and bridges are built on poor foundation materials. Pilings are often used to anchor structures to firmer deposits below the surface in these situations. Surface footings tend to be used to support less important structures. If surface footings are used to support one part of a structure and pilings for another, differential settlement will occur, with the area supported by surface footings setting faster than the piling supported section. Differential settlement generally occurs slowly enough that its effects are not serious.

Ground Failure

Earth materials in a natural condition tend to reach equilibrium over a long period of time. In geologically active areas such as California and Alaska there are many regions where earth materials have not yet reached a natural state of stability. For example, most of the valleys and bay margins are underlain by recent loose materials that have not been compacted and hardened by long-term natural processes. Landslides are common on most of the hills and mountains as loose material moves downslope. In addition, many activities of man tend to make the earth materials less stable and hence to increase the chance of ground failure. Some of the natural causes of instability are earthquakes, weak materials, stream and coastal erosion, and heavy rainfall. Human activities that contribute to instability include oversteepening of slopes by undercutting them or overloading them with

artificial fill, extensive irrigation, poor drainage or even groundwater withdrawal, and removal of stabilizing vegetation. These causes of failure, which normally produce landslides and differential settlement, are augmented during earthquakes by strong ground motions that result in rapid changes in the state of earth materials. It is these changes, by means of liquefaction and loss of strength in fine-grained materials, that result in so many landslides during earthquakes as well as differential settlement, subsidence, ground cracking, ground lurching, and a variety of transient and permanent changes in the ground surface.

Although the basic causes of ground instability are simple in concept, the consequences are often complex and highly variable. They include numerous varieties of landslides, ground cracking, lurching, subsidence, and differential settlement. Moreover, these types of ground failure occur on a wide variety of ground conditions. Landslides, for example, do not require a steep slope on which to form, particularly during earthquakes. Many occur on slopes that are virtually flat, and the surface on which they fail may be very shallow (1 to 2 feet deep) or as much as hundreds of feet below the ground surface. The type of ground failure that develops in a given area is determined by the nature of the natural man-made disturbance that occurs and partly by the topographic, geologic, hydrologic, and geotechnical characteristics of the ground.

Liquefaction

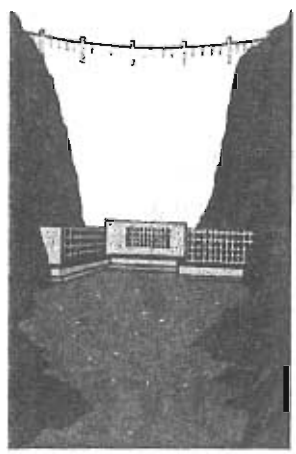
Liquefaction is a type of ground failure that can occur during an earthquake. Liquefaction can occur on relatively level ground and have catastrophic effects on structures. Liquefaction can cause buildings to collapse or sink, pipeline and storage tanks to float or break, disruption or destruction of gas lines, sewer lines, roads, etc. Liquefaction can also be the cause of landslides on slopes as small as 2.5%.

Liquefaction occurs when loose soils that are water-saturated are subjected to ground shaking of high intensity and long duration. Liquefaction is manifested by sand boils and mudspouts at the ground surface and water seepage through ground cracks or by the development of quicksand-like conditions or landslides. When quicksand-like conditions occur, buildings may sink or tilt into the ground and underground facilities may float to the surface.

Several conditions are necessary to produce liquefaction including water saturation, low density soil, uniform grain size, lack of confining pressure, high intensity and high duration ground shaking. Ground shaking intensity depends on the magnitude of an earthquake and the amplification of the ground shaking. In terms of soil density, loose unconsolidated soil materials are the most subject to liquefaction.

Uniform grain size, such as a deposit of only sand, causes materials to be more susceptible to liquefaction than mixed materials. The deeper in the soil zone the higher the confining pressure and consequently, the lower the potential for liquefaction.

Liquefaction can occur at any level of a soil deposit but usually occurs within the upper 40 to 50 feet. The potential for liquefaction exists wherever there are saturated, loose sand deposits, especially if they are near the surface. This includes most of the river valleys and the low lying plains that have poor drainage. Since subsurface soil properties are not precisely known, it is necessary to assume that all alluvial areas having high groundwater may be subject to liquefaction during strong earthquake shaking.



Areas with alluvial soils are subject to liquefaction hazard. In the Ojai vicinity, these areas are the Santa Ana Valley north of Casitas Lake, the Ojai Valley, and the Upper Ojai Valley.

Referring to Exhibit GEO-4 of the City of Ojai MEA, areas designated high hazard zones for liquefaction are alluvial areas which have had water table levels within 15 feet of the ground surface at some time in the last 50 years or since water well records have been kept. Moderate hazard zones include alluvial areas which have had water between 15 and 40 feet below ground level.

There are a few areas within the Sphere of Influence but outside the City boundaries which are subject to liquefaction hazard. These areas are located along or adjacent to San Antonio Creek and in the eastern portion of the Sphere of Influence.

The majority of the City of Ojai is subject to liquefaction hazard. Those portions of the City located far north along the City boundary or to the west of the Ojai Country Club are free from significant liquefaction potential.

Inundation From Dam Failure

Dam failures can result from a number of natural or manmade causes such as earthquakes (ground rupture or severe groundshaking), erosion of the face of foundation, landsliding which displaces a large volume of water, rapidly rising flood

waters, and structural/design flaws.

There are currently no dams within, adjacent to, or upstream from the City of Ojai which are large enough to endanger lives and property in the event of a failure. The Stewart Debris Basis, northerly of Canada Street, is not technically a dam (refer to Exhibit GEO-3 of the City of Ojai MEA). The facility was designed by the Corps of Engineers to accommodate a 500 year flood and is considered safe. However, in the event of its failure, lives and property could be at risk. In addition, the threat of inundation from dam failure could occur with the construction of a dam upstream of the major drainage courses such as San Antonio Creek which traverse or follow close to the City's borders. Because of these threats, this topic is included in the safety element for present and future reference.

There are three general types of dams: earth and rockfill, concrete arch or hydraulic fill, and concrete gravity. Each of these types of dams has different failure characteristics. The earth-rockfill dam will fail gradually due to erosion of the breach; a flood wave will build gradually to a peak and then decline until the reservoir is empty. A concrete arch or hydraulic fill dam will fail almost instantaneously; thus a very rapid build-up to a peak wave and then a gradual decline. A concrete gravity dam will fail somewhere in between instantaneous and gradual, with corresponding build-up of flood wave.

In addition to the above mentioned characteristics, warning ability is generally determined by the frequency of inspections for structural integrity, the flood wave arrival time (the time it takes for the flood wave to reach its maximum distance of inundation), or the ability to notify persons downstream and their ability to evacuate. The existence and frequency of updating and exercising an evacuation plan that is site-specific assists in warning and evacuation functions.

A dam failure will cause loss of life, damage to property, and other ensuing hazards, as well as the displacement of persons residing in the inundation path. Damage to electric generating facilities and transmission lines could also impact life support systems in communities outside the immediate hazard areas. A catastrophic dam failure, depending on size of dam and population downstream, could exceed the response capability of local communities. Damage control and disaster relief support would be required from other local governmental and private organizations and from the state and federal governments.

