

**THE OPEN SPACE/CONSERVATION ELEMENT**

**APPROVED BY THE CITY COUNCIL  
SEPTEMBER 22, 1998**

## **V. THE OPEN SPACE/CONSERVATION ELEMENT**

### **I. INTRODUCTION, PURPOSE AND AUTHORITY**

#### **A. INTRODUCTION**

The parks, open spaces and natural resources of a community have a major affect on the quality of life in a community and the overall character of the region. The park and recreation facilities in Hercules provide opportunities for members of the community to enjoy a variety of recreational and educational activities and interact with others. Trails provide access to outdoor areas and provide alternatives to driving automobiles. Usual locations for trails are within parks and open space areas, along creeks, along waterfronts, and between residential, employment, commercial and public areas. Open spaces perform a valuable function in enhancing the identity of Hercules, and providing buffers between incompatible land uses and from natural hazards such as landslides on steep slopes and flooding in low lying areas.

The conservation of natural resources is a local, state and national concern that starts within the community. Hercules has a number of natural resources that are often overlooked within an urban area. A primary resource relates to water; creeks, wetlands, the waterfront and the force of water during storms are all of concern. While Hercules does not have substantial wildlife and habitat areas such as occur in the unincorporated areas of the County, it does have sensitive habitats in wetlands, along the San Francisco Bay shoreline, along Refugio Creek, and to a lesser extent in the open space hills.

#### **B. PURPOSE**

The Open Space and Conservation Element provides direction for land use decisions regarding recreation, open space and natural resources oriented uses consistent with the goals, objectives and policies of the Land Use Element. In addition, the element addresses the management of these open space uses and natural resources.

#### **C. AUTHORITY**

##### **1. Open Space**

Government Code Section 65302(e) and 65560 et seq. requires an open space element in all city and county general plans. Section 65563:

"On or before December 31, 1973 every city and county shall prepare, adopt, and submit to the Secretary of the Resources Agency a local open space plan for the comprehensive and long-range preservation and conservation of open space land within its jurisdiction."

**Government Code Section 65560:**

- (a) "Local open-space plan" is the open-space element of a county or city general plan adopted by the board or council, either as the local open-space plan or as the interim local open-space plan adopted pursuant to Section 65563.
- (b) "Open-space land" is any parcel or area of land or water which is essentially unimproved and devoted to an open-space use as defined in this section, and which is designated on a local, regional or state open-space plan as any of the following:
  - (1) Open space for the preservation of natural resources including, but not limited to, areas required for the preservation of plant and animal life, including habitat for fish and wildlife species; areas required for ecologic and other scientific study purposes; rivers, streams, bays and estuaries; and coastal beaches, lake shores, banks of rivers and streams, and watershed lands.
  - (2) Open space used for the managed production of resources, including but not limited to, forest lands, rangeland, agricultural lands and areas of economic importance for the production of food or fiber; areas required for recharge of ground water basins; bays, estuaries, marshes, rivers and streams which are important for the management of commercial fisheries; and areas containing major mineral deposits, including those in short supply.
  - (3) Open space for outdoor recreation, including but not limited to, areas of outstanding scenic, historic and cultural value; areas particularly suited for park and recreation purposes, including access to lake shores, beaches, and rivers and streams; and areas which serve as links between major recreation and open-space reservations, including utility easements, banks of rivers and streams, trails, and scenic highway corridors.
  - (4) Open space for public health and safety, including, but not limited to, areas which require special management or regulation because of hazardous or special conditions such as earthquake fault zones, unstable soil areas, flood plains, watersheds, areas presenting high fire risks, areas required for the protection of water quality and water reservoirs and areas required for the protection and enhancement of air quality.

**Government Code Section 65561:**

The Legislature finds and declares as follows:

- (a) That the preservation of open-space land, as defined in this article, is necessary not only for the maintenance of the economy of the state, but also for the assurance of the continued availability of land for the production of food and fiber, for the enjoyment of scenic beauty, for recreation and for the use of natural resources.
- (b) That discouraging premature and unnecessary conversion of open-space land to urban uses is a matter of public interest and will be of benefit to urban dwellers because it will discourage noncontiguous development patterns which unnecessarily increase the costs of community services to community residents.
- (c) That the anticipated increase in the population of the state demands that cities, counties, and the state at the earliest possible date make definite plans for the preservation of valuable open-space land and take positive action to carry out such plans by the adoption and strict

administration of laws, ordinances, rules and regulations as authorized by this chapter or by other appropriate methods.

- (d) That in order to assure that the interest of all its people are met in the orderly growth and development of the state and the preservation and conservation of its resources, it is necessary to provide for the development by the state, regional agencies, counties and cities, including charter cities, of statewide coordinated plans for the conservation and preservation of open-space lands.
- (e) That for these reasons this article is necessary for the promotion of the general welfare and for the protection of the public interest in open-space land.

