



SAFETY ELEMENT

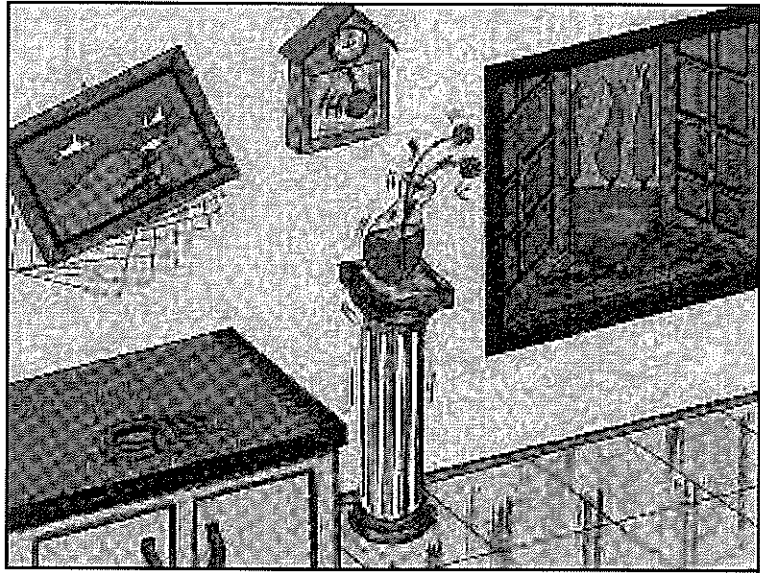
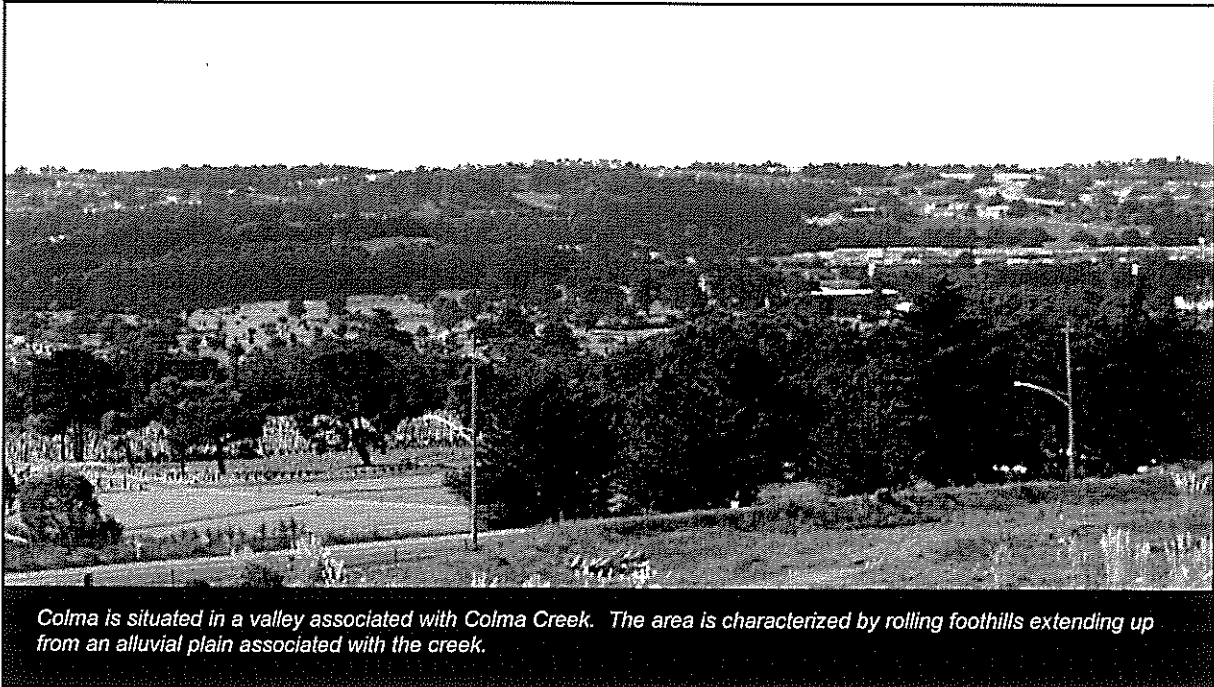


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Safety Element Table of Contents graphic from the *Campagna Multimediale di Informazione* of the *Osservatorio Geofisico Sperimentale*, Italy.



Colma is situated in a valley associated with Colma Creek. The area is characterized by rolling foothills extending up from an alluvial plain associated with the creek.

SAFETY ELEMENT

5.07.000 INTRODUCTION

5.07.010 PURPOSE

The Safety Element is intended to reduce the risks of harm to the public resulting from geologic and other hazards. Seismic, geologic and man-made hazards are identified and described, and policies and programs are presented to prepare for, prevent and respond to these potential hazards. The Safety Element also relates local safety planning efforts to Town land use decisions and provides detailed information for decision makers to use.

5.07.020 STATE LAW REQUIREMENTS

State Law, Government Code Section 65302(g) requires cities and counties to identify hazardous conditions and to prepare and implement policies that minimize risks to public health, safety and property. The specific hazards discussed in the Colma Safety Element are:

- a) seismically-induced surface rupture,
- b) ground shaking,
- c) ground failure,

- d) liquefaction,
- e) slope instability and subsidence;
- f) flooding;
- g) wildland and urban fires.

Colma is not subject to risk from a tsunami, seiche, or dam failure.

5.07.030 RELATIONSHIP TO OTHER GENERAL PLAN ELEMENTS

The Safety Element is related to all of the other General Plan Elements. The planning and policy decision making process for land uses, housing, circulation and open space must incorporate the policies of the Safety Element to reduce the risks of geologic and man-made hazards to the public. Safety issues are considered in the designation of land uses, and in the siting and design of buildings and streets.

5.07.100 GEOLOGIC HAZARDS

5.07.110 GEOLOGIC SETTING

5.07.111 Context

The San Francisco Bay Area is generally comprised of northwesterly trending mountain ranges and valleys, which reflect the alignment

of the coast ranges and the prevailing orientation of major faults, folds and associated geologic units. The Town of Colma is situated along Colma Creek in the stream valley that runs southeasterly from Lake Merced and is flanked by the San Bruno Mountains to the northeast and the Santa Cruz Mountains to the southwest. For general reference purposes the creek is considered to run from north to south, and San Bruno Mountain is considered to be east.

The Colma area is dominated, seismically, by the San Andreas Fault system. The main San Andreas fault and associated rift valley lies in the Santa Cruz Mountains, just over one mile west of Colma.

The Colma area is characterized by rolling foothills that extend east and west from the alluvial fan deposit associated with Colma Creek. The bedrock types underlying the Town include the Colma Formation, the Merced Formation, and the Franciscan Formation. The Colma Formation consists of poorly consolidated friable, well sorted, fine to medium grained sand, gravel, silt and clay deposits that form most foothills from Daly City southward through Colma Valley to Burlingame. The Colma Formation overlies the Merced Formation and consists of unconsolidated and moderately consolidated sandy silt and fine sand found throughout the Santa Cruz Mountains. The Franciscan Formation occurs in the San Bruno Mountain foothills. This association is composed of sedimentary volcanic and metamorphic rocks of shale and siltstone containing blocks of sandstone, greenstone and chert. The bedrock and surface geologic characteristics are shown in the Geology Map (Exhibit S-1).

5.07.120 GEOLOGIC HAZARDS

Geologic hazards include subsidence, settlement, and slope instability. The potential for these geologic hazards to occur in Colma is discussed below.

5.07.121 Subsidence and Settlement

Subsidence of the land surface is caused by the extraction of large volumes of fluid (water or petroleum products) from deep in the ground,

or collapse of underground mines. Settlement is a shallow phenomenon that results from the consolidation of near-surface soft soils (e.g. Bay mud) due to loading by fills or heavy structures. Widespread ground subsidence due to groundwater or petroleum withdrawal is not a significant potential hazard in Colma. Any hazards associated with settlement can be mitigated by proper foundation engineering.