Mass evacuation of the inundation areas would be essential to save lives, if warning time should permit. Extensive search and rescue operations may be required to assist trapped or injured persons. Emergency medical care, food, and temporary

shelter would be required for injured or displaced persons. Identification and burial of many dead persons would pose difficult problems; public health would be a major concern. Many families would be separated, particularly if the failure should occur during working hours, and a person inquiry or locator system would be essential. These and other emergency operations could be seriously hampered by the loss of communications, damage to transportation routes, and the disruption of public utilities and other essential services.

Governmental assistance could be required and may continue for an extended period. These efforts would be required to remove debris and clear roadways, demolish unsafe structures, assist in reestablishing public services and utilities, and provide continuing care and welfare for the affected population including, as required, temporary housing for displaced persons.

Other Geologic Hazards

In addition to seismic hazards, the geology of the Ojai area has created geologic hazards which may cause loss of life and property due to earth movement not associated with a seismic event. The following geologic hazards are found throughout the Ojai area.

Landslides

The widespread landsliding and slope instability throughout much of southern Ventura County can be related to the intensity of past faulting and folding of geologic strata, to the clay content of certain sedimentary formations and the subsurface moisture content. The County of Ventura has not identified any areas of past landslide activity within the City of Ojai, although the potential does exist.

Land development in hillside areas can result in the formation of new landslides if grading or development design does not take into account potentially adverse landslide conditions. Many of the area's natural slopes are underlain by bedded sedimentary rocks that are inclined downhill. The slopes in these cases are marginally stable and prone to failure along the bedding planes.

Generally in Ventura County, landsliding is most commonly found along prominent fault zones (refer to Exhibit GEO-3 of the City of Ojai MEA), anticlinal folds (upside down "U"-shaped folds in rock strata), areas of younger geologic formations and areas of weak or clayey bedrock. Landslides and potentially unstable slopes are especially common in hillside areas underlain by sedimentary bedrock. Many landslides are also associated with steep slopes which have been

undercut by erosion. Subsurface water is also a contributing factor to slope instability in the great majority of landslide occurrences. In general, most existing landslides in southern Ventura County are not of recent origins, over 100 years old and most are not actively moving. They are subject to movement if triggered by earthquakes, poorly planned grading or if ground moisture is substantially increased.

Several areas in the Ojai vicinity are subject to landsliding hazard. Most of these large areas are in the hillsides to the north and south of the City of Ojai. The Sulphur Mountain hills to the east of San Antonio Creek and south of the Upper Ojai Valley have large areas susceptible to landsliding. In the National Forest, northeast of the Ojai Valley, there is a large area of landsliding.

There are no significantly large areas of landsliding in the City's Sphere of Influence or in the City of Ojai.

Expansive Soils

Expansive soils are those which are generally clayey, expand or swell when wetted, and contract or shrink when dried. These soils are typically located in areas of moderate slope. Expansive soils are referred to as soils having high shrink-swell potential. Downslope soil creep in hillside areas is a concern with regard to expansive soils. As an expansive soil shrinks and swells it tends to move downslope due to gravity.

Expansive soils tend to be very localized and site specific and a soils test is usually necessary to determine a particular site's susceptibility to expansive soils. Engineering practices can sometimes be applied to alleviate the problems associated with building on expansive soils. Examples of these practices are appropriate foundation design, less steep slopes, removal and replacement of expansive soils, special landscaping, and irrigation techniques to bind and avoid wetting the soil.

Moderately expansive soils are prevalent throughout south Ventura County. Areas of low potential for expansive soils are common along rivers and some canyons. Small areas of highly expansive soils are scattered throughout the western portion of the south County. Larger areas are common in the southeastern portion of south County.

The great majority of the land within the City of Ojai is covered with moderately expansive soils with the exception of the central portion of the City which has low expansive potential. These soils can be built upon easily with conservative

engineering practices. The northeastern corner of the City is covered with highly expansive soils which must be taken into consideration prior to land development. Please refer to Exhibit GEO-9 of the City of Ojai MEA.

The majority of the City of Ojai's adopted Sphere of Influence is underlain by moderately expansive soils. The southeastern portion of the Sphere has highly expansive soils near Highway 150. Highly expansive soils are also prevalent in the portion of McDonald Canyon and the area east of Meiners Oaks located within the Sphere of Influence boundaries.

Erosion

The majority of soils in the Ojai area have potential for very severe water erosion if the soils are cultivated or heavily grazed. The exceptions to this are areas along riverbeds. These areas experience no potential to moderate potential for erosion hazard.

Outside the City limits, the trend of severe erosion hazard near the City increasing to very severe hazard to the northwest and reducing to moderate hazard to the southeast continues in the City vicinity. A small area east of Meiners Oaks, however, has potential for moderate erosion hazard.

Potential for severe erosion hazard characterizes the majority of the soils within the City limits. To the northwest, the potential increases to very severe. To the southwest, the potential for erosion hazard is reduced to moderate. Please refer to Exhibit GEO-10 of the City of Ojai MEA for an illustration of the erosion hazards which exist within the City and its sphere of influence.

FLOOD HAZARDS

The potential of flooding is a major safety concern in Ojai. Parts of the City and surrounding areas are subject to flood hazards. Structures in the Ojai area are highly susceptible to damage from water runoff. Controlling and directing the flow of water will need to be addressed. This will be accomplished by specifically identifying areas susceptible to flooding and making appropriate plans of action.

Climate

The climate of the Ojai area directly affects the duration and intensity of rainfall. It is characterized by hot summers and mild winters. The mean annual precipitation for the area ranges from 19 inches near the confluence of San Antonio Creek and the Ventura River, to 30 inches in the mountains.

Major floods in the area are produced by unstable frontal storms that form in the Pacific Ocean and approach the coast from the west. These frontal systems form by cold air masses from the polar regions mixing with very moist warm air from the tropics. They have a potential for producing heavy and prolonged rainfall. The rain generally occurs during the winter months from November to April. Storms last from three to four days. Local storms can cause high intensity precipitation for a duration of about six hours or less. General summer storms can also occur in southern California during the later summer or early fall months. These summer storms have not resulted in any major floods in the San Antonio Creek Basin during the periods for which discharge records are available.

Drainage

Drainage for the City of Ojai and Sphere of Influence is south and southwest. The streams and drains are typical of the majority of streams in southern California; streamflow is negligible except during and immediately after rains. Climatic and basin characteristics are not conducive to continuous runoff. Runoff increases rapidly in response to high-intensity precipitation and is magnified to some degree by the impermeable surfaces created by urbanization. Streamflow is seasonal and diminishes rapidly at the end of the winter precipitation season. Based on records on the last 100-year period of flood history, some flood damage will occur in the vicinity of Ojai on an average of once in every four years. The Ojai area historically has been subjected to major storms on an average of once every 11 years.

Channel Analysis

There are many creeks and drains in the Ojai area which could have an effect on the City when floods occur. The following tables and descriptions briefly detail those watercourses which pose possible flood hazards for the City of Ojai.

- **San Antonio Creek**

  This a major tributary to the Ventura River. It originates in Senior Canyon north of the Ojai Valley southwestward to its confluence with the Ventura River north of Casitas Springs.

- **Thacher Creek**

  This creek originates northeast of Ojai and flows in a southwesterly direction to its confluence with San Antonio Creek in the City of Ojai.