**Government Code Section 65562:**

It is the intent of the Legislature in enacting this article:

- (a) To assure that cities and counties recognize that open-space land is a limited and valuable resource which must be conserved wherever possible.
- (b) To assure that every city and county will prepare and carry out open-space plans which, along with state and regional open-space plans, will accomplish the objectives of a comprehensive open-space program.

**Government Code Section 65563:**

On or before December 31, 1973, every city and county shall prepare, adopt and submit to the Secretary of the Resources Agency a local open-space plan for the comprehensive and long-range preservation and conservation of open-space land within its jurisdiction.

**Government Code Section 65564:**

Every local open-space plan shall contain an action program consisting of specific programs which the legislative body intends to pursue in implementing its open-space plan.

**Government Code Section 65566:**

Any action by a county or city by which open-space land or any interest therein is acquired or disposed of or its use restricted or regulated, whether or nor pursuant to this part, must be consistent with the local open-space plan.

**Government Code Section 65567:**

No building permit may be issued, no subdivision map approved, and no open-space zoning ordinance adopted, unless the proposed construction, subdivision or ordinance is consistent with the local open-space plan.

## **Public Resources Code Section 5076:**

In developing the open-space element of a general plan as specified in subdivision (e) of Section 65302 of the Government Code, every city and county shall consider demands for trail-oriented recreational use and shall consider such demands in developing specific open-space programs. Further, every city, county, and district shall consider the feasibility of integrating its trail routes with appropriate segments of the state system.

### 2. Conservation

Government Code Section 65302(d) requires a conservation element of all city and county general plans as follows:

A conservation element for the conservation, development, and utilization of natural resources, including water and its hydraulic force, forests, soils, rivers and other waters, harbors, fisheries, wildlife, minerals, and other natural resources. That portion of the conservation element including waters shall be developed in coordination with any county-wide water agency and with all district and city water agencies which have developed, served, controlled or conserved water for any purpose for the county or city for which the plan is prepared. Coordination shall include the discussion and evaluation of any water supply and demand information described in Section 65352.5, if that information has been submitted by the water agency to the city or county. The conservation element may also cover:

- a) The reclamation of land and waters.
- b) Flood control.
- c) Prevention and control of the pollution of streams and other waters.
- d) Regulation of the use of land in stream channels and other areas required for the accomplishment of the conservation plan.
- e) Prevention, control and correction of the erosion of soils, beaches and shores.
- f) Protection of watersheds.
- g) The location, quantity and quality of the rock, sand and gravel resources.

## **Public Resources Code Section 2762: (Mineral Resources)**

- (a) Within 12 months of receiving the mineral information described in [Public Resources Code] Section 2761, and also within 12 months of the designation of an area of statewide or regional significance within its jurisdiction, every lead agency shall, in accordance with state policy, establish mineral resource management policies to be incorporated in its general plan which will:
  - (1) Recognize mineral information classified by the State Geologist and transmitted by the [State Mining and Geology] board.
  - (2) Assist in the management of land use which affect: areas of statewide and regional significance.
  - (3) Emphasize the conservation and development of identified mineral deposits.

- (b) Every lead agency shall submit proposed mineral resource management policies to the board for review and comment prior to adoption.
- (c) Any subsequent amendment of the mineral resource management policy previously reviewed by the board shall also require review and comment by the board.

**Public Resources Code Section 2763:**

- (a) If the area is designated by the board as an area of regional significance, and the lead agency either has designated that area in its general plan as having important minerals to be protected pursuant to subdivision (a) of Section 2762, or otherwise has not yet acted pursuant to subdivision (a) of Section 2762, then prior to permitting a use which would threaten the potential to extract minerals in that area, the lead agency shall prepare a statement specifying its reasons for permitting the proposed use, in accordance with the requirements set forth in subdivision (d) of Section 2762. Lead agency land use decisions involving areas designated as being of regional significance shall be in accordance with the lead agency's mineral resource management policies and shall also, in balancing mineral values against alternative land uses, consider the importance of these minerals to their market region as a whole and not just their importance to the lead agency's area of jurisdiction.
- (b) If the area is designated by the board as an area of statewide significance, and the lead agency either has designated that area in its general plan as having important minerals to be protected pursuant to subdivision (a) of Section 2762, or otherwise has not yet acted pursuant to subdivision (a) of Section 2762, then prior to permitting a use which would threaten the potential to extract minerals in that area, the lead agency shall prepare a statement specifying its reasons for permitting the proposed use, in accordance with the requirements set forth in subdivision (d) of Section 2762. Lead agency land use decisions involving areas designated as being of statewide significance shall be in accordance with the lead agency's mineral resource management policies and shall also; in balancing mineral values against alternative land uses, consider the importance of the mineral resources to the state and nation as a whole.

