IX. SAFETY ELEMENT

CA/KB

OVERVIEW

The Safety Element, one of nine elements of the General Plan, contains County policies on identified and potential hazards and safety considerations, their mitigation (i.e., reduction in damage and loss to real and personal property and minimization of adverse social and economic impacts) and implications for development.

The Safety Element text is organized in the following order:

- Purpose of the Element
- Constraints and Opportunities
- General Safety Element
- Implementation Programs
- Public Safety Component
- Natural Hazards Component

The first section provides an overview of the scope and purpose of the Safety Element followed by the Constraints and Opportunities section. Subsequently, the General Safety Element Implementation Programs, applicable to both Public Safety and Natural Hazards Components, are discussed.

The remaining sections deal with topics within the Public Safety and Natural Hazards Components. Accordingly, the Public Safety Component includes Crime, Fire, Hazardous Materials, and Aircraft Environment. The Natural Hazards Component consists of Flood and Seismic/Geologic Hazards. In addition to

the general goals and objectives for each Component, each topic presents its own specific goals, objectives, policies and implementation programs.

PURPOSE OF THE ELEMENT

The State Government Code requires general plans to include "a safety element for the protection of the community from any unreasonable risks associated with the effects of seismically induced surface rupture, ground shaking, ground failure, tsunami, seiche, and dam failure; slope instability leading to mudslides and landslides, subsidence and other geologic hazards known to the legislative body; flooding; and wildland and urban fires."

As such, the Safety Element is a primary document for identifying hazards which must be considered in the physical development of a jurisdiction. While the Safety Element is required to focus on fire, flood, and geologic hazards, it may also address other locally relevant safety issues.

A basic purpose of the Safety Element is to comprehensively inventory hazards which primarily impact persons and property in the unincorporated areas of Orange County. The scope of the Element also allows for a countywide perspective for other safety-related matters. This hazards inventory identifies information necessary for the development of goals, objectives, policies, and implementation programs.

The goals and objectives of the Safety Element are consistent with state requirements and are based on an assessment of safety-related needs, and the identification of problems impeding the resolution of hazards and safety concerns.

The policies and programs of the Element form an effective implementation plan to meet the established goals and objectives of the Element. The Safety Element serves to guide and direct local government decision-making in safety-related matters and also foster coordination with regional, state, and federal policies and programs.

As the County continues to grow, the demand for public safety will increase. Services and programs designed to improve the safety of Orange County residents as the urbanized areas expand will experience increasing pressure. This pressure will be met through various methods. For example, adequate methods of crime protection already exist in the urbanized area, but it is necessary that affirmative steps be taken to inform the public of available services and programs.

The demand for other safety related services, such as flood control, cannot be met entirely within the borders of Orange County. The County must ultimately depend on cooperation with other counties and agencies for the provision of an adequate supply of this service.

One of the major purposes of the Safety Element is to provide a clear statement of County policy so that timely steps can be taken to ensure that an adequate supply of

services and facilities will be available to meet the County's growth needs.

CONSTRAINTS AND OPPORTUNITIES

This section identifies existing and potential constraints to and opportunities for satisfying the projected safety demands for Orange County. While constraints do not always represent absolute barriers, they may inhibit the timely achievement of important safety objectives. The Element's policies and implementation programs are intended to minimize the constraints and to promote the identified safety opportunities.

Constraints

- ***Environmental Constraints***

  PUBLIC SAFETY

  Public safety concerns addressed in this Element include crime, fire, hazardous materials, and aircraft. The timely achievement of public safety objectives may be negatively affected by geography, geology, and climate combined with the inability to predict an occurrence. Fire suppression, for example, is constrained by topography when it precludes or inhibits firefighters from reaching a fire. Wind shifts and other climate changes may also negatively effect fire suppression.

  Hazardous materials pose very profound environmental consequences. Their presence in the environment can degrade air-quality and groundwater, severely damaging the food chain. Because of their affects, special care is required to transport, store, and dispose of these materials to ensure they do not enter the environment.

  Aircraft accidents are unpredictable. Although many accidents occur due to pilot error or aircraft failure, accidents also occur due to the influences of climatic changes and geography. Mountains are natural barriers which establish certain aviator routes. Aircraft straying from established routes or flying in poor visibility conditions heighten the chances of an accident.

  NATURAL HAZARDS

  Two natural hazard areas are discussed in this Element. They are flood hazards and seismic and geologic hazards. The natural environment affects the ability to predict the extent and magnitude of a natural disaster.

  Flood hazard protection is planned and implemented for major stream courses within Orange County. Flood protection devices are normally implemented to mitigate the effects of a predicted event. There is no certainty when such an event will occur and the extent of damage. The

same predictability problems exist for seismic hazards. Although fault traces have been identified within Orange County, an earthquake is an unpredictable occurrence.

- ***Fiscal Constraints***

  While operating and capital expenses for many safety related operations have risen, many traditional revenue sources have been cut or impaired, and spending limitations have been imposed on local governments, thus leaving them faced with reduced revenues for safety related planning at a time of growing need and public awareness.

  Major fiscal factors constraining local governments today in the provision of safety-related services, programs, and facilities include the following:

  PROPOSITION 13

  The passage of Proposition 13 in 1978 seriously limited local property taxes as a major revenue source for local governments. The effects of Proposition 13 are strongly felt by safety services and programs provided by the Orange County Sheriff-Coroner Department, the Orange County Fire Authority, the Orange County Flood Control District, and other County General Fund users.

  PROPOSITION 4 (THE GANN INITIATIVE)

  Passage of the Gann Initiative in 1979 placed constitutional limitations on the annual appropriations that can be made by each state and local government entity. The appropriations limit for each fiscal year is based upon the prior fiscal year increased by a factor for inflation and population growth. Excess revenues over appropriation limits must be returned to the taxpayers within the next two years. The effects of the Gann initiative are felt by the Orange County Flood Control District, County General Fund, and Fire Authority funds, and manifests itself in restrictions and reductions in safety related plans, programs, and facilities.

  CITY REDEVELOPMENT AGENCIES

  Redevelopment agencies within Orange County rely heavily on tax-increment financing as a primary revenue source. Under tax-increment financing, the redevelopment agency receives that portion of the property tax levy for an area which exceeds the levy for the base year. The increment represents the property tax revenue that otherwise would have been allocated to each of the area's taxing agents (e.g., Orange County General Fund, Orange County Fire Authority, and Orange County Flood Control District).

- ***Governmental Constraints***

  CONFLICTING OBJECTIVES AND

PRIORITIES

Competing public needs can result in conflicting priorities and programs. Further, the maze of regulations and standards overseen by a myriad of agencies can result in conflicting purposes, confusion, and ineffective programs.

INTERGOVERNMENTAL COORDINATION

It is very important for the federal, state, county, cities, and special districts to continue to communicate and to strive for greater coordination and cooperation in order to achieve common goals and objectives relative to safety-related planning.

- ***Economic and Market Constraints***

HAZARDOUS WASTE DISPOSAL

Historically, hazardous wastes have generally been disposed in designated landfills. More recently, landfill closure and costs associated with landfill disposal have forced hazardous waste producers to look elsewhere to dispose of their wastes, including on-site treatment prior to disposal.

Opportunities

- ***Environmental Opportunities***

LAND AVAILABILITY

The amount of undeveloped land in Orange County, particularly in the unincorporated area, can provide unique opportunities to consider, address, and initiate improved safety-sensitive planning through innovative land use planning and developments which promote maximum public protection.

ENVIRONMENTAL QUALITY

Statutory requirements protecting environmental quality (e.g., NEPA, CEQA, Federal 208 Water Quality Standards) aid in the early identification and mitigation of safety-related impacts. Through the environmental documentation process, appropriate mitigation measures or planning alternatives can be implemented to avoid or minimize future impacts.

- ***Fiscal Opportunities***

INNOVATIVE FINANCING

Despite the loss of conventional funding sources, there exists the potential to expand existing financial resources and to identify and utilize new resources to supplement existing ones. These resources may include the increased use of the following: user fees; non-property based taxes and miscellaneous revenues; developer financing for on-site and off-site

improvements which promote safety; benefit assessment bonds; revenue bonds; and joint funding of safety improvements.

FEDERAL AND STATE FINANCING

The mandate for improved safety-related planning, management, and implementation is sometimes accompanied by federal and state funds. Within the realm of hazardous materials planning, prioritized programs are being earmarked for funding. Under provision of AB 2948 (the Tanner Bill), the preparation of a hazardous waste management plan is reimbursable from the state. Elsewhere, the federal government has established funds for the implementation of the Santa Ana River Mainstem Project in Orange County and neighboring counties.

- ***Governmental Opportunities***

COORDINATED PLANNING OBJECTIVES AND STANDARDS

Orange County encourages long-range planning for the coordination of state and local government and private sector aims with the objective of phasing development in accordance with the consideration and provision of adequate safety measures. Orange County has taken a leadership role to promote safety-related programs, including hazardous waste management planning, hazardous materials disclosure, earthquake preparedness, and flood control.

DISASTER COORDINATION

The County of Orange recognizes the need for adequate disaster response planning. The opportunities and organizational structure exist to further coordinate emergency response to all natural disasters. The "Emergency Response Plan" of the County consists of both a detailed summary of the Countywide organization and a detailed description of the responsibility of each component agency in time of a disaster.

- ***Economic and Market Opportunities***

HAZARDOUS MATERIALS

The closure of Class I landfills and the increase in hazardous materials disposal Restrictions is giving impetus to new technologies. Combined with requirements of AB 2948 (Tanner Bill) this may give added incentives to private industry to develop additional technologies for the treatment and disposal of hazardous materials.

GENERAL SAFETY ELEMENT IMPLEMENTATION PROGRAMS

1. GENERAL PLAN CONSISTENCY PROGRAM

Action:

Continue review of public and private projects for consistency with the Orange County General Plan as required by state law (Government Code Section 65400 et seq.).

Discussion:
This program satisfies the state law requirement that private and public projects must be consistent with the local government's general plan in order to be approved. All public works projects, development projects, discretionary permits, capital improvement plans, and other private and public agency proposals are reviewed for consistency.

New or Existing Program: Existing

Implementation Schedule: Ongoing

Responsible Agency: RDMD

Source of Funds:
- County General Fund
- Developer fees

2. INTERGOVERNMENTAL COORDINATION AND PUBLIC PARTICIPATION

Action:
Intergovernmental and intragovernmental coordination will be improved through increased cooperation and contact with federal, state, regional, countywide, and Orange County agencies which impact or influence Safety Element implementation. For a list of related planning agencies, see the General Plan Appendix, Intergovernmental Coordination.

Discussion:
This program facilitates both intra- and intergovernmental coordination and citizen participation in order to promote a greater understanding of the County General Plan. Appropriate governmental agencies, organizations, and citizens are provided an opportunity to review documents and provide input during the General Plan revision and amendment process. Appropriate agencies are also consulted and involved in many of the implementation programs defined in this document.

New or Existing Program: Existing

Implementation Schedule: Ongoing

Responsible Agency: CEO and RDMD

Source of Funds: County General Fund

3. EMERGENCY MANAGEMENT PROGRAM

Action:
Continue to implement emergency mitigation measures as outlined in the California Emergency Plan, the California Master Mutual Aid Agreement, the Orange County Emergency Plan, Orange County

Operational Area Plan, S.O.N.G.S Plan, County of Orange and Orange County Fire Authority Hazard Mitigation Plan and other emergency management plans. Coordination and implementation will be improved through increased contact with all agencies and organizations which impact or influence emergency response planning.

Discussion:

This program focuses primarily upon the County's planned response to extraordinary emergency situations associated with natural disasters, technological incidents, intentional acts of terrorism and nuclear protection operations. Such disasters pose major threats to life and property and can impact the well-being of large numbers of people.

To reduce the County's susceptibility and vulnerability to extraordinary emergency situations, continuing emphasis is placed on the following: mitigation, emergency planning; training of full time, auxiliary, and reserve personnel; public awareness and education; and assuring the adequacy and availability of sufficient resources to cope with such emergencies.

Normal day-to-day emergencies and the well-established and routine procedures used in response to such emergencies are addressed in the implementation programs found in this element and in the daily procedures of the various responsible agencies.

On March 15, 2011, the Board of Supervisors adopted the County of Orange and Orange County Fire Authority Hazard Mitigation Plan (HMP) in compliance with federal and state regulations. The Hazard Mitigation Plan will be amended from time to time; for purposes of the General Plan the relevant HMP is the most recent HMP (https://ocsheriff.gov/commands-divisions/investigations-special-operations-command/emergency-management/hazard-mitigation) that has been approved by the Board of Supervisors. Any inconsistency between the HMP and other provisions of the Safety Element shall be resolved in favor of the provisions most recently amended and approved by the Board of Supervisors.

EMERGENCY RESPONSE

The Orange County Operational Area Emergency Operations Center (OC OA/EOC) is used for managing disaster response and recovery for County Agencies and Departments and constituents served by the operational areas. The EOC coordinates disaster response and recovery for the Operational Area, including all political subdivisions of Orange County, and communicates Operations resource requirements and availability with the State Regional Operations Center.

The Standardized Emergency Management System (SEMS) is the state mandated framework for emergency response and recovery.

In accordance with SEMS, the EOC is to act as a central point for coordination of operational, administrative and support needs of the emergency workers. Designated officials gather and process information to and from County agencies and departments, school and special districts, business and industry, volunteer organizations, individuals and State and Federal Governments.

The Orange County and Operational Area Emergency Operations Center is staffed with trained personnel from all agencies within the County of Orange and various operational area jurisdictions and agencies to fill policy decision-making positions to support EOC staff.

As there are various levels of emergencies that can require the activation of the EOC, some emergency incidences do not necessitate activation or only necessitate operation of the facility with a limited emergency management staff to monitor the situation and make notifications.

Emergency management information can be obtained from the Orange County Sheriff's Department website at www.ocsd.org.

PUBLIC SAFETY COMPONENT

Introduction

This Public Safety Component focuses on four public safety concerns that affect the physical and social development of Orange County. They include crime, fire hazards, hazardous materials, and aircraft. The information presented in the following Public Safety sections provides the background for the goals, objectives, policies, and programs which aim to minimize and prevent adverse impacts.

GENERAL GOALS AND OBJECTIVES: *Public Safety Component*

[NOTE: The following goals and objectives relate to the broader public safety topics. These broad-level goals and objectives are in addition to those described in the crime, fire hazards, hazardous materials and aircraft environment sections, respectively.]

Goal 1

Provide for a safe living and working environment consistent with available resources.

- ***Objective***

  1.1 To identify public safety hazards and determine the relative threat to people and property in Orange County.

Goal 2

Minimize the effects of public safety hazards through implementation of appropriate regulations and standards which maximize protection of life and property.

- ***Objectives***

  2.1 To create and maintain plans and programs which mitigate the effects of public safety hazards.

  2.2 To encourage the development and utilization of technologies that minimize the effects of public safety hazards.

Goal 3

Raise the awareness of Orange County residents, workers, and visitors to the potential threat of public safety hazards.

- ***Objective***

  3.1 To provide information, training, and assistance to reduce loss of life and injury and to protect private and public property from public safety dangers.

CRIME

Introduction

A basic ingredient of the quality of life sought by existing and potential residents of an area like Orange County rests in the notion that a community is secure and safe from criminal activity. To a growing urban place like Orange County, the concern of law enforcement is to devise measures for reducing the level of crime activities and to promote the idea that Orange County is a safe place to raise families, conduct business and recreate.

The two primary forms of crime deterrence most commonly used are suppression and prevention. Crime suppression may be defined as the application of proactive and investigative techniques by which law violators are aggressively identified, arrested and prosecuted.

By contrast, the traditional law enforcement approach to crime is reactive. With the exception of crimes committed in the presence of an officer, the police usually investigate major crimes after the fact. Proactive police efforts are usually limited to narcotics and crimes of vice.

There are two interrelated aspects of prevention which deserve discussion. First is prevention of crime, a major concern of policing and prosecution agencies. This aspect focuses on offenses and is directly related to crime reduction. Second is the prevention of criminality which focuses

upon the offender. Responsibility for this aspect of prevention is placed on society as a whole, specifically on social and correctional agencies and the courts. Orange County is a growing urban community. As its population grows, the incidence of crime is expected to increase.

The degree to which crime influences the growth and development of Orange County is in part the responsibility of the Sheriff's Department. The effectiveness of existing and future programs will be a key ingredient in the communities' perception that Orange County is a safe and secure place.

Current Conditions

ORANGE COUNTY SHERIFF'S DEPARTMENT

Since the 1940s, the Sheriff's Department has grown from a small, rural, County police force to a modern law enforcement agency employing nearly 4,200 people. Currently, the Orange County Sheriff-Coroner Department (OCSD) provides police patrol and investigative services to the unincorporated areas of Orange County and the contracting cities of Aliso Viejo, Dana Point, Laguna Hills, Laguna Niguel, Laguna Woods, Lake Forest, Mission Viejo, Rancho Santa Margarita, San Clemente, San Juan Capistrano, Stanton, and Villa Park.

In addition, the OCSD has developed a Mutual Aid Plan with each of the 23 remaining law enforcement agencies in the incorporated cities. Under the Mutual Aid Plan, formalized in March 1968 by the Orange County Chiefs of Police and Sheriff's Association, law enforcement agencies agree to provide additional necessary assistance during immediate local police emergencies. A detailed discussion of the Sheriff Patrol Service is provided in Chapter V, Public Services and Facilities Element.

CRIME STATISTICS

The Orange County Sheriff's Department maintains detailed records on crimes committed within its service areas in Orange County. Up-to-date crime statistics can be obtained from the Sheriff Coroner's Web site at www.ocsd.org.

SPECIAL PROGRAMS

The Orange County Sheriff's Department is involved in the war on drugs at every level. The Sheriff's Narcotics Program (SNP) proactively investigates street level illegal narcotic users and dealers with focus on the deterrence and arrest of street level, mid and upper level narcotic violators.

