CITY OF CATHEDRAL CITY

COMPREHENSIVE GENERAL PLAN

CHAPTER V

ENVIRONMENTAL HAZARDS

This chapter of the General Plan addresses those man-made and natural environmental hazards which occur in the City of Palm Desert and surrounding areas. General Plan elements discussed under this chapter include Geotechnical, Flooding and Hydrology, Noise, and Hazardous and Toxic materials. The assessment of and planning for these hazards or constraints is the primary purpose of this chapter of the General Plan.

GEOTECHNICAL ELEMENT

PURPOSE

The purpose of the Geotechnical Element is to describe the geotechnical conditions facing the City and to establish goals, policies, and programs which protect the community from seismic and related hazards. The Element and its supporting documentation are also intended to serve as an information database, which guides future development and land use policies and educates City residents about potential geotechnical hazards and methods to mitigate their impacts.

BACKGROUND

The Geotechnical Element, which focuses on the physical characteristics of the City and the safety of its residents, is directly related to a number of other General Plan elements, including the following: Land Use, Circulation, Housing, Public Buildings and Facilities, Water Resources, Flooding and Hydrology, Emergency Preparedness, Police and Fire Protection, and Water, Sewer and Utilities. The Geotechnical Element addresses potential seismic and related hazards, which can result in significant property damage, generate exorbitant clean-up and reconstruction costs, and interrupt the day-to-day operations of the City. In this regard, the Geotechnical Element is also related to the Economic Development Element.

A wide range of state legislation, including the California Government Code and Public Resources Code, requires that the City address geotechnical hazards and seismic safety issues. Per California Government Code Section 65302(g), the General Plan is required to address the need to protect the community from unreasonable risks associated with the effects of known geologic hazards, such as seismically induced ground shaking, subsidence, and ground rupture and failure. According to Government Code Section 65303, the General Plan may also address other subjects relating to the physical development of the community. This is accomplished, in part, by the Geotechnical Element, as well as the Flooding and Hydrology, Emergency Preparedness, and other elements of this Plan.

Perhaps the most important piece of state legislation relating to seismic safety is the Alquist-Priolo Earthquake Fault Zoning Act (found in Public Resources Code Sections 2621 et. seq.), which is intended to protect human life and property from the hazards associated with fault rupture. The Act and its impact on development in Cathedral City are described in this element.

Government Code Section 8876 establishes a program through which the City and other jurisdictions located within the most severe seismic shaking zone, Zone 4 (as set forth in Chapter 2-23, Part 2, Title 24 of the Administrative Code), shall identify all potentially hazardous or substandard buildings and establish a program for the mitigation of these structural inadequacies.

Geologic Setting

The City of Cathedral City is located within the northwesterly portion of the Salton Trough, a narrow, low-lying tectonic depression that began forming about 5 million years ago. The rocks and sediments exposed at the surface of the General Plan planning area, which can be classified based on their age, include:

1) Mesozoic and older (66 million years old and older) rocks in the Santa Rosa Mountains,
2) Pleistocene (11,000 to 1.6 million years old) sediments on Edom Hill, Flat Top Mountain, and the northwestern portion of the planning area, and
3) Holocene (0-11,000 years old) sediments on the valley floor.

The distribution of these sediments within the planning area is illustrated in Exhibit V-1. Their geologic and hydrologic characteristics are responsible for a number of geologic hazards and engineering challenges, which are described throughout this element.

Metasedimentary Rocks

The oldest sedimentary rocks, which overlie volcanic rock and basement bedrock, are conglomerates consisting of granitic and metamorphic debris. Within the General Plan planning area, these units are limited to the slopes of the Santa Rosa Mountains (map symbol **prb** on Exhibit V-1). The mountains consist of metamorphic rock of unknown age, which has been intruded by Early to Late Cretaceous (80 to 120 million years ago) crystalline rocks. The metamorphic rocks consist primarily of foliated schists and gneisses, which were probably derived from ancient marine sediments.

The metasedimentary rocks found in the planning area are typically non-water bearing, except where they are extensively jointed and fractured. Although joints, shears, and foliation provide avenues for water penetration, these units have low to moderately low permeability. Unweathered rock cannot be easily excavated, and blasting is usually required.

Alluvial Sediments

The most recently deposited sediments in the planning area are of alluvial (stream-deposited) or aeolian (wind-deposited) origin. Alluvial surfaces can be differentiated based on age and the degree of dissection and soil development. The youngest alluvial materials, known as active channel deposits, have no soil development and occur within the active stream channels of the planning area (map symbol **Qw**). These sediments are associated with the watershed of the Whitewater River, including the Salvia and Morongo Washes south of the Indio Hills and the Cathedral Canyon drainages at the base of the Santa Rosa Mountains. They also occur north of the Indio Hills.

Alluvial sediments that are slightly elevated above the active stream channels and slightly more dissected are classified as **Qyf2**, and occur in the northwestern corner of the planning area.

Exhibit V-1: Geologic Map of Cathedral City and its Sphere of Influence

Coarse, poorly sorted sands and gravels are referred to as alluvial fan and stream-wash deposits (map symbol **Qf**), and occur at the base of the Santa Rosa Mountains, on the alluvial fans emanating from Cathedral Canyon.

Alluvial plain sediments are typically loose near the ground surface, but become denser with increasing depth. They have medium to high permeabilities, except where silt layers retard the percolation of water. Because these units can be readily compacted with a combination of saturation and wheel rolling with rubber-tired construction equipment, they are generally suitable for use as compacted fill. Shrinkage of 20% to 30% can be expected upon compaction.

Alluvial fan sediments, which are dry with higher permeabilities, are also generally suitable for use as compacted fill. Compaction of the near-surface soils can be expected to result in up to 15% shrinkage.

The sediments that crop out in the Indio Hills are composed of Ocotillo Conglomerate, although some geologic sources refer to them as "oldest alluvial fan deposits," which are believed to be late Pleistocene in age (map symbol **Qdf** on Exhibit V-1). Ocotillo Conglomerate consists of pebble to cobble-sized sub-rounded clasts of locally derived gneisses and granites, with a lesser amount of basic volcanic rock, limestone, and pegmatite. It is approximately 2,400 feet thick in the Edom Hill area. The Ocotillo Conglomerate is the principal water-bearing unit of the upper Coachella Valley and typically has high concentrations of clay and a moderate potential for expansion (see "Expansive Soils" section below).

Aeolian Sediments

Wind-deposited (aeolian) sediments, which are typically alluvial in origin, are also referred to as sand dune deposits (map symbol Qds). These silty, fine and medium-grained soils are picked up and transported by strong winds emanating from the San Gorgonio Pass at the northwesterly edge of the Coachella Valley. They are redistributed along the central valley floor where they form shifting sand dunes. A thick accumulation of these windblown sands has formed the Palm Springs Sand Ridge, which rises as much as 100 to 120 feet above the valley floor and covers a significant portion of the General Plan planning area. As shown in Exhibit V-1, windblown deposits underlie much of the developed portion of the planning area.

Aeolian deposits are typically loose near the ground surface, but become denser with increasing depth. Like alluvial deposits, they are generally suitable for use as compacted fill, as they can be readily compacted with a combination of thorough wetting and wheel rolling with rubber-tired construction equipment. These units typically have high permeabilities, and shrinkage of up to 30% can be expected upon compaction.

Geologic Hazards

View of sand ridge at Mountain View Avenue

Slope Instability

Land adjacent to the Indio Hills and the east to northeast-facing slopes of the Santa Rosa Mountains have a moderate to high susceptibility to rock falls and landsliding. The metasedimentary and intrusive rocks that characterize the slopes of the Santa Rosa Mountains have several planes of weakness, including joints, fractures, and foliation. Depending on their orientation to man-made cuts in the soil, these areas could be susceptible to failure. Additionally, as these rocks weather, they can form rounded boulders which perch precariously on steep slopes and pose rock fall hazards down slope. Earthquake induced landslides and rock falls may occur in both the Indio Hills and Santa Rosa Mountains and are addressed in subsequent sections of this element. Mitigation of these hazards is best accomplished by avoiding development on steep slopes and implementing structural setbacks at the toe of slopes. Any proposed development adjacent to steep slopes of the Santa Rosa Mountains or Indio Hills should include an analysis for potential slope instability.

Collapsible Soils

Soil collapse, or hydroconsolidation, occurs when soils undergo a rearrangement of their grains and a loss of cementation, resulting in substantial and rapid settlement under relatively low loads. This phenomenon typically occurs in recently deposited Holocene soils in a dry or semi-arid environment, including aeolian sands and alluvial fan and mudflow sediments deposited during flash floods. The combination of weight from a building or other structure, and an increase in surface water infiltration (such as from irrigation or a rise in the ground water table) can initiate rapid settlement and cause structural foundations and walls to crack.

Alluvial and aeolian sediments in the planning area have the potential for collapse. Where development is proposed on these soils, this hazard should be evaluated as part of site-specific geotechnical evaluations, and recommendations should be made to mitigate the potential hazard. These studies should include analysis of the settlement potential of the entire soil column to the effective depth of infiltration of irrigation water, rather than only the near-surface soils. Additional recommendations which can mitigate these impacts include pre-watering of susceptible soils to induce collapse prior to construction, designing drainage to flow away from structures, avoiding open-bottomed planters adjacent to structures, using roof gutters to direct drainage away from foundations, and limiting the use of irrigation water.

Expansive Soils

Expansive soils contain significant amounts of clay particles that have the ability to give up water (shrink) or take on water (swell). When these soils swell, the change in volume can exert significant pressures on loads that are placed on them, such as buildings, and can result in structural distress and/or damage.

Given the relatively minor amount of clay present in soils in Cathedral City, expansive soils are not considered a hazard in the planning area. Although the older fan deposits of the Indio Hills may contain clay-rich soils near the surface, these units are typically removed and recompacted during grading. Mixing of soils during this process is expected to reduce their expansion potential.

Ground Subsidence
Ground subsidence is the gradual settling or sinking of the ground surface with little or no horizontal movement, and is usually associated with the extraction of oil, gas, or ground water from below the ground surface. Water contained in subsurface clay layers is squeezed out, and the clay is compacted by overlying sediments. Subsidence can result in the disruption of structures that are sensitive to slight changes in elevation, such as wells, canals, and sewer pipelines, as well as changes to surface drainage, reductions in aquifer storage, and the formation of earth fissures.

Subsidence as a result of groundwater withdrawal is one of the major environmental constraints facing the Coachella Valley, although most evidence of regional subsidence has been observed in the eastern Coachella Valley. Since the late 1970s, the regional demand for groundwater has exceeded the supply, and the ground water basin in the Coachella Valley is currently in a state of overdraft.

Ground surface fissures that occurred in 1948 near the intersection of Adams Street and Avenue 52 near the City of La Quinta are believed to have resulted from subsidence. CVWD's "Coachella Valley Water Management Plan" (November, 2000) indicates that, between 1996 and 1998, as much as 7 centimeters of subsidence occurred in the Palm Desert area. Continued overdraft of the limited groundwater resource is expected to result in declining groundwater levels, which will likely increase the rate of subsidence.

Mitigation of this hazard will require a regional approach to groundwater conservation and recharge. The U.S. Geological Survey plans to take precise elevation measurements every 2 to 3 years to determine the extent of subsidence in the eastern Coachella Valley. Continued monitoring of well water levels will also help assess the relationship between groundwater overdraft and regional subsidence. (Please refer to the Water Resources Element for more information about groundwater overdraft and recharge strategies.)

Wind Erosion
For thousands of years, strong winds emanating from the San Gorgonio Pass have been blowing and redistributing sand deposits in a southeasterly direction along the central axis of the Coachella Valley. This portion of the valley floor is largely composed of silty to sandy soils, which are easily picked up and transported by the wind. The wind erosion hazard is further compounded by the Whitewater River watershed, which crosses the most erosive zone of the valley floor. Most of the sand particles contained within the watershed are sharp and abrasive, as

they have not been rounded or smoothed by stream activity. Wind erosion is further perpetuated by urban development, especially when surface soils are disturbed and/or left unprotected.

As shown in Exhibit V-2, most of the General Plan planning area is located within a severe wind erosion hazard zone. Blowing sand constitutes a significant local environmental hazard, as it abrades and damages buildings and motor vehicles, fills drainages, driveways and yards, limits visibility on roadways, and requires substantial expense for sand removal and clean-up. Wind erosion and blowing sand also contribute to a significant health threat associated with the suspension of fine particulate matter in the air. Mitigation of this hazard has required the development and implementation of a multi-faceted mitigation plan, which includes the submittal of a dust control plan to the City prior to development. Other mitigation measures include watering of a site during construction, the installation of retaining walls and landscaping materials, and the application of chemical soil stabilizers (please refer to the Air Quality Element for more information about local and regional dust control measures).