- **Stewart Canyon Channel**

  Stewart Canyon traverses the City of Ojai and its Sphere of Influence from north to south. It goes through the center of the City. Along Stewart Canyon Channel urban development has occurred. This drain runs from the mountains north of the City south to its confluence with San Antonio Creek along the southern corporate boundary. A debris basin was built by the U.S. Army Corps of Engineers at the mouth of Stewart Canyon Storm Channel. It contains and regulates the outflow for both the Intermediate Regional (100-year) and Standard Project Floods (500-year). Below the basin a concrete channel and covered box conduit has been constructed to accommodate the Intermediate and Standard Project Flood. This improvement extends from the spillway of the debris basin to approximately 200 feet downstream of the Southern Pacific Railroad crossing. In this manner all flood hazards along Stewart Canyon Channel have been minimized above the downstream end of the channel improvement.

- **Fox Canyon Barranca**

  This traverses the City and Sphere from north to south in the eastern third of the City. Along Fox Canyon Barranca urban development has occurred. This drain runs from the mountains north the City to its confluence with Stewart Canyon Drain and then into San Antonio Creek, along the southerly corporate boundary.

  The principal danger of flooding along the Fox Canyon Barranca is the inadequate inlet under Daly Road. Following the 1985 Wheeler Fire, a debris barrier was constructed on Fox Canyon upstream of Daly Road. However, this inlet could still become clogged from debris generated upstream of Daly Road. An upstream extension to the conduit under Daly Road is proposed which would eliminate the inadequate inlet at Daly Road and place Fox Canyon underground to the mouth of the canyon some 800 feet upstream.

  The area tributary to Fox Canyon includes a large area east of the channel that is not collected due to a lack of lateral drainage facilities. The City Master Plan of Drainage (dated June 1979) proposes a storm drain parallel to Fox Canyon Channel. This drain would intercept much of the tributary east of Fox Canyon. It is designated as Drain 26 and is considered to be a Ventura County Flood Control "Redline" or jurisdictional channel.

- **McNell Creek**

  McNell Creek is an unimproved channel throughout its length and runs mostly through agricultural land. The channel is inadequate to contain an Intermediate Regional (100-year) Flood throughout its length.

- **Happy Valley Drain**

  This drain travels northeast to southwest and is situated just outside the western boundary of the City limits. The flood plain for Happy Valley Drain south of El Roblar is partially developed.

- **Dron Creek**

  This creek travels north to south, originating from the mountains and emptying into San Antonio Creek. Dron Creek has the potential to overflow its banks before it reaches San Antonio Creek.

Flooding Hazards

Almost all of the above described waterways pose a flooding threat to the City of Ojai. Flooding can be aggravated by several factors such as inadequate channel cross-sections, culverts at roadways, poor flow line alignment, and excessive debris.

The major watercourse influencing the City is San Antonio Creek. Damaging floods along this creek and its tributaries in the vicinity of Ojai are reported to have occurred in 1862, 1867, 1884, 1911, 1914, 1938, and 1943. Major floods along the creek are described as having a peak discharge greater than 3500 cubic feet per second. Major floods have been recorded along San Antonio Creek occurred in 1952, 1958, 1965, 1966 1969, and 1978. The flood of January 25, 1969 had the largest recorded peak discharge at 16,200 cf./sec. The largest peak discharge for San Antonio Creek during the 1978 winter storms was 14,000 cf./sec. which was recorded on February 10th. This was facilitated by the 16.23 inches of rainfall during the months of December and January in the City of Ojai. The January 16th storm produced a 6,900 cf./sec. peak discharge on San Antonio Creek with the March 4th storm producing a 10,100 cf./sec. discharge.

Most flooding problems along the San Antonio Creek are associated with excessive debris accumulation and in some instances, alignment of the natural stream; losses of recreational facilities such as picnic tables are common on an annual basis (Flood Insurance Study, HUD, 1978). The Ojai Valley is periodically threatened by flows containing large quantities of debris from steep canyons of the upper

watershed. The existing channels can become clogged with debris and no longer carry the volume of flood flows. These flows then spread over the valley causing loss in property and posing potential hazard to life.

Traditional improvement plans to alleviate debris flows are debris dams and basins at canyon mouths and the lining of channels. These improvements would then carry the cleared water from the basin outlets past points which are susceptible to flood damages. Systematic and periodic flood channel preventive maintenance including removing debris accumulating in flood channels and contributory streams would lessen or remove flood threats from debris clogged channels.

The floods during the January 1969 storms resulted in excessive channel sedimentation and production of large quantities of floating debris. In many areas, severe sedimentation resulted in the blockage of road crossings. This occurred along Grand Avenue and Ojai Avenue in the Ojai Valley and Highway 33 north of Ojai.

Debris basins are invaluable during storm periods because they provide an area to capture and accumulate debris before it can enter the downstream channels and cause damage. The Stewart Canyon Debris Basin is credited with saving the City of Ojai from major property damages and loss of lives. It is estimated that over 200,000 cubic yards of material were deposited in the basin by the January and February 1969 storms.

The floods during the January/February/March 1978 storm season produced minor flooding problems in numerous storm drains throughout the City of Ojai. Most of these facilities are designed for a 10-year storm and overflow during greater storms. However, the result is primarily nuisance flooding since the design flows are relatively minor. This type of flooding does not pose a serious threat to life and property.

A burned watershed, results of the July 1985 Wheeler fire, posed a serious potential threat of flooding to the Ojai Valley in the 1985-1986 flood season. Fortunately emergency measures including debris dams, temporary channels, watershed reseeding and extensive sand-bagging combined with a wet, but well distributed, rainfall resulted in little serious flooding to the valley.

Flood Plain Management

In October 1978 the City of Ojai adopted a Flood Protection Ordinance incorporating flood plain management programs recommended by a Flood Insurance Study. The intent of the ordinance is to regulate development in flood

plains and flood prone areas, the stream channels, canyon channels, and barranca channels identified in the Flood Insurance Study and in this document. Specific areas depicted on a parcel by parcel basis within the City limits and its Sphere of Influence subject to 100-year and 500-year flood plains are illustrated in the Safety Element's Flood Hazard Map (Exhibit S-1), and Exhibit GEO-3 in the City shows general areas within the City limits and Sphere of Influence subject to 100-year and 500-year flood plains of the City of Ojai MEA. It is important to note that the 500-year flood plain includes areas subject to 100-year flooding with average depths of less than one foot.

The Master Plan of Drainage Study, prepared for the City of Ojai in June 1979, identifies sources of funding which may be used by a development applicant in completing a specific project.

Drainage areas in the Ojai Valley located outside of the City limits are subject to the Ventura County Flood Control District regulations and policies guiding flood control activities. Please refer to Table HYD-C of the City of Ojai MEA for a description of these areas.

FIRE HAZARDS

Because of the mix of urban and wildland areas in the Ojai area, fire protection is a difficult problem and fire protection systems are complex. Much of the area surrounding the City of Ojai is covered with woodland, brush, or grassland. Large tracts of sparsely populated land must be protected from wildland fires in hot, dry summers at the same time that adequate protection must be provided to population centers. Fire protection in urban areas must also be designed and equipped to cope with industrial fires with their associated hazardous materials concerns, multi-level structures of varying occupancies, densely built and highly populated residential apartments and similar structures, and transportation accidents involving hazardous materials.