The primary purpose of this program is to remove these individuals by arrest and conviction from the County's neighborhoods, thus, providing a safe environment in which to live and raise a

family. Investigators from SNP are also assigned to John Wayne Airport, where they operate an airport narcotic interdiction program utilizing various investigative techniques and a narcotic detection canine.

In 1986, the Department was a co-founder of the Regional Narcotics Suppression Program (RNSP) with three of the County's municipal police departments. The program, commanded by the Sheriff's Special Investigations Bureau captain, now consists of officers from ten municipalities, including state and federal narcotic agents, and agents from three federal agencies. RNSP targets major narcotic traffickers and money launderers in an effort to interdict the flow of illegal drugs into the hands of local dealers.

The purpose of RNSP is the identification, apprehension and conviction of high-level drug traffickers and the seizure of assets derived from drug trafficking.

In addition to traditional narcotic enforcement methods, the department participates in two task forces aimed at the stemming of methamphetamine manufacturing within the County. These units implement proactive and reactive investigative strategies at a task force level.

The Drug Awareness and Education Program was implemented in 1987. This program, designed to educate the County's youth regarding the dangers of illegal drugs, is provided to every child attending a public elementary school within the Sheriff's primary and contractual jurisdictions, as well as all private schools countywide. Funding for this program is provided by the non-profit Drug Use is Life Abuse Organization, as well as monies seized pursuant to asset forfeiture by the Orange County Sheriff Department's narcotic enforcement efforts.

The Department also houses "Project: No Gangs." Founded by the Chief's of Police and Sheriff's Association in 1992, this educational program is funded by the non-profit Drug Use is Life Abuse Organization. This project targets elementary level school children in an effort to teach them about the consequences of gang membership and association.

GOALS, OBJECTIVES AND POLICIES: *Crime*

The following goals and objectives are in addition to the General Goals and Objectives for the Public Safety Component.

Goal 1

Refer to the General Public Safety Component goals found in the General Goals and Objectives section at the beginning of the Public Safety Component.

The objective below relates specifically to crime.

- ***Objective***

  1.1 To maintain adequate levels of Sheriff patrol services through

coordinated land use and facility planning efforts.

Policies

1. To determine those areas of investigation where land use regulation can most effectively reduce incidence of crime.

2. To provide coordination to all agencies within the County to assist in the prevention of crime.

3. To monitor and evaluate studies of crime prevention through land use and development standards to determine future regulations and programs.

4. To encourage development of programs and practices which incorporate crime prevention methods, techniques, and experience into the planning process.

5. To continue to coordinate land use proposal reviews with the County Sheriff-Coroner Department to assure that Sheriff patrol services are adequately addressed.

6. To maintain mutual aid agreements with incorporated cities to assure efficient service delivery for the County Islands.

IMPLEMENTATION PROGRAMS:
Crime

The following implementation programs are in addition to the General Safety Element Implementation Programs.

1. PUBLIC EDUCATION/ INFORMATION

Action:
Support the safety awareness efforts of the Sheriff-Coroner's Department and other agencies through public information and educational activities.

Discussion:
This program is intended to increase the community's awareness of the need for crime prevention and provide educational assistance to residences and businesses.

New or Existing Program: Existing

Implementation Schedule: Ongoing

Responsible Agency: Sheriff-Coroner Department

Source of Funds: County General Fund

2. NEIGHBORHOOD WATCH

Action:
The Neighborhood Watch Program prescribes three actions to be taken by the Office of the Sheriff-Coroner:

a) Citizens and their neighbors work

in a program of mutual assistance.

b) Encourage citizens/neighbors to participate in training in order to recognize and report suspicious activities in their neighborhoods.

c) Encourage citizens to also implement crime prevention techniques such as home security, Operation Identification, etc.

Discussion:
Neighborhood Watch is an organization involving citizens and neighbors within a community. This prevention program enlists the support of these citizens by having them work with law enforcement to reduce crime in their communities.

New or Existing Program: Existing

Implementation Schedule: Ongoing

Responsible Agency: Orange County Sheriff-Coroner Department

Source of Funds: County General Fund

3. SHERIFF'S RESERVE DIVISION

Action:
Sheriff's Reserve deputies will continue to serve in 14 specialized units, and eight details within these units which are organized to provide particular kinds of support for law enforcement activities. Also, integral to the Reserve Division are the Professional Services Reserves (PSR) and Chaplains. The PSR program is comprised of professional members of the community who donate their time and expertise on a variety of projects designed to enhance public safety and expand law enforcement capabilities. PSR provide support, analysis, and assistance with respect to emerging technologies in the private sector, and contribute greatly to the Sheriff's pro-active law enforcement efforts. Chaplains are trained personnel from diverse backgrounds and denominations utilized to assist, aid, comfort, counsel, mediate, and provide spiritual, psychological, and social services to the community and departmental members. Chaplain duties include death notifications, dead body calls, family disputes, missing children, seniors with dementia, welfare assistance, suicide attempts or barricaded suspects, emotionally disturbed citizens, officer involved shootings, and other incidents where a Chaplain's assistance is deemed warranted and requested by field personnel.

Discussion:
The Reserve division consists of volunteers who donate their time and experience to the Sheriff-Coroner Department as needed. Most Reserve Division members are employed full-time in various civilian occupations and professions.

New or Existing Program: Existing

Implementation Schedule: Ongoing

Responsible Agency: Orange County Sheriff-Coroner Department

Source of Funds: County General Fund

FIRE

Introduction

This section of the Safety Element examines the threat of fire to urban areas, wildlands, and the urban/wildlands interface. Fire is a constant threat in all parts of the County. Figure IX-1 depicts the fire hazard areas adopted by the Board of Supervisors. It is the responsibility of the Orange County Fire Authority to meet the fire threat challenge for present and future development and residents.

Some information pertinent to Orange County Fire Authority services are discussed in the latter part of this section. However, a detailed discussion of the OCFA facilities and services can be found in the Public Services and Facilities Element (Chapter V).

Current Conditions

WILDLAND FIRES

The major objective of wildland fire defense planning is to prevent wildland fires from starting and, if unsuccessful, to minimize the damage to natural resources and structures once a wildland fire starts. Some of the more successful programs/ordinances currently in effect which contribute to the success of fire prevention activities are:

a) Closure of private lands in hazardous fire areas to public access;

b) Uniform Building Code prohibition of combustible roof covering materials;

c) Construction and maintenance of community and private fuel modification programs;

d) Vegetative Management Program;

e) Weed Abatement Program; and

f) Fire Prevention Education Programs.

There are a number of natural conditions which might increase the possibility of wildland fires. Three such conditions are the type and condition of wildland vegetation, topography of the area, and weather elements.

Wildland fires are often difficult to control for the following reasons:

- Adverse weather conditions
- Large quantities of combustible fuel
- Inaccessible terrain
- Nonexistent or very limited water supply
- Large fire frontage-dispersing fire forces

A relatively large portion of the County is covered by natural (though modified) vegetation. Of these different vegetation types, coastal sage scrub, chaparral, and

grasslands reach some degree of flammability during the dry summer months and, under the right conditions, during the winter months.

Topography has considerable effect on wildland fire behavior and on the ability of firefighters and their equipment to take action to suppress those fires. A fire starting in the bottom of a canyon may rush quickly to the ridge and become large, before initial attack forces can arrive, simply because of topography. Rough topography greatly limits road construction and road standards and accessibility by ground equipment. Steep topography also channels air flow, creating extremely erratic winds on slopes and in canyons.

Many wildland fires have been associated with adverse weather conditions. In the

1982 Gypsum Canyon fire, 17 homes were lost and 18,000 acres were burned, leaving an estimated 16 million dollars in damage. The Santa Ana Winds during the time of the fire were approximated at 50-55 mph, making the fire difficult to contain.

In 1993, aided by extreme fire weather conditions, devastating firestorms swept the County during the period of October 24 through November 4. During this period, a total of 20 major fires in six Southern California counties burned out of control.

Figure IX-1

Three fires burned in Orange County during this time. They were the Stagecoach, Laguna Beach and Ortega fires. The Stagecoach fire burned 750 acres and destroyed 9 buildings. The Ortega fire burned 21,384 acres and destroyed 19 buildings. The Laguna Beach fire burned 14,337 acres, destroyed 441 homes and caused approximately $528,000,000 in damage.

In 1997, the Baker Canyon fire by Irvine Lake burned 6,317 acres of vegetation, followed by two additional fires in 1998: Blackstar/Santiago Canyons fire destroyed 8,800 acres, and the Carbon Canyon fire burned 733 acres of brush.

URBAN FIRES

The Orange County Fire Authority places major emphasis on fire prevention in urban areas. The Fire Authority objective is to prevent fires from starting. Once a fire starts, the object is to minimize the damage to life and property. Urban fire prevention programs that are designed to achieve this fire prevention objective are as follows:

a) Adoption and aggressive enforcement of the most recent Uniform Fire Code;

b) Development of a comprehensive master plan to ensure that staffing and facilities keep pace with growth;

c) Plan check and inspection of new construction to ensure that all construction features meet code requirements; and

d) Active participation in Subdivision Committee and other planning activities.

Some of the most difficult fire protection problems in the urban area are as follows:

- Multiple story, wood frame, high density apartment developments

- Large contiguous developed areas with combustible roof-covering materials;
- Storage, handling, and use of hazardous materials on site; and
- Natural disasters

The character of the existing built-up area and future land use determines the location of fire stations, number of companies, manning of such companies, and future fire protection facility needs. Structural conditions also influence the quantity of water needed for fire protection (fire flow) and hydrant distribution.

Features of structural conditions that affect fire control include the following:

- Type of construction and use of buildings
- Area of building (ground floor area)
- Number of stories
- Type of roof covering material
- Exposures to the building

The Uniform Building Code regulates all of the above features and requires certain built-in fire protection devices when maximum allowable areas or heights are exceeded, or the building use presents a life or property protection problem. Automatic fire extinguishing systems provide an effective and successful private fire protection system which can minimize loss of life and property caused by fires. These systems operate with 94-97% efficiency thereby reducing the demands of public fire protection needs.

Other principal factors that can contribute to reduced fire protection include:

- Delayed detection of emergencies

- Delayed notification to emergency agencies
- Location and response time of emergency equipment
- Street structure (private, and gate guarded, speed bumps/humps, inadequate fire lanes)
- Multiple-story, frame, apartment, and condominium units
- Inadequate and unreliable water supply with poor hydrant
- distribution
- Inadequate code revisions which lag behind fire prevention knowledge

URBAN/WILDLANDS INTERFACE

In an effort to alleviate fire dangers near the interface between urban development and wildlands, the construction of fuel modification zones (firebreak, fuelbreak, or greenbelt) has been required. The continued application of this method does have drawbacks and, therefore, is not the only acceptable solution

In addition to the associated impacts created by some fuelbreak installations, there are usually impacts on wildlife, unique vegetation, and, in some cases, to the watershed cover as deep-rooted chaparral species are replaced by shallow-rooted grasses. Fuelbreaks are costly to install, require expensive maintenance to insure their success during a wildfire, and

offer protection primarily to structures with direct exposure to the wildland. This inequity in protection versus installation/ maintenance costs represents a very important point regarding the natural resource/urban development interface conflict.

Fire prevention measures to reduce the level of risk to structures with wildland exposure must be developed within the

design of the residential development rather than in the natural resource.

FIRE SERVICES

The Orange County Fire Authority serves over one million residents in more than 22 member cities and the unincorporated areas of Orange County. OCFA provides fire protection and emergency service response, and participates in the California Mutual Aid Master Plan for use and assignment of resources for daily operations, and in the event of major emergencies.

OCFA was formed March 1, 1995 and is governed by a 24-member Board comprised of representatives from the 22 cities it protects and the Orange County Board of Supervisors. In addition to the unincorporated area, OCFA serves the cities of Aliso Viejo, Buena Park, Cypress, Dana Point, Irvine, Laguna Hills, Laguna Niguel, Laguna Woods, Lake Forest, La Palma, Los Alamitos, Mission Viejo, Placentia, Rancho Santa Margarita, San Clemente, San Juan Capistrano, Seal Beach, Stanton, Tustin, Villa Park, Westminster, and Yorba Linda.

The OCFA provides fire and emergency medical services with approximately 1,077 full time personnel with 357 reserves who live in these communities.

Known as the Orange County Fire Department from 1980 to 1995, the Orange County Fire Authority is one of the largest regional fire service organizations in California with 60 fire stations and a service area of 552 square miles. Front line apparatus includes 56 fire engines, 10 paramedic vans, and 13 trucks, of which 30 are paramedic advanced life support units and 25 are paramedic assessment units. The OCFA inventory also includes a helicopter, a hazardous materials response unit, airport crash rescue units at John Wayne Airport, swift water rescue, and a federally sponsored urban search and rescue task force.

Resources are deployed based upon a regional service delivery system, assigning personnel and equipment to emergency incidents without regard to jurisdictional boundaries. The equipment used by the department has the versatility to respond to both urban and wildland emergency conditions. The principal benefits of a regional system are reduced costs and increased effectiveness.

OCFA responds to a wide range of incident types, some of these include:

- **Medical:** From single calls to mass casualties with hundreds of victims. Each may or may not have a rescue component.
- **Fires:** Structures, industrial processes, vehicles, aircraft, trains, boats, flammable liquids, wildland, explosion, high rise, hospitals, and many others from simple to complex.

- **Rescues:** Trapped victims (car accidents, collapsed buildings, machinery accidents, cave-in-confined spaces).
- **At Risk Victims:** Swift water, high angle, and wilderness injuries or falls.

To formulate a deployment strategy, all these factors must be considered in the risk. It would be extremely difficult to analyze all these risks for each type of call. Therefore, Emergency Medical Services and fire configurations are considered primary. In most cases, if these are adequately covered, other incident types are well served.

The OCFA protection area is diverse and the delivery system must be as well. Four demand categories exist within OCFA:

- ***Urban:*** Industrialized areas and high density housing areas;
- ***Suburban:*** Communities with mostly one and two story single family dwellings or moderate density with a maximum of three story buildings; and
- ***Rural:*** Canyons and ranch area or portions of the protection area that plan to remain less developed.
- ***Undeveloped:*** Area that is not accessible by paved road and contains little or no physical improvements.

GOALS, OBJECTIVES AND POLICIES: *Fire*

This section of the Safety Element sets forth fire safety policies for Orange County and implementation programs to implement these policies.

The following specific fire safety goal is in addition to the General Public Safety Component goals and objectives found at the beginning of this chapter.

Goal 1

Provide a safe living environment, ensuring adequate fire protection facilities and resources to prevent and minimize the loss of life and property fire.

Policies

1. To encourage periodic updating of fire hazard mapping and continue to analyze existing fire hazard data as it pertains to Orange County.
2. To establish improved development standards for location of new construction, structural design, emergency vehicular access, and detection hardware.
3. To improve building code regulations to provide increased built-in fire protection.

4. To improve mutual aid and inter-agency automatic aid programs to maximize utilization of existing facilities.

5. To continue to improve the minimum water system design requirements for fire protection.

6. To provide technical and policy information regarding structural and wildland fire hazards to developers, interested parties and the general public through all available media.

7. To increase public awareness through educational programs which promote fire safe practices and fire prevention.

8. To inform the public of Fire Authority emergency services with special emphasis on prompt notification.

9. To encourage improvement of fire defense systems in hazardous areas.

10. To encourage the continued training of police officers and firefighters in arson detection to expand capabilities of the agencies in their detection and investigation of incendiary fires.

11. To maintain fire hazard information in the County's Buyer Notification Program.

12. To plan for the lowest fire insurance rating based on fiscal considerations and physical limitations (e.g., topography, response time).

13. To improve emergency response times for emergency responders through the use of a computer-aided dispatch system and "preempt traffic signal control" system.

14. To promote increased volunteerism in the various fire protection fields (e.g., public education, reserve firefighters, and support services).

IMPLEMENTATION PROGRAMS:
Fire

The implementation programs discussed below implement the County's fire policies and promote fire safe practices and strategies. These implementation programs are in addition to the General Safety Element Implementation Programs.

1. PUBLIC EDUCATION/ INFORMATION

Action:
Support the fire safety awareness efforts of the Orange County Fire Authority and other agencies through public information and educational activities.

Discussion:
The Orange County Fire Authority conducts programs and provides

information and assistance to promote public awareness concerning fire hazards and fire safe practices.

New or Existing Program: Existing

Implementation Schedule: Ongoing

Responsible Agency: Orange County Fire Authority

Source of Funds: Structural Fire Fund and Community Partnerships.

2. PLANNING AND DEVELOPMENT

Action:
Review and impose conditions of approval at the appropriate project development level to assure that adequate site design, fire safe construction materials, and fire detection and protection systems are incorporated into the proposal in order to achieve maximum fire protection and to minimize extent of loss associated with fire incidence.

Discussion:
The Orange County Fire Authority reviews all land use proposals including subdivisions and site development permits for adequate site design and implementation.

New or Existing Program: Existing

Implementation Schedule: Ongoing

Responsible Agency: Orange County Fire Authority

Source of Funds: Structural Fire Fund and User Fees

3. HAZARDOUS MATERIALS SERVICES

Action:
Continue to encourage the planning and enforcement of the provisions of disclosure ordinances adopted by cities and the Orange County Fire Authority.

The Certified Unified Program Agency (CUPA) should continue to promote communication and coordination of the various hazardous materials and hazardous waste programs.

Discussion:
In the wake of the 1985 Fricker Chemical fire, Orange County enacted the Hazardous Material Disclosure Ordinance, which was followed by state and federal law, requiring companies to disclose the hazardous materials they used and stored. Information from the disclosure and business plan program is provided to both emergency responders during hazardous materials incidents and the public upon request, and is used for regional emergency planning.