Exhibit V-2: Wind Hazard Zones in the Cathedral City General Plan Area

Regional Tectonic Setting

The City of Cathedral City is located at the northwestern extreme of the Salton Trough, a broad structural depression, which is the landward extension of the San Andreas rift zone. This spreading ridge is responsible for separating Baja California from mainland Mexico and creating the Gulf of California. As the ridge spreads, it forces the Pacific tectonic plate to move northwestwardly into the North American Plate. These plates are sliding past one another at a rate of about 50 millimeters per year, and their movement is responsible for generating the earthquakes that occur in southern California.

Approximately 70% of the movement between the Pacific and North American Plates is accommodated by the San Andreas fault. The remaining motion is distributed between the Eastern Mojave Shear Zone and several sub-parallel faults of the San Andreas fault zone, including the San Jacinto, Whittier-Elsinore, Newport-Inglewood, Palos Verdes, and several offshore faults.

Measuring Seismic Activity

The severity of an earthquake is generally classified according to its magnitude or intensity. Magnitude, a measure of the amount of energy released when a fault ruptures, is measured on the Richter scale. Each whole number step in magnitude represents a ten-fold increase in the amplitude of the waves on a seismogram and about a 31-fold increase in the amount of energy released. For example, a 7.5 Richter magnitude earthquake is about 31 times more powerful than a 6.5 Richter magnitude earthquake.

Intensity refers to a qualitative estimate of the damage caused by an earthquake at a given location and is commonly measured on the Modified Mercalli Intensity (MMI) scale. This scale includes twelve levels of intensity, ranging from I (tremor not felt) to XII (total damage) and is based upon observed damage to structures, other physical events, and human reactions to the quake. The intensity of ground shaking at a given site is a complex interaction of many factors, but of primary importance are the magnitude of the earthquake, the distance from the epicenter, the type of bedrock or soil materials between the epicenter and the site, and site-specific topographic features.

To evaluate the potential seismic hazards of a particular locale, geologists, seismologists, engineers and urban planners refer to the maximum credible earthquake (MCE) and maximum probable earthquake (MPE). The MCE is defined as the largest earthquake likely to occur on a fault or fault segment. The MPE represents the earthquake most likely to occur in a specified period of time, such as 30 or 500 years. The MCE and MPE magnitudes for a given fault are used to establish structural safety criteria and are generally estimated by seismologists based on the length of the fault, style of faulting, and other fault characteristics.

Seismic Activity in the Planning Area

To prevent development from being built directly on the trace of an active fault, the California Alquist-Priolo Earthquake Fault Zoning Act of 1972 has defined the following terms: active, potentially active, and inactive faults. An “active” fault is one which has proven displacement of the ground surface within about the last 11,000 years (within the Holocene Epoch). A “potentially active” fault shows evidence of movement within the last 1.6 million years, although the U.S. Geological Survey has modified this time period to 750,000 years. An “inactive” fault is one which has not moved in the last 11,000 years, as determined by direct geologic evidence, such as trenching.

Several faults are capable of generating strong ground shaking in the General Plan planning area. Those capable of generating peak horizontal ground accelerations of about 0.1g and greater (Modified Mercalli Intensities greater than VII) in the planning area are listed in Table V-1 below. Faults crossing the planning area are illustrated in Exhibit V-3.

Table V-1
Potential Seismic Intensities Associated with the Maximum Credible Earthquake (MCE)

Fault Name	Distance to GP Area (miles)	Magnitude of MCE	Peak Ground Acceleration of MCE (g)*	MMI** from MCE
San Andreas				
Coachella Segment (south strand)	0 –9	7.4	0.45-0.90	X-XII
Coachella Segment (north strand)	1 – 10	7.1	0.40-0.85	X-XI
San Bernardino Mtns. Segment	4 – 11	7.3	0.35-0.80	IX-XI
East Mojave Shear				
Burnt Mountain	7 – 14	6.4	0.15-0.40	VIII-IX
Eureka Peak	9 – 16	6.4	0.15-0.30	VII-IX
Landers	20 – 28	7.3	0.15-0.25	VI-IX
Lenwood-Lockhardt-Old Woman	34 – 40	7.3	0.10-0.15	V-VIII
Camp Rock-Emerson-Copper Mtn	25 –32	6.9	0.10-0.15	V-VIII
Johnson Valley (northern)	30 – 38	6.7	0.05-0.10	V-VII
Pisgah-Bullion Mtn-Mesquite	31 – 37	7.1	0.05-0.15	V-VIII
Calico-Newberry-Hidalgo	35 – 43	7.1	0.05-0.10	IV-VIII
Helendale-S. Lockhardt	41 – 47	7.1	0.05-0.10	IV-VII
North Frontal Fault Zone	30 – 47	7.0	0.15-0.30	VIII-IX
Pinto Mountain	15 – 22	7.0	0.15-0.30	VIII-IX
San Jacinto				
Anza	17 – 24	7.2	0.20-0.25	VIII-IX
Coyote Creek	21 – 29	6.8	0.10-0.15	VI-VIII
San Jacinto (San Jacinto Valley)	25 - 29	6.9	0.10-0.15	VI-VIII
Elsinore	40 – 47	7.1	0.05-0.10	V-VII

* Peak Ground Acceleration, where g is the acceleration of gravity, equal to 9.8 m/sec^2
** MMI = Modified Mercalli Intensity
Source: Table 1-2, “Seismic, Geologic, and Flooding Sections of the Technical Background Report to the Safety Element of the General Plan for Cathedral City,” prepared by Earth Consultants International, Inc., June 1999.

Exhibit V-3: Faults in the Cathedral City Planning Area

San Andreas Fault Zone

The San Andreas fault is the principal boundary between the Pacific and North American tectonic plates and controls the seismic hazard for southern California. In southern California, the San Andreas fault system is comprised of three segments:

1) Mojave Desert segment,
2) San Bernardino Mountains segment, and
3) Coachella Valley segment.

Only the Coachella Valley segment crosses the General Plan planning area. It consists of two fault strands: the San Andreas Fault strand (also known as the North Branch or Mission Creek fault) which occurs north and east of the planning area; and the Banning Fault strand (also known as the South Branch fault) which extends across the northern portion of planning area. The two strands merge southeast of the planning area, near the City of Indio, and continue southeastwardly toward the United States-Mexico border. Paleoseismic studies indicate that the last surface-rupturing earthquake on the Coachella Valley segment occurred around 1680. Prior to this, earthquakes on this fault occurred at an average recurrence interval of every 220 years. The segment is creeping at a rate of about 25 mm/year (+/-5 mm/year), and has more than a 22% probability of rupturing before the year 2024.

The Banning Fault of the Coachella Valley segment is capable of producing a magnitude 7.4 earthquake that would result in peak horizontal ground accelerations of between 0.45 and 0.9g in Cathedral City. Within the planning area, it consists of several splays that branch off from one another, then come together. In the vicinity of the Edom Hill Landfill, just east of the planning area, the fault consists of one main fault and at least three secondary splays. The Banning Fault is believed to have been responsible for generating the magnitude 5.9 North Palm Springs earthquake in 1986. Although the ground surface did not rupture during this quake, ground fractures occurred on the northern side of the fault, between Whitewater Canyon and State Highway 62.

The Mission Creek fault is capable of generating a magnitude 7.1 earthquake, with resultant peak ground accelerations of between 0.4 and 0.8g in the City. Geotechnical studies in the Desert Hot Springs area have documented several breaks that can be traced upward to within one foot of the ground surface. It is estimated that the City would be susceptible to ground accelerations greater than 1.0g during a simultaneous rupture of the Banning and Mission Creek faults.

The Coachella Valley segment joins the San Bernardino Mountains segment to the northwest of the planning area, near the northwestern limits of the City of Desert Hot Springs. The San Bernardino Mountains segment has a slip rate of about 24± mm/year (+/-5 mm/year), with an average recurrence interval of 146 years. It is estimated that this segment has a 28% probability of rupturing before year 2024.

Garnet Hill Fault

The Garnet Hill fault extends from the vicinity of Whitewater Canyon to possibly as far as Edom Hill, and crosses the planning area just north of Interstate-10. Given its orientation and proximity to the San Andreas fault, it has been suggested that the Garnet Hill fault is associated with, and perhaps even an ancestral branch of the San Andreas fault. Although the California Division of Mines and Geology has not designated it as an active fault, the Garnet Hill fault can act as a plane of weakness and move in response to an earthquake on another nearby fault. Ground fractures associated with the 1986 North Palm Springs earthquake were reported along the trace of the Garnet Hill Fault and indicate that a near-surface response of weak surfaces occurred at depth. Although the fault is not designated an Alquist Priolo Fault Zone, the City has the option to designate a Fault Hazard Management Zone along this fault to restrict or regulate future development across the trace of the fault.

San Jacinto Fault Zone

The San Jacinto Fault Zone extends from the City of San Bernardino, southeasterly toward the Brawley area, where it continues south of the U.S./Mexico border as the Imperial Fault. The fault is south of the Planning Area. The San Jacinto Fault zone has a high level of historic seismic activity, with at least ten moderate (6 > M > 7) earthquakes having occurred between 1890 and 1986, and an estimated recurrence interval of between 150 and 300 years. Available data suggest that the slip rates of the fault's northern segments are about 12± mm/year (+/-6 mm/year), and slip rates of the southern segments are about 4± mm/year (+/-2 mm/year). The San Bernardino and San Jacinto Valley segments are estimated to have a 37% and 43% probability, respectively, of rupturing before the year 2024.

East Mojave Shear Zone

The East Mojave Shear Zone includes several northwest-trending faults in the southern Mojave Desert that collectively appear to be accommodating between 9% and 23% of the motion between the North American and Pacific tectonic plates. Paleoseismic studies indicate that several earthquakes have occurred in this area during the Holocene Epoch, including the 1992 Landers earthquake, which occurred on the Johnson Valley fault. A magnitude 7.3 earthquake on one of these fault segments is expected to generate a peak horizontal ground acceleration of between 0.1 and 0.15g and MMI seismic intensity of between VII and VIII in Cathedral City.

Pinto Mountain Fault

The Pinto Mountain fault is an east-trending fault that is traceable for approximately 47 miles, from its junction with the San Andreas fault eastward to just east of the City of Twentynine Palms, north of the planning area. The Pinto Mountain fault is considered active, and Holocene Epoch movement has been documented. The fault is capable of generating a maximum credible earthquake of 7.0, which would generate peak horizontal ground accelerations of between 0.15 and 0.3g in the General Plan planning area.

Seismically Induced Geotechnical Hazards

Liquefaction

Liquefaction is the total or substantial loss of shear strength of loose, sandy, saturated sediments in the presence of ground accelerations greater than 0.2g. When liquefaction occurs, the sediments involved behave like a liquid substance. This phenomenon can result in structural distress and/or failure due to settlement, the buoyant rise of buried structures, the formation of mud spouts and sand boils, and seepage of water through ground cracks.

As illustrated in Exhibit V-4, the potential for liquefaction to occur is low to none throughout most of the planning area, principally because groundwater in the Cathedral City area typically occurs 150 to 200 feet below the ground surface, too deep to saturate the loose sediments of the valley floor. Although depth to groundwater may be less than 50 feet adjacent to the Santa Rosa Mountains in the southern planning area, the alluvial sediments in this area are coarse-grained sand, gravels, cobbles, and boulders that are not susceptible to liquefaction.

The potential for liquefaction is moderate to high, however, in the northern portion of the planning area, in the vicinity of the San Andreas Fault. In this area, the fault acts as a barrier to groundwater and causes groundwater to occur at shallow depths. Historically, springs and flowing wells have been observed at Willow Hole and areas just north of the planning area. During well drilling in 1981, groundwater was reported at depths of less than 30 feet northeast of Willow Hole. Given that groundwater occurs within 50 feet of the surface in this area, the unconsolidated alluvial sediments are highly susceptible to liquefaction. Shallow groundwater has also been reported along the northern side of the Banning Fault, but sediments in this area are semi-consolidated to consolidated and not susceptible to liquefaction.