5.07.122 Slope Instability

Slope instability is associated with landslides and mudslides, which are movements of soil, rocks or debris as a result of falling, sliding or flowing. Slides may occur through natural causes such as heavy rainfall or poorly consolidated bedrock, or through improper land use methods such as overwatering, undercutting slopes or overloading the tops of slopes.

The USGS Preliminary Map of Landslide Deposits in San Mateo County, California, by Earl E. Brady (1972), shows a small landslide deposit on the slope behind the auto dealerships, north of Serramonte Boulevard. Other areas of landslide susceptibility are shown on the Hazards Map (Exhibit S-3). Landslides are not abundant in Colma and the Town has a slope stability rating of "Fair". Areas in Colma with a potential for slope instability are the hillsides with slopes averaging 6 to 23 percent. These areas may experience ground failure due to the unconsolidated geologic units of the soil; however, the failures won't be widespread and catastrophic. In addition, areas where artificial cuts have been made in the alluvium have a minor landslide potential. This could affect the westerly edge of the Sterling Park area, which is on a bluff above El Camino Real, as well as golf course lands at the base of San Bruno Mountain. The recent alluvial materials closest to the Colma Creek drainage have a minor potential for lateral spreading in the event of seismic shaking. To reduce these risks, the Town's Municipal Code (Sections 5.223 and 5.710) calls for geologic and soil reports, as required by the City Engineer, to ensure that structures are appropriately designed and engineered.

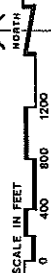
TOWN OF COLMA GENERAL PLAN

GEOLOGY

-  MEDIUM TO COARSE GRAINED YOUNGER ALLUVIAL FAN DEPOSITS
-  COLMA FORMATION
-  MERCED FORMATION
-  SHEARED ROCKS OF FRANCISCAN ASSEMBLAGE
-  UNDIVIDED FRANCISCAN SANDSTONE
-  SANDSTONE

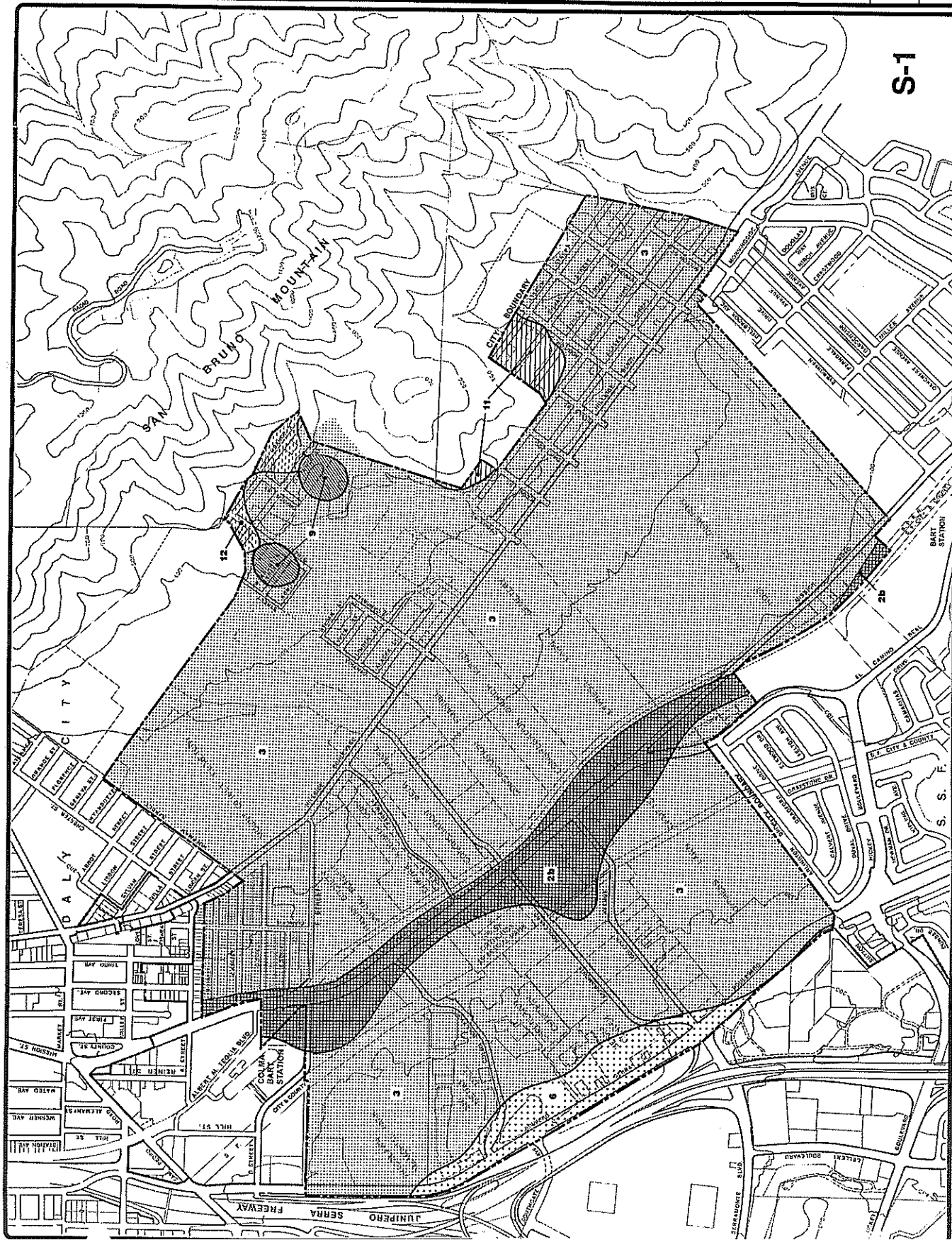
NOTE: Geologic material numbers correspond with the numbers on the County's map (referenced below).

SOURCE: Geotechnical Hazards Synthesis Map, County of San Diego, 1972.



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5.07.5

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

5.07.200 SEISMIC HAZARDS

5.07.210 SEISMIC HISTORY

There are no known active or potentially active faults within the Town of Colma. Two inactive faults, the San Bruno Fault and the Hillside Fault trace, have been located within Colma (refer to Exhibit S-3). The San Bruno Fault is a concealed/inferred fault that runs northwest to southeast through the center of Colma. However, the existence of this fault has since been disputed. Investigations by Bonilla (1959) indicated an unconformity within the Merced Formation and folding negating the evidence of the fault.

The Hillside Fault trace is located to the northeast of Colma along the southern base of the San Bruno Mountains. This fault, mapped by Bonilla (1971), separates the fairly coherent sandstone blocks of the San Bruno Mountain to the northeast from the extensively deformed sandstone and shale of the Franciscan assemblage to the southwest. It has not had any apparent movement in over two million years. Seismic information is insufficient to determine the present activity of either the San Bruno or Hillside faults. Both of these faults are close to the San Andreas Fault and, therefore, historic activity cannot be differentiated. **The San Andreas Fault, which**

is about one mile west of the western boundary of Colma, has had historic surface faulting (including tectonic creep), and continues to be the locus of historic damaging earthquakes.

The entire San Francisco Bay Area is subject to occasional very strong earthquakes that originate on the San Andreas Fault, which runs along the Pacific coast, the San Gregorio Fault, which is an offshore branch of the San Andreas Fault, and from the Hayward and Calaveras Faults in the East Bay. Historic records show that severe shocks have affected the area in 1836, 1838, 1865, 1906 and 1989. There is a strong possibility that the Town of Colma will experience the effects of an earthquake as large or larger than the 1989 earthquake within the lifetime of most of the present residents. Most geologists and seismologists agree that a large earthquake is likely to occur on the Hayward Fault or the San Francisco Peninsula segment of the San Andreas Fault.

5.07.220 SEISMIC HAZARDS

Seismically induced hazards with potential to affect Colma include ground shaking, ground failure, liquefaction and surface rupture. The likelihood, severity and location of any of these seismically induced hazards occurring in Colma

**TABLE S-1
COLMA EARTHQUAKE SHAKING INTENSITIES AND PROBABILITIES**

FAULT	FAULT LENGTH AND LOCATION	MAGNITUDE OF CHARACTERISTIC EARTHQUAKE ¹	SHAKING SEVERITY IN COLMA	PROBABILITY OF EARTHQUAKE IN THE NEXT 30 YEARS
San Andreas, Peninsula segment	32 miles, from the Santa Cruz Mountains to just south of the Golden Gate	7.1	VII "Strong Shaking"	23% ²
San Andreas, Peninsula/Golden Gate segment	55 miles, from the Santa Cruz Mountains to beyond the Golden Gate	7.3	IX "Violent Shaking"	8% ³
San Gregorio Fault	36 miles along the San Mateo coast	7.1	VII "Strong Shaking"	data not available

¹ Calculated by formula, based on surface fault length and moment magnitude.