OCFA targets the greatest frequency and more in-depth inspection efforts to the highest hazard occupancies, to

insure compliance with codes and recommended Best Management Practices (BMPs).

New or Existing Program: Existing

Implementation Schedule: Ongoing

Responsible Agency: Orange County Fire Authority and the other city fire departments

Source of Funds: Fees paid by persons reporting the presence of hazardous materials. Fees are based upon the number and quantities of materials reported.

4. CALIFORNIA ACCIDENTAL RELEASE PROGRAM (CalARP)

Action:

Continue implementation of CalARP, including updating of the hazardous materials ordinances for the new requirements and emergency responder coordination, as mandated by federal and state law.

Discussion:

CalARP is intended to result in an increased level of safety for the public and environment surrounding facilities using certain highly toxic and flammable materials. It is also intended to increase the level of communication among hazardous materials uses, the public, and emergency responders.

New or Existing Program: Existing

Implementation Schedule: Risk Management Plans were submitted to U. S. Environmental Protection Agency and local administering agencies on June 21, 1999 and were updated June 21, 2004. Facilities with chemicals, subject to the California amendments to the federal program, have from one to three years to submit Risk Management Plans from the date the plans are requested by the administering agency.

Responsible Agencies:

- Orange County Fire Authority
- HCA
- Fire departments which are participating agencies for CalARP.

Sources of Funds: User Fees.

HAZARDOUS MATERIALS

Orange County, among the most rapidly growing counties in California, continues to experience residential, employment, and economic growth. However, this growth does have its costs. Virtually all sectors of the County's economy are users of materials that, if improperly handled, stored, or disposed of, can pose health and environmental problems.

No master list of hazardous materials exists which can be agreed upon by all agencies that manage or regulate them. Lists which exist will change as more is learned about the effects of hazardous substances or as new substances become part of our technology. In addition, definitions of hazardous materials also vary from source to source. The current descriptions used in Federal and State legislation include the following:

a) A hazardous material is one which is either ignitable, reactive, corrosive, toxic, or any combination of these properties (Resource Conservation and Recovery Act).

b) A hazardous material is a substance or combination of substances which, because of its quantity, concentration or physical, chemical, or infectious characteristics may either:

- Cause, or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness; or
- Pose a substantial present or potential hazard to humans or the environment (State Health and Safety Code, Chapter 6.5).

c) A hazardous material is an injurious substance, including pesticides, herbicides, toxic metals and chemicals, liquified material gas, explosives, volatile chemicals, and nuclear fuels (California Government Code).

Exposure to some hazardous substances can result in acute or chronic health effects for the public such as respiratory problems or carcinogenicity. For example, over a long period of time, ingestion of drinking water contaminated by accidentally or illegally discharged hazardous waste can result in adverse health effects.

Recognizing, therefore, the importance of providing for the safe management of hazardous materials, it is the purpose of this section of the Safety Element to discuss five major aspects of the broad hazardous materials environment: hazardous materials, hazardous waste, medical waste, and nuclear materials (San Onofre Nuclear Generating Station).

These discussions also recognize the need for public access to general, unbiased information concerning all aspects of hazardous materials. Related hazardous materials issues involving siting of management facilities or land planning policy will be addressed as appropriate in the General Plan Land Use and the Public Services and Facilities (PSF) Elements.

Description

Hazardous materials are usable substances which, when put in contact with the environment, can adversely affect living organisms. Health effects can develop due to short- or long-term exposure. Hazardous materials, which can be ignitable, reactive, corrosive, or toxic, can also cause contamination of the environment when releases occur.

Sources/Locations of Hazardous Materials

The Health and Safety Code-mandated Hazardous Materials Area Plan developed by the Orange County Fire Authority in 1999 (with subsequent updates) contains a detailed hazard analysis of chemical hazards in much of the Orange County jurisdiction.

Hazardous materials are used in all segments of our society. Hazardous material users include manufacturing and service industries, agriculture, military bases, hospitals, schools, power plants, and households.

Hazardous materials used by these societal segments are normally stored in secured, on-site areas, in small containers or large aboveground or underground storage tanks. There are 1,980 underground storage tanks storing over 23 million gallons of hazardous materials at 747 facilities regulated by the County of Orange.

Hazardous Materials Transportation

The major transportation routes in Orange County include the freeway system, surface streets, pipelines, and railroads. These routes are used daily to transport hazardous materials from suppliers to users. On these routes, transportation accidents involving hazardous materials can occur. The threats posed by a transportation accident involving hazardous materials include explosions, physical contact by emergency response personnel, environmental degradation, and exposure to the public via airborne exposure.

The Federal Department of Transportation (DOT) is the primary regulatory authority for the interstate transport of hazardous materials. The DOT regulations establish criteria for safe handling procedures (e.g., packaging, marking, labeling, placarding, and routing). Criteria also exist regarding personnel qualifications and training, inspection requirements, and equipment specifications. The California Highway Patrol enforces the intrastate transport of hazardous materials and hazardous wastes.

Another major hazardous materials transportation mode in Orange County is that of underground pipelines. These pipelines predominately transport crude or refined petroleum, gasoline, and jet fuel. The major threats posed by this transportation method include explosions, fire, and contamination of surface and groundwater potentially used as a source of drinking water.

The regulatory agency responsible for enforcement as well as inspection of pipelines transporting hazardous materials is the California State Fire Marshal's Office, Hazardous Liquid Pipeline Division. Under mandate from Title 49 of the Code of Federal Regulation, the agency is charged with compliance review:

1) Inspection and enforcement

2) Pipeline failure and investigation

3) Pipeline training and certification

Locally the Orange County Fire Authority has emergency response authority.

Hazardous Materials Management

a) Underground Storage Tank Program

The Orange County Health Care Agency (OCHCA) has been designated by the Board of Supervisors as the agency to enforce the Underground Storage Tank (UST) program. The OCHCA Underground Storage Tank Program regulates approximately 747 underground storage tank facilities with 1,980 underground tanks within its jurisdiction. This program does not regulate underground tanks in the cities of Anaheim, Fullerton, Orange, and Santa Ana which implement their own programs.

The comprehensive program, implemented by OCHCA, includes conducting regular inspections of underground tanks; oversight of new tank installations; issuance of permits; regulation of repair and closure of tanks; ensuring the mitigation of leaking underground storage tanks; pursuing enforcement action; and educating and assisting the industries and general public as to the laws and regulations governing underground storage tanks.

b) Hazardous Materials Disclosure Program:

The Hazardous Materials Disclosure Program began as a direct result of two major hazardous materials incidents: the tragedy in Bhopal, India in December 1984, and the three day fire at the Lorry Fricker pesticide warehouse in Anaheim in June, 1985.

Under mandate from the California Health and Safety Code, the Orange County Fire Authority is the designated Agency to:

1) Inventory the Storage and use of hazardous materials in commercial or industrial occupancies;

2) Develop and implement area emergency plans to respond to a hazardous materials incident; and

3) Require businesses that handle hazardous materials to develop business emergency plans to deal with a fire or release of these materials.

The information disclosed by the industrial community is stored in a computerized data base and is made available to fire and police response personnel, the Sheriff-Coroner Department, the Health Care Agency, all hazardous materials response teams in the county, and the planning departments of the cities served by the Orange County Fire Authority.

Title 4 of the Orange County Codified Ordinances mandates an orderly program for the acquisition of basic information on the use and disposal of hazardous materials in the County. By contractual agreement or resolution of the individual city, the Orange County Fire Authority administers the provisions of the State law, Heath and Safety Code Chapter 6.95 in the unincorporated areas and in twenty two of the incorporated cities of the County. The remaining cities have adopted their own ordinances and are administering similar programs themselves.

Hazardous Materials Planning and Coordination

On February 7, 1984, the Orange County Board of Supervisors established the Hazardous Materials Task Force (HMTF) to review the County's hazardous materials activities and make recommendations to ensure effective coordination and control of countywide resources. The work begun by the HMTF continues under the jurisdiction of the Health Care Agency, Certified Unified, Program Agency (CUPA).

The functions and responsibilities of the HMTF include the following:

- Facilitate the coordination of various parts of the County's hazardous materials program; assist in coordinating County hazardous materials activities with outside agencies and organizations including

various state, federal, special districts, industry and community agencies and groups that impact or are involved with hazardous materials management issues/activities.

- Provide comprehensive, coordinated analysis of hazardous materials issues including the needs and priorities of all the various organizations involved in hazardous materials activities.

- Direct the preparation, implementation, and modification of the County's Hazardous Waste Management Plan as required by State law (Tanner Bill, AB 2948).

- Act as a clearinghouse for information and increase public awareness of hazardous materials issues/activities.

Hazardous Wastes

DESCRIPTION

The use of hazardous materials in the manufacture and use of many products considered essential to our economy result in the production of hazardous wastes which must be handled and disposed of in a safe manner to avoid harming human health and the environment. Hazardous wastes are commonly hazardous materials for which no further use is intended.

Hazardous wastes can be solid, liquids, gases, or sludges. A major issue concerning hazardous wastes is the potential accidental release of these substances. These releases can occur during any stage of handling, but particularly during storage and disposal.

HAZARDOUS WASTE GENERATION

Orange County, considered part of the Los Angeles region, is within the third highest hazardous waste generation area in California. The Department of Health Services (DOHS) rankings identify the Southern San Joaquin Valley as the second highest generator and the San Francisco Bay area as the highest. Together, these three regions account for 90% of the statewide annual hazardous waste generation. (See Figure IX-2.)

In 1983, 10.2 million tons of hazardous waste was estimated by the DOHS to be produced in California each year, the Los Angeles region accounting for 2,110,457 tons per year (21.5%) with 489,041 tons (5%) coming from Orange County alone.

In 1986, on passage of the Tanner Bill, State and local agencies began a process aimed at developing concise statewide hazardous waste management. The Tanner process will help to create a more comprehensive means of recording hazardous waste generation and tracking hazardous waste disposal.

More than 6,100 businesses under the County’s jurisdiction - from yacht repair shops to defense contractors - produce

wastes that can pose dangers as immediate as burns or as latent as cancer, if they are disposed of improperly. The majority of hazardous waste generators are located in three cities well-known for their industrial activities - Santa Ana, Anaheim, and Irvine.

However, all of the cities in Orange County have a number of hazardous waste generators, mostly small quantity generators. Of the 6,100 hazardous waste generators, approximately 5,900 of these are small quantity generators; for example, automotive body shops, dry cleaners, photo labs, etc. There is a growing need to develop affordable treatment alternatives to avert the potential cumulative effects of disposal by small quantity waste generators.

HAZARDOUS WASTE DISPOSAL

a) Disposal Facilities

Hazardous waste land disposal facilities are classified by the State Water Resources Control Board as Class I or Class II-1, based on each site's hydrogeological characteristics and projected waste acceptance.

Prior to the 1984 Resource Conservation and Recovery Act (RCRA) amendments which call for a phased ban on land disposal of untreated waste, Class I facilities could accept virtually all types of hazardous waste, while Class II-1 facilities were allowed to accept only specified types of hazardous waste.

Until November 30, 1984, California had seven operating Class I land disposal facilities. Since that time, the BKK Landfill in West Covina has been closed due to increasingly restrictive State regulations, the harsh economics of hazardous waste land disposal and the threat of potential future liabilities.

Much of the hazardous waste produced in Orange County and the rest of Southern California was transported to the BKK site. Since the closure of the BKK site, Orange County's hazardous waste is transported to the nearest sites at Casmalia in northern Santa Barbara County and at Kettleman Hills in Kings County, as depicted in Figure IX-3, or to facilities in other states.

In Orange County there are a number of sites where hazardous waste has been disposed of both legally and illegally which requires cleanup or mitigation. Currently, nine sites have been identified in Orange County as abandoned hazardous waste sites which are eligible to be funded for cleanup pursuant to the State Hazardous Substances Cleanup Bond Act of 1984 (Superfund). In addition to these nine sites, 800 additional abandoned sites are being examined by

the State DOHS as potentially containing hazardous wastes.

Furthermore, an OCHCA survey of all dumps and landfills located in the County was conducted in 1980, this survey report identified 92 waste disposal sites in the County, the majority of which have been used for the disposal of municipal refuse and inert materials. A small percentage of hazardous waste is suspected to be present as a result of disposal of household hazardous waste.

Also of significance are 285 sites in the County that have been identified as hazardous waste sites as a result of underground tanks leaking and contaminating either the soil and/or groundwater. This number has been increasing and is expected to continue to increase in the foreseeable future.

b) Illegal Dumping

Illegal dumping takes on many forms

Figure IX-2

Figure IX-3

including disposal on plant property, on vacant land, or to the sewers. In addition, the Orange County Water District has identified incidences of localized groundwater contamination resulting from inadvertent release of virgin hazardous materials.

The number of hazardous waste sites requiring cleanup is expected to increase due to the following: a possible increase in illegal disposal due to the phased closure of most of the hazardous waste landfills to untreated hazardous waste and a significant increase in costs to dispose, treat, or recycle; increased awareness and reporting by the public; and greater implementation of programs by OCHCA and other agencies.

In addition, the mitigation of such sites is technically complex and can take several years. This can result in costs to responsible parties, if they can be identified, that are prohibitive. However, monitoring of storm sewers by RDMD and the groundwater by the Orange County Water District has indicated that any widespread illegal disposal of hazardous waste to the groundwater has not endangered this resource to a significant extent.

ORANGE COUNTY HAZARDOUS WASTE MANAGEMENT

a) <u>Hazardous Waste Management Plan Development</u>

Because past hazardous waste management practices failed to assess, in many cases, the long-range health risks to the general population of prolonged exposure to toxic substances, stricter regulatory standards and more sophisticated measuring techniques are being applied to old hazardous waste landfill operations.

As a result, significant contamination is being found. As a means of mitigation, the Environmental Protection Agency (EPA) under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), also referred to as the Superfund, is actively pursuing a program of uncontrolled hazardous waste site assessment; stabilization of sites imminently threatening to public health; and remedial cleanup of sites receiving priority ranking.

In anticipation of the shortage of hazardous waste disposal facilities in Southern California, State and local elected officials initiated a Southern California Hazardous Waste Facility Study in 1981. By 1985, Orange County and six other counties (Imperial, Riverside, San Bernardino, San Diego, Santa Barbara, and Ventura; plus representation from cities in those counties) founded the Southern California Hazardous

Waste Management Authority. Los Angeles County and Kern County attend meetings, but have not officially joined the Authority.

The purpose of the Authority is to provide local jurisdictions a framework within which to establish and implement an equitable allocation of hazardous waste management facilities called for in the regional Action Program. The role of the Authority is to coordinate implementation of programs and siting of facilities sufficient to safely manage hazardous waste in Southern California.

As part of its participation in the Authority, Orange County drafted a hazardous waste management plan to serve as a beginning point for discussing and developing a comprehensive system of hazardous waste management for the County. At the same time the Draft Plan project was approved by the Board of Supervisors, the Governor signed the Tanner Bill, AB 2948. This bill established a state policy on the use of hazardous waste landfills and provided a schedule for moving away from their use as disposal sites for raw, untreated chemical wastes.

This law created a set of programs and procedures to facilitate the siting and permitting of treatment and residual repository facilities through local level hazardous waste management planning. The Tanner Bill also provides for the establishment of an Advisory Committee comprised of members representing different sectors of society. The Committee is responsible for overseeing the Draft Plan development and approval process. Provisions dealing with an expeditious administrative process for appealing land use decisions for off-site, multi-user hazardous waste facilities and extending some "seed money" to assist in their planning efforts were also established in this bill.

In accordance with the Tanner Bill time frame and in order to offer an option to previous forms of hazardous waste disposal, the Orange County Hazardous Materials Program Office established a two phase project. The first phase consisted of a series of one-day events called Toxic Roundups at which residents disposed of unwanted household toxins. The Toxic Roundups were a means of providing public education to increase public awareness in segregation, disposal, and proper handling of household hazardous waste and water quality issues.

As an ongoing program, four to five collection stations will be established throughout the County by October 1987 for the collection of household and small generator wastes. The program will be a joint venture of the County, cities, and solid waste haulers.

b) Orange County Health Care Agency (OCHCA) Hazardous Waste Program

In 1983, the County Board of Supervisors established the OCHCA Hazardous Waste Management Program to reduce the threat of exposure to the general public and to protect the environment. The comprehensive program includes conducting routine inspections of hazardous waste generators; conducting investigations of complaints of illegal hazardous waste storage and disposal; responding to emergency incidents involving both hazardous materials and hazardous waste; and oversight of cleanups from leaking underground storage tanks and hazardous waste.

This program is also responsible for pursuing enforcement action, where warranted, and educating and assisting the industries and general public as to the laws and regulations governing hazardous wastes. The laws and regulations governing hazardous waste are the California Health and Safety Codes Chapter 6.5 and the California Administrative Codes Title 22.

c) Proposition 65 Program

The Environmental Health Division of the Orange County Health Care Agency also oversees the implementation and enforcement of Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986. Section 4 of this law requires designated government employees, as of January 1, 1987, to disclose illegal discharges or threatened illegal discharges of hazardous waste likely to cause substantial injury to public health and safety. Information is to be reported to the Health Officer and Board of Supervisors within 72 hours or criminal, and civil penalties could be faced. The Health Officer in turn makes the information available to the news media and the public.

Medical Wastes

SOURCES/LOCATION OF WASTES

Currently there are approximately 163 regulated facilities in Orange County that generate in excess of 4,500 tons of medical waste annually. These facilities include hospitals, doctors' offices, the County Morgue, laboratories etc.

Potential hazards at these locations range from improper identification of medical waste to a spillage of liquid etiologic cultures in areas accessible to the public. Exposure to these types of waste could lead to the public contracting a disease depending upon the agent and exposure.