Seismically Induced Settlement

Strong ground shaking can cause the densification or compaction of soils, resulting in local or regional settlement of the ground surface. Settlement can damage structures and foundations, as well as pipelines, canals, and other grade-sensitive structures. The potential for seismically induced settlement to occur is controlled by the intensity and duration of ground shaking and the density of subsurface soils.

As shown in Exhibit V-5, the valley floor, which contains loose, recently deposited sediments, is highly susceptible to this phenomenon. Development proposed in these areas should include subsurface geotechnical investigations, which evaluate the potential for seismically induced settlement. Proper foundation design and the densification or compaction of subsurface soils prior to development can mitigate some of the damaging effects associated with settlement.

Exhibit V-4: Liquefaction Susceptibility Map

Exhibit V-5: Areas Susceptible to Seismically Induced Settlement

Seismically Induced Slope Instability

It is estimated that a ground acceleration of at least 0.10g in steep terrain is necessary to generate earthquake-induced rock falls. Given that several faults are capable of generating peak ground accelerations of this magnitude in Cathedral City, there is a moderate to high potential for seismically induced rock falls and landslides to occur in the General Plan planning area. Susceptible areas are illustrated in Exhibit V-6, and include areas within and adjacent to the slopes of the Santa Rosa Mountains and Indio Hills, particularly where the bedrock of the Santa Rosa Mountains is intensely fractured or jointed. As shown in Exhibit V-6, nearly all of the areas with a moderate or high susceptibility to slope instability are currently undeveloped. The East and West Cathedral Canyon Washes act as a buffer between the slopes of the Santa Rosa Mountains and development in the Cove, and would be expected to absorb much of the potential damage from rock falls and provide some level of protection to existing habitable development.

Intense ground shattering can be expected at the top of Edom Hill and other narrow, steep ridges, where topographical features can localize and focus the ground shaking at the ridge top. Mitigation of these hazards can be best achieved by avoiding development on steep slopes and enforcing appropriate building setbacks at the base of the slopes. Even engineered cut and fill slopes constructed on the valley floor may be subject to failure if they are of sufficient height. These slopes must be designed to resist seismically induced failure, and their design should be based on site-specific soil stability analyses that include subsurface soil sampling and laboratory testing.

Seiches

Seiches refers to the seismically-induced oscillation or sloshing of water contained in an enclosed basin, such as a reservoir, pond, water storage tank, or swimming pool. This hazard is dependent upon the frequency of seismic waves, distance and direction from the epicenter, and design criteria of the enclosed body of water. Although damage from small bodies of water, such as swimming pools, would be expected to be minor, damage to or failure of larger bodies of water, such as water tanks and retention basins could result in the inundation of land and structures downgradient, hinder efforts to suppress fires, and limit the supply of potable water after a major earthquake.

The Desert Water Agency owns four water reservoirs, which are situated on elevated terrain surrounding the Cathedral Canyon Cove in the Santa Rosa Mountains. Damage to and/or failure of these tanks could result in inundation of homes and property in the Cove neighborhood. Two water reservoirs owned by the Coachella Valley Water District are located on Flat Top Mountain in the northern portion of the planning area. Although land downgradient from these tanks is currently vacant, their damage or failure could impact future development. Design elements, such as baffles and braces, are warranted to reduce the potential for seiches in tanks, open reservoirs, and ponds where overflow or structural failure may cause damage to nearby properties. The American Water Works Association (AWWA) Standards for Design of Steel Water Tanks includes new criteria for the seismic design of water tanks.

Exhibit V-6: Areas Susceptible to Seismically Inducted to Slope Instability

Applicable Legislation

Alquist-Priolo Earthquake Fault Zoning Act

Perhaps the most important piece of legislation related to the mitigation of earthquake hazards is California's Alquist-Priolo Earthquake Fault Zoning Act, which was signed into law in 1972. The primary purpose of the act is to mitigate the hazard of fault rupture by prohibiting the location of structures for human occupancy across the trace of an active fault. The Act requires the state geologist to delineate "earthquake fault zones," which show evidence of Holocene surface displacement along one or more of their segments and are clearly detectable by a trained geologist. The boundary of an earthquake fault zone is generally about 500 feet from major active faults, and 200 to 300 feet from well-defined minor faults. The Act requires cities and counties to withhold development permits for sites within an Earthquake Fault Zones until geologic investigations demonstrate that the sites are not threatened by surface displacement from future faulting.

The California Division of Mines and Geology (DMG) has completed Alquist-Priolo Earthquake Fault Zone mapping for the General Plan planning area, which includes a fault zone along the Banning Branch of the San Andreas fault, as illustrated in Exhibit V-3. Although the DMG has not delineated an Alquist-Priolo Earthquake Fault Zone along the trace of the Garnet Hill fault, the City may wish to establish its own Fault Hazard Management Zone around this fault due to the possibility of ground fracture.

Uniform Building Code

The primary tool used by the City to ensure seismic safety in structures is the Uniform Building Code (UBC). The UBC describes the minimum lateral forces needed to resist seismic shaking, which are based on the area's seismic zone, type of structural system, building configuration and height, and soil profile of the structure and site in question. The San Andreas and San Jacinto faults are defined as Type A faults by the UBC. The UBC is updated roughly every three years, and was last updated in 1997. In accordance with state law, the City has adopted the most recent version of the UBC.

Until recently, three different Uniform Building Codes were used throughout the United States, each addressing the prevailing geologic conditions in different geographic sections of the country. Beginning in 1994, the International Code Committee (ICC) began consolidating the three codes into one. The new code is known as the International Building Code (IBC) and is to be used nationwide. The State of California is currently involved in efforts to modify sections of the International Building Code. Until the IBC is adopted by the State, cities and counties in California are precluded from adopting it. It is anticipated that the State and City of Cathedral City will adopt the International Building Code within the next several years, and upon adoption, it will completely replace the UBC.

California Building Code

The California Building Code (CBC) is a modified version of the UBC, which is tailored for California geologic and seismic conditions. It is included in Title 24 of the California Administrative Code and includes stringent earthquake provisions for critical structures, including public schools and hospitals. The CBC was last amended in 1998 and adopted by the City in 1999.

Seismic Retrofitting
Most injuries and loss of life associated with earthquakes are related to the collapse of buildings and structures. Particularly hazardous buildings include unreinforced masonry (URM) buildings, wood frame structures, pre-cast concrete structures, tilt-up buildings, and mobile homes. Soft-story buildings, which lack adequate strength due to too few shear walls, may also be subject to damage or collapse.

Although the City does not maintain a seismic retrofit ordinance, it has evaluated potentially hazardous commercial structures throughout the City. In 1984, State Assembly Bill (AB) 537 required all cities in California to identify and evaluate the seismic integrity of large-occupancy commercial structures built before 1976, and to retrofit them as necessary. Given that the City of Cathedral City was not incorporated until 1982, and most commercial development in the City occurred after 1976, only a few potentially hazardous structures were identified and retrofitted. Most were located within the downtown area and have since been demolished as part of the Downtown Redevelopment project. Only one adobe commercial structure, a restaurant on Cree Road, is still standing. The structure is exempt from AB 537 due to its limited size and occupancy; however, signs have been posted at all entrances to inform patrons that the building consists of unreinforced masonry. In the early 1990s, several industrial warehouses on Perez Road were retrofitted with steel straps at the property owner's discretion.

FUTURE DIRECTIONS

Although it is impossible to prevent earthquakes and other geologic hazards from occurring, their destructive effects can be minimized. Comprehensive mitigation measures include the identification and mapping of potential hazards, prudent planning efforts, enforcement of applicable building codes, and expedient retrofitting of weak or dangerous structures. The City will also need to rely on the regulations and guidelines set forth in the Alquist-Priolo Earthquake Fault Zoning Act, State CEQA statutes, PM_{10} control plans, and the Uniform/International Building Code. The Planning Department must assure that development proposals are thoroughly evaluated with regard to geotechnical and seismic safety, and that all necessary site-specific geotechnical studies are conducted and thoroughly evaluated.

GOAL, POLICIES AND PROGRAMS

Goal
The protection of human life, structures, and land from the effects of geotechnical and seismic hazards.

Policy 1
All new development shall continue to be constructed, at a minimum, in accordance with the seismic design requirements contained in the most recently adopted edition of the Uniform Building Code/International Building Code.

Policy 2
In accordance with state law, all development proposals within designated Alquist-Priolo Earthquake Fault Zones shall be accompanied by appropriate geotechnical analyses.

Program 2.A
Secure available publications from trade organizations and the state, and distribute to developers, property owners, and other appropriate parties, which describe the content and format of geotechnical investigations that must be carried out within Alquist-Priolo Earthquake Fault Zones.
Responsible Agency: City Engineer, Building Department
Schedule: Immediately

Program 2.B
The City will pursue a cooperative agreement with the Riverside County Geologist, State Geologist, or contract geological engineer to review and determine the adequacy of geotechnical and fault hazard studies.
Responsible Agency: Planning Department, City Engineer
Schedule: Immediately

Policy 3
The City shall establish a Fault Hazard Management Zone along the Garnet Hill fault and restricting or prohibiting the construction of structures for human occupancy across the trace of the fault.

Program 3.A
The City shall establish criteria for, and require the preparation of fault hazard analyses in a manner consistent with the requirements of the Alquist-Priolo Earthquake Fault Zoning Act.
Responsible Agency: Planning Department, City Engineer
Schedule: Upon designation of the Garnet Hill Fault Hazard Management Zone

Policy 4
The City will establish and routinely update an informational database, which describes potential seismic and other geotechnical hazards within the City boundaries and sphere-of-influence.

Program 4.A
Consult and coordinate with the California Division of Mines and Geology, other relevant state and federal agencies, and surrounding communities to establish, maintain, and update the informational database.
Responsible Agency: Planning Department, City Engineer/Consulting Geologist
Schedule: 2002-2003; Routine updating

Policy 5
Where development is proposed in areas identified as being subject to geotechnical hazards (including, but not limited to slope instability, soil collapse, liquefaction and seismically induced settlement), the City shall require the preparation of site-specific geotechnical investigations by

the applicant prior to development. All such studies shall include mitigation measures that reduce associated hazards to insignificant levels.

Policy 6
All grading, earthwork, and construction activities shall be in accordance with applicable fugitive dust control ordinances and regulations, including those established by the City, CVAG, SCAQMD, and other appropriate agencies.

Policy 7
To minimize the potential impacts of subsidence due to the extraction of groundwater, the City should actively support and participate in local and regional efforts at groundwater conservation and recharge.

Policy 8
Establish and maintain a program by which all potentially hazardous structures, including residential structures, which pose a threat due to inadequate seismic design, engineering or construction, are identified, inventoried, and rehabilitated.

Program 8.A
The City will prepare and distribute an informational handout to property owners which encourages the retrofitting of privately-owned hazardous structures, including residential structures, describes appropriate methods of rehabilitation, and suggests methods of financing such improvements.
Responsible Agency: Planning Department, Engineering Division, Building Division, Fire Department; Business License Desk
Schedule: 2003-2004

Policy 9
Coordinate with public and quasi-public agencies to assure the continued functionality of major utility systems in the event of a major earthquake.

Program 9.A
Establish working relationships with the Coachella Valley Water District, Desert Water Agency, Southern California Edison, The Gas Company, Verizon, and other appropriate agencies, to maintain strategies to safeguard major utility distribution systems and strengthen or relocate facilities that are in potentially hazardous areas.
Responsible Agency: Planning Department, Public Works Department, City Engineer, public and quasi-public agencies
Schedule: Immediate; Continuous

Program 9.B
Cooperate with CalTrans to stabilize hazardous slopes and strengthen bridges and other potentially hazardous structures along state roadways within and around the City.
Responsible Agency: Public Works Department, City Engineer, CalTrans
Schedule: Immediate; Continuous

Policy 10
To the greatest extent practical, all new septic tank leach fields, seepage pits, drainage facilities, retention basins and heavily irrigated areas shall be located away from structural foundations and supports to minimize the potential for localized collapse of soils.

Policy 11
Maintain earthquake preparedness information and proactively distribute the materials to City residents and businesses.

FLOODING AND HYDROLOGY ELEMENT

PURPOSE

The Flooding and Hydrology Element establishes the goals, policies, and programs that provide the City with protection from potential flooding hazards, thereby protecting the public health and safety of residents, businesses and visitors. The desert environment creates unique conditions relating to flood control and protection from the 100 and 500 year storm. These conditions are described below, and methods to manage or eliminate them are provided also.