**II. OPEN SPACE USES AND NATURAL RESOURCES**

The open space conservation element is concerned with the conservation, development and utilization of the natural resources within the city. These resources include:

- Air Quality
- Parks and Open Space
- Water Supply
- Water Quality
- Hydrology
- Land Resources
- Vegetation
- Wildlife

## **A. PARKS AND OPEN SPACE**

### 1. Parks

The City of Hercules has one community park, the 55-acre Refugio Valley Park, four smaller neighborhood parks totaling approximately 31 acres, and two mini-parks totaling 2.5 acres. Refugio Valley Park consists of Refugio Lake and associated facilities at Refugio Valley Road and Pheasant Drive. There is also a linear path and a community/swim center along the north side of Refugio Valley Road. A new waterfront park of 20 acres is proposed along the San Pablo Bay waterfront adjacent to the existing East Bay Regional Park District lands. The Waterfront Park will incorporate the waterfront trail running the length of the City's waterfront. No schedule has been established for development of the proposed Waterfront Park. It is anticipated that there will also be a new park in the Franklin Canyon/sphere of influence area to serve the anticipated population within this area.

The neighborhood parks include Ohlone Park on Turquoise Drive adjacent to Ohlone School; Hanna Park adjacent to the Hanna Ranch School at the east end of Refugio Valley Road; Woodfield Park on Lupine Road adjacent to Hercules Elementary School; Foxboro Park on Canterbury Drive; Railroad Mini Park on Santa Fe Avenue; and Beechnut Mini Park on Beechnut Court. Existing multi-purpose ballfields in Hercules, at Ohlone and Woodfield Parks, are being used to capacity by City-run sports programs.

A new community park, Hanna Park, is planned adjacent to the Hanna Ranch School at the east end of Refugio Valley Road. A new multipurpose ballfield (for baseball/softball and soccer), that would occupy about 6 acres of the planned 11 10 acre park is scheduled for completion. The remainder of the Hanna Park facilities are scheduled for funding from developer fees, although no time schedule is set and the availability of adequate funds is uncertain. Another neighborhood park is scheduled for development on a city-owned site in the Forest Run neighborhood just west of I-80. This 6 acre park will be developed for passive recreational use with facilities such as a walking path, benches, and picnic tables. A 5 acre park is proposed to be built in conjunction with the new elementary school west of I-80.

The General Plan Growth Management Element and Open Space/Conservation Element contain the following minimum standards for parks and open space (per 1,000 population): 3.25 acres of community parks and 1.75 acres of neighborhood parks. Based on a 1996 population of 19,400, the City currently provides adequate neighborhood parks, but provides less than the required acreage of community parks.

Under the projected buildout of the General Plan in 2010, the City would have approximately 25,100 people, resulting in the need for about 81.5 acres of community parks and about 44 acres of neighborhood parks, to meet park standards. Assuming that the 26 acre Waterfront Park were developed by the time of buildout, the City would have about 81 acres of community parkland, meeting the community park standard. If the 6-acre Forest Run Park and the 5 acre park proposed with the new school west of I-80 were developed by buildout, the City would have about 44.5 acres of neighborhood and mini parks, meeting the neighborhood park standard.

## 2. Open Space

The City also has approximately 950 832 acres of trails and open space, predominately located along Refugio Creek on both sides of I-80, in the southwest portion of the City near the Historic District, and among the residential areas in Refugio Valley in the eastern portion of the City. In addition, the Civic Center area includes the Hercules Heritage Garden Project which is a community based effort to recreate a California native woodland. The purpose of the project is to increase awareness of the rapidly disappearing California native woodland while providing an open space area that can be used for a relaxed, outdoor community meeting place.

The open space areas of Hercules are also an educational resource for the community which provide the opportunity to visit and study a variety of plant communities and wildlife habitats in close proximity to developed areas.

Based on a 1996 population of 19,400 and a standard of 34 acres of public and private open space per 1,000 population, the City currently provides adequate open space. The proposed Lower Refugio Creek open space corridor of approximately 20 acres, added to the existing 832 acres of open space would total about 852 acres, meets the open space standard of 853 acres for the buildout population. Some additional amount of open space is also anticipated within the remaining undeveloped properties located in the Lower Refugio Valley. It is anticipated the Franklin Canyon site will provide approximately 220 acres of additional open space.

The City of Hercules has adopted the Briones Hills Agricultural Preservation Agreement which has been adopted by six other cities (Lafayette, Martinez, Orinda, Pinole, Pleasant Hill and Richmond) and Contra Costa County. The agreement protects a 64 square mile area to the east and south of Hercules through a joint policy of not annexing any land within the preservation area to urban service districts or cities.