Additionally, the public may be exposed to human pathogens as a result of accidents in the work place, streets and highways etc. The County Fire Department has developed emergency procedures for contact and clean-up.

MEDICAL WASTE MANAGEMENT

The OCHCA Medical Waste Program was established in 1982 in response to a large increase in the number of incidents involving the illegal disposal of medical wastes in County landfills, on roadways etc. This potential exposure to medical waste was recognized as a threat to landfill workers and citizens of the County.

The Medical Waste Program, implemented by OCHCA, includes conducting regular inspections of medical waste generating facilities, investigating complaints regarding illegal storage or disposal of medical waste, pursuing enforcement action where warranted, and educating facilities and the public as to the laws and regulations governing medical wastes activities.

Radioactive Material

DESCRIPTION

Radioactive material, another form of hazardous substance, is any material that emits ionization radiation spontaneously. The increasing volume and variety of high and low level radioactive materials that are generated, stored, or transported in Orange County create potential hazards due to the threat of accidental release of radiation.

Ionizing radiation can damage living cells, leading to somatic injury or harmful genetic effects. Excessive amounts of radiation can contribute to or cause an increase in serious illness and/or mortality. Sources of potential exposure range from a small spill inside a facility to a radioactive plume of smoke from a major fire.

Radioactive material incidents require specialized technical expertise that varies depending on the materials involved and the type of incident. The resources and personnel required to react to a radioactive materials incident may involve various local, special district, state, and federal agencies. The specific outline of first responders can be found in the Orange County Emergency Plan.

Nuclear Materials (San Onofre Nuclear Generating Station-SONGS)

DESCRIPTION

Naturally occurring radiation is in the air we breathe, the food we eat, in our homes, and even in our bodies. This "natural background" radiation is the largest contributor to a person's average radiation dose. Radiation can affect the body cells and, in excessive amounts, can be injurious. The nuclear power industry contributes less than 1% of the radiation to which we are regularly exposed and yet is the one source that generates the greatest concern among the general public.

SOURCES/LOCATION

a) Sources

Radioactive by-products are contained within the plant, except for small quantities of radioactive gases released into the air and liquids released into the ocean. Such releases occur infrequently and are monitored by the plant personnel in accordance with strict government standards.

The two most likely sources of radiation contamination from SONGS are transportation accidents involving shipments of nuclear materials and uncontrolled airborne releases from the plant site.

NUCLEAR MATERIALS/WASTES AT SONGS

Low-level wastes: The largest volumes of such wastes are disposable protective clothing (e.g., towels, gloves, shoe covers), tools, and containers that have been used by radiation workers inside the plant and which usually exhibit very little radioactivity. Also included are demineralizing and filtering materials used to purify water in the reactor coolant systems. These wastes contain very small to moderate amounts of radioactive materials.

High-level wastes: These wastes generally consist of highly concentrated radioactive fission and activation products created during nuclear fission in a reactor. Generally, this consists of used nuclear fuel elements. Such wastes will eventually require long term isolation from the environment, and, until the Federal Government is ready to accept them for permanent disposal, they will be held at the plant site.

New fuel elements: New fuel elements are the source material used in a nuclear fission reactor. They are not highly radioactive and do not present a serious radiation hazard. However, they must be shipped in accordance with strict federal standards.

b) Location

The San Onofre Nuclear Generating Station (SONGS), located next to San Onofre State Beach, is on the Camp Pendleton U.S. Marine Corps Base in San Diego County. SONGS is approximately five miles south of the City of San Clemente.

Nuclear Materials Management (SONGS)

a) REGULATION/AGENCIES

***U.S. Nuclear Regulatory Commission (NRC)*:** Before nuclear power plants are allowed to operate, their owners must demonstrate to the NRC, an independent federal agency, that construction and operation of their nuclear plants will not present an

undue risk to public health and safety by meeting the most comprehensive set of standards and regulations of any industrial activity.

***U.S. Federal Emergency Management Agency (FEMA)*:** The administration of the regulations, commonly referred to as NUREG 0654/FEMA-REPl, is the primary responsibility of the Federal Emergency Management Agency. Coupled with the regulation of on-site operations, these regulations are directed to the off-site protection of public health and safety, in the event of an accident, through extensive coordinated plans of the several primary local response agencies.

California Office of Emergency Services (OES): The OES is dedicated to coordinating State resources in the event of an accident and is primarily responsible for monitoring at SONGS or any other nuclear power generating station. The OES is also responsible for recovery activities within a 50-mile zone surrounding SONGS, known as the Ingestion Pathway Zone (IPZ). Radiation sources, if released in uncontrolled quantities within the IPZ, could enter and contaminate the food chain.

Inter-jurisdictional Planning Committee (IPC): While the local governments and agencies surrounding SONGS do not have authority to regulate plant operations, they have responsibilities for protecting the public health and safety of their constituents and, accordingly, are intimately involved in emergency planning and response activities. The primary response agencies include Orange and San Diego Counties, the Cities of San Juan Capistrano and San Clemente, Marine Corps Base Camp Pendleton, and the local office of the State Parks and Recreation Department. In 1983, these agencies established the Inter-jurisdictional Planning Committee that meets regularly to coordinate their emergency plans, train, exercise, and resolve matters of mutual concern.

b) PROGRAMS

Emergency Zones Response Program: In an effort to prepare those who live and work in areas outside, but adjacent to SONGS, the federal and state governments have established three levels of emergency zones. Although it is very unlikely an emergency might arise, these zones are devised to maximize protection of public health and well being.

Emergency Planning Zone: The U.S. Nuclear Regulatory Commission has established an area surrounding every nuclear generating station identified as an Emergency Planning Zone (EPZ). (See Figure IX-4). At SONGS, the

EPZ encompasses portions of Orange and San Diego counties, the cities and communities of San Clemente, San Juan Capistrano and Dana Point, portions of the Camp Pendleton Marine Corps Base, and several beaches and parks operated by the State Department of Parks and Recreation (i.e. San Onofre State Beach, San Clemente State Beach and Doheny State Beach). While a serious emergency at SONGS is considered highly unlikely, extensive planning efforts within the EPZ provide for emergency protective actions such as sheltering or, in very extreme emergencies, evacuation.

Public information brochures are distributed periodically to every resident and business owner within the EPZ. Included is information on radiological emergencies, protective action procedures, location of transportation assembly areas, evacuation routes, designated reception centers, and Emergency Broadcast stations.

***(PEZ)*:** The State of California has defined an area outside and adjacent to the federal EPZ as the Public Education Zone. At SONGS, the PEZ encompasses the communities of Laguna Beach, Laguna Hills, Laguna Niguel, Lake Forest and Mission Viejo in Orange County; portions of the Cleveland National Forest in Riverside, Orange and San Diego counties; and additional portions of the Camp Pendleton Marine Corps Base and the communities of Oceanside, Fallbrook, Bonsall, Carlsbad and Vista in San
Diego County

***Ingestion Pathway Zone (IPZ)*:** The Federal Government has established an area with a 50-mile radius around every nuclear generating station as an Ingestion Pathway Zone (IPZ). At SONGS, the IPZ encompasses all of Orange County and parts of San Diego Los Angeles, San Bernardino and Riverside counties. This zone is established for the purpose of monitoring and decision-making specifically to avoid the ingestion of deposited nuclear materials by humans and livestock. The State of California, Department of Health Services, has the primary responsibility for operations in the Recovery Phase of a nuclear power plant accident and is assisted by the Health Department from each of the affected counties.

Summary

State and local efforts in hazardous waste management will continue to lay foundations for development of comprehensive legislation and implementation programs. The Tanner process will serve to direct these efforts toward reduction of interagency

redundancy; eventual creation of compatible State and local data; development of long-range, focused plans; and development of technologies aiding in waste treatment and source reduction.

GOALS, OBJECTIVES, AND POLICIES: *Hazardous Materials*

General goals and objectives may be found in the beginning of the Public Safety Component.

1) To provide consultation, assistance, and education to the public, industries, and other agencies regarding the applicable laws and regulations of hazardous materials (including underground storage tanks), hazardous waste, medical waste, and nuclear materials.

2) To respond to all emergency incidents to oversee and ensure that these incidents involving hazardous waste, and medical waste are properly mitigated.

3) To investigate all complaints involving hazardous waste, and medical waste and take enforcement action as needed.

4) To inspect, evaluate, and maintain an adequate surveillance of hazardous materials, hazardous waste, and medical waste in order to ensure full compliance with the laws and regulations.

5) To secure and maintain complete and accurate information on the identity, volume, location, and management methods of all hazardous materials, hazardous waste, and medical waste in Orange County. This will aid in management, planning, and emergency response.

6) To implement and administer all mandated laws, regulations, and ordinances relating to hazardous materials, hazardous waste, and medical waste.

7) To create and/or support legislation that reduces the various levels of risk posed by hazardous materials, hazardous waste, infectious waste, and radioactive materials to the public and to industries and businesses.

8) To provide training to designated personnel to keep them up-to-date, regarding new equipment and technology, on the reduction of risks of hazardous materials (including those stored in underground storage tanks) hazardous waste, and medical waste.

9) To implement the Orange County Emergency Plan particularly sections addressing hazardous waste, medical waste, and nuclear materials incidences. This will help to foster participation in countywide planning efforts.

10) To encourage development of emergency evacuation procedures for areas immediately surrounding facilities storing, handling, or processing nuclear material.
11) Evaluate new equipment and technology used in the handling, storage, transport, and disposal of nuclear materials.

12) To cooperate in providing coordinated emergency plans specific to the San Onofre Nuclear Generating Station.

13) To participate in mechanisms for coordinated emergency planning and response among the utility and other governmental jurisdictions.

14) To participate in and provide training to Orange County emergency responders and decision-makers to ensure ongoing proficiency in managing all aspects of a nuclear power plant emergency.

15) To encourage and participate in public education in advance of need with respect to notification of a nuclear power plant emergency and proper public protective actions.

16) Conduct plan checks of all new and existing underground storage tank installations to assure compliance with construction and monitoring standards.

17) To support regional efforts as needed to plan for and facilitate the establishment of regional treatment facilities to manage the hazardous, and medical waste which are generated within this County.

18) To make available to the public and news media information on nuclear waste discharges likely to cause substantial injury to public health or safety.

To implement the Tanner Process for Hazardous Waste Management planning.

IMPLEMENTATION PROGRAMS:
Hazardous Materials

1. PUBLIC EDUCATION/ INFORMATION

Action:
Support the efforts of the Health Care Agency's Hazardous Materials Program and other agencies through public information and educational activities.

Discussion:
This program is intended to increase the community's awareness of the need for proper disposal of hazardous waste and provide educational assistance to residences and businesses.

New or Existing Program: Existing

Implementation Schedule: Ongoing

Responsible Agency: Health Care Agency's Hazardous Material Program

Source of Funds:

- Hazardous Waste Generator Fees

2. HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAM

Action:

Continue to promote the efforts of the Integrated Waste Management Department (IWMD) in organizing *Figure IX-5*

collection of household toxic wastes on a regular basis.

Discussion:
This effort is aimed at securing the proper disposal of household chemicals considered dangerous to the environment, particularly ground water supplies.

New or Existing Program: New

Implementation Schedule: Ongoing;

***Responsible Agency*:** Integrated Waste Management Department

Source of Funds:
- Fees from the Waste Management Enterprise Fund
- Orange County Sanitation District
- User Fees

3. HAZARDOUS MATERIALS MANAGEMENT COORDINATION

Action:
Continue to promote the efforts of the Hazardous Materials Program Office (HMPO) in reviewing the County's hazardous materials activities and in making recommendations to ensure effective coordination and control of countywide resources.

Discussion:
In furthering the efforts to adequately and effectively manage the hazardous materials/waste stream in Orange County, the Hazardous Materials Program Office (HMPO) of Health Care Agency facilitates the coordination of various parts of the County's hazardous materials program both within the County and with outside organizations. This organization is accomplished through the following:

- Explanation and interpretation of policies and priorities established by the State and the County;
- Establishment and direction of both ongoing and ad hoc committees of working level staff from many agencies to address specific issues or procedures;
- Facilitating the exchange or sharing of information, concerns and priorities between staff of different agencies;
- Establishing and maintaining regular contact and involvement with regional, State and Federal agencies and officials involved in hazardous materials issues.

New or Existing Program: Existing

Implementation Schedule: Ongoing

Responsible Agency: Health Care Agency

Source of Funds:
- County General Fund

- Hazardous Waste Generator Fees

4. BUYER NOTIFICATION PROGRAM

Action:
Continue the administration of the Buyer Notification Program as designated by Board of Supervisors Resolution 82-1368. Land use maps and planning information required by the guidelines shall be updated yearly by the sub-divider/developer, or more often, if the Director of Planning and Development Services is aware of planning changes which affect the subdivision and makes the update a condition of approval of the map.

Discussion: The Buyer Notification Program is intended to provide prospective homebuyers with an appropriate overview of nearby planning and development. Information provided in the distributed packets includes the location of such facilities as fire stations and critical utility facilities.

New or Existing Program: Existing

Implementation Schedule: Ongoing

Responsible Agency: RDMD

Source of Funds: County General Fund

5. HAZARDOUS WASTE PROGRAM

Action:
Continue to implement the Waste Management Program. The program includes the Hazardous Waste Generator Program, the Emergency Response Program, and the Underground Storage Tank Program.

Discussion:
The purpose of the Hazardous Waste Program is to protect the public and the environment from exposure to hazardous waste and hazardous materials stored in underground storage tanks. Maximization of protection is accomplished through surveillance and enforcement of hazardous waste generators.

New or Existing: Existing

Implementation Schedule: Ongoing

Responsible Agency: Orange County Health Care Agency

Source of Funds: Completely funded by fees collected from the generators of hazardous waste.

6. PROPOSITION 65 COMPLIANCE PROGRAM

Action:
Continue to implement the Proposition 65 Compliance Program.

Discussion:
This program is to inform the public of illegal or threatened illegal discharges of hazardous waste that are likely to cause substantial injury to public health or safety.

New or Existing: Existing

Implementation Schedule: Ongoing

Responsible Agency: Orange County Health Care Agency

Source of Funds: Completely funded by fees collected from the generators of hazardous waste and by fees collected from the underground storage tank owners.

7. MEDICAL WASTE PROGRAM

Action:
Continue to implement the Medical Waste Program.

Discussion:
The purpose of the Medical Waste Program is to protect the public health by detecting and reducing the incidents of illegal storage and disposal of medical waste.

New or Existing: Existing

Implementation Schedule: Ongoing

Responsible Agency: Orange County Health Care Agency

Source of Funds: Completely funded by fees collected from the generators of medical wastes.

IMPLEMENTATION PROGRAMS:
Nuclear Materials

8. EMERGENCY PLANS

Action:
Continue to evaluate Orange County's Incident Response Plan for the San Onofre Nuclear Generating Station (SONGS) and update annually, as appropriate.

Discussion:
Southern California Edison and each primary response agency, including the County of Orange, is responsible for the preparation of its own emergency plans concerning a nuclear power plant accident. Orange County's Incident Response Plan for SONGS is updated regularly and must be coordinated with the plans of other jurisdictions with which there are common responsibilities. Inter-jurisdictional procedures have evolved to cover these responsibilities.

New or Existing: Existing

Implementation Schedule: Ongoing

Responsible Agency:
OCFA/Emergency Management Division

Source of Funds: Reimbursable from utility-funded account administered by State Office of Emergency Services.

9. INTERJURISDICTIONAL PLANNING COMMITTEE (IPC)

Action:
Participate in the deliberations of the Inter-jurisdictional Planning Committee and encourage cooperative planning, decision-making, and response actions among all participating agencies.

Discussion:
The primary response agencies and jurisdictions include Southern California Edison Company, Orange and San Diego counties, San Clemente, San Juan Capistrano, Camp Pendleton Marine Corps Base, and the local office of the State Parks and Recreation Department. Other participating agencies are the American Red Cross and the California Highway Patrol.

While local governments and agencies surrounding SONGS do not have authority to regulate plant operations, they do have responsibilities for protecting the public health and safety of their constituents should there be an extraordinary release of radioactivity. Accordingly, the IPC meets regularly to coordinate their emergency plans, train, exercise, and resolve matters of mutual concern.

New or Existing: Existing

Implementation Schedule: Ongoing

Responsible Agency: OC Sheriff

Source of Funds: Reimbursable from utility-funded account administered by State Office of Emergency Services.

11. TRAINING

Action:
Provide training to emergency responders and others responsible for making decisions that affect appropriate public protective actions and participate in joint exercises of nuclear power plant emergency plans.

Discussion:
In any emergency situation, the utility only has the authority to advise local governments of plant status and to make recommendations. Overall coordination is facilitated by agency representatives at the joint Emergency Operations Facility, the Emergency News Center, and a dedicated decision-making communications network. These facilities are exercised regularly by the local jurisdictions and agencies who are evaluated

periodically by the Federal Emergency Management Agency.

Significant local training activities include:

1) Periodic Drills: Simulated drills to test specific components of the emergency plans;

2) Regular Exercises: Full-scale exercises of both on-site and off-site emergency plans at least every two years, and more frequently if required. On-site performance is evaluated by the Nuclear Regulatory Commission and off-site response is monitored and evaluated by the Federal Emergency Management Agency; and,

3) Community Alert Siren/Emergency Broadcast Systems Test: Annual full-scale activation of the Community Alert Siren System together with activation of the Emergency Broadcast System.

New or Existing: Existing

Implementation Schedule: Ongoing

Responsible Agency: OC Sheriff

Source of Funds: Reimbursable from utility-funded account administered by State Office of Emergency Services.

12. PUBLIC EDUCATION

Action:

Provide information materials upon request and participate in nuclear power plant emergency education forums with Southern California Edison and other primary response jurisdictions as appropriate.