Fire Hazard Severity

In recent years, extensive study has been undertaken at the State level to classify the fire hazard severity of different regions of the State. One of the key components in measuring severity is the type and quantity of flammable vegetation within a given unit of land area. This factor, also known as "fuel loading characteristics," can then be combined with weather and slope to obtain a measure of relative hazard. Please refer to Exhibit GEO-3 of the City of Ojai MEA for an illustration of designated fire hazard areas. This exhibit is also included in Appendix B of this document.

Fuel Loading

Three basic fuel loading characteristics have been identified by the State. "Heavy" fuel loading vegetation is assigned to woodland and brushwood areas. This characteristic is generally assigned to vegetation that is six feet or more in height and which has a crown density of 20 percent or more of the ground area. The heavy fuel loading vegetation types include oak woodlands and chaparral which are found in abundance in the rural areas surrounding the City.

"Medium" fuel loading vegetation generally includes scrub vegetation that is less than six feet in height but with similar crown density characteristics. This category includes California sagebrush, coyote brush, manzanita, and other chaparral species common to the area.

"Light" fuel loading vegetative types are various types of grasslands, herbaceous rangelands and irrigated pasture lands. These areas are almost completely treeless and highly flammable during dry seasons. The significance of this fuel is that it carries the fire into the medium and heavy fuel beds.

Weather Conditions

The second major natural characteristics to consider in fire hazard measurement are local weather conditions. In Southern California, very little rain normally falls between mid-April and the beginning of November. By September, many portions

of the State are tinder dry from months of aridity. It is not unusual for strong, drying winds to blow in from the north and east.

The State has established three "critical fire weather frequency" classes to measure the weather-related fire hazard severity. These classes basically measure the annual number of days in which a critical "fire load index" is exceeded over a 10-year period, with Class I the lowest and Class III the highest level of danger.

Slope

The third major characteristic of fire hazard measurement is the degree of slope present in a localized area. The rugged terrain and steep slopes that characterize much of the area surrounding the City can create extreme access problems for fighting fires once they have started. Generally, vegetation is more abundant in steep canyon areas due to less severe sun and wind exposure and greater capture of rain runoff. Fires that start in the bottom of canyons will burn 16 times faster upslope than if they begin at the top of ridges and burn downslope.

The State has divided slope categories into three different classes of fire severity. Class I includes slopes from 0 to 40 percent. This category assumes that direct attack on the fire is possible with all-wheel drive fire trucks, bulldozers, and crews and aircraft. Class II includes slopes between 41 and 60 percent. This class assumes direct attack is not possible with fire trucks, but still possible in most cases with bulldozers, hand crews, and aircraft. Class III includes slopes greater than 61 percent. This class includes areas mostly beyond the capability of bulldozers which can only be directly attacked by hand crews and aircraft.

Level of Service

The Ventura County Fire Protection District provides the City of Ojai with structural fire protection and general rescue services.

The City is mainly served by District Fire Station #21. The station is located in the southeastern section of Ojai and has an estimated average response time of 4.9 minutes to calls in the City. Additional support can be provided by three District stations outside of the City limits. These include the Meiner Oaks, Oak View, and Upper Ojai stations.

Station 21 is manned by 3 firefighters, which is the standard engine company staffing throughout the District. The station currently is equipped with a 50 foot telesquirt, water tender, reserve engine, and brush engine.

The Fire District currently requires sprinklers in all buildings 5,000 square feet or greater. Any residential development outside of areas served by the water service district is required to maintain a minimum water supply to be used for fire suppression. All new development is required to provide steamer hydrants every 500 feet in residential and 300 feet in commercial or industrial districts.

The Fire Prevention Division is responsible for the review of all proposed development, street names, and inspection of licensed care facilities, fire protection systems and businesses handling hazardous materials.

Weed Abatement

The Fire District's weed abatement program currently requires all flammable material, including weeds and trash, to be cleared from all lots.

It is general policy of the District to clean the entire lot, but if in the opinion of the Fire Chief or his agent this needs to be modified, then in no case would the District clean less than 100 feet from all structures.

HAZARDOUS MATERIALS AND WASTE

Hazardous Material means a substance or combination of substances which, because of quantity of concentration, or physical, chemical, or infectious characteristics, may either a) cause or significantly contribute to an increase in mortality or an increase in serious illness; or b) pose a substantial present or potential hazard to human beings or the environment. Hazardous materials include substances that people rely on continuously, such as petroleum projects, oil-based paints, pesticides and the like.

Hazardous Waste means any waste substance that may cause or significantly contribute to serious illness or death, or may pose a substantial threat to human health or the environment when improperly managed; these substances are generally toxic, corrosive, flammable or reactive.

The basic difference between wastes and materials is the intended use. "Hazardous Wastes" are materials that are no longer useful and must be properly and safely disposed of, treated or recycled. In some cases, waste at one facility can be used as a raw material at another facility. In those cases, the material would be regulated under the hazardous material regulations, and not the hazardous waste regulations.

Several catastrophic incidents over the past 20 years involving human illnesses, loss

of life and environmental destruction caused by hazardous materials and wastes, as well as gradual long term groundwater pollution from leaking dumps and tanks, have led to the enactment of hundreds of Federal and State laws which place limits and prohibitions on the way hazardous wastes are managed from the point of generation to the point of disposal. Increased regulatory requirements and the increased costs associated with the proper disposal of all classifications of waste has led to illegal disposal operations countywide. The Ventura County Planning Division has inventoried all past and current waste disposal sites which may pose health or land use problems by adversely affecting land, water or air resources.

The County's Hazardous Waste/Materials Management Plan has been adopted by the City of Ojai and is incorporated by reference into this Safety Element. The plan includes a coherent set of goals and strategies for the management of hazardous materials and wastes within the County.

DISASTERS

In the event of a major seismic or wildfire event, the City of Ojai will require a disaster plan which outlines the various operations and procedures to be taken by local agencies. This plan shall discuss, at a minimum, evacuation routes, peakload water supply requirements, minimum road widths, and clearance around structures, in order to reduce casualties and damages during and following the disaster. Title 3, Chapter 1, "Emergency Organization" of the Ojai Municipal Code currently establishes an administrative plan for disaster directives. This ordinance establishes a Disaster Council chaired by the Mayor and designates the City Manager as the Director of Emergency Services. In addition to the City's disaster plan, the County's Multi-Hazard Emergency Response Plan outlines the various operations and procedures to be taken by agencies throughout the County of Ventura.

The City is currently in the process of updating the City's existing Disaster Plan. The revisions to the Plan include: a re-evaluation of the City's disaster preparedness, special first aid and CPR training for City employees, and development of a data base listing persons within the City who have special talent which may be useful in the event of an emergency. The City has recently completed a mailing to inform residents about earthquake hazards and how to prepare for them. Also, an unreinforced masonry ordinance has been adopted by the City which will provide seismic strengthening for unreinforced masonry bearing wall buildings. This ordinance will assist in reducing the risk of structural damage to these buildings in the event of an earthquake.

Seismic Events

The City of Ojai lies approximately 35 miles southwest of the San Andreas fault. A catastrophic earthquake having a magnitude of 8.3 on this portion of the San Andreas fault is likely before the end of the twentieth century and is estimated to have a current annual probability of occurrence between two and five per cent. It is based on a repeat occurrence of the great Ft. Tejon earthquake of January 9, 1857, and other geophysical observations. As geologists know, at least eight major earthquakes have occurred in this area, with an average spacing in time of 140 years, plus or minus 30 years.