² Estimate based on data and data of past earthquakes.

³ Estimate based on a random distribution of earthquakes model.

Sources: *On Shaky Ground Supplement*, Association of Bay Area Governments (ABAG) 1998
Association of Bay Area Governments earthquake web site (1998): <http://www.abag.ca.gov>

depends upon a specific site's geology, topography, soil type, weather and intensity of development. The Geologic, Seismic-Shaking, and Hazards Maps (Exhibits S-1, S-2 and S-3) provide a basis for evaluating potential hazards in Colma and for requiring a geotechnical study or special engineering, architectural, or site design consideration. The seismic hazards are described below.

5.07.221 Ground Shaking

The primary effect of an earthquake which may be experienced in Colma is ground shaking that could last for up to one minute. The intensity of shaking is measured by the logarithmic Richter scale or rated using the modified Mercalli index. The shaking may cause sliding and tipping over of furniture, falling of objects from shelves, and collapse or partial collapse of weak masonry structures such as water tanks and chimneys. Table S-1 shows the amount of shaking that would occur in Colma from an earthquake, depending on the fault, and the probability of an earthquake occurring on a particular fault in the next 30 years. (When reviewing Table S-1, note that the 1989 Loma Prieta earthquake had a Richter Magnitude of 7.1).

Most of the homes in Colma are single family dwellings that are of standard wood frame construction. Wood frame houses typically have a good record of performance in strong earthquakes, although older homes may experience chimney failure or become separated from their foundations. Generally, unreinforced masonry structures are least able to withstand the lateral force of an earthquake (refer to Section 5.07.222, Dangerous Buildings). The areas most affected by ground shaking are flats, alluvial and filled areas where liquefaction may occur.

5.07.222 Dangerous Buildings

A dangerous building is one that might pose potentially serious risk of loss of life and injury, or of severe curtailment of community services in case of a damaging earthquake. Structures built prior to seismic safety building requirements typically pose the most serious threat to life and safety.

Buildings which can be considered dangerous have exterior parapets and ornamentation



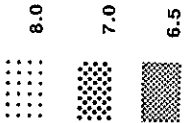
In earthquakes, unreinforced masonry buildings (top) are particularly vulnerable. Wood-frame buildings generally perform well, although an earthquake's lateral force may cause structures to separate from their foundations (the house in the bottom photo was originally positioned next to the stairway).

subject to shaking loose in an earthquake, unanchored exterior walls or sheathing on roof or floors incapable of withstanding lateral loads. Structures exhibiting these characteristics have not been individually identified; however, owners of unreinforced masonry buildings constructed prior to 1933 should have the structures examined by a licensed engineer or architect and should undertake improvement of structures to ensure seismic safety. The Town's Municipal Code (Section 5.407) calls for the abatement of dangerous buildings as specified by the National Construction Codes. These buildings are a public nuisance which require either repair, rehabilitation, or demolition. When a property owner requests any kind of permit from the Town, his or her building will be evaluated for its safety. If the Town Building Official suspects the building to be unsafe, the Town will require the owner to have the building

TOWN OF COLMA GENERAL PLAN

PREDICTED SEISMIC-SHAKING INTENSITIES

MODIFIED MERCALLI INTENSITIES*

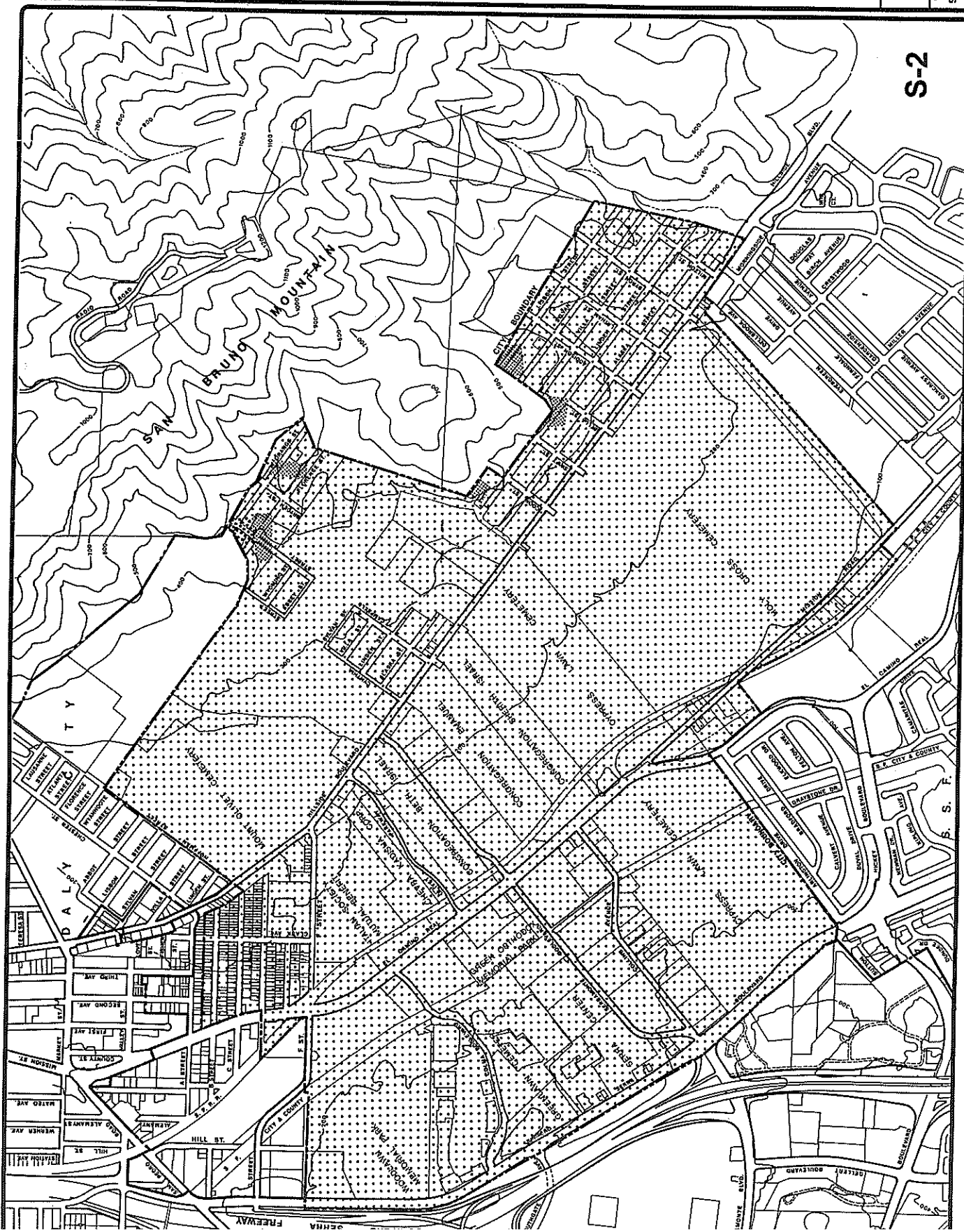


*Refer to Appendix 5.07.500
(Safety Element Appendix A) for
a description of the Modified
Mercalli Intensities

NOTE: The location and shape
of the areas shown are approximate
only. Further geologic testing
should be conducted for proposed
development, as required by the
City Engineer.



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SOURCE: U.S.G.S. Map 1-1257-H
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inspected by a licensed engineer or architect and take the necessary actions to make the building safe.

5.07.223 Ground Failure

A secondary effect of an earthquake is ground failure, which may occur anytime after an earthquake or aftershock. Seismic ground failures are caused by the soil losing its structural integrity through liquefaction, surface ruptures, lurching and settling. Historic data indicates that ground failures could occur along Colma Creek, the westerly edge of Sterling Park, the slopes behind the auto dealers north of Serramonte Boulevard, and along the steeper slopes abutting San Bruno Mountain.