The preservation of lands constrained by topography or drainage, including steep slopes, areas rich in vegetation and cover, and alluvial plains and drainage channels greatly reduce runoff and preserve the capacity of downstream facilities. Furthermore, the planned integration of on-site stormwater detention facilities, where possible and appropriate, significantly reduces the needed size of downstream facilities, while creating opportunities for groundwater recharge, and enhanced open space and/or recreation areas.

BACKGROUND

The Flooding and Hydrology Element is related to several other General Plan Elements, including the Geotechnical Element, the Hazardous and Toxic Materials Element and the Circulation Element, which address the need for, and availability of, adequate access and evacuation routes in the event of a major disaster or threat to the community. Policies and programs set forth in the Land Use Element also have some impact on flooding issues, as they direct the location of open space, essential public facilities, and developed areas, which potentially may be severely damaged by flooding.

Chapter 73 of the Statures of California, 1939, requires that adjoining jurisdictions plan for regional flood control. In addition, Government Code Section 8401(c) requires that local governments plan, adopt, and enforce flood plain management through land use restrictions when necessary. This legislation, also known as the Cobey-Alquist Flood Plain Management Act, establishes requirements for receiving state financial assistance for flood control measures. Finally, California Government Code Section 8589.5 and 65302 (g) require the mapping of areas subject to inundation in the event of dam failures.

Regional Climatic Setting

The City of Cathedral City is located in the northern Coachella Valley and is flanked by the San Jacinto and Santa Rosa mountains on the west, and the Little San Bernardino Mountains on the east.

Annual rainfall is very low from the desert floor into the foothills, ranging from 4 to 6 inches per year and averaging about 5 to 6 inches along the Little San Bernardino foothills. Summer temperatures can occasionally exceed 125°F and winter temperatures seldom fall below freezing. The mountains and upper elevations of the planning area are cooler, with an approximate 5°F drop with every 1,000-foot increase in elevation.

Rains fall in the desert generally during the months of November through March, although short-duration, high intensity storms also occur during the summer months of July through September. High intensity storms can result in too much water falling at too rapid a rate, so that the ground cannot effectively absorb the rainfall, causing sheet flooding. The benchmark storms used by the Army Corps of Engineers to determine credible storm data include the storm of 1939, which occurred over Indio on September 24th of that year, which generated 6.45 inches of rain in 6 hours. Tropical storm Kathleen, in September of 1976 also generated high rain amounts, resulting in about 3 inches of rain in Cathedral City.

Development also increases flooding hazards, insofar as more development reduces the permeable surfaces into which water can penetrate, and concentrates flows in both volume and velocity.

Local and Regional Flood Control

The generation and management of stormwater runoff are typically divided into two separate categories, local and regional drainage, which are ultimately interrelated. Local drainage is either defined by the limited size of the drainage area or to the generation of runoff and facilities capturing and conveying runoff from over a larger geographic area. Regional drainage ultimately picks up and conveys local drainage through the careful integration of these two systems.

Potential flooding problems in the City and its planning area are related to a rise in the water level of Whitewater River and its tributaries, to storm flooding on the alluvial fans, and to runoff associated with the foothills of the Santa Rosa and Little San Bernardino Mountains. Minor flooding and ponding of surface water also occurs on the relatively flat valley floor if the flood control channels draining Cathedral Canyon (the East, West and North Cathedral Channels) overflow or are unable to withstand heavy precipitation. The southern portion of the City also receives flow from Palm Canyon Wash and Tahquitz Creek to the west, and Tramview Wash to the southwest.

There are four watersheds which affect the City's flood control. Each of these is briefly described below:

I-10 North Watershed
The area north of Interstate 10, and the drainage areas which contribute to it, constitute this watershed. The watershed area is primarily undeveloped land. The Long Canyon Wash and Morongo Wash both contribute to this watershed.

The Big and Little Morongo Creeks drain the western portions of the Little San Bernardino Mountains. Big and Little Morongo Washes join south of Pierson Boulevard in Desert Hot Springs to form Morongo Wash, which enters the General Plan area as a wide braided network of washes approximately 3/4 mile wide. Flows from the Long Canyon Wash join Morongo Wash near 20th Avenue and Palm Drive about 1 mile north of the General Plan planning area. The wash flows due south and crosses I-10 and the railroad right of way, through three bridges and some small culverts, where most of the flows join the Whitewater River. Additional flows continue in a southeasterly direction between I-10 and the railroad tracks, to the Date Palm Drive overpass, where flows are forced southerly, across the railroad tracks and into the Vista Chino/Date Palm Drive intersection. Flows from the Long Canyon Wash also pass through Willow Hole, cross Date Palm Drive north of I-10, then flow between I-10 and Varner Road in a southeasterly direction to Thousand Palms and I-10, east of the planning area.

I-10 to Whitewater River Watershed

This watershed is bounded on the north by I-10, and on the west and south by the Whitewater River. This area of the City is the most rapidly growing in terms of new housing units. Levees along the Whitewater River, as well as concrete armoring on its east side, protect development to the east, in the City. Areas of special concern within this watershed includes the area bounded by McCallum Way, Avenida Maravilla, and Vista Chino; the area within the area bounded by Date Palm Drive, Ramon Road and Tortuga; the intersection of Vista Chino and Landau Boulevard; Dinah Shore Drive between Date Palm and Cathedral Canyon; and Gerald Ford at Plumley, where poorly defined drainage areas cause nuisance flows. Most flood water in this watershed is conveyed on existing City streets.

Eagle Canyon Watershed

This watershed is located west of the West Cathedral Canyon Channel, and south of Palm Canyon Wash. Eagle Canyon and a number of other mountain drainages are the primary source of flood waters in this watershed. The Eagle Canyon flows cross developed areas before discharging into the Cathedral Canyon North Channel. A dam has been planned for Eagle Canyon to control flooding, but has not been constructed. Preliminary engineering and right of way studies have been completed. The Flood Control District has budgeted funds for additional studies and engineering in this area.

Cove Area Watershed

This watershed is bounded by the Cathedral Canyon Channel East and West, and the Whitewater River. The East and West channels convey flood waters on either side of the Cove, and discharge into the Whitewater River. A number of culverts have been constructed through the channel levees to convey flows from the Cove to the channels. The streets generally have no curb and gutter, and are not sufficient, therefore, to contain the 100 year storm.

Regional Flood Control: the Coachella Valley Water District and the Riverside County Flood Control District

The Coachella Valley Water District (CVWD) and the Riverside County Flood Control District are responsible for the management of regional drainage within and in the vicinity of Cathedral City, including rivers, major streams and their tributaries, and areas of significant sheet flooding.

Both Districts are empowered with broad management functions, including flood control planning and construction of drainage improvements for regional flood control facilities, as well as watershed and watercourse protection related to those facilities. To carry out their mandates, the Districts also have powers of taxation, bonded indebtedness, land and water rights acquisition, and cooperative partnerships with local, state, and federal agencies. An elected Board acts as the official decision-making body of CVWD, while the Riverside County Board of Supervisors is the official decision-making body of that District.

Cathedral City Regulation of Local Drainage

While CVWD and the County have the primary responsibility for regional facilities, in close cooperation and coordination with the City, it is the City that remains directly responsible for the management of local drainage. The effectiveness with which the City and Districts manage drainage issues will have a direct effect on the scale, complexity and cost of future flood control facilities. The cost-effectiveness of prevention and on-site management should be actively integrated into community land use planning and regulation, recognizing significant physical and financial constraints in many areas of the city.

FEMA and the Federal Flood Rate Maps

The Federal Emergency Management Agency maps areas of significant potential flooding for the City and its planning area. The FEMA Flood Insurance Rate Maps (FIRMs) serve as the basis for determining the need for and availability of federal flood insurance. Exhibit V-7 is a compilation of the data presented in three FIRM Community Panels (maps) currently dated July, 1999. Each of the applicable flood zones is briefly described below.

A: Areas of 100-year flood: base flood elevations have not been determined.
AE: Areas of 100-year flood inundation; base flood elevations not determined.
AF: Floodway areas in Zone AE (mostly contained by levees).
A?: Estimated continuation of Zone A not mapped by FEMA.
X: Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas of less than 1 square mile; and areas protected by levees from 100-year flood.
None: Areas determined to be outside 500-year flood plain or where flood hazards are undetermined.

Exhibit V-7: Flood Zones in the Planning Area

The FEMA maps for the City of Cathedral City planning area designate lands within the 100-year flood plain (Zone A). These areas include washes, channels and areas subject to sheet flow flooding. The maps do not cover the northern portion of the General Plan area and some of the Agua Caliente tribal lands within the City limits.

The FEMA maps show that the 100-year flood zone for the Whitewater River is generally confined to the area along the channel of the river and its tributaries.

Areas of 100-year flood inundation also occur locally in Cathedral Cove. The 500-year flood limits cover a large portion of the central portion of the City, and the older residential and commercial section in Cathedral Cove. Most of East Palm Canyon within the City limits is located within the 500-year inundation area.

Flooding in the planning area consists primarily of shallow flooding associated with Morongo Wash and the West branch of Salvia Wash. A significant amount of flow also emanates from the Long Canyon wash, which separates Edom Hill from Flat Top Mountain, in the Willow Hole area. Because of the confined nature of this canyon, floodwaters in these areas move at relatively high velocities, with potential to do considerable damage.

Significant improvements in the northern portion of Cathedral City have been proposed by the Coachella Valley Water District. Amendments have not yet been approved by FEMA, but CVWD expects that these proposed changes, when implemented, will reduce the flooding hazard in this area.

Cathedral City Comprehensive Storm Drain Master Plan

The current Cathedral City Comprehensive Storm Drain Master Plan, prepared in March, 1990, is a strategy for the construction, maintenance and funding of storm drainage improvements in the City for all four watersheds. The Plan analysis includes coordination with the plans of other agencies having jurisdiction, including the Riverside County Flood Control District and CVWD. Ultimately, the coordinated development of the City's Plan and those of the two District will result in a comprehensive approach to the protection of property in the City from flood waters.

The Master Plan has been implemented by the Master Drainage Plan ordinance and serves as the operational tool for technical guidelines and developer requirements regarding site retention or installation specifics. Financial plans for City sponsored projects, however, have not been implemented.

Backbone Drainage Systems

Capital projects such as dikes, levees, channels, and debris and detention/retention basins have been constructed to manage project-specific, community and regional drainage systems in the community. Designing, financing and constructing these facilities are significant challenges and important opportunities. Methods of flood controls and their costs are weighed against the economic impacts likely to result from major flooding, in some areas, flood control improvements are frequently necessitated by development itself, which creates its own runoff management problems.

Whitewater River Channel
The Whitewater River Channel is the main drainage facility in the city and the Coachella Valley. At Cathedral City, the Whitewater River drains approximately 720 square miles, and generates a 100-year storm discharge of approximately 37,000 cfs and a standard project discharge of approximately 78,000 cfs. The Coachella Valley Water District is continuing its program of channel revetment (concrete armoring of channel walls) to protect the channel from stormwater erosion.

Cathedral Canyon Channel
The Cathedral Canyon Channel originates at the City's western corporate limit, near Golf Club Drive, and flows from west to east, draining into the Whitewater River at the City's eastern City limit.

East Cathedral Canyon Channel
The East Cathedral Canyon Channel flows eastbound along the Cove area directly into the Whitewater River. Portions of the channel, which were originally lined by the County prior the City's incorporation, have recently (1999) been revetted by the City at East Palm Canyon Drive.

West Cathedral Canyon Channel
The West Cathedral Canyon Channel flows along the west boundary of the Cove area, slowing from south to north and feeds into the Cathedral Canyon Channel. The Channel is under the jurisdiction of the Riverside County Flood Control District.

Areas in the City that have received flood control improvements are those subject to potentially destructive floods with a probable frequency of at least once every 100 years (100-year flood). Significant capital investments have been made in the community where these threats occur, including the revetment discussed above. Improvements have been completed over a long period of time, and in the case of the West and East Cathedral Canyon Channels, date back to 1950.

Mid-Valley Stormwater Channel

The Mid-Valley Channel is a regional flood control facility, planned as a concrete-lined trapezoidal channel along the foot of the northeastern facing slopes of the Palm Springs Sand Ridge. The Coachella Valley Water District has completed the planning and design of the project. The channel will have a sandy bottom wherever possible to enhance percolation of runoff.