First instance property losses for the magnitude 8.3 event on the south-central San Andreas fault are estimated to be close to $20 billion.

Depending upon the time of day or night, this magnitude 8.3 event will kill between 3,000 and 14,000 people and cause between 12,000 and 55,000 people to require hospitalization.

The City must anticipate the occurrence of great earthquakes which will overwhelm present capabilities to respond adequately and in an organized manner.

Evacuation Routes

A major seismic event could conceivably cut off evacuation routes into and out of the City of Ojai. Highway 33 north of the City could be temporarily closed through portions of the Los Padres National Forest due to landslides. The section of highway through the Forest includes six (6) wooden bridges and three (3) tunnels which could sustain damage during a seismic event. Caltrans currently has plans to replace all six (6) of the wooden bridges with concrete structures by early 1994, at the earliest date. These bridges, located between Matilija and Bear Creeks, will cost approximately $2.4 million to replace, with construction estimated to begin in early 1993.

Highway 150 east and west of the City could also experience closures due to landslides. Highway 33 south of the City could experience disrupted pavement and damage to bridges. In addition to the major highways, surface streets could experience delays and detours due to disrupted pavement, downed power lines, and structural debris. These disruptions could last up to 72 hours in some cases. It is also possible that a major seismic event or other emergency in the Ventura area could disrupt traffic along the Pacific Coast Highway (PCH)/Highway 101 north of the City of Ventura. In the event of the closure of PCH/Highway 101, Highways 33 and 150 may be designated as an alternative route between Ventura

and Santa Barbara via the City of Ojai.

The disaster map of the City's General Plan (Exhibit S-2 located in the City of Ojai MEA) identifies the major routes leading out of town and the distances to the nearest hospitals outside of the City limits. The map also identifies locations of nuclear fallout shelters designated by the State Office of Emergency Services. In the event of a non-nuclear emergency, emergency shelters will be set up by the Red Cross at schools, parks, and other public facilities. These sites will be determined by the Red Cross at the time of the emergency based upon the type and location of the emergency.

Water Supply

The City of Ojai obtains 83% of its water from ground water supplies. The remaining 17% is obtained from Lake Casitas via the lake's main conveyance system. In the event of a major seismic disaster, both of these sources of water may be limited.

Groundwater wells throughout the City may be damaged by faulting and earth movements which could displace sources of groundwater. Wells with water sources which remain intact may be rendered inoperable if water pumps are damaged or power supplies are cut off. In addition, wells which remain operable may experience damage to their distribution systems, severely limiting water availability.

Water supplied by Lake Casitas may be limited in the event of a dam failure or damage to the lake's main conveyance system.

The City's disaster plan should include policies to deal with water distribution needs immediately following a seismic event.

Minimum Road Widths

In the event of a major seismic disaster, emergency response vehicles will require access to various structures throughout the City. The City's disaster plan should include minimum street widths to accommodate emergency response vehicles.

Wildland Fires

The area surrounding the City of Ojai is particularly vulnerable to wildland fire hazards which could pose a community-wide threat during a major conflagration. The City's low-density residential areas closest to areas of high fire danger pose the greatest threat.

Evacuation Routes

A major wildland fire has the ability to shut down any one of the major highways leading out of the City. It is not likely, however, that all major routes out of the City would be shut down simultaneously. Formal fire evacuation routes have not been predetermined, due to the unpredictability of a fire. Law enforcement agencies will therefore need to react according to the needs of each situation.

Water Supply

A major wildland fire may result in decreased water pressure throughout the City as a result of increased water use by firefighters and residents alike. This could result in disastrous situations if water pressure drops below effective levels in crucial areas. The City's disaster plan should outline backup water supplies and ways to reduce pressure decreases before they drop below crucial levels.

Minimum Road Widths

In the event of a major wildfire disaster, emergency response vehicles will require access to various structures throughout the City. The City's Disaster Plan should include minimum street widths to accommodate emergency response vehicles, as recommended by the Fire Prevention Division of the Fire District.

Clearances Around Structures

The City of Ojai currently follows the Fire District's brush clearance requirement of 100 feet minimum around structures in high-bush areas. This has been proven to significantly reduce hazards to life and property during wildfires by providing an effective fire break.

GOALS, POLICIES AND IMPLEMENTING PROGRAMS

INTRODUCTION

This section of the Safety Element sets forth Goals, Policies, and Implementing Programs. These were formulated from analysis of the Element's Issues and Needs section. Policies and Implementing Programs were created to implement each Goal. The Goals, Policies, and Programs are presented in a format to enable the reader to clearly understand how each Goal is to be realized.

Where necessary and appropriate, all or a portion of a category's Goals, Policies and Programs are cross referenced to another City or County document. In such cases the referenced document's Goals, Policies, and Programs are incorporated in the Safety Element by reference.

The first category ("GENERAL") provides overall Goals, City Policies and Implementing Programs. The GENERAL section is then followed by specific safety and seismic safety issue sections. The general goals detailed below apply to all issue sections.

GENERAL

Goals

1) A City that is prepared for hazards and disasters so as to protect the public health, safety, and welfare, and to minimize damage to property.

2) A City whose development is planned in consideration of major hazards and other physical constrains so as to minimize loss of life, injury, and damage to property resulting from hazards and disasters.

3) A City whose citizens are informed as to the appropriate actions to take in the event of hazards and disasters.

4) A City that continues to improve upon inter-agency communication and cooperation regarding safety issues and emergency response preparedness.

Policies

1) Applicants for land use and development permits shall provide all necessary

information relative to hazardous conditions which may affect their proposals. Applicants shall also specify how they intend to alleviate identified hazards.

2) All geologic and soil reports submitted with development permit applications, including recommendations for measures to eliminate or mitigate any possible hazard, shall be reviewed by qualified personnel registered and certified by the State, such as engineers or engineering geologists.

3) Essential facilities shall be designed and constructed to resist, insofar as is practical, the forces generated by earthquakes, gravity, fire and winds.

4) The City Department of Planning and Building shall continue to enforce requirements of the Uniform Building Code pertaining to earthquake-resistant design and construction.

Implementing Programs

1) The City Department of Planning and Building, with the technical support of the Public Works Department and other applicable agencies, shall review the Safety Element periodically to identify what information needs to be updated, and where appropriate, shall submit a budget request as part of the next year's City budget.

2) The City Department of Planning and Building shall prepare a program for Council consideration to reduce structural deficiencies through the removal, reinforcement, or modification of the structures whose failure could cause significant numbers of injuries, substantial loss of life, or unacceptable level of economic loss.

3) The City Planning Department shall maintain the latest copy of the Ventura County Office of Emergency Services update of the Ventura County Multi-Hazard Functional Emergency Response Plan including mitigation measures and preparedness, response, and recovery strategies for the following nine contingency plans:
   - o Floods
   - o Earthquakes
   - o Landslides

- o Hazardous Materials
- o Dam Failure
- o Nuclear Defense/Radiological Emergency
- o Wildland Fire
- o Transportation Accidents (involving airplanes, boats, major highway accidents, and railroads)
- o Off-shore Oil Spills

4) The City Planning Department shall explore the feasibility of requiring the recordation of a Notice of Hazards and Hold Harmless Agreements with the County Recorder for all subdivisions of land and discretionary permits in areas of known potential hazards.