Discussion:

Responding appropriately in an emergency depends not only on cooperation of the primary responders, but on an informed public. Accordingly, public education is required by federal regulators for the 10-mile Emergency Planning Zone (EPZ) surrounding SONGS, and by State regulators for the Public Education Zone (PEZ) surrounding the EPZ.

Education Resources: Within the Emergency Planning Zone, an Emergency Information Booklet is mailed by Southern California Edison to every residential and business address within the EPZ containing information on radiological emergencies. The same information is sent to every new utility customer in the EPZ. Other resources include a Speakers' Bureau, school programs, tours, telephone directory instructions, beach posters, and hotel and motel placards.

Within the Public Education Zone (PEZ), every residential and business address in the Public Education Zone is periodically mailed an Emergency Information Handbook. The handbook provides information about the emergency plans, agencies involved, the nature of radiation, and the effectiveness of sheltering should public protective action ever be required. The handbook is also mailed to new customers within the PEZ on a regular basis.

New or Existing: Existing

Implementation Schedule: Ongoing

Responsible Agency: Southern California Edison Company and, where appropriate, OC Sheriff.

Source of Funds: Reimbursable from utility-funded account administered by State Office of Emergency Services.

AIRCRAFT ENVIRONMENT

[Note: A comprehensive update to the Aircraft Environment section will be completed as part of a future General Plan Amendment.]

Introduction

Aircraft provide a valuable and necessary service to Orange County residents and businesses. Orange County is unique among most counties in California because commercial, general, and military aviation facilities are located within its borders. These facilities generate a high level of air traffic which is further influenced by aircraft transiting through the County en route to destinations elsewhere. The sheer number of aircraft operating within the County and the air routes covering the County heightens the chances of aircraft accidents, yet aircraft accidents occur infrequently when compared to the number of air operations.

This section of the Safety Element explores the aircraft environment of Orange County. To do so, it focuses on commercial, general, and military aviation operations either by fixed-wing aircraft or helicopters. The section does not discuss aircraft noise. Information pertaining to aircraft noise may be found in the Noise Element of the General Plan.

Current Conditions

COMMERCIAL AVIATION

- John Wayne Airport (JWA) is owned by the County and the only commercial service airport in Orange County. It is served by nine commercial air carriers and five commuter airlines. In 2002, 7.9 million passengers used the airport. It is estimated that the current level of demand for service exceeds 12 million persons; however, the Airline Access

Plan limits the maximum number of passengers through John Wayne Airport. Those passengers not served at John Wayne obtain air service from airports outside the County, 10.3 million annual passengers.

- Los Angeles International Airport (LAX) is a regional air transportation facility covering over 1,500 acres of west Los Angeles. There are currently over 550,000 flight operations a year at the airport; total average daily passenger traffic is over 81,000 people. The cities and communities surrounding LAX are largely built-out and consist primarily of residential land uses. The land uses immediately surrounding the airport consist primarily of commercial and industrial uses.

- Ontario International Airport is a regional air transportation facility covering over 1,100 acres of the City of Ontario. There are currently over 145,000 flight operations per year at the airport; total average daily passenger traffic is over 17,000 people. At present, the areas to the west and north of the airport are largely built-out or approved for development, where the areas to the east and south are largely undeveloped.

- Long Beach Airport is a sub-regional air transportation facility operated by the City of Long Beach. The airport covers approximately 1,100 acres north of the San Diego Freeway. In 2003, there were approximately 4,000 passengers daily with an average of 18 daily commercial aircraft departures.

- Burbank-Glendale-Pasadena Airport is a regional airport located south of the Verdugo Mountain range. There are currently over 37,000 annual flight operations with an estimated projection of over 50,000 by the year 2000. Total average daily passenger traffic is currently over 8,000 people. The fleet mix at Burbank Airport includes the following: B-737s; DC-9s; MD-80s; and B-727s. Anticipated is the conversion of the noisier B-727, B-737, and DC-9 to the quieter departing B-737-300, B-757, and BAe-146.

GENERAL AVIATION

John Wayne Airport serves as the home base for approximately 1,000 personal and business ("general aviation") aircraft. During calendar year 1986 there were approximately 5,000 business jet departures.

Within Orange County there are more than 2,600 aircraft registered to personal and corporate owners; yet, there is only one other airport for these types of aircraft within the County besides JWA--Fullerton Municipal, with 590 based aircraft. All other private aircraft flying to or through

Orange County are home based at airports outside Orange County.

The use of helicopters in business and pleasure has grown enormously in the last decade. With no room to expand, urban airports have had to fit helicopter takeoff and landing areas next to busy airliner runways, taxiways and fueling ramps. Though helicopter pilots and airline pilots are under the guidance of air traffic controllers, they are, depending on the airport, generally communicating on separate radio frequencies.

In Southern California, where an estimated 167,000 helicopter flights occur each year, finding locations for new heliports is a growing concern. There are already 203 heliports within the region, including a growing number in Orange County, most of which are privately owned and operated. About 30 helicopters are based at JWA.

MILITARY AVIATION

- **Los Alamitos Armed Forces Reserve Center**

  Los Alamitos Armed Forces Reserve Center (AFRC), twelve miles from JWA, is located in northwestern Orange County within the City of Los Alamitos. On-site facilities presently include two runways and associated taxiways, ramp space, and hangars. The AFRC is primarily used for helicopter training missions. There are approximately 80,000 yearly flight operations at the facility (SCAG, 1980).

  In the event of an extraordinary emergency situation requiring an unusual emergency response, Los Alamitos Armed Forces Reserve Center may be available to provide significant assistance. Los Alamitos AFRC may provide additional communication centers, medical facilities (Los Alamitos houses an emergency field hospital), and evacuation equipment in the forms of helicopters, aircraft, and vehicles. Military personnel can also be mobilized to augment the ranks of emergency personnel. Also, this military installation maintains its own emergency response plan that addresses on and off post emergency incidences which could be drawn upon in a County disaster situation.

- **MCAS Camp Pendleton**

  The air station within Marine Corp Base (MCB) Camp Pendleton is located 50 miles southeast of JWA. MCB Camp Pendleton serves as the primary west coast training facility for all elements of Marine Corps and Navy amphibious assault training and support missions. Marine Corps Base Camp Pendleton operates light assault aircraft, including the OV-10 Bronco, the AH-1J Cobra and the UH-lN Huey

helicopters. Over 120,000 operations were generated by this airfield in 1986.

Aircraft Accident Potential

Orange County is located in one of the busiest aviation areas in the world (two of the busiest 10 airports in the United States are within a 50-mile radius) along with a multitude of transient traffic. Currently incoming traffic to JWA crosses airspace above Huntington Beach and Newport Beach that is also used by planes preparing to land at Long Beach Municipal Airport.

In addition to Long Beach and John Wayne Airports commercial traffic coming and going from Los Angeles International Airport (LAX) adds to the aerial congestion above Orange County (40 percent of departing LAX passenger jets are routed south over Seal Beach and then east over Lake Forest or further south to San Diego). However, many of the flights are flying at altitudes in excess of 10,000 feet.

AIR INSTALLATIONS ACCIDENT POTENTIAL DESCRIPTIONS

A concern of the general public living in the proximity of an airport or under the aircraft flight paths is the incident of an aircraft accident resulting in ground damage. Airports and air carriers share much this same concern although their motivation is generally to promote positive public sentiment.

The air installations within Orange County maintain records which detail the aviation accidents that have occurred within the air space surrounding the facility. They provide important information to evaluate the relative air safety within Orange County. Below is information describing the accident potentials for the three primary air installations within the County.

1) **John Wayne Airport (JWA):** In early 1985 the Board of Supervisors adopted an Airport Master Plan for John Wayne Airport. The plan was the subject of extensive environmental documentation, including an evaluation of aircraft accidents. The environmental document (EIR 508) based on the only accident statistics obtainable from the National Transportation Safety Board for the period of 1972 to 1981 revealed that 54 accidents have occurred during 5.9 million operations (arrivals and departures) or .9 accidents per 100,000 operations.

2) **Fullerton Airport:** The Airport's Noise and Safety Committee has compiled accident records for the period of 1960 through 1987. The records for this 26 year period reveals 28 accidents. The airport averages approximately 212,000 operations a year with an accident rate of approximately .5 accident per 100,000 operations. In no instance has an

accident resulted in the death of anyone on the ground.

3) **Los Alamitos Armed Forces Joint Forces Training Center:** Accident records maintained by this facility are subject to Department of Defense criteria in the same manner as the records maintained by the two former Marine Corps Air Stations. Though minor mishaps causing less than 10,000 dollars in damage to aircraft have occurred on the air field premises, no accidents have occurred which have resulted in loss of life or major ground damage in the last ten years.

Aircraft Safety Management

REGULATIONS

Through the Federal Aviation Act of 1958,

Figure IX-5

as amended, and numerous Grant-in-aid programs for airport development, the federal government has exercised a strong legal and practical preemption over state and local authority in the areas of airspace use and management, air traffic control, aviation safety, and the regulation of aircraft noise at its source. The federal government also controls interstate and foreign air commerce.

State and local governments that are not airport proprietors are largely limited to protecting their citizens through land use controls or other police powers which do not affect aircraft operations directly or indirectly.

The airport proprietor has with certain limitations, the right to determine the type of service his airport will provide as well as the type of aircraft to utilize his airport facilities. The actual scope of proprietor authority over airport and aircraft operations has been the subject of substantial litigation in recent years, yet, the scope of the proprietor's authority remains imprecisely defined. The dividing lines between federal, state, and local government, and airport proprietor responsibilities and authority, are not clear and are subject to different interpretations.

Certain standards are specified in Part 77 of the Federal Aviation Regulations to define airspace around an airport that should be free of obstructions to air navigation. Ideally no obstructions should penetrate these "imaginary surfaces" surrounding the airport as defined in Part 77.

PROGRAMS

Air Traffic Control Areas and Designated Authorities

Orange County is crisscrossed by a complex system of air traffic corridors and landing and take-off patterns. Much of Orange County commercial air traffic flies across complex air spaces controlled by various Federal Aviation Administration facilities. These facilities include the following: Los Angeles Terminal Radar Approach Control (LA TRACON) Center; Los Angeles Air Route Traffic Control Center (LA Center) at Palmdale; and the Coast Terminal Radar Approach Control (Coast TRACON) located at MCAS Miramar.

LA TRACON daily handles the approach and departure routes for more than 1,700 flights arriving and departing from Los Angeles International (LAX). The Los Angeles Air Route Traffic Control Center at Palmdale controls as many as 300 aircraft at a time in an oblong 180,000-square-mile rectangle of airspace covering southwest Utah, southern Nevada, western Arizona, Southern California and a stretch of the Pacific Ocean reaching 200 miles out to sea. Coast TRACON covers a 3,000-square-mile area including most of

Orange County. TRACONS utilize computer-enhanced radar images to guide pilots through the Los Angeles-Orange County basin until airport tower controllers take over during final approach.

These facilities guide thousands of planes through various types of airspace above Orange County. Among these types of airspace are the following: Terminal Control Areas (TCAs), Airport Radar Service Areas (ARSAs), and Airport Traffic Areas (ATAs) (See Figure IX-5).

The Los Angeles TCA is 52 miles long, 24 miles wide and is separated into 12 zones. A pilot may not enter any part of the TCA unless he first receives a clearance from air traffic controllers. A pilot must also possess a two-way radio, VOR (very high frequency omnidirectional radio) receiver, a transponder and an encoding altimeter.

An Airport Radar Service Area (ARSA) consists of controlled airspace extending upward from the surface or higher elevation to specified altitudes, within which all aircraft are subject to the operating rules and pilot and equipment requirement specified by Federal Aviation Regulations (FAR Part 91).

GOALS, OBJECTIVES AND POLICIES: *AIRCRAFT ENVIRONMENT*

Orange County is unique among California counties because commercial, general, and military aviation installations are located within its boundaries. Air traffic generated by these facilities, coupled with air traffic transiting through the County, presents an image of crowded skies heightening the chances of aircraft accidents. However, accidents occur infrequently compared to the number of operations.

This section of the Safety Element presents a specific aircraft safety goal and policies intended to minimize existing aircraft hazards and promote aviation safety.

Goals and Objectives

The following specific goal is in addition to the General Public Safety Component Goals and Objectives found earlier in this chapter.

Goal 1

To protect the health, safety, and general welfare by ensuring the orderly expansion of airports and the adoption of measures that minimize the public's exposure to safety hazards within areas around airports.

Policies

1. To utilize the most recent adopted Air Installations Compatible Use Zone (AICUZ) studies for military air installations (i.e., Los Alamitos Army Airfield) as the basis for safety compatibility planning in the vicinity of the facility.

2. To refer projects, as required by Section 21676 of the Public Utilities Code, to the Airport Land Use Commission for Orange County prior to their adoption or approval to determine consistency of the projects with the Airport Environs Land Use Plan (AELUP). Said projects include, but are not limited to, General Plan amendments, Zone Changes, or other discretionary action for the purpose of construction or alteration of a structure more than 200' AGL (Above Ground Level) and applicants seeking approval for the construction or operation of a heliport or helistop.

3. To support the creation of regulations requiring aircraft detection equipment.

4. To encourage the creation and updating of detailed flight charts and publications for the airspace in Orange County.

5. To encourage cooperative agreements between the County and the air installations to provide relief services in times of natural disaster.

IMPLEMENTATION PROGRAMS:
Aircraft Environment

The following section identifies existing programs that promote aviation safety and enhance public awareness.

1. PUBLIC INFORMATION AND COMMUNITY LIAISON

Action:
Support expanded public information and community liaison services as a means to public awareness.

Discussion:
This program promotes community awareness of aviation operations and safety. As an example, open houses held annually by Los Alamitos AFRC enhance community liaison. Public information and public involvement in the planning and operation of air installation**s** are also promoted through the Airport Land Use Commission, Airport Commission, and liaison services to local jurisdictions' councils.

New or Existing Program: Existing

Implementation Schedule: Ongoing, expand as necessary

Responsible Agencies:

- John Wayne Airport/Airport Commission
- Department of Defense
- Airport Land Use Commission
- Federal Aviation Administration

Source of Funds:

- Federal Government
- County General Fund
- Airport Funds

2. AIR INSTALLATIONS COMPATIBLE USE ZONES (AICUZ) PROGRAM

Action:

Continue to utilize and maintain the AICUZ to ensure compatible development in airport areas and to minimize public exposure to potential safety hazards associated with aircraft operations.

Discussion:

This program addresses compatibility problems arising between military air installation flight operations and urban development. The program strives to maintain the mission of an air installation and to protect surrounding communities from potential aircraft hazards.

New or Existing Programs: Existing

Implementation Schedule: Ongoing

Responsible Agency: Department of Defense

Sources of Funds:

- Department of Defense
- County General Fund

3. BUYER NOTIFICATION PROGRAM

Action:

Continue the administration of the Buyer Notification Program as designated by the Board of Supervisors Resolution 82-1368. Land use maps and planning information required by the guidelines shall be updated yearly by the sub-divider/developer or, more often, if the Director of Planning, Resources and Development Management Department is aware of planning changes which affect the subdivision and make the update a condition of approval of the map.

Discussion:

The Buyer Notification Program provides prospective home buyers and businesses with an overview of nearby planning and development. Information provided includes public facilities, demographics, and land use data including the location of air installations.

New or Existing Program: Existing

Implementation Schedule: Ongoing

Responsible Agency: RDMD

Source of Funds: County General Fund

4. AIRPORT ENVIRONS LAND USE PLAN (AELUP)

Action:

To continue to refer projects as defined by Section 21676 of the Public Utilities Code and within the planning areas of the Airport Land Use Commission to the commission to determine consistency with the Airport Environs Land Use Plan.

Discussion:

This program aims to safeguard the general welfare of inhabitants within the vicinities of airports and to ensure the continued compatible operation of existing and future airports including heliports and helipads and for proposed construction or alteration of a structure more than 200' Above Ground Level within Orange County. The plan seeks to ensure that urban development and air installation facilities are not concentrated in areas susceptible to potential aircraft hazards and to guard against structures or activities that adversely affect navigable airspace.

New or Existing Program: Existing

Implementation Schedule: Ongoing

Responsible Agency: Airport Land Use Commission

Source of Funds:

- John Wayne Airport
- County General Fund

NATURAL HAZARDS COMPONENT

The Natural Hazards Component focuses on two types of naturally occurring hazards that have the potential to significantly affect the County. Those hazards are flood and seismic/geologic hazards. Below are the general goals and objectives for the Natural Hazards Component. Specific goals, objectives and policies for the natural hazard topics are provided later in this section.

GENERAL GOALS AND OBJECTIVES: *Natural Hazards Component*

Goal 1

Provide for a safe living and working environment consistent with available resources.

- ***Objective***

1.1 To identify natural hazards and determine the relative threat to people and property in Orange County.

Goal 2

Minimize the effects of natural safety hazards through implementation of appropriate regulations and standards which maximize protection of life and property.

- ***Objectives***

2.1 To create and maintain plans and programs which mitigate the effects of natural hazards.

2.2 To support the development and utilization of technologies which minimize the effects of natural hazards.

Goal 3

Raise the awareness of Orange County residents, workers, and visitors to the potential threat of natural hazards.

- ***Objective***

3.1 To provide information, training, and assistance to reduce loss of life and to protect private and public property from environmental hazards.

FLOOD HAZARDS

Introduction

Orange County's geography and climate increase its susceptibility to flooding. Commonly, where a broad alluvial plain exists, such as the one created by the Santa Ana River, there has been and is a continual expansion of urban development.

The change from agriculture to urban development increases the amount of impermeable surfaces and raises flood potential. Whenever ground surfaces are covered by pavement or other impermeable surfaces, direct absorption of precipitation by the underlying soil is precluded and runoff increases and creates a potential threat of flooding. This condition is further aggravated during peak rain periods when absorptive ground becomes saturated, increasing the rate of storm runoff.