The proposed channel route will begin southeast of a retired landfill and septic tank disposal field located at the northern extension of DaVall Drive, and will flow to Avenue 42 in Indio between Washington Street and Country Club Drive.

The “benefit area” portion of the City of Cathedral City is limited to the area south of the Southern Pacific Railroad, east of Date Palm Drive, north of Ramon Road and west of the city limits at DaVall Drive.

Specific Plan No. 89-40, which was approved by the City Council in April, 1990, requires the provision of drainage easement to allow runoff to feed into the Mid-Valley Channel. The Specific Plan provides a combination retention area/park site of approximately 15 acres to be located at the eastern extreme of the planning area adjacent to the Southern Pacific right-of-way.

The Mid-Valley project area is not identified as a flood hazard zone by the Federal Emergency Management Agency (FEMA). However, analysis prepared by Bechtel Engineering for CVWD indicates that development in the project area, without the benefit of the 100-year on-site retention, would generate a storm discharge of 4,827 cfs (cubic feet per second) in the vicinity of Ramon Road east of the City, and 7,201 cfs at Monterey Avenue in Palm Desert. Storm discharge at the Coachella Valley Channel in La Quinta would total 20,837 cfs, indicating the potential for the drainage area to generate significant stormwater runoff once development occurs.

Testifying to the effectiveness of the City’s 100-year storm retention program for new development in the project area, mitigation is expected to reduce the 100-year Stormwater discharge at Ramon Road to 1,280 cfs, Monterey Avenue to 1,426 cfs, and Coachella Valley Channel to 12,690 cfs.

A proposed addition to the Mid-Valley Channel would pick up portions of the Morongo Wash drainage in the northeast sphere, north and south of I-10, as part of the Cathedral City Comprehensive Storm Drain Master Plan.

Local Drainages and Facilities

Local drainages can pose a significant flood hazard to existing and future development in the City. These include the Eagle Canyon wash and several unnamed washes on the southern end of the City, which contribute to localized flooding along the East Palm Canyon corridor.

Currently (2001), only two true storm drains exist in the City. A small storm drain is located at Landau Boulevard and Ramon Road, which feeds into the Whitewater River. The other, Line 1, is located southeast of Rio del Sol, and is about 1/3 completed. The City’s Storm Drain Master Plan includes a number of detention and retention basins, storm drain pipelines south of I-10 and north of the Whitewater River, an Eagle Canyon debris basin, and several improvements in the Cove. The City, CVWD and the Union Pacific Railroad are also working on the design of a railroad bridge and Mogongo Levee, south of interstate 10, which will remove a large portion of lands currently in flood zone “A” from the flood hazard north of Verona Road.

The Cathedral City Comprehensive Storm Drain Master Plan (1990) presents proposed drainage systems, conceptual design and cost estimates and financial analysis for funding techniques for future implementation.

Land Use and Flood Control

Thoughtful and appropriate land use planning and development is one of the most effective and direct methods of controlling flooding and limiting threats to lives and property. Consistent with other primary goals of the community, land use planning can call for the preservation of natural vegetation in the foothills and mountains, which function as natural water sheds for local drainage and ground water recharge, and can affect the volume of stormwater and debris that reach downstream facilities.

Land use decisions also impact the potential for damage to property, and injury to people in the City. The analysis of development proposals to determine the appropriate type and location of structures near major drainages and in areas subject to sheet flooding can reduce or eliminate damage or injury. Development should be strictly regulated, and should include prohibitions on the construction of structures for human habitation within drainage areas. Protection measures may include raising the finished floor level about the flood depth projected for the surrounding area and providing protection against scouring. Until such time as flood protection is provided which removes areas from threats of flooding, development in these areas must be carefully regulated and designed to FEMA standards.

Wildlife Habitat and Recreation in Flood Control Facilities

Stormwater facilities can also be viewed as an opportunity for multiple uses, including recreation and wildlife habitat. Washes, detention/retention basins and channels should be designed to capitalize on the open space and recreational opportunities they represent. In addition to integrating hiking and equestrian trails into these facilities, these areas can offer meaningful areas for passive enjoyment and habitat for a broad variety of desert animals and plants. They can also serve as an effective buffer between the built and natural environment, and provide open spaces for neighborhoods (please also see the Community Image and Urban Design Element).

NPDES Program -- National Pollution Discharge Elimination System

The Clean Water Act of 1972 set goals to restore and maintain water quality by reducing "point source pollution" such as pollutants from industry and sewage treatment facilities. In 1987, amendments to the Act shifted focus to polluted runoff, requiring states to reduce discharges into our waterways. These amendments required the US Environmental Protection Agency (EPA*)* to formally regulate polluted runoff just as it regulates industry and sewage treatment plants - with permits under the National Pollutant Discharge Elimination System (NPDES). The NPDES program requires communities with populations exceeding 100,000 to apply for a municipal permit. Municipal permits require cities and counties to eliminate or control "non-point source pollution."

In most states, including California, the state administers the NPDES permitting program, rather than the EPA. Nine Regional Water Quality Control Boards administer the program for California. Portions of Riverside County fall under the jurisdiction of three of these Boards: the Santa Ana, the San Diego, and the Colorado River Basin Regional Water Quality Control Boards.

Recognizing that this regulation would affect them all, the Flood Control and Water Conservation District, the County of Riverside, the 23 Riverside County cities and the Coachella Valley Water District joined forces to apply for joint NPDES municipal permits, rather than separate ones. This has allowed the "co-permittees" to share resources, eliminate duplicate efforts, and minimize program costs to the public.

The District's service area includes portions of three major river basins: the Santa Ana, the Santa Margarita and the Whitewater, of which the City of Cathedral City is a part. The Colorado River Regional Board has issued an NPDES municipal stormwater permit to the District and its respective co-permittees, including Cathedral City.

The program emphasizes pollution prevention, control measure activities, utilization of existing resources and programs, and coordination with regional and state compliance activities. The goals of these activities include the following:

- Eliminate illicit connections and illegal discharges to the storm drain system;
- Promote public awareness and participation through the Program's education program - The StormWater/CleanWater Protection Program;
- Identify and control stormwater pollution created by industrial and commercial activities;
- Establish stormwater management programs for public agencies to reduce the amount of pollutants that enter and accumulate in storm drains;
- Identify and establish local regulatory control measures for activities that can pollute the storm drain system, such as new development and construction, and residential, commercial and industrial activities;
- Monitor wet and dry weather flows to identify the origin, types, and concentrations of non-point source pollutants;

- Increase existing municipal efforts to clean streets, collect solid waste, and prevent used oil and other hazardous wastes from entering storm drains;
- Develop local ordinances to establish legal authority for cities and counties to regulate stormwater discharges.

FUTURE DIRECTIONS

The enforcement and implementation of regional and City Master Drainage Plans will ultimately represent the primary tools for the City in implementing the goals, policies and programs contained herein. The improvement contained in the Master Plans will control the regional drainage pattern so that it can be better managed. The Master Drainage Plans will also impact the potential for development in areas subject to flooding. It is also important that regulations contained in the Municipal Code, including the Zoning Ordinance and Public Works standards, reflect the programs and projects included in the Master Plans.

GOAL, POLICIES AND PROGRAMS

Goal

The provision of adequate facilities to protect lives and property from local and regional flooding hazards.

Policy 1
Maintain a Master Plan of Drainage which is updated to reflect the changing needs of the City.

Program1.A
Local regulations and guidelines shall be established which are consistent with the Master Plan of Drainage, direct the management of runoff, and provide for local drainage facilities which support the effective use of regional facilities.
Responsible Agencies: Public Works Department; City Engineer
Schedule: Continuous

Program 1.B
Monitor and periodically update the Master Plan of Drainage to reflect changes in local and regional drainage and flood conditions.
Responsible Agencies: Public Works Department; City Engineer
Schedule: Continuous

Policy 2
Major drainage facilities shall be designed to maximize their use as multi-purpose recreational or open space sites, consistent with the functional requirements of these facilities.

Program 2.A
Coordinate and cooperate with responsible regional agencies in achieving multi-use agreements within flood control channels and designing safe, attractive recreational facilities which maintain the functional requirements of the drainage facilities.
Responsible Agencies: Public Works Department; Planning Department; CVWD, RCFCD
Schedule: Continuous

Program 2.B
Work closely with responsible agencies to design drainage and flood control facilities that minimize negative aesthetic impacts and retain natural groundcover and vegetation to the greatest extent possible.
Responsible Agencies: Public Works Department; Planning Department; CVWD; RCFCD
Schedule: Continuous

Policy 3
Continue to actively participate in regional flood control and drainage improvement efforts and to develop and implement mutually beneficial drainage plans.

Policy 4
The City shall cooperate in securing FEMA map amendments for projects as they occur.

Program 4.A
The City shall coordinate and cooperate in the filing of appropriate FEMA application materials to secure amendments to the Flood Insurance Rate Maps for the City, consistent with existing and proposed improvements.
Responsible Agencies: Public Works Department; City Engineer; CVWD; RCFCD
Schedule: Continuous

Policy 5
Pursue all credible sources of funding for local and regional drainage improvements needed for adequate flood control protection.

Program 5.A
Consider the establishment of Area Drainage Plans or Assessment Districts to fund drainage improvements.
Responsible Agencies: Public Works Department; City Engineer
Schedule: Continuous

Program 5.B
Explore and pursue County funding, state funding under the Cobey-Alquist Flood Plain Management Act, other State programs, and federal funding options for local and area-wide flood control projects.
Responsible Agencies: Public Works Department; City Engineer
Schedule: Continuous

Policy 6
All new development shall be required to incorporated adequate flood mitigation measures, such as grading that prevents adverse drainage impacts to adjacent properties, on-site retention of runoff, and the adequate siting and sizing of structures located within flood plains.

Program 6.A
Stormwater retention for the 100 year storm shall be enforced through the development review process and routine site inspection.
Responsible Agencies: Public Works Department; Planning Department
Schedule: Continuous

Policy 7
Assure that adequate, safe, all-weather crossings over flood control channels are provided where necessary, and are maintained for passage during major storm events whenever possible.

Policy 8
Investigate the need for the construction of curbs and gutters in neighborhoods lacking sufficient street drainage improvements.

Policy 9
Critical health and safety facilities shall not be located within the 100-year flood plain unless flood-proofing or other mitigation measures are implemented.

Program 9.A
The Land Use Map and Zoning regulations shall prohibit the construction of critical facilities within the 100-year flood plain unless flood-proofing or other mitigation measures are implemented, and shall only permit residential development if adequate flood-proofing measures have been implemented.
Responsible Agencies: Planning Department; Public Works Department
Schedule: Continuous

NOISE ELEMENT

PURPOSE

The purpose of the Noise Element is to coordinate the community's land uses with the existing and future noise environment, and to design measures intended to minimize or avoid community exposure to excessive noise levels. As the City grows, so does the potential for land use conflicts which can result in an unacceptable noise environment. Through the implementation of the policies and programs in this Element, current and future noise impacts can be greatly reduced or avoided entirely.

BACKGROUND

The Noise Element is directly related to the Land Use and Circulation Elements. It also has a direct relationship with the Economic and Fiscal Element, since low noise levels are a fundamental characteristic of a resort residential community, and the City's relatively quiet, peaceful atmosphere can be considered a major community asset.

The noise environment can have a significant influence on the health and comfort of the community. In general, the noise levels in Cathedral City's residential neighborhoods are average, typical of quiet rural areas. Motor vehicles are the major source of continuous, excessive noise in the City. Primary noise generators include traffic on Interstate-10, East Palm Canyon Drive, Date Palm Drive, Vista Chino, Palm Drive, Varner Road, Edom Hill Road and Ramon Road. Freight rail service along the Southern Pacific Railroad, parallel to I-10, is also responsible for generating excessive noise. High noise levels resulting from commercial aviation at the Palm Springs International Airport also occasionally have an intrusive impact on the community's noise environment. However, recently completed expansion of airport runways to the northwest is expected to reduce airport noise exposure in Cathedral City to acceptable levels. Other noise generators include construction activities, industrial operations, lawnmowers, and home appliances. Sensitive receptors within the planning area include schools, a library, and a medical facility.

Issues to be addressed in the Noise Element are identified in subsection (f) of the California Government Code Section 65032, which requires that the Noise Element define and evaluate the community's noise problems. Section 21083.1 of the California Environmental Quality Act (CEQA) requires the adherence to the State Guidelines and allows cities to determine whether a development project will have a "significant effect on the environment," ranging from traffic noise in a residential neighborhood to unacceptable noise generated by the equipment at a commercial shopping center. The State requires the adoption of a noise control ordinance be for the resolution of local noise complaints.