5) The Department of Planning and Building shall comply with applicable provisions of Chapter 12.2 (commencing with Section 8875), Division 1, of Title 2 of the Government Code, pertaining to identification of potentially hazardous buildings in the City of Ojai, and establishment of a mitigation program for such potentially hazardous buildings.

SURFACE RUPTURE

Related goals, policies, and implementing programs are included on page OS-13 of the Open Space Element of the City's General Plan.

Goals

General goals which apply to all issue sections are identified on page 37 of this document.

Policies

1) No development shall be located within a fault hazard area unless detailed seismic-geologic investigation confirms that such development on the proposed specific site would not be hazardous. Such investigations shall include a site-specific characterization of anticipated ground motion, which would include estimates of peak horizontal ground acceleration and duration

of shaking.

2) No habitable buildings or other structures shall be located over, or within 50 feet of, any active or potentially active fault (as depicted on Exhibit GEO-3 of the City of Ojai MEA).

3) Land in fault hazard areas should, where feasible, be designated Open Space or Agriculture on the General Land Use Maps.

4) Roads, streets, highways and utility conduits shall be planned to avoid crossing active or potentially active faults where feasible. When such location is unavoidable, the design shall include measures to reduce the effects of any fault movement as much as possible.

5) No new essential facilities including hospitals, fire and sheriff's stations and communication centers, and no new uses which have a high occupancy potential such as schools, theaters, churches and shopping centers, shall be located within fault hazard areas.

Implementing Programs

1) All development projects involving construction within an Alquist-Priolo Special Studies Zone (as depicted on Exhibit GEO-3 of the City of Ojai MEA) shall be reviewed by the City Public Works Department in accordance with the requirements of the Alquist-Priolo Special Studies Zones Act and the policies and criteria established by the State Mining and Geology Board pursuant to said Act.

2) The City Planning Department shall maintain the latest version of the Ventura County Sheriff's Office of Emergency Services Multi-Hazard Emergency Response Plan, Earthquake Contingency section.

3) The Department of Planning and Building shall be responsible for implementing the requirements of the Essential Services Buildings Seismic Safety Act of 1986.

GROUND SHAKING

Related goals, policies and implementing programs are included on page OS-13 of the Open Space Element of the City's General Plan.

Goals

General goals which apply to all issue sections are identified on page 40 of this document.

Policy

1) All structures designed for human occupancy shall incorporate engineering measures to mitigate against risk of injury in areas identified by the Public Works Department as subject to ground shaking.

Implementing Programs

1) The City Public Works Department shall have a study prepared examining existing City-owned public utility systems for susceptibility to damage from ground shaking, and shall analyze the extent of acceptable risk of the effects of such ground shaking.

2) The City Department of Planning and Building and the City Manager's Office shall continue enforcement of the City of Ojai Unreinforced Masonry Ordinance. An unreinforced masonry mitigation program is currently underway.

3) The City should conduct a public education program to inform Ojai citizens of earthquake hazards and encourage them to prepare for them.

SUBSIDENCE

Related goals, policies, and implementing programs are included on page OS-13 of the Open Space Element of the City's General Plan

Goals

General goals which apply to all issue sections are identified on page 37 of this document.

Policies

1) Potential subsidence effects shall be evaluated prior to approval of new oil or gas well drilling permits.

2) Structural design of buildings and other structures shall recognize the potential for differential settlement and subsidence.

3) No structure which is needed for public safety or emergency services shall be located where an interruption in service could result from structural failure due to subsidence. If such location in an area subject to potential subsidence is unavoidable, the structure shall be designed to mitigate the hazard.

Implementing Programs

1) The City Public Works Department shall maintain current versions of the County Surveyor's periodic examinations of monument elevations throughout the County. The Department shall coordinate with the Surveyor to modify the subsidence portion of the Safety Element as necessary.

2) The City should conduct a public education program to inform the public of subsidence hazards and educate them to identify areas of possible subsidence.

GROUND FAILURE

Related goals, policies, and implementing programs are included on page OS-13 and of the Open Space Element of the City's General Plan

Goals

General goals which apply to all issue sections are identified on page 37 of this document.

Policies

1) Continue to require that adequate soils, geologic, and structural evaluation reports are prepared when deemed appropriate by the Building Official. All reports submitted to the City for review shall be prepared by registered soils engineers, engineering geologists, and/or structural engineers.

2) Geologic reports, building plans, and environmental impact reports prepared for major construction projects (i.e., all critical facilities or uses with large human occupancies in recognized or suspected hazard areas) should be reviewed by registered engineering geologists and structural engineers.

3) Continue ensuring that other appropriate State regulations regarding the

identification and mitigation of seismic hazards are implemented.

4) Promote and encourage additional seismic investigations within the City by Federal, State, and local agencies and organizations.

Implementing Programs

1) The City shall require, prior to approval of a project located in a seismic hazard zone, (as depicted on Exhibit GEO-3 in the City of Ojai MEA), a geotechnical report defining and delineating any seismic hazard. Such investigations shall include a site-specific characterization of anticipated ground motion, which would include estimates of peak horizontal ground acceleration and duration of shaking. If the City finds that no undue hazard of this kind exists, based on information resulting from studies conducted on sites in the immediate vicinity of the project and of similar solid composition to the project site, the geotechnical report may be waived. After the report has been approved or a waiver granted, subsequent geotechnical reports shall not be required, provided that new geological datum, or data, warranting further investigation is not recorded. The City shall submit one copy of each approved geotechnical report, including the mitigation measures, if any, that are to be taken, to the State Geologist within 30 days of its approval of the report.

2) The City's Grading Ordinance shall be modified to include specific regulations for identified areas with seismic hazards.

LIQUEFACTION

Related goals, policies, and implementing programs are included on page OS-13 of the Open Space Element of the City's General Plan.

Goals

General goals which apply to all issue sections are identified on page 37 of this document.

Policy

1) Require that measures identified in any soils, geologic, and/or any structural reports to adequately mitigate liquefaction and be imposed as conditions of project approval, to the extent feasible.

Implementing Program

1) Prior to the issuance of building or grading permits critical facilities or essential facilities located within areas prone to liquefaction (as depicted on Exhibit GEO-4 of the City of Ojai MEA), a soils engineering and geologic-seismic analysis shall be prepared in order to assess the liquefaction potential and mitigation. Such investigations shall include a site-specific characterization of anticipated ground motion, which would include estimates of peak horizontal ground acceleration and duration of shaking.

DAM FAILURE

Goals

General goals which apply to all issue sections are identified on page 37 of this document.

Policies

1) Current Dam Inundation maps shall be obtained from the County Sheriff's Department - Office of Emergency Services.

2) Dams shall be designed and located to ensure their safety from all maximum credible seismic events.

3) The City of Ojai shall provide development standards and restrictions to minimize potential risk within areas that would be subject to inundation as a result of dam failure.

Implementing Programs

1) The City Planning Department shall maintain current copies of the Ventura County Office of Emergency Services Dam Failure Response Plan Contingency section of the Multi-Hazard Emergency Response Plan.

2) The City Public Works Department shall develop and maintain a dam inundation warning plan for the Stewart Debris Basin area to alert affected governmental agencies, residents, and businesses located in the potential hazard areas. This dam inundation plan should be coordinated with local television and radio media. This plan shall be revised if future dams are proposed in the areas upstream of the City of Ojai.

3) The City should conduct a public education program to inform Ojai citizens of the City's dam inundation warning plan.