The hazard of dam failure is another major flood threat. The threat is primarily one of sudden downstream flooding, which could be disastrous if it occurs when a dam's impoundment volume is near capacity. Disaster potential is high since flood inundation could occur with minimal warning.

Another type of flooding occurs from the blockage of a flowing stream by a landslide. A natural dam may be created by the landslide temporarily impounding water. As a result of erosion, these flood

flows are released downstream. Seiching, an earthquake-induced wave within a lake, reservoir or harbor, may cause flooding, though its occurrence in Orange County would be considered rare.

Coastal flood inundation is another hazard. In response to the problems of planning, designing, and construction of structures and coastal flood control devices, Orange County undertook a study of Coastal Flood Plain Development.

The study, completed in 1985, provides technical criteria and guidelines for the review of structures and coastal protective devices in Orange County. The comprehensive study is intended to supplement zoning, land use, specific plans, and Local Coastal Programs, and should be updated at appropriate intervals to remain current in the face of shoreline position changes and sea level fluctuations.

The primary flood effects caused by inundation, erosion, and sedimentation are potential loss of life and property damage. There are other, less well-known effects that may be equally threatening and damaging. Among these are disruptions of commerce; disruptions to emergency transportation; pollution of drinking water caused by broken sewage lines; and strains placed upon the emergency services needed to respond to a flood emergency.

Orange County Flood History

Periods of sustained or intense precipitation are commonly associated with generating flood conditions. Precipitation within Orange County is generally the result of three distinct storm mechanisms. The most important mechanism is convergence associated with general winter storms. These storms originate as low pressure cells in Southern Alaska. On occasion, they move far enough south to carry widespread precipitation across southern California.

The second mechanism, also associated with general winter storms, is caused by orographic uplift. Mountain masses (i.e., Santa Ana Mountains) present a natural barrier to moisture laden air masses and deflect them upward increasing condensation and precipitation.

The third mechanism causing intense precipitation is convection. Thunderstorms, which may produce intense rainfall for relatively short duration are caused by the rapid heating and cooling of moisture laden air (i.e., convection).

General winter storms, which cause most of the major floods in the Santa Ana River basin, usually occur between the months of November through April. Flooding within the basin may be the result of one or successive storms of differing duration and intensity which compounds their effects. The heavy rainfall of the second or third storm may create a severe flood condition. In this century, storm-caused flooding has been reported in Orange County for the years 1903, 1916, 1922, 1927, 1938, 1943, 1965, 1966, 1969, 1974, 1978, 1979, 1980, 1982, 1983, 1985, 1986, 1992, 1993, 1995 and 1998. Eight of these storms, 1916, 1938, 1969, 1974, 1980 1983, 1995, and 1998, have produced widespread flooding in the County.

Two measurements commonly used to describe floods are flood frequency and flood size. Flood frequency refers to the chance in any given year that a flood of a given size could occur in a given watershed. A 100-year flood, then, is a flood that has a one in 100 (or 1%) chance of occurring in any year in a specific watershed.

There are three measurements for determining flood size: base flood, standard project flood, and probable maximum flood. A base flood usually refers to the 100-year flood, one percent chance of being equaled or exceeded in any year. A standard project flood is a flood that would result from the

most severe combination of meteorological and hydrological conditions considered reasonably characteristic of the geographic area. A probable maximum flood is estimated to be two to two-and-one-half times greater than a standard project flood,

and generally used in designing dam spillways.

Description of Potential County Flood Threats

FLOOD INUNDATION

Santa Ana River:

The Santa Ana River basin is the largest watershed area in Southern California encompassing approximately 3,200 square miles. The river, until it is fully improved under the current Federal Project, represents the greatest flood hazard west of the Mississippi River because of the urban development present within its expansive watershed. The watershed area is separated into an upper and lower basin roughly divided by Prado Dam and Reservoir near the City of Corona.

The Santa Ana River flows through the principal urban centers of San Bernardino and Riverside counties in the upper basin and most of the major cities of Orange County in the lower basin. Within Orange County, the

overflow area for a standard project flood included the following cities: Costa Mesa; Newport Beach; Santa Ana; Orange; Anaheim; Garden Grove; Fullerton; Buena Park; Cypress; Los Alamitos; Huntington Beach; Seal Beach; and adjacent unincorporated areas (see Figure IX-6).

According to a 1975 U.S. Army Corps of Engineers' report on the Santa Ana River Mainstem and Santiago Creek, under the most severe conditions likely, floodwaters would cover over 100,000 acres to an average depth of 3 feet. Floodwaters of about six to seven feet deep, could occur on land areas near the Pacific Coast Highway, and in low-lying areas of Huntington Beach. Without implementation of the Federal Project, such a flood could affect as many as 500,000 homes and 2,000,000 people.

Santiago Creek:

Santiago Creek (see Figure IX-7), a principal tributary of the Santa Ana River, rises on the western slopes of the Santa Ana Mountains and receives intermittent flows from several smaller canyons, including Black Star, Baker, Silverado, Modjeska, and Harding.

The Creek cuts a course 28 miles long from its headwaters near Santiago Peak to its confluence with the Santa Ana River. It drains a total of 102 square miles. Irvine Lake, also referred to as Santiago Reservoir, is formed behind Santiago Dam.

From Santiago Dam, Santiago Creek courses northwestward through Irvine Regional Park to Villa Park Reservoir formed behind Villa Park Dam. It then courses

Figure IX-7

southwestward through the cities of Villa Park, Orange, and Santa Ana. The creek joins the Santa Ana River just below the Garden Grove Freeway near the borders of the cities of Orange, Santa Ana, and Garden Grove. Below Villa Park, the creek flood plain is heavily urbanized; above this point, it remains largely in its natural state.

Other Orange County Creeks:
In addition to the major water courses of the Santa Ana River and Santiago Creek, other streams and creeks possess potential flood problems. These flood potentials are of a more localized nature as opposed to the more extensive hazard presented by the Santa Ana River and Santiago Creek.

In North County perhaps the greatest flood potential exists from the Huntington Beach/Fountain Valley Channels; the East Garden Grove-Wintersburg Channel; Carbon Creek Channel; Anaheim/Barber City Channel; San Diego Creek; and Peter's Canyon Wash (see Figure IX-8). Flood control improvements for these facilities were developed in accordance with earlier design criteria intended to meet flood threats expected to occur within a predominately rural agricultural county as it developed upon the broad alluvial fan of the Santa Ana River.

South Orange County is crisscrossed by creeks which are integrated with existing and future development. The most noteworthy creeks are: Aliso Creek, Trabuco Creek, Oso Creek and San Juan Creek (See Figure IX-8). The water courses are generally left in their natural condition because these creek channels and other lesser ones are predominantly incised arroyos. As necessary, various flood control facilities to mitigate the flood threat have been constructed in conjunction with urban development.

DAM INUNDATION

Prado Dam:
Prado Dam and Reservoir, completed by the Corps of Engineers in 1941, are intended to provide flood protection to the Lower Santa Ana River basin. The earthen dam and its reservoir were designed in the 1930s to control floods of magnitudes that could be reasonably expected to occur under anticipated future development of the watershed (typically a 200-year flood).

Since Prado Dam was built, however, changes have occurred in the drainage area. Historical data on rainfall and runoff, coupled with advances in predicting future flood potential, have shown Prado Dam to presently offer only 70-year flood protection. In addition, intensive urbanization within

the drainage area has occurred, further complicating this problem.

Another serious concern is that the existing Prado Dam and spillway could not accommodate a probable maximum flood, resulting in overtopping of the dam. Figure IX-9 depicts the potential flood hazards that might occur from a failure of Prado Dam.

Santiago Creek Dam:
Santiago Creek Dam is an earthen dam which impounds water forming Irvine Lake. The dam provides water conservation as a primary benefit, flood control as a secondary function, and promotes recreational activities within the lake. Flooding would be exacerbated by the failure downstream of Villa Park Dam. Figure IX-9 depicts the flood hazard potential that could happen should the dams fail.

Villa Park Dam:
Villa Park Dam is an earthen dam located downstream from Santiago Creek Dam. This facility is the

Figure IX-8

Figure IX-9

principal flood protection along Santiago Creek. Failure of this dam would pose a flood hazard impacting the downstream communities of Villa Park, Tustin, Orange, Santa Ana, and Irvine.

Other Dams:
In addition to the flood control protection provided by Prado Dam on the Santa Ana Rivers and Santiago Creek Dam and Villa Park Dam on Santiago Creek, there are additional dams within Orange County constructed for flood protection purposes. Fullerton Dam, Brea Dam and Carbon Canyon Dam in North County are earthen dams constructed and operated by the Army Corps of Engineers to provide flood protection to urban development along Fullerton Creek, Brea Creek, and Carbon Canyon.

Orange County Flood Control

Actions to reduce flood potential in Orange County are shared by the federal government, the Orange County Flood Control District, and local jurisdictions.

FEDERAL GOVERNMENT

The federal government assists local jurisdictions to implement major flood control facilities. In Orange County, the most significant of these flood control facilities is the Santa Ana River system. The U.S. Army Corps of Engineers, beginning in 1975, recommended the implementation of the Santa Ana River Mainstem Project (previously the All-River Plan), over four other options, as the preferred means of providing main-stream physical control over potential Santa Ana River flood waters in the event of a Standard Project Flood (SPF). With the revisions to the plan as approved, the system will provide flood protection to Orange County from a 190-year event.

The plan calls for significant improvements to the Santa Ana River system. The Santa Ana River Mainstem Project (see Figure IX-10), contained in the Water Resources Development Act of 1986 (PL 99-662), was signed into law by the President Reagan on November 17, 1986. As signed by President Reagan the Act authorized the following Santa Ana River improvements:

- Raise Prado Dam and increase reservoir capacity;
- Construct a new dam to be called "Seven Oaks Dam" on the Santa Ana River northeasterly of the communities of East Highlands and Mentone;
- Implement flood plain management between Seven Oaks and Prado dams;
- Acquire the floodway in the Santa Ana Canyon reach of the river to carry the water releases from Prado Dam, providing some structural protection along certain bends in the river, but maintaining the natural conditions as

much as possible as a floodway and for environmental enhancement;

Figure IX-10

- Construct channel improvements in the Coastal Plain reach of the river below Santa Ana Canyon, on Santiago Creek (in Santa Ana, Orange, and Villa Park), improvements to the former gravel pits including controlled outlet gate, and on Oak Street Drain (in Corona); and Mill Creek and San Timoteo Creek in San Bernardino County;

- Reconstruct existing recreational facilities (at local sponsor expense);

- Project includes reconstruction or enhancement of a salt water marsh, open space and mitigation lands at Seven Oaks Dam for endangered plants and animals.

REGIONAL SYSTEM

Orange County Flood Control District:

Orange County Flood Control District (OCFCD) is empowered to construct and maintain flood control works to prevent or minimize loss of life and property caused by flooding and to conserve water. The Resources and Development Management Department (RDMD) implements the Flood Control District's flood control program which includes the design, construction, operation, and maintenance of regional and subregional flood control facilities.

The Flood Control District's capital improvement program is generally with assistance by the City Engineers Flood Control Advisory Committee (CEFCAC)-a committee composed of one City Engineer from each Supervisorial District appointed by the Orange County Division, League of California Cities and Manager, RDMD/Public Works Division.

Project proposals from all-sources are analyzed by Flood Control District staff and submitted to CEFCAC to prioritize construction and studies. The recommendations are utilized by RDMD in preparing the annual Flood Control District budget request.

Flood Control District revenue is obtained mainly from property taxes. Under the provisions of Section 97 and 98 of the Revenue and Taxation Code, the amount of Flood Control District revenue derived from property taxes is based on the average percentage received during the three years prior to the passage of Proposition 13, plus a proportionate share of the subsequent tax base growth. Subsequent to the passage of Proposition 13, State Special District augmentation funds have also been received.

Orange County Floodplain Management:

Floodplain management is a key component to effective flood control within Orange County. The Federal Emergency Management Agency delineates through official maps, Flood Insurance Rate Map (F.I.R.M) and Flood Boundary and Floodway Map, areas of special flood hazard, the risk premium zones, and floodways applicable to a community. These maps form the basis for Orange County's

flood plain management program implemented through zoning regulations. These zoning regulations (Section 7-9-113 of the Orange County Zoning Code) are intended to be applied to those areas which are subject to periodic flooding and accompanying hazards.

Three levels of floodplain protection are identified. The FP-1 designation is applied to the "floodway," the channel of a river or other watercourse and that part of the floodplain reasonably required to safely discharge the base floods as shown on the federal Flood Boundary and Floodway Maps or areas the County has identified as a floodway. The FP-1 designation permits private flood control facilities, general open space uses and public/private utility structures.

The FP-2 designation is applied to areas identified on Federal Flood Insurance Rate Maps or areas identified by the County to be within a special flood hazard area. Development is permitted within FP-2 areas in compliance with specific development standards, including construction and design elements that minimize flood damage, and raising the lowest floor of a building including a basement or cellar one foot above the flood level.

The FP-3 designation is applied to areas shown on the Flood Insurance Rate Maps or designated by the County to be susceptible to coastal flooding by the "Coastal Flood Plain Development Study." Development is permitted within the FP-3 areas subject to satisfaction of design criteria contained in the "Coastal Flood Plain Development Study."

The purposes of floodplain zoning regulations as applied by the County include prevention of loss of life and property and to minimize economic loss caused by flood flows; establishment of criteria for land management and land use in flood-prone areas that are consistent with the criteria promulgated by the Federal Insurance Administration for the purpose of providing flood insurance eligibility for property owners; regulation and control of use of land below the elevation of the design flood flow within the floodplain; and compliance with the Cobey-Alquist Floodplain Management Act requirements for floodplain management regulations.

Adherence to the Act's provisions entitles a local jurisdiction to receive state financial assistance for flood control project rights-of-way costs.

Local Drainage Program:

Storm drains are normally smaller facilities or underground pipes which collect drainage from local streets. In new developments, local drainage facilities are constructed by

developers in accordance with master plans of drainage. However, in many older parts of Orange County, local systems were not built due to lack of major systems to accept their discharge. Limited funding from the County General Fund or the Road Fund is used to implement local storm drains.

Future Prospects

The implementation of the Santa Ana River Main Stem Federal Project and other Santa Ana River improvements along with regional and local flood control facilities should provide Orange County with appropriate flood protection safeguards. Construction of the project began in 1992 and is anticipated to be completed by 2005.

GOALS, OBJECTIVES AND POLICIES: *Flood Hazards*

The goals and objectives of this section are in addition to the general Natural Hazards Component Goals and Objectives described in the beginning of the Natural Hazards Component. Together, these provide a strategy for addressing and mitigating potential flood hazards.

Goals and Objectives

Goal 1

Provide effective and efficient flood protection throughout Orange County.

- ***Objective***

1.1 To implement the improvements for the Santa Ana River Mainstem Project.

1.2 To develop and enhance intergovernmental relations for flood protection programs in Orange County.

1.3 To implement flood control facilities which protect both existing and proposed development, including the structural and operational integrity of essential facilities during flooding.

1.4 Locate, when feasible, new essential public facilities outside of flood hazard zones, including hospitals and health care facilities, emergency shelters, fire stations, emergency command centers, and emergency communications facilities or identify construction methods or other methods to minimize damage if these facilities are located in flood hazard zones.

Policies

1. To phase improvements to Flood Control District facilities consistent with funding capabilities:

   a) Implement them within the time frame of the Santa Ana River Main stem Project for equivalent capacities;

b) Provide as a goal 100-year flood protection for residences and other non-flood-proof structures; and

c) Complete links in the system that have not been provided by new development.

2. To encourage and promote coordination between regional/local flood control agencies and the State/Federal agencies for optimum flood prevention programs and protection devices.

3. To regulate development of major watercourses and floodplains through application of appropriate land use measures.

4. To identify areas subject to inundation due to base flood runoff.

5 To identify areas subject to inundation due to dam failure.

6. To limit erosion and sediment transport from development areas to bays and harbors.

7. To permit reasonable movement of sediment to the open ocean for beach sand replenishment through remedial measures.

8. To provide technical and policy information regarding flood hazards, including but not limited to, flood hazard information from the Army Corps of Engineers, dam failure inundation maps available from the Office of Emergency Services (OES), and Floodplain Mapping Program maps and 200-year floodplain maps from the Department of Water Resources (DWR), to developers, interested parties, and the general public.

9. To disseminate information regarding hazards and mitigating measures through all available media.

10. To monitor and evaluate studies of the use of non-structural alternatives, including more compatible land use planning adjacent to watercourses for flood control purposes.

11. To provide guidance during and after flood disasters and promote interagency assistance for persons affected.

12. To create design criteria which minimizes or mitigates impacts associated with crossing of flood plains by development, including essential public facilities.

13. To appropriate funds for the Santa Ana River Mainstem Project and expedite construction.

IMPLEMENTATION PROGRAMS:

Flood Hazards

1. INTERGOVERNMENTAL COORDINATION

Action:
Continue to develop intergovernmental relations toward achieving flood protection goals and objectives.

Discussion:
The Orange County Flood Control District (OCFCD) currently cooperates with various levels of government including federal, state and local agencies. For instance, local projects are analyzed and prioritized by various agencies for budget and implementation purposes requiring effective agency coordination. In addition, the primary regional project, the Santa Ana River Mainstem Project which received Congressional approval, is dependent upon OCFCD coordination with the U.S. Army Corps of Engineers for project development and implementation and local funding.

Cooperation among affected counties (Riverside, San Bernardino and Orange Counties) will also be important for project phasing and implementation. Continued and expanded cooperation among agencies will provide a coordinated effort toward achieving flood protection funding phasing and implementation goals and objectives.

New or Existing Program: Existing

Implementation Schedule: Ongoing

Responsible Agency: RDMD

Source of Funds: Various Funding Sources

2. COASTAL FLOOD PLAIN DEVELOPMENT

Action:
Utilize the Coastal Flood Plain Development Study to evaluate projects in areas prone to coastal flooding and update the report as often as warranted.