5.07.224 Liquefaction

Liquefaction is a common phenomena during major earthquakes. Liquefaction is the temporary transformation of saturated cohesionless soils (such as sand, silt or gravel) to a liquefied state as a result of seismic ground shaking. Liquefaction typically occurs where the groundwater level is high and increased pressure from the seismic ground shaking restricts the ability of the water to drain away. The trapped water saturates the soil and the soil loses its ability to support the downward load of a structure, causing buildings and foundations to sink and ground shaking to intensify. The relative liquefaction susceptibility and probability of susceptible sediment in subsurface materials is low in most of Colma due to well-drained soils and relatively deep aquifers in the area which decrease the chances of liquefaction.

5.07.225 Surface Rupture

It is unlikely that surface ruptures will occur in Colma because the mapped faults within or in very close proximity to Colma are not known to be active. Surface rupture is typically limited to a narrow zone along an active fault. This might be expected to occur along the main trace and major active branches of the San Andreas Fault during a seismic event. Geologic reports required for specific projects may identify minor fault traces. If so, specific recommendations of the geotechnical engineer should be followed.

5.07.226 Lurching and Settlement

Lurching is the movement of ground materials toward a free face such as a cliff or stream bank. The earthquake forces cause earth to move in

the unsupported direction and results in cracks in the ground generally paralleling the exposed bank or stream. Lurching is not related to liquefaction; however it may cause similar structural damage. Roads, structures and patios should be positioned a safe distance away from the top and bottom of banks and cut slopes to minimize damage caused by lurching.

Differential settlement or compaction occurs when earthquake forces cause ground materials to become more dense. This can occur in both dry and saturated granular soils. In saturated soils this occurs when the water drains away, allowing densification. Differential settlement can occur if there are local variations in the types of soil. Structural damage can be caused when different parts of a structure suddenly are non-uniformly supported by the ground below. Buildings should be properly designed and engineered to minimize the impact of ground settlement.

5.07.227 Seismically-Induced Flooding

Seismically-induced flooding may result if water tanks fail or if the San Francisco Water Department's pipeline is broken during an earthquake. The failure of water tanks located in the foothills of San Bruno Mountain may cause flood damage to cemeteries along Hillside Boulevard and some residences within the City of South San Francisco and Daly City. The failure of San Francisco's water pipeline will not result in a catastrophic flood. If the pipeline was completely sheared off during an earthquake the immediate area might be washed out before the Water Department's maintenance crew could shut off the valves to stop the flow of water. The water line through Colma is at a higher elevation than Colma Creek; a break in the pipe would likely result in the water flowing into Colma Creek, thereby limiting the extent of localized flooding. In an effort to reduce the likelihood of the water tanks or San Francisco's water pipeline from flooding areas of the Town, the Town should request that responsible agencies, or entities inspect these facilities to ensure that the supports for water tanks and water pipelines are in good condition to withstand an earthquake.

5.07.300 COMMUNITY SAFETY

5.07.310 FLOOD HAZARDS

Most floods in the Bay Area are generally classified as flash floods. Flash flood conditions typically occur when a moderate rainfall is followed by a heavy rainstorm. The moderate rainfall saturates the soil, allowing minimal additional infiltration. Increased urbanization in the Bay Area has increased the amount of impervious areas and reduced the potential for groundwater infiltration, thereby resulting in increased levels of water runoff and flooding potential.

The Town of Colma is bisected by Colma Creek, which is part of a watershed drainage basin defined by San Bruno Mountain on the east and the ridge traced by Skyline Boulevard on the west. Colma Creek flows through the center of Colma and continues through South San Francisco to the Bay. Colma Creek is part of the San Mateo County Flood Control District. The Colma Creek Flood Control Zone covers approximately 16.3 square miles including the Town of Colma as well as portions of the cities of Pacifica, Daly City, San Bruno and South San Francisco.

Historically, flooding frequently occurred on El Camino Real at F Street, on El Camino Real at Mission Road, and in other localized segments of Colma Creek. Current and past improvements to the Colma Creek drainage channel have reduced the creek flooding. Accordingly, Colma has been determined by the Federal Emergency Management Agency (FEMA) to be only minimally flood-prone and therefore not included on FEMA's official Flood Zone Maps. A General Plan policy requires that on-site detention be provided to reduce peak flows. As part of a 1991 street reconstruction program, the Town installed a larger box culvert under Serramonte Boulevard to increase the capacity of the storm drainage system. Currently the Town is working with CalTrans, BART and the County Flood Control District to resolve the flooding problems along Colma Creek. CalTrans is helping to fund the installation of a bypass culvert at El Camino Real and F Street to relieve an undersized segment of open creek. A box culvert will be installed in

the El Camino Real right-of-way down Mission Road. The Flood Control District, with some help from BART and local cities, will fund the extension of the El Camino Real box culvert down Mission Road, the installation of a bypass culvert at the wye, the installation of a second box culvert in Mission Road, and improvements to the creek alignment and capacity south of Colma.

5.07.320 FIRE HAZARDS

Fire hazards pose a threat to life and property. Urban fire hazards include buildings, automobiles, rubbish and unkept vacant lots. Wildland fire hazards include uncultivated land, timber, range, brush and grass lands in undeveloped areas. The Town of Colma has a Fire Protection Program through the Colma Fire Protection District (CFPD) to minimize the risks of urban and wildland fires.

5.07.321 Urban Fire Hazards

Fires in urban areas pose the greatest threat to life and property due to the proximity of people and structures. The types of structures posing the most significant fire hazards within the City are structures built prior to 1940 which have substandard wiring and heating systems. Other sites of fire concern are unmaintained public utility easements, sites with large amounts of fuel and combustibles storage, and unmaintained or poorly maintained buildings.

5.07.322 Wildland Fire Hazards

The California Department of Forestry (CDF) determines the degree of wildland fire hazard based on the natural setting of the area, the degree of human use of the area, and the level and ability of public services to respond to fires that do occur. The CDF has rated the San Bruno Mountain Park and the adjacent undeveloped areas of Colma as areas of moderate fire hazard. Fires in these areas usually occur during the summers, primarily where grass and brush grow. The CDF responds to wildland fires from a number of stations, depending on proximity and availability. The closest station to Colma is at 20 Tower Road in Belmont. Undeveloped areas within Colma are not "wildland areas" as defined by the California Department of Forestry, but CDF

TOWN OF COLMA GENERAL PLAN

HAZARDS MAP

APPROXIMATE LOCATION
OF AN INACTIVE FAULT
(Concealed)



SMALL LANDSLIDE

LANDSLIDE SUSCEPTIBILITY

VERY LOW (I)

LOW (II)

LIQUIFICATION SUSCEPTIBILITY

LOW

MODERATE TO LOW

SAN FRANCISCO WATER
PIPELINE (Underground)

WATER TANK AND
DIRECTION OF SPILLED
WATER FLOW

AREAS SUBJECT TO
FLOODING

SOURCES:

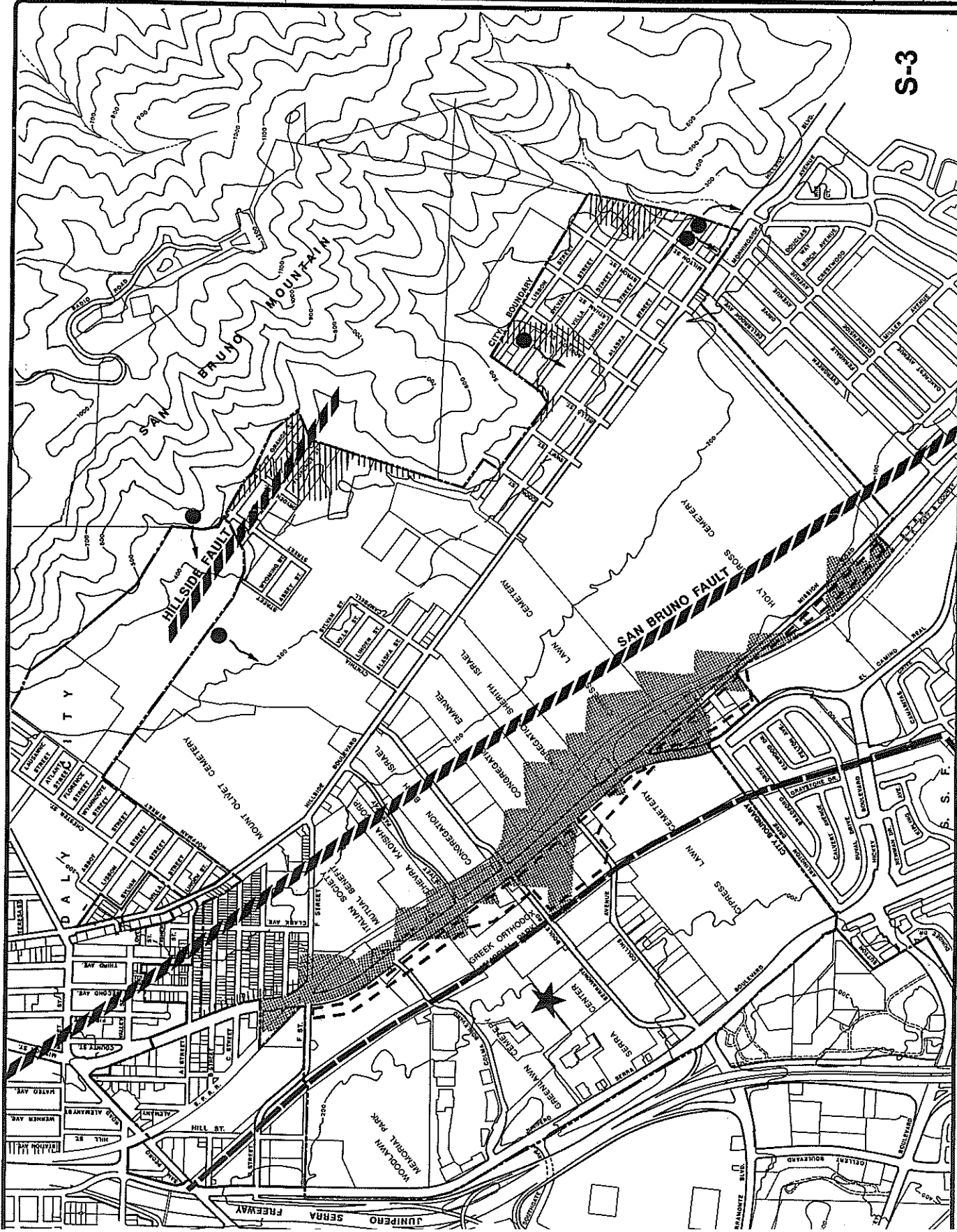
- 1) Map Showing Liquefaction Susceptibility, USGS, 1987
- 2) Landslide Susceptibility, USGS, 1972
- 3) Geotechnical Hazard Synthesis Map, County of San Mateo, 1977
- 4) Town's Constraint Map

SCALE IN FEET
0 400 800 1200

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criteria may be used to identify and evaluate fire hazards in these areas which are CFPD's responsibility.

5.07.323 Fire Control Services

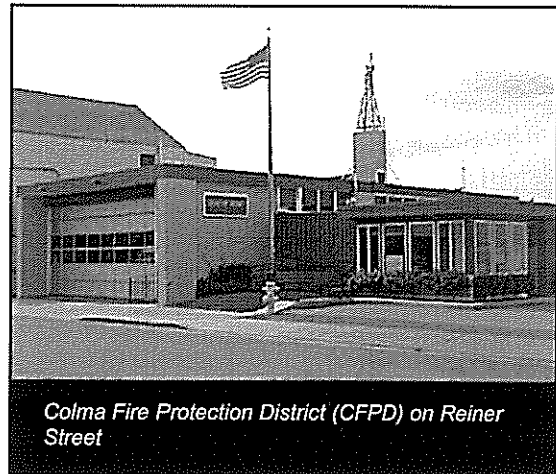
The Colma Fire Protection District (CFPD) provides fire protection to the Town of Colma and the surrounding unincorporated areas. The Colma fire station is located just north of town at 50 Reiner Street near San Pedro Road. The station is staffed by 29 paid call fire fighters and three salaried part-time personnel (Chief, Battalion Chief, and Staff Captain) (1998).

Equipment available to the Fire District includes four engines (three with 1,500 gallon per minute (gpm) pumping capacity and one 1,000 gpm reserve engine), one 75 foot aerial ladder truck and one squad truck (1998). If the unincorporated area where the Colma Fire Station is located is annexed to the City of Daly City, the existing fire protection facilities could continue to operate from its existing location. The station is strategically located relative to Colma's most urbanized areas, and it is convenient to the Sterling Park residential area.

The Colma Fire Protection District will continue to serve the Town of Colma as long as the Town so desires. The District can only be dissolved if its service is limited to the Town of Colma and if the Town elects to operate its own Fire Department. Should the Fire Protection District be dissolved in the future, the Town of Colma should consider either acquiring the District's existing facility and equipment, or acquiring a site for a new public safety facility.

The Colma Fire Protection District currently has an average response time of 3.5 to 4.0 minutes to sites in the Town of Colma. The time it takes to respond to an emergency is important because of the critical care period (seven to eight minutes) needed for physical health emergencies, and the potential for fire to spread and increase in intensity. Mutual aid agreements with other cities and departments ensures that additional fire protection support is available if needed.

Colma's fire protection services are evaluated by the Insurance Service Office (ISO), whose ratings establish the fire insurance rates paid by local residents and businesses. ISO rating



is partially based on such factors as available water supply, manpower and equipment. The Colma Fire Protection District is rated IV on a scale of I-X (1998), where a rating of I is best.

The Town's Fire Protection Program includes plan check and inspection of new structures and remodels in the City. Plan check by the Fire District assures adequate fireflow levels, general access, turnarounds, and other relevant fire protection measures, as well as ensuring that building sites can be readily identified by street names and address numbers. Additional requirements may be the installation of automatic sprinkler systems in all structures that are either 3,000 square feet or more in floor area, more than two stories in height, or 30 feet or more in height. Other requirements may also be imposed as conditions of approval for a project by the Fire Chief. The Fire Protection services offered by the District also include public education programs and building inspection programs. Speakers from the District are generally available to schools and the public for information on fire prevention and protection.

5.07.324 Mutual Aid

Colma has mutual aid agreements with Daly City, San Bruno, Pacifica, South San Francisco and Brisbane. The Fire Protection District's Mutual Aid agreements provide for rapid response to structural fires in the District when requested. When additional help is needed by the Colma Fire Protection District or Police Department, the San Mateo County, Central and South strike teams or County offices, respectively, may be called in. Mutual aid agreements for both the Fire Protection District

and the Colma Police Department provide service anywhere in neighboring jurisdictions when assistance is specifically requested.

5.07.325 Peak Load Water Supply

The required peak load water supply is the amount of water necessary to suppress fire in a structure during peak water use periods. Fire flow requirements are expressed in gallons per minute (gpm), and are determined by type of construction, and size (square footage). The Colma Fire Protection District and Uniform Fire Code requires that all structures have fire flows of no less than 1500 gpm. More may be required in a non-sprinklered building. In order to reduce fire hazard, mitigation may be required in building construction. Mitigation often includes the installation of fire rated walls and automatic sprinkler systems.

5.07.330 HAZARDOUS MATERIALS

"Hazardous materials" include toxic metals, chemicals, and gasses; flammable and/or explosive liquids and solids; corrosive materials; infectious substances; and radioactive materials. The accidental release of a hazardous material to the environment could cause a range of problems, depending on the type, location, and quantity of the material released. There are numerous State and Regional agencies that oversee and monitor the use and disposal of hazardous materials. The efforts of these agencies, in conjunction with periodic inspections by Colma safety personnel, serve to reduce the risk associated with hazardous material.