LANDSLIDES

Related goals, policies, and implementing programs are included on page OS-13 of the Open Space Element of the City's General Plan.

Goals

General goals which apply to all issue sections are identified on page 37 of this document.

Policies

1) The City Public Works Department will continue to enforce Chapter 70 (Excavation and Grading) of the Uniform Building Code to ensure that areas of landslide or hillside areas are adequately investigated and that any development incorporates appropriate design provisions to prevent landsliding.

2) Development in existing landslide/mudslide hazard areas shall not be permitted unless adequate geologic and soils engineering investigations are performed, and appropriate and sufficient safeguards are incorporated into the project design.

3) In landslide/mudslide hazard areas, there shall be no avoidable alteration of the land which is likely to increase the hazard, including concentration of water through drainage, irrigation or septic systems, removal of vegetative cover, and no steepening of slopes or undercutting of the bases of slopes.

4) Drainage plans which direct runoff and drainage away from unstable slopes shall be required for construction in hillside areas.

Implementing Programs

1) Geologic reports, building plans, and environmental impact reports prepared for major construction projects (i.e., all critical facilities or uses with large human occupancies in recognized or suspected hazard areas) shall be reviewed by registered engineering geologists and structural engineers.

2) The City Public Works Department shall continue to enforce the City's

Hillside Erosion Control Ordinance (Section 9-11.101 through 9-11.406 of the Ojai Municipal Code).

3) Whenever there is a substantial landslide or significant damage to a foundation or structure occurs as a result of a landslide, the City shall require a detailed study of the geologic materials, foundations, or structures involved to be prepared.

4) The City should conduct a public education program to inform Ojai citizens of the landslide hazards which exist in the area.

EXPANSIVE SOILS

Related goals, policies, and implementing programs are included on page OS-13 of the Open Space Element of the City's General Plan.

Goals

General goals which apply to all issue sections are identified on page 37 of this document.

Policy

1) No habitable structures or individual sewage disposal systems shall be placed on or in expansive soils (as depicted on Exhibit GEO-9 of the City of Ojai MEA) unless suitable mitigation measures are incorporated to prevent the adverse effect of these conditions.

Implementing Program

1) In all areas of highly expansive soils (as depicted on Exhibit GEO-9 of the City of Ojai MEA) a soil test shall be required for each specific building site, and construction must conform to established standards of the City of Ojai Building Code.

EROSION

Related goals, policies, and implementing programs are included on page OS-13 of the Open Space Element of the City's General Plan.

Goals

General goals which apply to all issue sections are identified on page 37 of this document.

Policies

1) Develop a program for onsite inspection of grading work for developments in severe to very severe erosion areas (as depicted in Exhibit GEO-10 of the City of Ojai MEA) to ensure that bedding plants are not undercut and that proper fill material is carefully placed and compacted.

2) Encourage planting of vegetation on unstable slopes to protect structures at lower elevations. Utilize native plants for landscaping in the hills to eliminate the need for supplemental watering which can promote earth movement/erosion.

3) Keep land uses which are subject to serious property damage from erosion out of erosion hazard areas identified as severe to very severe (as depicted in Exhibit GEO-10 of the City of Ojai MEA). Control the siting and design of uses in these erosion hazard areas to minimize the danger of property damage from erosion, such as requiring deep pilings for houses.

Implementing Program

1) For projects proposed in severe to very severe erosion areas (as depicted in Exhibit GEO-10 of the City of Ojai MEA), the City shall require a geologic report that includes analysis of soils foundation, grading, erosion, and sediment control.

FLOOD HAZARDS

Related goals, policies, and implementing programs are included on page CONS-8 of the Conservation Element and page OS-13 of the Open Space Element of the City's General Plan.

Goals

General goals which apply to all issue sections are identified on page 37 of this document.

Policies

1) Support measures for disclosure of the presence of flooding hazards during transactions of property located within areas of special flood hazard (as depicted in Exhibit S-1 of the City of Ojai MEA).

2) Support measures for the abatement of flooding hazards, including but not limited to: (1) removal or relocation of development from flood hazard areas; (2) construction of impoundments or channel diversions provided that adequate mitigation of environmental impacts can be demonstrated; and (3) debris clearance and silt removal programs conducted by Ventura County Flood Control District in a manner so as not to disrupt existing riparian communities to the extent feasible.

3) Consider higher density land uses to be appropriate within flood hazard areas in developed urban areas when adequate mitigation of the flood hazard can be demonstrated.

4) Discourage the location of new critical facilities in flood hazard areas.

5) Wherever possible, retain natural flood plains and guide development to areas outside of areas of special flood hazard.

6) Promote subdivision design to avoid areas of special flood hazard when possible, and identify these areas on the approved subdivision map.

7) Land use in the flood way should be limited to open space, agriculture, or passive to low intensity recreational uses, subject to the approval of the County Flood Control District.

8) Development shall be protected from a 100-year flood if built within identified flood plain areas.

Implementing Programs

1) The design of any structures which must be constructed in flood plain areas as depicted on the Flood Hazard Map (see Exhibit S-1 of the City of Ojai MEA) shall be governed by the County Flood Plain Management Ordinance and shall incorporate measures to reduce flood damage to the structure and to eliminate any increased potential flood hazard in the general area due to such construction.

2) The City Planning Department shall maintain current copies of the County Office of Emergency Services Multi-Hazard Emergency Response Plan's Flood Contingency section.

3) Federal Flood Insurance Rate Map and Flood way Map information shall be maintained by the Public Works Department.

4) The flood plain limits shall be reviewed annually, as required by Government Code Sec. 65302(a), by the Ventura County Flood Control District. All changes shall be conveyed to the City Planning Department which will process an amendment to the Flood Hazard Map (See Exhibit S-1 of the City of Ojai MEA).

5) When development is proposed in areas of special flood hazards (as depicted in Exhibit S-1 of the City of Ojai MEA), any structure shall be required to be safely elevated above the base flood elevation and not contribute to the flooding hazard to surrounding structures.

6) The City shall assure through a Master Drainage Plan and development ordinances that proposed new development adequately provides for development of onsite and downstream offsite mitigation of potential flood hazards and drainage problems and require development fees to fund the required improvements.

7) The City should monitor and participate in County Flood Control District No. 1 policy-setting and budgeting, and should advocate preventative maintenance programs and capital improvements aimed at reducing flood hazards.

8) The City should conduct a public education program to inform Ojai citizens of the flood hazards which exist in the area.

FIRE HAZARDS

Related goals, policies, and implementing programs are included on pages LU-1 and LU-2 of the Land Use and Circulation Element of the City's General Plan.

Goals

General goals which apply to all issue sections are identified on page 37 of this document.

Policies

1) All applications for new subdivisions, development plans, conditional use permits, environmental impact reports, and business license applications, shall be made available for review and comment by the County's Fire Prevention Division to ensure compliance with fire safety regulations.

2) The City shall suggest that the Fire Prevention Division review all applications for new development in hillside/canyon areas to assess potential impacts to existing fire protection services.

3) Consider higher density land uses for fire hazard areas in rural areas if development is clustered near major roads, has adequate access for fire protection vehicles, and can demonstrate adequate water supplies and fire flow.

4) In urban areas, consider higher density land uses to be appropriate if development can be served by the Fire Department, adequate access for fire protection vehicles is available, and sufficient water supply and fire flow can be guaranteed.