Discussion:
The Coastal Flood Plain Development Study, approved in 1985, addressed Orange County's requirement for technical criteria and standards for the review of structures and protective devices on coastal property designed to mitigate and minimize coastal flooding.

The report serves as a working base to be expanded and improved upon through periodic updating, new coastal data, and new methods to analyze coastal flooding.

New or Existing program: Existing

Implementation Schedule: Ongoing

Responsible Agencies: RDMD

Source of Funds: County General Fund

3. SANTA ANA RIVER MAINSTEM FEDERAL PROJECT

Action:

Expedite to the greatest extent feasible the implementation of the Santa Ana River Mainstem Project as an integral flood control management program.

Discussion:

Construction of the project began in 1992 and is anticipated to be completed by 2005. To expedite funding, Prado Dam is being considered as a separate element which would provide for a 50-50 cost share between the federal government and the three counties.

New or Existing Program: Existing

Implementation Schedule: Ongoing

Responsible Agencies:

- U.S. Army Corps of Engineers
- Orange County Flood Control District
- San Bernardino County Flood Control District
- Riverside County Flood Control and Water Conservation District

Source of Funds:

- Property tax
- State Subvention
- Various other funding sources

4. ORANGE COUNTY FLOOD CONTROL DISTRICT SYSTEM

Action:

Continue to provide efficient and effective flood control protection for Orange County residents.

Discussion:

The Orange County Flood Control District is empowered to construct and maintain flood control works for water conservation and to prevent or minimize loss of life and property caused by flooding. The Resources and Development Management Agency (RDMD) is responsible for implementing the Flood Control District's program that includes the design, construction, operation, and maintenance of regional flood control facilities.

New or Existing Program: Existing

Implementation Schedule: Ongoing

Responsible Agencies:

- O.C. Flood Control District
- RDMD

Sources of Funds:

- Property Tax
- Various other funding sources

SEISMIC AND GEOLOGIC HAZARDS

Introduction

Orange County, like most regions that border the Pacific Ocean, is a region of high seismic activity and, therefore, is subject to potentially destructive earthquakes. Earthquakes are the result of an abrupt release of energy stored in the earth. This energy is generated from the forces which cause the continents to change their relative position on the earth's surface; this process is called "plate tectonics."

Large earthquakes are caused by the rupturing of great rock masses under strain within the earth's crust. This usually takes the form of abrupt slipping or sliding along a rupture plane (fault). Each time two segments of the earth's crust suddenly shift past one another along a fault, an earthquake occurs. Major earthquakes are commonly accompanied by foreshocks and aftershocks that are usually less intense and represent local yielding and adjustments of rock masses along the main zone of faulting.

Earthquakes create two types of hazards: primary and secondary. Primary seismic hazards include ground shaking, ground displacement, subsidence, and uplift due to the seismic episode. Primary hazards can, in turn, induce secondary hazards. These include the following: ground failure (lurch cracking, lateral spreading, and slope failure), liquefaction, seismically induced water waves (tsunamis and seiches), movement on nearby independent faults (sympathetic fault movement), and dam failure.

Orange County residents are exposed to other geologic hazards not necessarily associated with earthquakes. Landslides result from the movement of slope-forming earth or rock materials downward under the influence of gravity. A landslide may take the form of a flow, slide, fall, or a combination of the three. This form of earth movement is the most costly of the non-seismic geologic hazards. Two other geologic hazards, subsidence and uplift, are caused by vertical mass movements of earth materials with little or no lateral movement.

Erosion of fields, cliffs, and stream channels has been of concern to man for centuries. The process of erosion occurs naturally in nature; however, it can be induced and encouraged by man's activities. One example is river channelization which impedes transportation of sediments to the coast. Since beaches depend on sediments to replenish sand supply, sediment reduction leads to beach and cliff erosion, a major County safety concern. A final non-seismic hazard described in this section is associated with soil characteristics.

Additional, up-to-date information on seismic and geologic hazards in Orange County can be obtained through the State Department of Conservation, California

Geological Survey, Website: www.conservation.ca.gov/cgs/ Specifically, two publications from the State Department of Conservation, "Guidelines for Evaluating and Mitigating Seismic Hazards in California" (1997) and "Fault-Rupture Hazard Zones in California" (Special Publication 42) contain detailed information about liquefaction and geo-technical issues in Orange County and are available without charge through the website.

Existing Conditions

SEISMIC

Orange County is more fortunate from a seismic safety standpoint than some of its neighboring counties. Two potentially hazardous, active fault zones run along the coastal and inland edges of the County. (See Figure IX-11.) The best known of the two faults is the Newport-Inglewood Fault, which angles from offshore near Dana Point, inland through what is now the City of Newport Beach, on into Los Angeles County through the cities of Long Beach and Torrance. This fault zone produced the catastrophic 1933 Long Beach earthquake with a Richter scale magnitude of 6.3. It is believed this fault is capable of generating a maximum 7.5 magnitude earthquake.

Paralleling this fault zone across the northeasterly edge of the County is the Whittier Fault, a westward continuation of the longer Elsinore Fault which trends along the northeast side of the Santa Ana Mountains into Mexico. Most recorded shocks in this zone range from 4.0 to 5.0 magnitude, which is considered moderately active. However, in 1910 an earthquake registering 6.0 on the Richter scale hit Riverside County in the vicinity of Lake Elsinore. It is estimated that the maximum credible earthquake capable from the Whittier-Elsinore Fault Zone is 7.0 magnitude.

Earthquakes on faults located outside the County can cause damage within the County. Depending on their magnitude, earthquakes generated within a fifty-mile radius of a given point are considered noteworthy and could cause minor to moderate damage.

The blind thrust faults including the Elysian Park Blind Thrust Fault and Compton Blind Thrust Fault extend into and underneath northwestern and southwestern Orange County, respectively. The plain of another blind thrust fault that is associated with the Elysian Park Blind Thrust, underwent displacement during the Whittier Narrows Mw 6.0 Earthquake of 1987 that caused 360 million dollars in damage and killed 3 to 8 people. The Elysian Park and Compton Blind Thrust Faults are believed to be capable of maximum earthquake magnitudes of Mw 6.7 and Mw 6.8 respectively.
For Orange County, these perimeter faults are: San Andreas; San Jacinto (including Imperial and Superstition Hills); Malibu-Coast-Raymond; Palos Verdes; San Gabriel; and Sierra Madre-Santa Susana-Cucamonga

faults (including "San Fernando"). The Norwalk, Peralta Hills and El Modeno Thrust Faults, located within Orange County, between the Whittier and Newport-Inglewood fault zones are not shown by the State as Earthquake Fault Zones (called Special Studies Zones prior to January 1, 1994).

Due to the proximity of active and potentially active faults in and around Orange County and its degree of urbanization, the risk of structural damage and loss of life due to ground shaking is considerable. The risk of secondary hazards is also great. According to various geologic experts, much of Orange County is highly susceptible to slope failure (activated by ground shaking), lurching and displacement. Another secondary hazard of particular concern to some portions of Orange County is that of liquefaction

Figure IX-11

Liquefaction is a change in condition of saturated granular soil or coarse silt from solid state to liquefied state. When these materials are vibrated, they often behave as a heavy liquid. Liquefaction occurs when saturated soil changes from a solid to a fluid condition.

Figures IX-12 and IX-13 show the areas of liquefaction and degree of ground shaking for various areas around Orange County in the event of a maximum credible earthquake on the San Andreas or Newport-Inglewood faults. Table IX-1 describes the effects experienced during varying degrees of ground shaking. The numbers down the left hand side (l to 12) represent the Mercalli Scale while the numbers in parentheses represent comparable ground shaking as recorded on the Richter scale. The Mercalli and Richter scales are two means of measuring ground shaking during an earthquake. Earthquake magnitude is currently reported as a Moment Magnitude (Mw). Additional information regarding areas of potential liquefaction is contained in quadrangle maps called Seismic Hazard Zone Maps.

Another potential secondary source of damage is from the generation of seiches and tsunamis. A seiche is the oscillation of sloshing of water caused by seismic activity or landsliding. It may occur in a lake, bay, or other enclosed body of water. It may result in damage to peripheral shore development or to downstream development if water tops a dam.

Tsunamis or seismic sea waves may be generated by an undersea earthquake, landslide, or by volcanic activity. The Orange County coastline is shielded to the west by the Channel Islands and to the north by Point Conception from most sources of tsunamis thereby reducing the threat of damage.

There is a potential for damage along the coast from a tsunami resulting from ocean floor displacement along some of the numerous active fault in the off-shore Southern California borderline from large submarine landsliding.

Another serious secondary water damage hazard emanates from linear systems failure. This condition involves the bursting of underground water pipes and mains. Its effects may be widespread, crippling entire communities. If failures occur on main trunk lines, entire regions of Orange County may be without public services. These types of failures could result in situations ranging from contamination of drinking water to an inability to successfully fight fires which may be caused by other linear system failures, such as gas or oil lines or electrical transmission lines.

NON-SEISMIC

In addition to the safety hazards posed by seismic activity, other types of geologic features also occur which pose a potential threat to the well-being of County residents, their homes, and businesses. These geologic

TABLE IX-1.

MODIFIED MERCALLI INTENSITY SCALE

MAGNITUDE ON RICHTER SCALE	*Effects At Different Levels of Intensity Intensity Scale of 1931 (abridged)*
Below 3.0	I. Not felt by most people, only instruments detect the earthquake.
3.0-3.9 ***Distance Felt:*** ***(approx. miles)*** ***15***	II. People lying down might feel the earthquake. III. People on upper floors of building will feel it, but may not know it is an earthquake. Hanging objects swing.
4.0-4.9 ***Distance Felt:*** ***(approx. miles)*** ***30***	IV. People indoors will probably feel it, but those outside may not. Houses may creak. V. Nearly everyone feels it. Sleepers are awakened. Doors swing, pictures move, things tip over.
5.0-5.9 ***Distance Felt:*** ***(approx. miles)*** ***70***	VI. Everyone feels the earthquake. It is hard to walk. Windows and dishes broken. Books fall from shelf.
6.0-6.9 ***Distance Felt:*** ***(approx. miles)*** ***125***	VII. It is hard to stand. Plaster, bricks, and tiles fall from buildings. Small land slides. VIII. People will not be able to drive cars. Poorly built buildings may collapse and chimneys may fall.
7.0-7.9 ***Distance Felt:*** ***(approx. miles)*** ***250***	IX. Most foundations are damaged. Masonry heavily damaged. Pipes are broken. The ground cracks. X. Most buildings are destroyed. Water is thrown out of rivers and lakes. Large landslides.
8.0-8.9	XI. Rails are bent. Bridges and underground pipelines unusable. XII. Large rock masses displaced. Large objects may be thrown into air. Most things are leveled.

Source: Orange County Fire Authority, Emergency Management Division, 1986.

Figure IX-12

Figure IX-13

features include landslides, subsidence and uplift, natural erosive forces, and potentially detrimental soil characteristics (expansive, peat, sulfate, gaseous and corrosive soils, and soils subject to hydroconsolidation).

Landslides: Landslides may be divided principally into three overlapping categories: surficial failures, rotational slides, and planar slides. Surficial failures the most common failures, occur generally within four to five feet of ground surface. In rotational slides the failure surface takes an arcuate shape both in horizontal and vertical profile. Planar slides result when natural planes of weakness within a rock formation are exposed either by the natural process of erosion or during grading operations.

A major factor contributing to these three types of slides is the process of grading. The lack of precautionary measures to stabilize slopes or cutting into the failure plane of an existing landslide can result in the failure of material or slopes.

Another common thread of similarity among all three categories of slides is that as the water saturation of soil occurs, the soil's bearing capacity is decreased. This weakening, coupled with gravitational factors and the various characteristics of the soil material, leads to destructive outcomes.

Other types of sliding that occur are mudflows, debris avalanches, rockfalls, rockslides, and gravity sliding. These landslides are either variations between or gradations within the three individual categories.

Devastation and economic setback from landslides were exhibited in the October 1978 Laguna Beach/Bluebird Canyon slide in which 25 homes were lost and 15 million dollars in damage was done. The slide area covered 3.5 acres--part of a five-acre ancient slide area. In February 1980, Laguna Beach was struck by mudslides which damaged 117 homes and 35 businesses and totaled an estimated 5 million dollars in damage.

During February 1998, debris flow caused two deaths and destroyed several homes in the City of Laguna Beach. In June 2005, the Bluebird Canyon area was again struck by a landslide that damaged or destroyed 28 homes. In May 1963, several private homes in Silverado Canyon were severely damaged by rock and debris flow. These residences were evacuated and the public road use was restricted to local residents and essential traffic. In February 2005, another rockslide occurred in Silverado Canyon killing one resident and damaging four structures. Because of recurring rockfall and debris flows endangering life and property of residents in Silverado Canyon, the Board of Supervisors authorized, on May 18, 1983, a geotechnical review of the mud/debris flow and rockfall hazards. The study "Silverado Canyon Geologic Hazards Report" dated October 1983 may be reviewed by the public at the County of Orange Development Processing Center, 1st Floor, 300 N. Flower Street, Santa Ana.

San Clemente--dubbed by geologists as physically "least stable of Orange County cities due to its propensity for unstable slopes" was hit on September 4, 1986, by a landslide. This slide caused five homes in the Shore cliffs development to be evacuated after they were left teetering on an 80 foot high precipice. Many other incidences of landslides have been recorded and other areas identified as ancient landslide sites which are dormant but can become active again, much like volcanoes.

The California Geological Survey, also known as Division of Mines and Geology (CDMG) reported that the winter storms of 1997 and 1998 increased movement on a landslide in Laguna Niguel that resulted in the loss of four homes on Via Estril and several condominiums located at the toe of the slope.

It was also reported that these rainstorms accelerated the movement of a landslide in the City of Orange near Vista Summit Way that damaged homes within a three city block area. Mudslides also caused damage to homes and roads in Silverado Canyon, Modjeska Canyon and within the cities of Brea, Dana Point and Newport Beach.

Orange County, as much as the State of California, contains some active faults along which earthquakes occur, and contains some rocks representing ancient volcanic activity. Mary areas are covered by soils deposited by surface waters, landslides and wind. Many of these deposits are unstable and they expand and contract with the addition and removal of moisture, respectively. Orange County is committed efforts to examine landslide potential and unstable soils.

The lead department in this effort is the Resources and Development Management Department (RDMD). This Department is responsible for the following: 1) the critique of consultant work on various construction projects including the review of grading plans and review of soil and geologic reports; and 2) the implementation of corrective measures to mitigate adverse geologic hazards (i.e., landslides, liquefaction, etc.).

A major policy that aids the efforts of the grading section is the Orange County Grading and Excavation Code, adopted by the Board of Supervisors for the purpose of safeguarding life, land, property, and public welfare by regulating grading on private property in the unincorporated areas of Orange County. The Grading and Excavation Code sets forth rules and regulations to control excavation, grading, and earthwork construction, including fills and embankments, and establishes administrative requirements for issuance of permits and approval of plans and inspection of grading construction in accordance with the requirements for grading and excavation as contained in the Uniform Building Code.

The Grading Manual, supplements the Grading Code with detailed information regarding rules, interpretations, standard specifications, procedures requirements, forms, and other information applicable to control excavation, grading, and earthwork construction in unincorporated Orange County.

Other documents utilized in the review of grading plans and geo-technical (soil and geology, currently California Geological Survey and Division of Mines and Geology Special Publication 42 on Alquist-Priolo Earthquake Fault Zones) reports include the Uniform Building Code and special Publication 117-Guidelines for Evaluating and Mitigating Seismic Hazards in California, issued March 1997 by the Division of Mines and Geology.

Land Subsidence and Uplift: Subsidence and uplift are terms used to describe changes in elevation occurring over reasonably large areas. Subsidence can be either caused by forces within the earth's crust or by withdrawal of fluids such as oil or water, or solids such as soil or rock. Oil extraction differs from groundwater extraction mainly because much greater depths, greater pressures, and a greater danger of subsidence are involved. Uplift on the other hand, is the result of the injection of water or another liquid, into the ground to replace material removed.

RDMD-Geomatics/Land Information Systems (LIS) Division performs an annual

GPS (Global Positioning System) Vertical Control Survey. This Survey covers the entire County on a 6 km grid. The data, when compared to the previous annual survey, is used to detect subsidence.

The Geomatics/LIS Division also monitors eight dams within the County. Most dams are monitored every year with some being every three to five years. Surveys are performed to detect any horizontal or vertical movement in the structure. Dam movement can result from various causes such as subsidence, earthquake, water pressure, faulty construction, etc.

Erosion: Erosion is the process by which earth and rock materials are worn away and transported by the action of water, wind or ice.

Beach erosion has damaged or destroyed both functional structures and appurtenant erosion protection devices. Topsoil loss due to erosion in agricultural areas led to the formation of the Federal Soil Conservation Service, which conducts research and provides consultation to minimize this loss. Stream erosion and siltation have long constituted major hazards to cities and to man-made facilities situated alongside or straddling watercourses. Soil loss and stream erosion are addressed in Chapter VI (Resources Element) of the Orange County General Plan. Beach erosion problems, however, are discussed in this element.

Beach and Cliff Erosion:

Beach and cliff erosion problems are a major concern in Orange County. This process is influenced to the greatest degree by man-made changes and obstructions in the ocean affecting the coastline. Other factors are wind, interference with stream processes, wave height and direction, tides, and sand lost to deep ocean basins. Whenever waves are present, sand moves on or off beaches. Major movements often occur during wave storms. Waves are more energetic during this time, and these storm-induced, longshore, and offshore-directed currents provide a means to transport the wave-mobilized sand away from or towards the beach. This movement is wholly or partially reversible in that the sand volume lost from the beach during the storm may be partially or completely returned to the beach after the storm.