The California Department of Health Services has prepared a Model Community Noise Control Ordinance as a model for use by local jurisdictions. The City of Cathedral City has such an ordinance in place (Chapter 11.96 of the City Municipal Code).

Community Noise Equivalent Level

The definition of Noise is unwanted or undesired sound. The combination of noise from all sources near and far is known as the Ambient Noise Level. A very sudden change in air pressure from the immediate "normal" atmospheric pressure results in airborne sound. For purposes of this discussion, the ambient noise level at a give location is termed "environmental noise".

In order to understand environmental noise, some familiarly with the physical description of noise is necessary. Frequency range, intensity/loudness and temporal/time-varying aspects are the primary physical characteristics of sound. The decibel (dB), A-weighted level (dBA), and Community Noise Equivalency Level (CNEL) are all used to describe and numerically weigh noise. Each of these measurement scales are briefly described below.

The decibel is the unit of measurement describing the amplitude, or strength of sound. The A-weighted decibel approximates the subjective response of the ear to a noise source by discriminating against the very low and very high frequencies in the spectrum. The Community Noise Equivalent Level (CNEL) is the average of the intensity of a sound over a 24 hour period, with corrections for time of day. The time of day corrections results in the addition of five decibels to sound levels in the evening from 7 p.m. to 10 p.m., and the addition of 10 decibels to sound levels at night between 10 p.m. and 7 a.m. It is necessary to make these adjustments because of the decrease in background noise levels during the evening and night hours when compared to daytime hours. People are therefore more sensitive to noise during these times, and sounds are weighted accordingly. During evening and night hours, tolerable noise levels should be 5 to 10 dBA lower, and the CNEL number is weighted accordingly.

Ranges and Consequences of Noise

Noise sources are classified as either "line source" (a busy street) or "point source" (a commercial compressor). A number of factors affect the noise as it travels through the air, including temperature, wind speed and direction, hard and soft ground surfaces, and landscaping and walls. This is particularly important when considering the noise generated by a roadway, insofar as these factors can mitigate or intensify the noise level.

Normal conversation is roughly 55 dB at five feet of separation, whereas a loud engine noise is about 100 dB. Most everyday sounds occur in the range of 40 to 100 dB. Doubling the sound energy of a noise source only increases the decibel rating by 3 dB, due to the logarithmic nature of the sound measuring (decibel) scale; however, because of the internal mechanism of the human ear and how it receives and processes noise, a sound must be nearly 10 dB higher than another sound to be considered twice as loud. High noise levels can affect everything from property values and economic productivity to psychological health.

When there is an increase in the difference between background or ambient noise and the noise generated from a particularly intrusive source such as, traffic, a barking dog, aircraft or industrial operations, adverse reactions to noise generally intensify. Noise control measures should reduce noise by 5 to 10 dBA in most circumstances to effectively lower the perceived sound. Loud, short duration noises from barking dogs and low-flying aircraft, for example, therefore generally have little impact upon the CNEL levels, because of the averaging techniques used in this measuring technique.

The Existing Cathedral City Noise Environment

Motor vehicle traffic in the City of Cathedral City is the primary source of noise. Aircraft traffic also contributes negatively to the noise environment, to a smaller but occasionally significant extent. Also, the northern portion of the City is substantially impacted by the U.S. Interstate-10/Southern Pacific Railroad corridor. Other sources of community noise include mechanical equipment serving commercial and industrial land uses.

Motor Vehicle Noise

Vehicular traffic, including automobiles, trucks, buses, and motorcycles, is the major noise source measured (2001) within the City. Cars generate noise from engine vibration, the interaction of tires and the roadway, and the exhaust system. Noise produced by traffic fluctuates in relation to its volume, the percentage of trucks, and the average speed. Table V-2 lists the existing noise levels at several locations. The table also shows the anticipated noise levels at General Plan buildout.

Interstate-10 and Southern Pacific Railroad Lines

In addition to traffic along Highway 111 and the other major arterial roadways impacting the City, both incorporated and sphere areas are impacted by rail and vehicular traffic associated with the Southern Pacific Railroad line and U.S. Interstate-10, respectively. The passage of trains, although an intrusive noise event, occurs only periodically and with limited duration. More significant is the influence of Interstate-10 traffic noise, which increases at night due to persistent truck volumes combined with an atmospheric nighttime temperature inversion. This inversion tends to reduce the acoustic attenuation typical of distance over open terrain, making noises seem louder. Train traffic currently (2001) results in 40 trains per day through the planning area, with an average of 80 cars per train, and a train length of 5,200 feet.

On a CNEL basis, the calculated combined impacts associated with 2001 Interstate-10 and Southern Pacific railroad traffic place the 59.7 dB and 75.1 dB contours at 800 feet and 100 feet south of the railroad lines, respectively. The 65 CNEL contour is approximately 430 feet from the tracks and the 60 CNEL contour about 770 feet from the tracks.

Aircraft Noise

Aircraft noises impacting the community come from commercial and general aviation operations at the Palm Springs International Airport, located west of the City Limits. The updated Airport Master Plan and Part 150 Noise Compatibility Study evaluated airport operations, monitored portions of the noise environment, and projected future noise impacts from planned expansions and increased operations. The flight tracks, or patterns, that aircraft are assumed to follow in the abovementioned noise study indicate limited overflights in Cathedral City.

For year 1993 conditions, the peak season 65 CNEL noise contour extended into Cathedral City, primarily between Ramon Road and Dinah Shore Drive, just past Cathedral Canyon Drive (Exhibit V-9). A review of the noise sensitive receptor locations points out the potential for current peak season aircraft noise impacts to existing residential receptors, but does not indicate existing noise impacts to any schools, libraries, or health care facilities.

With the mandated changes to the noise standards for jet aircraft, the noise contours for 1999 conditions are substantially smaller (Exhibit V-9). The peak season 65 CNEL noise contour will remain entirely within the City of Palm Springs, stopping short of the intersection of Sunny Dunes Road and San Luis Rey Drive, without any change to the operation of the airport (other than necessary to meet increased demand).

The Palm Springs International Airport noise contours to the south will decrease substantially with the recently completed runway 13R-31L extension being 1,500 feet to the northwest. The runway extension to the north will move the average location of the take-off and landing operations northerly, away from Cathedral City. The peak season 65 CNEL noise contours for 2005 and 2025 are projected to remain entirely within Palm Springs.

Exhibit V-8: Sensitive Noise Receptors

Exhibit V-9: Palm Springs Regional Airport Projected Noise Exposure

Mechanical and Industrial Noise

There are other noise generators within the City, in addition to noise generated by automobile traffic and aircraft, which could create significant noise related dissonance. Activities such as construction and automotive repair and other related industrial operations can result in unacceptable noise levels. Loading and materials transfers and other acoustically unscreened operations will also raise issues of impact and compatibility.

Significant noise can also result from the operation of mechanical equipment, including refrigerator units and heating/air conditioner equipment in commercial centers. Noise from roof-mounted equipment can travel to bordering neighborhoods and impact sensitive receptors. Fans and compressors which emit a constant hum can adversely affect the quality of life in a residential neighborhood. The design and location of equipment can mitigate this potential impact, and should be included in the review of new development projects by the City.

The Community Noise and Land Use Compatibility Model

The standard used for maximum outdoor noise levels in residential areas in California and in the City is a CNEL of 65 dBA. Within the City of Cathedral City, the applicable limit one-hour average for outdoor noise levels in residential areas is 55 dBA (ordinance 11.96.030). The noise impacts are "unmitigated" or represent the worst-case noise impact without any obstruction of the noise. A number of tools are available to the City to substantially reduce noise impacts, as discussed below.

Sensitive receptors include residences, schools, libraries, churches, hospitals and nursing homes, and destination resort areas. Golf courses, parks, and other outdoor activity areas can also be sensitive to noise levels. Less sensitive land uses include commercial and industrial centers, hotels and motels, neighborhood ballparks and other outdoor spectator sport facilities. The least sensitive uses are heavy commercial and industrial uses. Table V-3 depicts the CNEL ranges of allowable exterior ambient noise levels for various land uses at buildout.

Table V-2
Land Use Compatibility for Community Noise Environments

Land Uses	CNEL (dBA) 50	55	60	65	70	75	80
Residential - Single Family Dwellings, Duplex, Mobile Homes	A	A					
		B	B	B			
					C		
						D	D
Residential – Multiple Family	A	A	A				
			B	B			
					C		
						D	D
Transient Lodging: Hotels and Motels	A	A	A				
			B	B			
					C	C	
							D
School Classrooms, Libraries, Churches, Hospitals, Nursing Homes and Convalescent Hospitals	A	A	A	A			
			B	B			
					C	C	
							D
Auditoriums, Concert Halls, Amphitheaters							
	B	B	B	B			
				C	C	C	C
Sports Arenas, Outdoor Spectator Sports							
	B	B	B	B	B		
					C	C	C
Playgrounds, Neighborhood Parks	A	A	A	A			
				C	C		
					D	D	D
Golf Courses, Riding Stables, Water Recreation, Cemeteries	A	A	A	A	A		
					C	C	
							D
Office Buildings, Business, Commercial and Professional	A	A	A	A			
				B	B	B	
						D	D
Industrial, Manufacturing, Utilities, Agriculture	A	A	A	A	A		
					B	B	
						D	D

Source: Cathedral City General Plan Update Noise Background Study", Endo Engineering, 2001: *California Department of Health Services, "Guidelines for the Preparation and Content of the Noise Element of the General Plan," 1990*

Explanatory Notes

A **Normally Acceptable**: With no special noise reduction requirements assuming standard construction.

B **Conditionally Acceptable**: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirement is made and needed noise insulation features included in the design

C **Normally Unacceptable**: New construction is discouraged. If new construction does not proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

D **Clearly Unacceptable**: New construction or development should generally not be undertaken.

Cathedral City Noise Ordinance

The City has established noise standards by adopting an amendment to its Municipal Code. Chapter 11.96 of the Cathedral City Municipal Code establishes community-wide noise standards and emphasizes the value of an acceptable noise environment. It provides regulations for noise measurement and monitoring and cites special provisions of, and exemptions to, the ordinance. It is intended to regulate excessive noise from existing uses and activities, and to serve as a references guide for identifying other pertinent noise regulations. The Cathedral City Noise Ordinance provides definitions of key terms and establishes exterior noise level standards on a time-of-day basis along with adjustments for intensity and duration. It also provides regulations for noise measurement/monitoring. Violations of the Noise Ordinance are defined as a nuisance and subject to the procedures, remedies and penalties for such nuisances. The Noise Ordinance regulates existing uses and activities, while the noise standards in the General Plan are intended to guide the location of future noise generators and sensitive land uses.

Noise Measurements and Computer Modeling: Existing and Projected Future Noise Levels

The noise levels at 100 feet from each road's centerline were determined by modeling the roadway with the Highway Traffic Noise Prediction Model (RD-77-108), developed by the Federal Highway Administration. The model includes a number of parameters modifiers, including traffic volume, vehicle mix and speed, and roadway geometry. The resulting noise levels are then weighted, added for a 24 hour period, and output as a CNEL measurement. CNEL contours are then located for the 60, 65 and 70 CNEL location. A detailed description of the modeling done for this General Plan is included in the General Plan EIR and its appendices.

Increasing traffic volumes are expected to generate the leading future noise impacts to the community. The Circulation Element Traffic Study was used to determine roadway volumes at buildout. The average posted speed limits and a percentage mix of light and heavy truck traffic along the roadways was included in the modeling data, making the projected traffic noise data more accurate.

Project-specific site design will significantly reduce noise impacts below those projected, and therefore, these estimates are considered conservative and unmitigated. Table V-4 lists the 1999 and preferred General Plan buildout noise contours along the City's major roadways.