5) Support efforts to identify all roads, streets, and major public buildings in a manner so that they are clearly visible to fire protection and other emergency vehicles.

6) Provide adequate access to and fire breaks adjoining open space areas subject to fire hazard as part of new developments.

7) Regulations for clearance of vegetation around oil production facilities shall continue to be strictly enforced.

Implementing Programs

1) After April 1, 1991, all new construction within the State Responsibility Areas (SRAs) in the City's Sphere of Influence shall meet or exceed the standards set by the State Board of Forestry pertaining to:

   - Road standards for fire equipment access
   - Standards for signs, identifying streets, roads, and buildings

- o Minimize private water supply reserves for emergency fire use
- o Fuel breaks and greenbelts

2) All discretionary permits shall be required, as a condition of approval, to provide adequate water supply and access for fire protection and evacuation purposes.

3) All discretionary permits in Fire Hazard Areas shall be conditioned to include fire-resistant vegetation, cleared fire breaks, or a long-term comprehensive fuel management program as a condition of approval. Fire hazard reduction measures shall be incorporated into the design of any project in a Fire Hazard Area.

4) New residential subdivisions shall provide not less than two means of access for emergency vehicles and resident evacuation. A deviation from this policy is only allowed when the proposed road conforms with the County Road Standards and when the proposed road is approved by the County Fire Chief.

5) All applicants for subdivisions, multi-unit residential complexes, and commercial and industrial complexes shall be required to obtain, prior to permit approval, certification from the County Fire Protection District that adequate fire protection is available, or will be available prior to occupancy.

6) The County Fire Protection District shall be responsible for the prescribed burn program as mandated by the Vegetation Management Program (VMP) SB 1704, along with fuel breaks and other fire prevention measures.

7) The County Fire Protection District shall continue to work cooperatively with the U.S. Forest Service, California Department of Forestry, adjacent County fire departments, and local City fire departments, towards managing wildland fires.

8) The County Fire Protection District shall continue to revise, maintain, and make available to the Planning Division their historical burn area maps in conjunction with the State Division of Forestry.

9) The City Planning Department shall maintain current copies of the Ventura County Office of Emergency Services Multi-Hazard Emergency Response

notification, evacuation and sheltering due to fire.

10) The City shall ask the Ventura County Fire Protection District to consider adoption of an automatic sprinkler ordinance for structures used for human occupancy in hillside and canyon areas.

11) Require that the length of cul-du-sacs be limited to a maximum of 800 feet.

12) New subdivisions in hillside or canyon areas of the City shall be designed to facilitate brush clearance around structures.

13) The City shall require water purveyors within the City to establish a priority list for upgrading fire flow capabilities in neighborhoods that currently have inadequate fire flows.

HAZARDOUS MATERIALS AND WASTE

The City has adopted the Ventura County Hazardous Waste Plan. The goals, policies, and programs from the following Chapter of the County of Ventura General Plan is incorporated by reference into this report. The Chapter incorporated by reference is:

> County of Ventura, 1988. Ventura County General Plan Goals, Policies, and Programs, Hazards Chapter - 2.15 Hazardous Material and Waste.

In addition to the goals, policies, and programs contained within the Ventura County Hazardous Waste Plan, the following policy shall also apply.

Policies

1) The City shall coordinate with Ventura County to periodically establish days to collect household hazardous waste within the City of Ojai.

DISASTERS

Related goals, policies, and implementing programs are included on pages LU-1 and LU-2 of the Circulation Element of the City's General Plan.

Goals

General goals which apply to all issue sections are identified on page 37 of this

document.

Policies

1) The City shall identify evacuation routes out of the City to be used by residents and emergency response personnel. Please refer to Exhibit S-2 of the City of Ojai MEA for a description of evacuation routes out of the City.

2) In the event that State Highways 33 or 150 become impassable for a period of over 30 minutes, the California State Highway Patrol (CHP) shall be notified, and will in turn shall notify Caltrans of the situation.

3) The City shall ensure that adequate water supplies are available to Ojai residents following a major disaster.

4) The City shall require streets serving new development to be wide enough to accommodate emergency response vehicles. The required widths shall be consistent with the standards located in Chapter 3 Subdivision Regulations, Title 10 Planning and Zoning.

5) The City shall maintain an effective fire break of 100 feet around all habitable structures.

Implementing Programs

1) Residential subdivisions shall have sufficient access for emergency vehicles and for the evacuation of residents. Two or more routes of access should be provided, preferably on different sides of the development. These access points shall be reviewed and approved by the City Police and County Fire Protection District prior to the development's approval.

2) The City shall prepare for alternative sources of water in the event that existing supplies are cut off. Alternative sources may include the trucking in of water to affected areas.

3) The City shall encourage the citizens of Ojai to include bottled water as part of their earthquake preparedness kits.

4) The City has developed, and will be distributing, an earthquake emergency brochure as part of its public education program.

5) The City shall request the Ventura County Office of Emergency Services to conduct regular simulated disaster training sessions for the Ojai Valley.

6) The City's Disaster Plan shall be periodically updated to incorporate the use of the most advanced technology available to assist the population in disaster preparedness and relief efforts. The updates shall include coordination with the gas, telephone, and electric utilities and other appropriate agencies to provide for the use of portable telephones and other communication equipment during emergency situations.

7) The City shall coordinate with local school districts to allow for the use of school facilities in the event of an emergency.

8) The City shall encourage homeowners in high risk fire zones to obtain swimming pool water pumps, and if possible, to provide for additional sources of water.

9) All future roadways shall be constructed consistent with City standards and shall allow for two-way traffic with room for parking on at least one side.

10) The City Public Works Department shall continue cooperative efforts with the County Fire Protection District's to enforce the weed abatement program.

11) The City shall update its Disaster Plan to address issues raised in this Element. The City shall invite participation from the County of Ventura to address the Ojai Valley in a coordinated fashion.

INFORMATION SOURCES

DOCUMENTS

Federal Emergency Management Agency	Flood Insurance Rate Map City of Ojai Community Panel Number 060416 0005C, April 19, 1983
California State Division of Mines and Geology	Elementary Seismology
State of California Office of Planning and Research	1990 General Plan Guidelines
Ventura County	General Plan: Seismic Safety Element
	Multi-Hazard Functional Plan
City of Ojai	Master Environmental Assessment

PERSONS AND ORGANIZATIONS CONTACTED

City of Ojai

Planning Department	William Prince Marilyn Grauel
City Manager	Andrew Belknap
City Attorney	Monte Widders
City Engineer	Glenn Hawks

Public Works	W.S. Moore
Ventura County	
Fire Department	Chief Jim Smith Fire Marshal County Fire Protection
District	Bill Wright Vegetation Management County Fire Prevention
Division	Rick de Mora County Fire Prevention
Division	Captain Tom Weir County Station #21, Ojai
	Sandy Wells Public Information
Drafting Department	Kay Clarke
Office of Emergency Services	Karen Guidi
State of California	
Board of Forestry	Fran Henson
California Highway Patrol	Lieutenant Claude LaMont
Department of Conservation, Mines and Geology Division	Roger Martin
Department of Forestry and Fire Protection	Jim Bliss

Department of Transportation (Caltrans)	Bruce Dyar
Department of Water Resources	Marsha Lines
Office of Emergency Services	Nancy Hartacher