The Tanner Bill¹ acknowledges that hazardous waste management is a responsibility which must be shared by all communities. Consequently, San Mateo County prepared the San Mateo County Hazardous Waste Management Plan, which Colma adopted. The goals of the Plan are to ensure that hazardous waste is managed to protect public health and safety and preserve the County's economic viability; to reduce the amount of hazardous

¹ Government Code Section 6596.1 and 66780.8 and Health and Safety Code Sections 25117.7, 25117.2, 25117.5, 25200.1, 25200.2 and Article 3.5 and 8.7 in Chapter 6.5 of Division 20.

waste generated in San Mateo County; to promote public confidence in government and industry's ability to safely manage hazardous waste; and to encourage cooperation between government, industry and the public when planning for hazardous waste management.

Pretreatment and disposal through the sewage system is the predominant form of authorized hazardous waste disposal. However, illegal disposal of hazardous waste is a concern which must be addressed. Small generators, including small businesses and households, are the parties primarily responsible for illegal disposal of hazardous waste into sewer systems, at landfill sites, and directly into streams, or dumping along roadways. Federal and State laws have put into place a program to regulate stormwater discharge from certain industrial activities. State and Regional Water Resource Boards are administering the Federal program National Pollutant Discharge Elimination Systems (NPDES). The State's permit is called the General Industrial Activities Stormwater Permit. The program requires specific industrial activities to obtain a NPDES General Permit. Each permit holder must, among other things, develop and implement a Stormwater Pollution Protection Plan (SWPPP) and a Monitoring and Reporting Program Plan. This program will reduce the amount of pollutants entering the storm drainage system and curtail illegal disposal of hazardous waste into the system

5.07.331 Hazardous Material Sites

Colma's hazardous materials storage sites are regulated through the San Mateo County Department of Environmental Health. The County issues permits for underground tanks, hazardous waste generators, and hazardous materials users regulated by the Health and Safety Code (Chapter 6.5 Section 25500 to Division 20). The County regularly inspects the underground tanks in Colma, which are predominantly gasoline storage tanks for service stations and vehicle yards.

Commercial and industrial facilities where hazardous waste is generated and stored for less than 90 days are also inspected and monitored by the County Environmental Health Department.

Although the County's permitting procedures are adequate, the Town should be more involved with the management of facilities storing, generating or handling hazardous materials. An inventory of hazardous materials sites within the Town should be compiled and the Town should follow up to see that County permits for the storage and handling of such materials are obtained. Hazardous materials incidents can be handled adequately by the Town's police department and the Colma Fire Protection District. If necessary, additional support or equipment for a hazardous incident is also available through the joint effort of other local and state agencies. Hazardous materials programs adopted by the Town should include continuance of existing programs such as training of police personnel in hazardous materials management and ensuring that businesses are permitted through the County.

State and Regional agencies monitor hazardous material storage sites and generators. The 1998 State list of Hazardous Waste and Substances sites and the County's Fuel Leak list include several sites in Colma. All of the known tank sites have been remedied. Sites with minor amounts of ground contamination have been identified and appropriate mitigation is underway, with appropriate State and County agencies overseeing the remediation. The remediation process typically involves removal of leaking tanks, testing of soil for contamination, removal of any contaminated soil, and backfilling with clean soil. Groundwater monitoring wells are then installed. New installations must use double wall tanks as required by the Uniform Fire Code. In addition, the placement of tanks are inspected and approved by the Colma Fire Protection District.

Landfill sites have the potential to contaminate groundwater and air and to produce hazardous gases. The Bay Area Air Quality Management District (BAAQMD) and the Bay Area Regional Water Quality Control District (RWQCD) both oversee the management and closure of landfill sites to protect the public's health and safety. Landfill sites are designed to avoid water contamination by using clay and synthetic liners, laying refuse over clean soils, and by installing leachate systems and groundwater monitoring wells. Gas recovery systems are used to collect

and burn the landfill gases (especially methane gases) which otherwise can be odorous and present a fire and explosion hazard. Gas probes are placed on- and off-site to ensure that the gases are not migrating laterally. Both landfill sites in Colma (the active Hillside Landfill, near San Bruno Mountain Park, and the closed Junipero Serra Disposal Site, beneath the 280 Metro Mall and Home Depot) have groundwater and gas recovering systems which are routinely monitored by the landfill operator and by the property owners' civil engineers, to ensure that these systems are functioning correctly. The Colma Fire Protection District also routinely inspects the gas recovery systems. The landfill and gas monitoring systems are designed to resist earthquake forces.

However, if a catastrophic earthquake were to occur, the landfill liner and cap could rupture, causing fill material to move and possibly damage the gas recovery system. These failures would not pose an immediate hazard, but the landfill cap and gas recovery system would need to be repaired as soon as possible.

5.07.332 Handling and Transport

The California Department of Health Services monitors the transportation of hazardous waste through a manifest system which is used to trace all hazardous waste transported off-site to storage, treatment, or disposal facilities. Most hazardous waste generated in Colma is transported to recycling companies. Hazardous waste generated outside of Colma may be transported through the Town on Interstate 280 and Highway 82 (El Camino Real). The California Highway Patrol and CalTrans are responsible for controlling transportation of hazardous materials and scene management in the event of a spill on a State or Federal highway. The Colma Fire Protection District would respond to a local hazardous material spill. The Town's Police Department may assist in emergency action. Procedures to be followed in the event of a hazardous spill are outlined in the *San Mateo County Hazardous Waste Management Plan*. Upon request by the Colma Fire Protection District, the County's Hazardous Material (HAZMAT) response team may respond to incidents. The HAZMAT response team is funded through the San Mateo Operational Area Office of Emergency Services.

5.07.340 AIRPORT SAFETY

An aircraft incident can occur anywhere, however incidents which affect life and property on the ground are more likely to occur in areas immediately surrounding airports. The San Francisco International Airport (SFIA) which is the seventh busiest airport in the world (1998) is located approximately 3.5 miles southeast of Colma. Aircraft taking off from SFIA fly over San Bruno, South San Francisco, and Daly City in what is referred to as "the gap." The gap, as it traverses these cities, is 1.2 miles wide and 5.8 miles long. This aircraft swathe encompasses the entire Serramonte neighborhood of southern Daly City, central San Bruno and South San Francisco, and is directly adjacent to the Town of Colma.

In 1970 the State Legislature required the establishment of Airport Land Use Commissions (ALUC) within counties to develop plans for land uses around airports. The purpose of the ALUC is to provide for the orderly long-term growth of airports and their surrounding areas, as well as to protect the people who live near airports and the welfare of the public in general. The San Mateo County Airport Land Use Commission has set safety standards specifying how land near San Francisco Airport can be used based on safety and noise considerations, height restrictions for new construction, and construction standards for buildings.

The San Francisco International Airport has designated transitional surfaces as alternate routes for planes to take off or land. The "gap" has been designated as an approach surface with transitional surfaces extending on either side, including one transitional surface extending over Colma. Any development in the transitional zone must be in compliance with ALUC maximum height standards. The structure/building height restrictions under the Transitional surfaces for Colma are approximately 400 feet above average mean sea level. This height limit will not constrict development in Colma, which is roughly at 110 feet above sea level and where the normal commercial height limit is 40 feet.

5.07.350 EMERGENCY OPERATIONS

5.07.351 Emergency Programs

An emergency is an incident threatening life, property, or the environment -- particularly one which occurs suddenly or unexpectedly. The resulting damage is determined by the nature of the incident and the response to it. The reaction to an emergency is often the major determinant of the severity of its impact. The Town can minimize threats to public safety by ensuring its capability to adequately respond to potential emergencies.

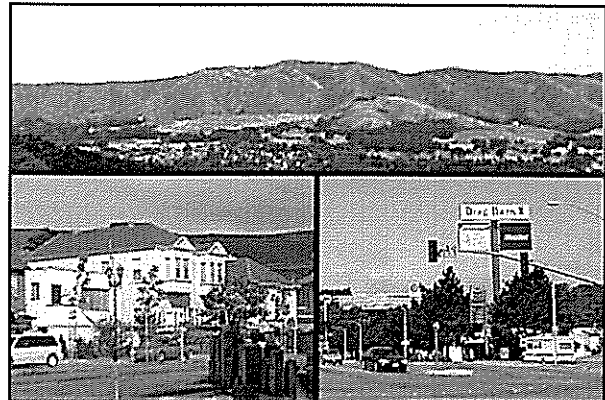
The Town of Colma with the aid of the San Mateo County Sheriff's Office has prepared a Standardized Emergency Management System (SEMS) plan as required by the California Emergency Services Act. The Plan defines the Town's planned response to emergency situations and assigns emergency tasks to Town personnel, provides operational guidelines, and inventories equipment, supplies, and personnel available for emergency response. The Town's Emergency Operations Center is based at the Colma Fire District station. The center contains a kitchen, emergency supplies and equipment and would serve as a communications and administrative headquarters in an emergency. In the event this location is not functional, the Emergency Operation Center could be at the Community Center on F Street. The police department also has facilities to function as an operational headquarters for emergency response personnel and equipment, if necessary.