In general, seasonal changes in the beach profile will be much greater than the net yearly change that occurs over a period of many years. The sand supply is also renewed by the sediment load of rivers and streams emptying into the ocean. This latter process

does not occur at a constant rate. Although influenced by such factors as the lining of flood control channels, the damming of rivers and streams is a much more important factor in reducing the amount of sediment carried to the ocean.

Beach cliff erosion is a major concern to development along coastal Orange County. The erosion of cliffs causes landslides and subsequent problems to hillside development. The erosion rate in Orange County is considered moderate countywide (approximately l inch per year). Although various development and zoning standards have been devised, no programs have been devised to specifically control beach cliff erosion.

Technical criteria and guidelines were prepared for Orange County EMA (now RDMD) Flood Control by Moffat and Nichol Engineers. This study, "Coastal Flood Plain Development, Orange County Coastlines" was created for the review of structures and coastal protection devices at five coastal reaches in Orange County. Using 1984 coastal design data, Moffat and Nichol developed three recommendations for improving beach erosion protection:

1) Establish a methodology to update and improve the coastal design data sets as new information becomes available;

2) Establish a procedure to obtain local information using a combination of trained County staff and beach-resident volunteers; and

3) Establish a geotechnical data bank for coastal design review purposes.

The implementation of recommendation (1) has occurred through the creation of floodplain zones and other appropriate policy. The implementation of the remaining recommendations would ensure an improved data set will be available for future design purposes, including beach restoration and maintenance.

Soil Characteristics:

Expansive Soils: These are soils which incorporate water into their mineral structure. This process causes swelling of mineral grains and an increase in soil volume. The degree of soil expansion is determined by the percentage and types of minerals in the soil. In addition, the amount of water a soil can incorporate depends on the

stress on the grains created by the combined weight of soil and man-made structures.

Much of Orange County is covered by soil that experts say may cause cracking in concrete foundations. The most prevalent problems stem from clay or "expansive" soil which expands and contracts with moisture, causing building foundations, sidewalks, and swimming pools to lift and crack. Geologists indicate that three predominant soil conditions exist in residential areas of Orange County. Possible effects of "expansive" soil conditions exist in each of the three predominant soil conditions:

1) *Differential Swell*: The thicker zone of expansive soil causes more swelling at one side of the residence than at the other.

2) *Concentric Swell:* Water migration beneath a foundation causes swelling in its center.

3) *Slope Yielding:* The soil shifts downslope, tilting the foundation.

Problems attributed to expansive soils are usually related to improperly designed or constructed foundations. Due to the diversity of soil conditions in Orange County, experts agree that no residence is completely safe from cracking, slipping, or sinking to some degree, regardless of the residence's age or location. Currently, problems attributed to expansive soils are being mitigated through structural and design regulations as well as through soil treatment techniques.

Peat Formations: In the process of coal formation from masses of vegetation, peat is the earliest stage of conversion. It consists of mats of partly decayed vegetable matter which may or may not be covered by sediment. Accumulation of peat can

occur in various ways including sand beach bars blocking coastal streams; generation of sag ponds by faulting; and, historically common in Orange County, abandonment of stream meanders by a river cutting a new path.

The hazards are created when structures are placed on a land surface underlain by a peat deposit. The structure may be damaged by collapse of the peat mat or by fires generated by accumulation of methane gas beneath the structure. Currently, hazards caused by peat deposits are mitigated through initial consolidation or removal of the peat material prior to construction.

Sulfate Soils: Soil containing an unusually high sulfate content can cause the concrete slab upon which houses are built to crack, crumble and break apart. This is due to the presence of destructive sulfates - a salt-like substance derived from sulfuric acid. It is most notably detected by telltale cracks in the concrete which is accompanied by a characteristic white, powdery substance. The powder is composed of the sulfate minerals gypsum and ettringite that grow in the concrete and cause expansion, cracking and deterioration.

In Orange County this problem is particularly prevalent in La Palma where 50 to 100 homes in a single tract were affected in late 1985. As many as 100 additional homes may have cracked and, in some cases, crumbling floors. Without repairs to replace the concrete slab, the entire structure of the houses can be endangered.

Many reasons have been offered by various engineers as to why there are high sulfate soils in some areas and not others. These experts cite explanations which range from factors associated with previous usage of the property (e.g., dairy operations which have large volumes of animal droppings), to usage of cement additives which react negatively with the soil. Engineering geologists know that naturally high sulfate conditions correspond to the Monterey Formation and Clayey Siltstone Facies of the Capistrano Formation, and they know the geographic distribution of these rock units. Presently regulations and design standards in the Uniform Building Code describe specific cement types and mix designs to be used in construction which is directly

exposed to soil or water containing sulfate concentrations.

Gaseous Soils: In March 1985, a fire and explosion in the Fairfax area of Los Angeles occurred, drawing attention to a potential safety hazard caused by the natural accumulation of gas within the soil. Naturally occurring gas within the soil is often caused by bacterial activity (i.e., biogenic gas) and is not associated with petroleum.
In an effort to preclude further occurrences, the State legislature enacted Senate Bill SB 1458 (Roberti) directing the Department of Conservation, Division of Oil and Gas to select and survey areas suspected of containing the greatest potential for hazardous gas accumulations.

Three criteria were utilized to identify suspected areas: 1) the areas must be urban; 2) the areas must have oil and gas wells that were abandoned prior to 1930; and 3) the areas must have a history of natural oil and/or gas seepage.

Based upon the three criteria, eight high risk areas were identified within Southern California. Three sites were identified within Orange County: Newport oil field (City of Newport Beach); Brea-Olinda oil field (City of Brea); and Huntington Beach oil field (City of Huntington Beach).

Corrosive Soils: Soils become corrosive to metals when they are abnormally acidic (low PH) or saline (high chlorine content with low resistance to electrical current). Metallic pipes and structures can be protected by various coatings, wrappings, and cathotic devices. Without this protection, the life of the metallic structures are greatly shortened with resulting cost increases.

Hydro-consolidation: Hydro-consolidation is a condition that occurs closer to the ground surface as compared to the similar condition of subsidence. The honeycomb-like structure of the soil contributes greatly to the failure of the soil. When built upon or covered over with fill, this weakly supported soil collapses immediately when put in contact with water.

Seismic and Geologic Hazard Management

ALQUIST-PRIOLO EARTHQUAKE FAULT ZONING ACT (FORMERLY SPECIAL STUDIES ZONES ACT)

The State legislature enacted the Alquist-Priolo Special Studies Zones Act in 1972 to assure that homes, offices, hospitals, public buildings, and other structures for human occupancy are not built on active faults. The act includes special study zone criteria and requires a geological investigation before a local government can approve most development projects in a special study zone.

As required under the Act, the State Geologist initiated a program early in 1973 to delineate Special Study Zones which encompass potentially and recently active traces of four major faults (San Andreas, Calaveras, Hayward, and San Jacinto) as well as other "sufficiently active and well defined" faults. Although there are eight Special Studies Zones which partially include areas bordering Orange County, only six of the maps identify faults within the County. Earthquake Fault Zones are shown on the quadrangle maps; Prado Dam, Seal Beach, Newport Beach, La Habra, Los Alamitos, and Yorba Linda.

Modifications were made to the study zone surrounding the Newport-Inglewood Fault extending into the Newport Beach quadrangle. This modification, made by CDMG, July 1, 1986, narrowed the study zone from several thousand feet to 700 feet and shortened the zone which now stops just north of Atlanta Avenue in Huntington Beach. Revisions were also made to the Seal Beach and Los Alamitos Quadrangles in 1986 and the La Habra quadrangle in 1991. The Yorba and Prado Dam quadrangles have not been changed from the date issued in 1980.

Areas within unincorporated Orange County that are impacted by the "Earthquake Fault Zones" (formerly Special Studies Zones) maps are located within the Bolsa Chica area, Tonner Canyon area and island areas adjacent to the cities of Yorba Linda and Brea. County programs and policy for implementation of Alquist-Priolo requirements are found in the Bolsa Chica Local Coastal Plan.

a) <u>Seismic Hazards Zones Maps</u>:

In 1990 the Legislature passed the Seismic Hazard Mapping Act. Under this Act, the Division of Mines and Geology has produced a series of official maps that identify areas prone to liquefaction and earthquake induced landslides. At the present time, nine official maps have been released that are located within the County. The official Seismic Hazards Zones Maps include Anaheim Quadrangle (revised April 1998); La Habra Quadrangle (April 1998); Los Alamitos Quadrangle (March 1999); Newport Beach Quadrangle (April 1997 Liquefaction-April 1998 Landslide);

Orange Quadrangle (April 1998); Seal Beach Quadrangle (March 1999); Tustin Quadrangle (April 1998) Yorba Linda Quadrangle (April 1998); Whittier Quadrangle (March 1999); San Juan Capistrano Quadrangle (Dec. 2001); Laguna Beach Quadrangle (April 1998); Dana Point Quadrangle (Dec. 2001); Santiago Peak Quadrangle (June 2002); Prado Dam Quadrangle (Jan. 2001); Black Star Canyon Quadrangle (Jan. 2001); and, El Toro Quadrangle (Jan. 2001).

b) Additional Seismic and Geologic Mapping Data:

The California Division of Mines and Geology (CDMG) has produced a series of maps depicting the environmental geology of Orange County (1976). This ten plate set depicts faulting; recency of faulting; earthquake epicenters; liquefaction potential; relative seismic shaking; massive bedrock landslides; mud-debris flows and rock-fall; expansitivity potential of soils and rock units; distribution of peat deposits; and tsunami risk. These maps can be reviewed at the Orange County Resources and Development Management Department, Building and Safety Division.

BUYER NOTIFICATION PROGRAM

The County Buyer Notification Program, established by the Board of Supervisors, is intended to provide prospective home buyers with appropriate information about future development and public facilities planned for the area surrounding a residential subdivision project. Information concerning locations of key facilities are provided on a community project map.

EROSION CONTROL

Erosion control measures in Orange County are not confined to beach and cliff erosion, but extend to agricultural lands and bay/estuary protection. Such control measures can be found in the comprehensive erosion control program in effect in the Newport Bay watershed area. This program is voluntary and incorporates a variety of individual elements aimed at specific erosion concerns:

a) Agricultural Best Management Practices (BMP): This program instructs farmers in various land management practices to reduce soil loss. Because agricultural practices are considered a non-point source of soil erosion, complete reduction of agricultural soil loss is extremely difficult;

b) Construction Activities: This Element acts in conjunction with the

County's grading ordinance to reduce soil erosion;

c) **Foothill Basins Program:** This program is aimed at controlling erosion within the foothills; as of yet, the program has not been implemented;

d) **In-channel Sediment Control:** Sediment control is enhanced through deposition of sediment in the Lower San Diego Creek;

e) **Upper Bay Control:** Sediment is captured before it migrates to the Upper Bay; and

f) **Localization:** Sediment is actively managed locally to minimize wide-spread project administration areas.

These programs/elements are monitored by the Environmental Resources Section of RDMD.

Other methods of controlling erosion in Orange County exist, including the County's Grading Ordinance which strictly regulates hillside grading with regard to soil stability. It provides for erosion control measures at the time of development. The U.S. Army Corps of Engineers addresses shoreline erosion through participation in shoreline facility construction, management efforts, beach erosion studies, and other shoreline issues.

Future Prospects

In view of the County's susceptibility and vulnerability to natural hazards, both seismically and geologically induced, continuing emphasis will be placed on emergency planning; training of full-time, auxiliary, and reserve personnel; public awareness and education; and securing sufficient resources to cope with such hazards. Emphasis will also be placed on mitigation measures to reduce losses from hazards.

Planning for these interrelated elements will necessitate coordination on the part of County, City, and State agencies charged with the protection of life and property. County agencies will continue to coordinate their efforts through mitigation measures and hazard plans aimed at maximizing this protection.

GOALS, OBJECTIVES AND POLICIES: *Seismic Safety and Geologic Hazards*

Goals and Objectives

Refer to the General Natural Hazards Component goals and objectives found at

the beginning of the Natural Hazards Component of this chapter.

Policies

1. To provide emergency planners with ongoing and up-to-date information about private utilities' emergency planning to accommodate and maintain resource sharing between the public and private sector.

2. To continue the development and implementation of earthquake mitigation, preparedness, response, and recovery through the Emergency Management Council and Orange County Operational Area.

3. To promote public awareness and preparedness in the area of seismic safety in Orange County.

4. To implement ordinances, regulations, and procedures which mandate the review, evaluation, and restriction of land use due to possible undue geologic threat.

5. To encourage establishment of seismic design criteria and standards for county facilities (e.g., transmission lines, water and sewage systems, and highways), any structures housing necessary mobile units and support equipment, and other vital resources which would be needed following an earthquake (e.g., "back-up" power generation facilities and water storage).

6. To periodically update maps of existing faults, slide areas, and other geographically unstable areas in and around Orange County.

7. To monitor, evaluate, and analyze existing seismic and geological data as it pertains to Orange County to determine future regulations and programs.

8. To establish development standards for land use, new construction, and proposed improvements to ensure proper design and location of structures.

9. To provide coordination to all agencies within the county to assist in the mitigation of geologic and seismic hazards and to educate those agencies in preparedness, response and recovery from a major earthquake.

10. To provide technical and policy information regarding geological and seismic hazards to developers, interested parties, and the general

public through the Orange County Buyer Notification Program.

11. To ensure coordination and consistency between the Orange County General Plan and the County Emergency Plan and Orange County Operational Area Plan.

IMPLEMENTATION PROGRAMS:
Seismic and Geologic Hazards

1. PUBLIC EDUCATION/ INFORMATION

Action:
Support the safety awareness efforts of the Orange County Sheriff-Coroner Department/ Emergency Management and other agencies through public information and educational activities.

Discussion:
This program is intended to increase the Community's awareness of the need for disaster preparedness and provide educational assistance to residences and business.

New or Existing Program: Existing

Implementation Schedule: Ongoing

Responsible Agency: Orange County Sheriff-Coroner/Emergency Management Division

Source of Funds: County General Fund

2. COMPREHENSIVE EROSION CONTROL PROGRAM

Action:
Support the comprehensive erosion control program efforts of RDMD to preserve Orange County beaches, cliffs, bays and estuaries, and agricultural lands.

Discussion:
Individual erosion control programs include Agricultural Best Management Practices aimed at instructing farmers in land management practices; construction activity guidelines; the Foothill Basins Program, aimed at controlling erosion within the foothills; in-channel sediment control; upper bay control; and localized sediment control.

New or Existing Program: Existing

Implementation Schedule: Ongoing

Responsible Agency: RDMD

Source of Funds: County General Fund

3. ALQUIST-PRIOLO PROGRAM

Action:
Continue to administer Alquist-Priolo requirements in designated special study zones as dictated in Orange County policy.

Discussion:
As required Under the 1972 Alquist-Priolo Special Studies Zone Act, the Office of the State Geologist delineated Special Study Zones which encompass potentially and recently active traces of four major faults (San Andreas, Calaveras, Hayward, and San Jacinto). The Alquist-Priolo Special Study Zone is enforced to assure that homes, offices, hospitals, public buildings, and other structures for human occupancy are not built on or nearby active faults. Subsequently, numerous active and potentially active fault traces in the state have been catalogued by and shown by the State on published maps.

New or Existing Program: Existing

Implementation Schedule: Ongoing

Responsible Agency:
- California Division of Mines and Geology
- RDMD

Source of Funds: County General Fund

4. ORANGE COUNTY/SOUTHERN CALIFORNIA EARTHQUAKE PREPAREDNESS PROJECT (SCEPP)

Action:
Continue to administer and expand implementation of the Orange County/SCEPP plan through the Public Information Office Committee and other organizations and agencies. Implementation should include public education awareness and response motivation.

Discussion:
Guided by the California Seismic Safety Commission (SSC), SCEPP is concerned with a broad range of issues related to earthquake preparedness. There are two concepts associated with SCEPP:

a) The project works directly with local governments, private industry, and volunteer groups in a cooperative planning effort; and

b) The SCEPP approach addresses the full range of earthquake strategies including mitigation, short-term prediction response,

emergency response, and recovery.

New or Existing Program: New

Implementation Schedule: Ongoing

Responsible Agency: Orange County Sheriff-Coroner /Emergency Management Division

Source of Funds: County General Fund

5. BUYER NOTIFICATION PROGRAM

Action:

Continue the administration of the Buyer Notification Program as designated by Board of Supervisors Resolution 82-1368. Land Use maps and planning information required by the guidelines shall be updated yearly by the subdivider/ developer, or more often if the Director of Planning, RDMD is aware of planning changes which affect the subdivision and requires the update as a condition of the map's.

Discussion:

The Buyer Notification Program is intended to provide prospective home buyers with an appropriate overview of nearby planning and development. Key information denoted on Buyer Notification maps includes location of service facilities and life-sustaining infrastructure (e.g., fire stations, hospitals, utilities).

New or Existing Program: Existing

Implementation Schedule: Ongoing

***Responsible Agency*:** RDMD

Source of Funds: County General Fund.

6. INTERGOVERNMENTAL COORDINATION

Action:

Continue to develop intergovernmental relations toward achieving seismic and non-seismic protection goals, objectives, and policies.

Discussion:

With regards to handling seismic and non-seismic matters, Orange County cooperates with various levels of government including federal, state, and local agencies. For instance, SCEPP is a state and federally funded effort to spur local jurisdictions to prepare for predicted and unpredicted "catastrophic" earthquakes in the Los Angeles metropolitan area. Continued and expanded cooperation among

agencies will provide a coordinated effort toward achieving seismic and non-seismic protection funding, phasing, and implementation.

***New or Existing Program*:** Existing

***Implementation Schedule*:** Ongoing

***Responsible Agency*:** RDMD

***Source of Funds*:** County General Fund