Table V-3
1999 and General Plan Buildout Projected Noise Contours On Major Roadways
(Distance To CNEL Contours in Feet from Centerline)

	1999 Traffic			General Plan Buildout		
Roadway Link	**60**	**65**	**70**	**60**	**65**	**70**
Interstate-10						
W/O Date Palm Drive	1,567	729	342	2,938	1,365	635
E/O Date Palm Drive	1,744	811	380	3,587	1,666	775
Palm Drive						
S/O Varner Road	N/A	N/A	N/A	810	377	178
Mountain View Drive						
N/O Varner Road	N/A	N/A	N/A	474	223	108
Edom Hill Road						
E/O Varner Road	N/A	N/A	N/A	105	51	R/W
Valley Center Boulevard						
E/O Palm Drive	N/A	N/A	N/A	285	134	66
W/O City Limit	N/A	N/A	N/A	294	138	68
W/O Date Palm Drive	N/A	N/A	N/A	418	195	93
E/O Date Palm Drive	N/A	N/A	N/A	359	168	81
W/O Da Vall Drive	N/A	N/A	N/A	399	187	89
Landau Boulevard						
N/O Vista Chino	N/A	N/A	N/A	207	99	50
S/O Vista Chino	N/A	N/A	N/A	125	62	R/W
N/O 30th Avenue	N/A	N/A	N/A	158	76	R/W
S/O 30th Avenue	N/A	N/A	N/A	184	88	R/W
N/O Ramon Road	160	77	R/W	192	92	R/W
Cathedral Canyon Drive						
S/O Ramon Road	332	156	75	219	103	50
N/O Dinah Shore Drive	N/A	N/A	N/A	155	73	R/W
S/O Dinah Shore Drive	238	112	56	172	81	R/W
N/O Perez Road	N/A	N/A	N/A	157	75	R/W
S/O E. Palm Canyon Drive	N/A	N/A	N/A	135	65	R/W
Date Palm Drive						
S/O Varner Road	182	85	RW	544	255	123
S/O Valley Center Boulevard	N/A	N/A	N/A	684	319	152
N/O Vista Chino	412	192	92	874	407	192
S/O Vista Chino	405	189	90	561	262	126
N/O 30th Avenue	387	181	87	544	255	123
S/O 30th Avenue	264	125	62	372	176	88
N/O Ramon Road	334	159	81	433	204	100
S/O Ramon Road	377	178	89	416	201	99
N/O Dinah Shore Drive	370	173	83	420	198	99

Table V-3 (Continued)
1999 and General Plan Buildout Projected Noise Contours On Major Roadways
(Distance To CNEL Contours in Feet from Centerline)

	1999 Traffic			General Plan Buildout		
Roadway Link	**60**	**65**	**70**	**60**	**65**	**70**
Date Palm Drive (cont'd)						
S/O Dinah Shore Drive	372	176	88	460	216	105
N/O Gerald Ford Drive	337	158	76	426	201	99
N/O Perez Road	348	163	79	482	226	110
S/O Perez Road	N/A	N/A	N/A	426	201	99
N/O E. Palm Canyon Drive	260	123	61	366	173	87
S/O E. Palm Canyon Drive				142	67	33
Da Vall Drive						
S/O Varner Road	N/A	N/A	N/A	332	156	75
N/O Interstate 10	N/A	N/A	N/A	654	305	145
S/O Interstate 10	N/A	N/A	N/A	634	296	141
N/O 30th Avenue	N/A	N/A	N/A	561	262	126
S/O 30th Avenue	N/A	N/A	N/A	327	153	74
N/O Ramon Road	RW	RW	RW	299	140	68
S/O Ramon Road	RW	RW	RW	290	136	67
S/O Dinah Shore Drive	N/A	N/A	N/A	313	147	71
S/O Gerald Ford Drive	N/A	N/A	N/A	353	165	80
Varner Road						
E/O Palm Drive	N/A	N/A	N/A	339	161	82
E/O Date Palm Drive	110	51	RW	227	108	54
W/O Da Vall Drive	N/A	N/A	N/A	211	100	51
E/O Da Vall Drive	N/A	N/A	N/A	317	149	72
Vista Chino						
E/O City Limit				460	216	105
W/O Landau Boulevard	387	181	87	420	198	97
W/O Date Palm Drive	317	149	72	596	279	133
E/O Date Palm Drive	N/A	N/A	N/A	187	89	R/W
W/O Da Vall Drive	N/A	N/A	N/A	207	99	50
30th Avenue						
W/O Date Palm Drive	78	RW	RW	183	86	RW
E/O Date Palm Drive	80	RW	RW	289	135	65
W-O Da Vall Drive	N/A	N/A	N/A	302	141	67
Ramon Road						
W/O Landau Boulevard	412	192	92	544	255	123
W/O Cathedral Canyon Drive	474	223	108	536	251	121
W/O Date Palm Drive	433	204	100	561	262	126
E/O Date Palm Drive	332	156	75	496	233	113

Table V-3 (Continued)
1999 and General Plan Buildout Projected Noise Contours On Major Roadways
(Distance To CNEL Contours in Feet from Centerline)

	1999 Traffic			General Plan Buildout		
Roadway Link	**60**	**65**	**70**	**60**	**65**	**70**
Ramon Road						
W/O Da Vall Drive	N/A	N/A	N/A	570	266	128
E/O Da Vall Drive	424	198	94	606	283	135
Tachevah Drive						
E/O Date Palm Drive	N/A	N/A	N/A	44	R/W	R/W
E/O Santoro Drive	N/A	N/A	N/A	44	R/W	R/W
Santoro Drive						
S/O 30th Avenue	N/A	N/A	N/A	248	116	56
N/O Ramon Road	N/A	N/A	N/A	185	88	44
Dinah Shore Drive						
W/O Cathedral Canyon Drive	82	RW	RW	502	234	111
W/O Date Palm Drive	176	84	RW	465	217	103
E/O Date Palm Drive	201	96	RW	431	201	96
W/O Da Vall Drive	N/A	N/A	N/A	472	220	104
E/O Da Vall Drive	158	74	RW	376	176	84
Gerald Ford Drive						
E/O Date Palm Drive	267	125	60	327	153	74
W/O Da Vall Drive	N/A	N/A	N/A	337	158	76
E/O Da Vall Drive	249	117	58	317	149	72
Perez Road						
N/O E. Palm Canyon Drive	N/A	N/A	N/A	224	106	54
W/O Cathedral Canyon Drive	175	83	R/W	249	117	58
W/O Date Palm Drive	231	110	58	294	138	68
Buddy Rodgers	N/A	N/A	N/A			
E/O Date Palm Drive	N/A	N/A	N/A	337	158	76
East Palm Canyon Drive						
W/O Perez Road	343	160	77	395	186	92
E/O Perez Road	N/A	N/A	N/A	324	154	79
W/O Cathedral Canyon Drive	313	147	71	315	150	77
E/O Cathedral Canyon Drive	N/A	N/A	N/A	310	148	76
W/O Date Palm Drive	273	128	63	259	124	66
E/O Date Palm Drive	N/A	N/A	N/A	634	296	141
“C” Street						
E/O Cathedral Canyon Drive	N/A	N/A	N/A	98	46	R/W
W/O Date Palm Drive	N/A	N/A	N/A	134	62	R/W

Table V-3 (Continued)
1999 and General Plan Buildout Projected Noise Contours On Major Roadways
(Distance To CNEL Contours in Feet from Centerline)

	1999 Traffic			General Plan Buildout		
Roadway Link	**60**	**65**	**70**	**60**	**65**	**70**
Frank Sinatra Drive						
E/O E. Palm Canyon Drive	245	116	58	290	136	67
E/O Da Vall Drive	256	121	60	424	198	94

Source: Cathedral City General Plan Update Noise Background Study", Endo Engineering, 2002

Mitigating Noise Impacts

Preserving a quiet noise environment can be accomplished through thoughtful transportation planning, land use planning, project design mitigation, simple and sophisticated technology, and acoustical barriers applied to community noise compatibility Site planning and design standards should provide direct noise impact mitigation for areas particularly impacted by noise. The use of buffer zones consisting of earthen berms, walls and landscaping between sensitive land uses and roadways and other noise sources is an effective tool for noise mitigation. Building orientation, particularly the placement of windows, can significantly mitigate impacts on residential land uses. A number of materials are also available which can baffle noise sources, and result in effective noise mitigation. When development proposals include sensitive receptors planned next to the impacted roadways described in Table V-4 above should be required to complete noise analysis, which will include mitigation measures, to ensure that the buildout of the project will not result in unacceptable noise levels.

FUTURE DIRECTIONS

Consistent with its character as a resort residential community, the City of Cathedral City benefits from an essentially quiet noise environment. Highway and major roadway noise sources, however, clearly impact the City. Future efforts in this regard should focus on the preservation of the peaceful and quiet atmosphere enjoyed presently by residents and visitors to the community. The Land Use Element, and particularly the assignment of land use designations will have a critical role to play in the City's ability to control noise for sensitive receptors in the future. Another level of land use control is provided by zoning designations, which provide development standards that reduce impacts and enhance compatibility. The Circulation Element has also been designed, where possible, to protect the City's residential areas from excessive traffic noise and to assure appropriate noise levels. The ongoing coordination of these two elements of the General Plan must play a key role in the City's consideration of development projects, public works improvements, and City sponsored construction.

GOAL, POLICIES AND PROGRAMS

Goal

A noise environment that complements the City' low density residential character and its various land uses.

Policy 1
Protect noise sensitive land uses, including residential neighborhoods, schools, hospitals, libraries, churches, resorts and community open space, as well as land uses proposed in the vicinity of the railway, Interstate 10, the Mid-Valley Parkway, and Da Vall Drive from high noise levels generated by existing and future noise sources.

Program 1.A
Develop and maintain an inventory of existing noise sources and areas of incompatibility and establish procedures to reduce the noise levels in these areas, where economically and aesthetically feasible.
Responsible Agency: Planning Department; Public Works Department
Schedule: 2003-04

Program 1.B
Require building setbacks, the installation of wall and window insulation, soundwalls, earthen berms, and/or other mitigation measures in areas exceeding the City's noise limit standards for private development projects as they occur.
Responsible Agency: Planning Department
Schedule: Continuous

Program 1.C
Maintain and enforce a Noise Control ordinance that establishes community-wide noise standards and identifies measures designed to resolve noise complaints.
Responsible Agency: Planning Department
Schedule: Ongoing

Program 1.D
Use Specific Plans and the development review process to encourage the use of buffers between noise sensitive land uses and incompatible land uses.
Responsible Agency: Planning Department; Planning Commission; City Council
Schedule: Ongoing

Program 1.E
Parking lots, loading zones, and large trash bins shall be located at a sufficient distance from adjacent residential properties to reduce associated noise impacts.
Responsible Agency: Planning Department
Schedule: Continuous.

Policy 2
The relationship between land use designations in the Land Use Element and changes in the circulation pattern of the City, as well as individual developments shall be monitored and mitigated.

Program 2.A
The City zoning ordinance and development review standards shall be used to limit land use patterns and project designs to those that are noise compatible.
Responsible Agency: Planning Department

Schedule: Continuous

Program 2.B
Develop guidelines and minimal criteria requirements for noise analyses for future development projects. Studies shall evaluate project impacts and the effectiveness of proposed mitigation measures.
Responsible Agency: Planning Department; Public Works Department
Schedule: 2003-04; Every five years.
.
Program 2.C
Periodically review and amend the Land Use map as appropriate to assure reasonable land use/noise level compatibility.
Responsible Agency: Planning Department
Schedule: Annually.

Policy 3
Private sector project proposals shall include measures that assure that noise exposures levels comply with State of California noise insulation standards as defined in Title 25 (California Noise Insulation Standards).

Policy 4
Maintain a circulation map which maintains low levels of traffic within neighborhoods, and assigns truck routes to major roadways only.

Program 4.A
Designate primary truck routes and ensure that they are clearly marked throughout the community. Except for traffic providing location-specific services and deliveries, construction trucks and delivery trucks shall be limited to East Palm Canyon Drive, Interstate-10, Date Palm Drive, Palm Drive, Varner Road, Edom Hill Road, Dinah Shore Drive, Ramon Road, and Vista Chino.
Responsible Agency: Public Works Department, City Engineer
Schedule: 2001-2002

Program 4.B
Development projects which result in through-traffic in residential neighborhoods shall be discouraged through the development review process.
Responsible Agency: Planning Department, Public Works Department, City Engineer
Schedule: Ongoing

Policy 5
Maintain an ongoing contact with the Palm Springs Airport to ensure that flight paths and airport improvements do not impact or extend noise contours into the City.

Policy 6
Coordinate with adjoining municipalities to assure noise-compatible land uses across jurisdictional boundaries.

Policy 7

The City shall restrict grading and construction activities that may impact residential neighborhoods to specified days of the week and times of day.