Additional emergency resources are available to the Town through the San Mateo Operational Area Emergency Services organization. The San Mateo Operational Area Emergency Services Organization was formed through a joint power agreement to coordinate interjurisdictional operations and coordinate mutual aid among San Mateo County and its twenty cities.

5.07.352 Evacuation Plans and Transportation Failures

In the event of an emergency, the Colma Police Department, assisted by the Town's Public Works Department, would establish evacuation routes and maintain traffic control.

Responsibilities and tasks for evacuation are assigned in the Town's Emergency Management plan. The Circulation Element identifies the major roads which would serve as principal routes for evacuation of people out of hazardous areas and to safety. These routes may also serve as the principal routes for movement of emergency equipment and supplies to the incident scene.



GOAL: Protect the community from damages to life and property caused by catastrophes related to seismic activity or geologic conditions.

5.07.400 SAFETY POLICIES & IMPLEMENTATION MEASURES

5.07.410 SEISMIC AND GEOLOGIC			
REFERENCE NUMBER	POLICY	IMPLEMENTATION MEASURE	CROSS REFERENCES TO OTHER GENERAL PLAN ELEMENTS
5.07.411	The Town should continue to investigate the potential for seismic and geologic hazards as part of the development review process and maintain this information for the public record. Safety Element maps should be updated as appropriate.	The City Planner will review incoming geologic reports associated with new development and update base information and maps.	
5.07.412	The Town should require geotechnical, soils and foundation reports for proposed projects which warrant them according to the Safety Element and its geologic and Hazard Maps, the County's Seismic and Safety Element; and the Town's Building Official and Building Codes.	Soils and geotechnical reports will be required as part of the submittal for new development projects. The City Engineer and Building Official will review necessary reports as part of the building permit process.	
5.07.413	Colma should prohibit development in seismic or geologically hazardous zones, including any land alteration, grading for roads and structural development.	Based on applicable Geologic and Engineering reports, this policy will be carried out by the City Engineer and City Planner.	
5.07.414	All critical care facilities and services should be designed to remain functional following the maximum credible earthquake. Placement of critical facilities and high-occupancy structures in areas prone to violent ground shaking or ground failures should be avoided.	The City Engineer and Building Official will review Geologic reports, Engineering studies and plans for these types of structures.	
5.07.415	The Town should request that owners of all buildings identified as unsafe have their buildings inspected by a licensed engineer or architect, and take the necessary steps to make them safe.	This policy will be implemented by the Building Department.	
5.07.416	Colma should work with San Mateo County, California Water Service Company and the San Francisco Water District to ensure that all water tanks and main water pipelines are capable of withstanding high seismic stress.	The City Planner and City Engineer will make inquiries about these items.	

5.07.420 FLOODING			
REFERENCE NUMBER	POLICY	IMPLEMENTATION MEASURE	CROSS REFERENCES WITH OTHER GENERAL PLAN ELEMENTS
5.07.421	Drainage facilities should be maintained to accommodate the flow capacity of Colma Creek through Colma to accommodate the storm water runoff from a 100-year storm.	The Town will continue to participate in the review of flood improvement projects, carried out by San Mateo County, to reduce flood hazards throughout the town.	
5.07.422	The Town should continue to require the habitable portions of new structures to have a first-floor elevation that is elevated to or above the projected 100-year water surface, and to be adequately protected from flooding, as defined in the Municipal Code (Section 5.05.335).	This policy will be implemented as a standard condition of Planning Permits and during review of construction plans by the City Engineer and Building Official.	
5.07.423	On-site storm water detention facilities should be constructed for new developments (over ½ acre) which contribute runoff to Colma Creek to store the difference in runoff between the 10-year predevelopment storm (original natural state) and the 100-year post development storm, with stormwater released at the 10-year predevelopment rate. Property owners should be required to enter into agreements for maintenance.	This policy will be implemented as a standard condition of Planning Permits and during review of construction plans by the City Engineer and Building Official.	Open Space 5.04.341

5.07.430 FIRE SAFETY			
REFERENCE NUMBER	POLICY	IMPLEMENTATION MEASURE	CROSS REFERENCES WITH OTHER GENERAL PLAN ELEMENTS
5.07.431	The Town should support the Fire Protection District as they strive to improve the District's ISO rating.	The City Council and City Manager will continue to monitor and work with the Fire Protection District to implement this policy.	
5.07.432	Colma should ensure that all buildings have visible street numbers and are accessible to fire vehicles and equipment. A minimum 20 foot wide fire lane should be provided to all commercial and large scale residential facilities.	The Fire Protection District will review and condition approval of new development plans to meet these standards and will encourage businesses, at the time of fire inspections, to meet these and other fire safety standards.	
5.07.433	Colma should assist the Fire Protection District in efforts to continue to maintain an average response time of two to four minutes to all locations in Colma.	The City Council and City Manager will continue to monitor and work with the Fire Protection District to implement this policy.	
5.07.434	The Town should continue to have the Colma Fire Protection District review development plans for conformity with the Uniform Fire Code and Title 24 of the California Building Code.	The Fire Protection District or its designee will continue to review development plans.	
5.07.435	The Town should support the Fire Protection District's continued programs of fire prevention and public education about fire safety.	The City Council and City Manager will continue to monitor and work with the Fire Protection District to continue this program.	

continued

5.07.430 FIRE SAFETY (continued)			
REFERENCE NUMBER	POLICY/GOAL	IMPLEMENTATION MEASURE	CROSS REFERENCES WITH OTHER GENERAL PLAN ELEMENTS
5.07.436	Encourage the Fire Protection District to continue its participation in mutual aid agreements with Pacifica, Daly City, San Bruno, South San Francisco, Brisbane and the San Mateo County Fire Chiefs Association County Wide Plan.	The Fire Protection District will continue to implement ways to improve local service to Colma and neighboring communities.	
5.07.437	The Town should insure that the community is served by a self-sufficient fire protection system which may include support for the existing District, establishment of a joint powers agreement, acquisition of the existing District and facilities or development of a new free-standing fire station.	A preliminary facilities study has been prepared to assess current and future needs of the District. The City Council and Fire Protection District will continue to monitor and evaluate future service for the Town.	Land Use 5.02.372
5.07.438	Colma should consider acquisition of a site for a new public safety facility.	The Town continues to investigate opportunities for acquiring sites for civic purposes.	Land Use 5.02.371

5.07.440 HAZARDOUS MATERIALS			
REFERENCE NUMBER	POLICY/GOAL	IMPLEMENTATION MEASURE	CROSS REFERENCES WITH OTHER GENERAL PLAN ELEMENTS
5.07.441	Colma should support County efforts to locate, regulate and maintain information regarding hazardous materials located or transported within the Town.	The Fire Protection District, San Mateo County Environmental Health Department, and the City Engineer will carry out this policy.	
5.07.442	Colma should collect and maintain a list of locations in Town where hazardous materials are used.	The Fire Protection District, City Engineer, and City Planner will maintain hazardous materials lists.	
5.07.443	Measures aimed at significantly decreasing solid waste generation should be promoted. Recycled materials storage and collection areas should be required throughout the Town and in all new developments.	The City Council will continue to work with waste haulers and owners of the Hillside Landfill in Colma to reduce solid waste generation and to increase recycling. Proper waste storage will be required as a standard condition of Planning Permits.	
5.07.444	Public awareness of safe and effective hazardous waste use, storage and disposal should be promoted. The Town newsletter should be used to inform residents.	Articles or prepared materials from various sources will be distributed or included in the Town newsletter.	
5.07.445	Colma should continue permitting of hazardous material sites in Town through the San Mateo Department of Environmental Health Inspection Program.	The San Mateo County Environmental Health Department will carry out this policy.	

5.07.450 EMERGENCY OPERATIONS			
REFERENCE NUMBER	POLICY	IMPLEMENTATION MEASURE	CROSS REFERENCES WITH OTHER GENERAL PLAN ELEMENTS
5.07.451	The Town should maintain the Colma Emergency Management Plan and continue to participate with San Mateo County's Mutual Aid Programs and Operational Area Emergency Services Organization as a basis for community emergency preparedness.	City staff will continue to work with the San Mateo Operational Services Operational Emergency Services Organization to maintain and improve community emergency preparedness.	
5.07.452	Colma should continue to analyze significant seismic, geologic and community wide hazards as part of the environmental review process, and require that mitigation measures be made conditions of project approval.	The City Planner and other departments will monitor and recommend hazards mitigation as part of project approval.	
5.07.453	Emergency evacuation routes should be determined by the Police Chief and City Engineer. Evacuation routes should follow the major roadways as set forth in the Circulation Element.	The Police Department will direct any necessary evacuation routes.	
5.07.454	Colma should promote awareness of the Town's emergency operations procedure. The Town newsletter should be used to inform residents.	Articles or prepared materials from various sources will be distributed or included in the Town newsletter.	
5.07.455	Colma should strive to improve interjurisdictional, interagency cooperation with other public and private agencies for safety in future land use planning, hazard prevention and emergency response.	City staff will communicate with their counterparts in other jurisdictions to continue to work toward protecting community safety.	
5.07.456	Colma should work with the Colma Fire Protection District to establish an alternative Emergency Operations Center, if the Fire Protection District facility is not operational.	City staff will work toward having necessary supplies available at an alternative site when one is selected.	

5.07.500 PROGRAMS FOR SAFETY ELEMENT IMPLEMENTATION

Listed below are the programs for Plan Implementation. All are existing programs.

5.07.501 California Environmental Quality Act (CEQA) Environmental Review Procedure

The initial study for any applicable project takes into account the effects of the project on available safety resources and the relative safety of the project itself. Mitigation measures are made conditions of project approval.

5.07.502 Subdivision Ordinance

The Subdivision Ordinance sets forth minimum standards for land division, site preparation and facility design. Soil and geotechnical reports may be required by the City Engineer and Building Office.

5.07.503 Municipal Code

The Colma Municipal Code requires all new and remodeled projects to comply with Building Code requirements, and other Town ordinances.

5.07.504 Inspection of Buildings

The Fire Protection District's Building Inspection Program includes enforcement of current fire and building code requirements. The Fire Protection District and the Building Inspector are responsible for the identification of hazardous buildings and proper structural maintenance of critical care facilities or services.

5.07.505 Project Review

Proposed projects are reviewed by the Building Official, City Planner, City Engineer, and Police and Fire District personnel. This procedure provides information for use in design review and the conditioning of permits for new development.

5.07.506 San Mateo Operational Emergency Services Organization

This organization is derived from a County Joint Powers Agreement, and, therefore, attempts to manage and coordinate emergency operations among the various cities. Colma continues to participate.

5.07.507 Standardized Emergency Management System (SEMS)

This Plan outlines the Town's planned response to emergency situations. Typical emergency response is administered by the Police and Fire Departments. Major events may result in mobilization and operation of an emergency control center. Colma's emergency control center is located at the Fire Protection District offices on Reiner Street.

5.07.508 Colma Fire Protection

The program involves building and site inspections as well as public education.

5.07.509 San Mateo County Major Air Crash/High Risk Plan

This plan specifies initial notification and response assignments in regard to a major airliner accident or high rise fire in the County.

5.07.510 San Mateo County Hazardous Waste Management Plan, San Mateo County Hazardous Materials Area Plan

These plans serve to monitor use, storage and transportation of hazardous materials as well as prepare for and respond to the release of hazardous material.

5.07.511 Mutual Aid Programs

Local cities and the County utilize mutual aid programs to assist each other in response to major emergencies.

5.07.512 Town of Colma Capital Improvement Program

Includes a series of Drainage and Flood Control programs:

- Colma Creek Flood Control Project
- Mission Road Local Drainage Improvements
- El Camino Real Local Drainage Improvements
- Colma Creek Service Access Improvements
- Hillside Boulevard Ditch Reconstruction
- El Camino Real Ditch Reconstruction

All of these projects are scheduled for completion by 2001.

5.07.500 SAFETY ELEMENT APPENDIX A

5.07.510 MODIFIED MERCALLI INTENSITY (MMI) SCALE

MMI Value	Description of Shaking Severity	Summary Damage Description	Full Description
I			Not felt. Marginal and long period effects of large earthquakes.
II			Felt by persons at rest, on upper floors, or favorably placed.
III			Felt indoors. Hanging objects swing. Vibration like passing of light trucks. Duration estimated. May not be recognized as an earthquake.
IV			Hanging objects swing. Vibration like passing of heavy trucks; or sensation of a jolt like a heavy ball striking the walls. Standing motor cars rock. Windows, dishes, doors rattle. Glasses clink. Crockery clashes. In the upper range of IV wooden walls and frame creak.
V	Light	Pictures Move	Felt outdoors; direction estimated. Sleepers awakened. Liquids disturbed, some spilled. Small unstable objects displaced or upset. Doors swing, close, open. Shutters, pictures move. Pendulum clocks stop, start, change rate.
VI	Moderate	Objects Fall	Felt by all. Many frightened and run outdoors. Persons walk unsteadily. Windows, dishes, glassware broken. Knickknacks, books, etc., off shelves. Pictures off walls. Furniture moved or overturned. Weak plaster and masonry D* cracked (<i>refer to definitions of masonry types below</i>). Small bells ring (church, school). Trees, bushes shaken (visibly, or heard to rustle).
VII	Strong	Nonstructural Damage	Difficult to stand. Noticed by drivers of motor cars. Hanging objects quiver. Furniture broken. Damage to masonry D, including cracks. Weak chimneys broken at roof line. Fall of plaster, loose bricks, stones, tiles, cornices (also unbraced parapets and architectural ornaments). Some cracks in masonry C. Waves on ponds; water turbid with mud. Small slides and caving in along sand or gravel banks. Large bells ring. Concrete irrigation ditches damaged.
VIII	Very Strong	Moderate Damage	Steering of motor cars affected. Damage to masonry C; partial collapse. Some damage to masonry B; none to masonry A. Fall of stucco and some masonry walls. Twisting, fall of chimneys, factory stacks, monuments, towers, elevated tanks. Frame houses moved on foundations if not bolted down; loose panel walls thrown out. Decayed piling broken off. Branches broken from trees. Changes in flow or temperature of springs and wells. Cracks in wet ground and on steep slopes.
IX	Violent	Heavy Damage	General panic. Masonry D destroyed; masonry C heavily damaged, sometimes with complete collapse; masonry B seriously damaged. (General damage to foundations.) Frame structures, if not bolted, shifted off foundations. Frames racked. Serious damage to reservoirs. Underground pipes broken. Conspicuous cracks in ground. In alluvial areas sand and mud ejected, earthquake fountains, sand craters.
X	Very Violent	Extreme Damage	Most masonry and frame structures destroyed with their foundations. Some well-built wooden structures and bridges destroyed. Serious damage to dams, dikes, embankments. Large landslides. Water thrown on banks of canals, rivers, lakes, etc. Sand and mud shifted horizontally on beaches and flat land. Rails bent slightly.
XI			Rails bent greatly. Underground pipelines completely out of service.
XII			Damage nearly total. Large rock masses displaced. Lines of sight and level distorted. Objects thrown into the air.

***DEFINITIONS OF MASONRY TYPES:**

MASONRY A: Good workmanship, mortar, and design; reinforced, especially laterally, and bound together by using steel, concrete, etc.; designed to resist lateral forces.

MASONRY B: Good workmanship and mortar; reinforced, but not designed in detail to resist lateral forces.

MASONRY C: Ordinary workmanship and mortar; no extreme weaknesses like failing to tie in at corners, but neither reinforced nor designed against horizontal forces.

MASONRY D: Weak materials, such as adobe; poor mortar; low standards of workmanship; weak horizontally.

Source: Association of Bay Area Governments (ABAG)