HAZARDOUS AND TOXIC MATERIALS ELEMENT

PURPOSE

The Hazardous and Toxic Materials Element describes methods to safely manage hazardous and toxic materials in the community. This Element reinforces the City's concern for the protection of its residents and visitors from adverse health and other impacts associated with these materials. Policies and programs are established which assure effective and safe use, storage, and transport of hazardous and toxic substances in the City of Cathedral City.

BACKGROUND

The rapid and innovative development of new technologies and chemical processes has resulted in the introduction of new and potentially hazardous materials. Accidental spills, illegal dumping, and other uncontrolled discharges of these materials can pose a significant threat to the community and its environment.

The Air Quality and Water Resources Elements are directly related to the Hazardous and Toxic Materials Element in their efforts to preserve clean air and protect against water resource contamination. This Element is also related to the Land Use Element, with the potential of hazardous material use, storage, or disposal to undermine land use compatibility. The Public Safety Element also plays an important role in establishing policies and programs to protect the general public from adverse impacts associated with toxic and hazardous materials. The Biological Resources Element may be negatively impacted by improper management of these materials.

It is mandated by California Government Code Section 65302(g) that the General Plan of a community address safety issues, including but not limited to hazardous materials. Responsibility for regulating and monitoring the management, disposal, labeling, and use of toxic and hazardous materials lies with a variety of federal. State, and local agencies, including the U.S. Environmental Protection Agency, the California Office of Health Planning and Development, and the Riverside County Department of Health. AB 2948 (Chapter 1504, Statutes of 1986), commonly known as the Tanner Bill, authorizes counties to prepare Hazardous Waste Management Plans (HWMP) in response to the need for sage management of hazardous materials and waste products. The California Regional Water Quality Control Board (CRWQCB), as well as the Coachella Valley Water District, maintains information concerning contaminated water wells and groundwater. The state and federal Environmental Protection

Agencies (EPA) and the State Department of Health also provide information concerning specific hazardous waste sites.

There are no large industrial or commercial users of hazardous materials in the City, only a few identified hazardous/toxic material small quantity generators are associated with commercial, and quasi-industrial and medical operations. These have the potential to be associated with accidental spills, purposeful illegal dumping, air emissions, and other uncontrolled discharges into the environment. Improper use and management of these materials pose a significant potential threat to the community and its environment. The small quantity generators in the City include gasoline service stations, auto repair shops, dry cleaners and medical clinics.

Products, chemical and purified chemical compounds, and elements that re considered hazardous or toxic exist in wide variety and are used in households, commercial businesses and industrial operations and processes. They range through home and pool related chlorine products, chemical fertilizers, herbicides and pesticides, stored fuels and waste oil, chemical solvents and lubricants, and a variety of medical materials.

Known or identified underground fuel storage occurring at locations in the City, where leakage has occurred in the past has been mostly confined to gasoline service stations and commercial operations which maintain on-site fuel tanks for their delivery vehicles. The Regional Water Quality Control Board maintains listings for such sites, and monitors them as required. The U.S. EPA requires all service stations to retrofit or replace underground storage tanks with double-walled construction. In the City Sphere-of Influence various industrial activities, including machining, wind turbine servicing, and materials research, also have the potential for uncontrolled discharge of hazardous materials.

Hazardous Waste and Sewage Disposal

An area of recent concern in the Coachella Valley and the Cathedral City area has been the impact of long-term septic tank use on groundwater resources. Contamination problems have not been particularly evident, although impacts on the lower portions of alluvial cones with extensive upslope residential development are areas of concern. Monitor wells in the Cove area show that elevated levels of nitrate and viruses from subsurface septic systems have been detected, but do not currently exceed County regulations (see also the Water Resources Element). The use of septic tanks in these generally porous soils and on sloping gradients can result in concentrated flows of seepage to the lower portions of these areas and can result in contamination of the water table. Septic tanks are still commonly in use in Cathedral City and their use will continue to pose varying threats to ground water.

Hazardous Waste Management Plans

The City of Cathedral City coordinates with appropriate county, state and federal agencies in the identification of hazardous material sites, and their timely cleanup. In order to manage these issues, the City may establish and maintain information on these sites, and periodically monitor facilities and operations that produce, utilize or store hazardous materials in the city. By staying involved in multi-agency monitoring of illegal dumping in the City, conferring in the regulation of underground storage tanks and septic systems, and regulating the transport of hazardous materials through the community, the City can better protect against potential hazards associated with hazardous materials and wastes.

AB 2948 (Chapter 1504, Statures of 1986), commonly known as the Tanner Bill, authorizes counties to prepare Hazardous Waste Management Plans (HWMP) in response to the need for safe management of hazardous materials and waste products. The Riverside county HWMP was adopted by the Board of Supervisors and approved by the California Department of Health Services in 1990. The County HWMP identifies the types and amounts of wastes generated in the County and established programs for managing these wastes.

To comply with Health and Safety Code Section 25135, the Riverside County HWMP assures that adequate treatment and disposal capacity is available to manage the hazardous wastes generated within the jurisdiction, and addresses issues related to manufacture and use. This plan was developed jointly by the County, Cathedral City and other cities within the County, the State, the public and industry to address the disposal, handling, processing, storage and treatment of local hazardous materials and waste products.

Preparation of the HWMP included extensive public participation. Its policies require the coordination of County efforts with state and federal agencies in the identification and establishment of programs for managing these wastes. As an integral part of the County HWMP, the City of Cathedral City hazardous waste management policies for the General Plan are basically extensions of the County Plan and are hereby incorporated by reference. Currently (2001), there are several sources of information concerning hazardous waste sites in the City of Cathedral City area.

The California Regional Water Quality Control Board (CRWQCB) and the Coachella Valley Water District, maintain information concerning contaminated wells and groundwater, The state and federal Environmental Protection Agencies (EPA) and the State Department of Health also supply information concerning specific hazardous waste sites and their locations. The California Department of Industrial Relations, Cal-OSHA Division, regulates the proper use of hazardous materials in industrial settings. Private database screening and documentation services are also available, which will search, extract, and summarize reports on contaminated site recorded in various state and federal databases.

Household Hazardous Waste

Residential use of household chemicals, automobile batteries and used oil, paint and similar materials result in hazardous waste. The County offers a number of services for the disposal of residential hazardous wastes. These include the “ABOP” (Antifreeze, Batteries, Oil and Latex Paint) site, located at the Palm Springs Fire Department Training Center in Palm Springs, which will dispose of these materials for residential users. The facilities will take up to 5 gallons or 50 pounds of materials per trip, and all materials must be clearly marked and sealed. The site is open every Saturday, and will only take materials from individuals. No business wastes are permitted. The City's Environmental Conservation Manager is working with the County to establish an ABOP site in Cathedral City.

City residents may also dispose of their used motor oil by placing it next to their garbage or recycling container at the curb on their regular collection day. Up to two gallons per pick up is permitted. Waste Management of the Desert collects the oil, and disposes of it.

The County also organizes Household Hazardous Waste collection days throughout the year at fire stations and city corporation yards across the Valley. The schedule is posted and advertised periodically.

Residents may also dispose of waste motor oil at several Used Motor Oil Drop-Off Centers located in Cathedral City, including Chief Auto Parts, Crystal Chrysler Center, Firestone Tires, Pep Boys and The Lube Shop.

Hazardous Materials Response

Hazardous and toxic materials are determined critical by the County Department of Health, and the County and the City can require property owners to test, temporarily close and/or remove all hazardous liquids, solids or sludge located on the site. Leaking underground storage tanks must be removed by contractors having Hazardous Waste Certification and a General Engineering license. Between cessation of storage and actual closure, monitoring is generally required by the site's operating permit. When soils contamination is detected, the clean up procedure to be followed, the degree or level of cleanliness required by the regulator, and the method of treatment (if permitted) will be directed by the County Health Hazardous Materials Division and/or the Regional Water Quality Control Board.

The City of Cathedral City has the opportunity to coordinate with appropriate county, state, and federal agencies in the identification of hazardous material sites, and the active regulation of their timely cleanup. The Cathedral City Fire Station #412, located within the city limits, has the capacity of authority as a First Response Team; the agency responsible for the Hazardous Response Plan is the County of Riverside Health Hazardous Materials Division and/or the Regional Water Quality Control Board.

FUTURE DIRECTIONS

The City of Cathedral City has the responsibility to coordinate with the appropriate agencies in the identification of hazardous material sites, and the active regulation of their timely cleanup. This element can most efficiently be implemented through regular consultation with the RWQCB and the County Health Department and by updating information on hazardous material sites, monitoring facilities that utilize or produce hazardous materials within the City. The City should also remain current regarding the monitoring and regulating of underground storage tanks and septic systems, and regulating the transport of hazardous materials through the community.

A prudently coordinated program of oversight and management between responsible agencies will be essential. Regular consultation and coordination between the City Emergency Preparedness Director and responsible county and state agencies is also appropriate. Processes for determining appropriate levels of local, County and State personnel and facilities will also be critical. The goals, policies and programs of this element help to direct the planning and development of appropriate strategies to address hazardous and toxic materials in the community.

GOAL, POLICIES AND PROGRAMS

Goal

An environment which is safe from the threat of hazardous and toxic materials.

Policy 1
Utilizing the resources available through the County of Riverside and the Regional Water Quality Control Board, maintain current data on hazardous materials users within the planning area.

Program 1.A
Update the City's data on hazardous materials users quarterly, by regularly contacting the County Department of Environmental Health and the Regional Water Quality Control Board and securing their databases or lists.
Responsible Agencies: Fire Department; County Environmental Health Department; Regional Water Quality Control Board
Schedule: Continuous

Program 1.B
Coordinate with responsible agencies to assure enforcement of state and federal regulations for the testing and monitoring of underground fuel storage tanks for leakage.
Responsible Agencies: Public Works Department; Planning Department; Fire Department; State and federal EPA; County Health Department
Schedule: Continuous

Program 1.C
A Conditional Use Permit shall be required for all new development that generates, transports, or stores hazardous materials.
Responsible Agencies: Planning Department
Schedule: Continuous

Policy 2
Encourage and facilitate the adequate and timely cleanup of existing and future contaminated sites within the City and its sphere-of-influence.

Program 2.A
Coordinate with responsible state and federal agencies to activate cleanup procedures, and monitor the status of cleanup efforts on an ongoing basis.
Responsible Agencies: Fire Department; State and federal EPA; County Health Department; CRWQCB
Schedule: Continuous

Policy 3
The City shall thoroughly evaluate development proposals for lands directly adjacent to sites know to be contaminated with hazardous or toxic materials.

Policy 4
The City shall designate appropriate access routes to facilitate the transport of hazardous and toxic materials.

Program 4.A
Coordinate with the Fire Department, Police Department, neighboring jurisdictions, and other appropriate agencies to identify segments of highway or local roads that shall be restricted from transporting hazardous and toxic materials to preserve public safety.
Responsible Agencies: Planning Department; Fire Department; Police Department
Schedule: Continuous

Program 4.B
Enforce roadway access restrictions and consider the implementation of fines or penalties for violations.
Responsible Agencies: Public Works Department; Fire Department; Police Department
Schedule: Continuous

Policy 5
The Fire Department shall maintain a citywide Emergency Response Program, which provides for emergency services in the event of a hazardous spill or airborne release.

Policy 6
Encourage households and small businesses to dispose of hazardous and toxic wastes in accordance with county, state, and federal regulations.

Program 6.A
Continue to distribute information materials provided by the County and the Regional Water Quality Control Board regarding proper management and disposal of household hazardous and toxic wastes, and post it on the City web site.
Responsible Agencies: Environmental Conservation Manager, County Environmental Health
Schedule: Immediate; Continuous

Program 6.B
Implement the Household Hazardous Waste Element (HHWE) as prepared by the Coachella Valley Association of Governments and its member cities.
Responsible Agencies: Fire Department
Schedule: Immediate; Continuous

Policy 7
The City shall actively oppose plans for hazardous or toxic waste dumps, landfills, or industrial processes that may potentially adversely affect the City and its Sphere-of-Influence, and shall participate in the identification of alternative sites.

Policy 8
Confer and coordinate with the Coachella Valley Water District, Desert Water Agency, and the California Regional Water Quality Control Board in the regulation, monitoring, and phased removal of subsurface sewage disposal systems.

Program 8.A
The development review process shall be used to assure that all new development connects to the sewage collection systems of the Coachella Valley Water District and Desert Water Agency where that service is available.
Responsible Agencies: Planning Department; Public Works Department; DWA; CVWD
Schedule: Continuous