## 3. Trails

The East Bay Regional Park District (EBRPD), City of Hercules and City of Pinole, under a Joint Powers Authority, undertook a Shoreline Feasibility Study in 1986 to investigate the feasibility of developing a shoreline trail between Point Pinole in Pinole and Lone Tree Point in Rodeo, and to identify possible trail alignments. The feasibility study shows three possible trail alignments across the parcels: a pedestrian, bicycle and equestrian trail linking the shoreline and Historic Hercules to San Pablo Avenue; a boardwalk over the marsh/wetlands area south of Hercules Point; and a pedestrian trail along the inland side of the railroad parallel to the shoreline.

The land use diagram within the Land Use Element depicts a regional Shoreline Trail that runs along the shoreline on the inland side of the Union Pacific Railroad. This alignment has not been approved by the EBRPD, although the district views the future development of the Shoreline Trail through Hercules as a long-term goal, and will work with future property owners and the City towards a development agreement.

#### 4. Scenic Areas

Hercules has a scenic setting where the higher areas east of I-80 over look the San Pablo Bay with distant views of the coastal range in Marin County. Areas west of I-80 closer to the Bayfront also have scenic views. In addition the Highway 4 corridor through Franklin Canyon has scenic views of the valley and adjacent hillside grasslands and oak woodlands. The Circulation Element has recognized the scenic character of San Pablo Avenue and Highway 4 by designating them as scenic routes and providing implementation measures for development along them.

#### **B. WATER SUPPLY**

Potable water is currently supplied to the City of Hercules by the East Bay Municipal Utility District (EBMUD) through the Maloney and Mendocino Pressure Zones. The Maloney Pressure Zone is served by the Crockett Aqueduct and Sobrante Filter Plant, and supplies potable water to part of Richmond and elevations in Hercules between 0 and 200 feet mean sea level (msl). A cascade water system is used to pump water to several elevations higher than 200 feet msl. The Mendocino Pressure Zone serves elevations between 200 - 400 feet msl, and is the primary potable water source for recent residential development in the City. Storage systems for elevations between 200 - 400 feet msl are currently nearing capacity. Both zones provide adequate potable water supply and pressure to the City.

EBMUD schedules capital improvements (e.g., storage systems, reservoirs, and pumping plants) based upon ABAG's Projections '90 household projections. If a development would result in a higher number of households than ABAG projected for year 2010, additional capital improvements could be required, including pumping plants, storage tanks, and/or distribution pipelines. EBMUD expects to examine potential revision of its system capacity charge (the fee that new users are charged for connection to the distribution system) as part of a master planning process to be completed for the area including Hercules. Expected new development for buildout of the City would be taken into account in this planning process, and the system capacity charge could be adjusted so that required distribution improvements would be possible.

#### **C. WATER QUALITY**

Water quality is affected by a number of pollutants that are carried into surface and ground waters by runoff. These pollutants include oil and grease from roadways; agricultural pollutants and fecal coliform bacteria from crop and grazing lands; low levels of heavy metals from the former munitions factory or from the watershed area southwest of I-80; and general debris from roadways. Monitoring of water quality indicated the shallow groundwater to be brackish and non-potable, but also not substantially affected by previous industrial uses of the properties.

New development along Refugio Creek would cause an increase in impermeable surfaces with the potential for increased flooding. New commercial facilities could introduce point sources of pollution for any pollution source that would not discharge into an established sewer system. These sources would require a National Pollution Discharge Elimination System (NPDES)

permit. Development of these areas could also increase the load of nutrients, metals, oil and grease carried in runoff from roadways to surface and ground waters.

### 1. Wastewater Management

The City is served by two sewage treatment plants, the Pinole-Hercules plant and the Hercules Sewage Treatment plant. Existing capacity of the Pinole-Hercules plant is approximately 3.8 million gallons per day (mgd) average wet weather flow (AWWF),<sup>1</sup> and the existing capacity of the Hercules plant is about 0.35 mgd. The entire capacity of the Hercules plant is used exclusively by the City of Hercules. The City, as part of the assessment district for the Pinole-Hercules plant, has a current capacity and allocation of 2.04 mgd of the total capacity of this plant. Because the Pinole-Hercules plant operates at less than design capacity, Hercules currently has access to about 1.9 mgd of treatment capacity at that plant. The total current wastewater treatment capacity owned by the City of Hercules is approximately 2.4 mgd. About 2.3 mgd is currently available. The remaining capacity at Pinole is expected to be available following several minor capital improvements that are planned for the facility.

The Pinole-Hercules wastewater treatment plant is jointly owned by the cities of Hercules and Pinole. Operation and maintenance of the plant is provided by the City of Pinole, and the City of Hercules reimburses costs incurred in treating Hercules' wastewater.

### 2. Water Reclamation

Water reclamation in Hercules is expected to be potentially attractive only if local reclamation is affected and will be long-term. Reclamation feasibility will, to a large extent, be dependent upon the geographical relationship between the supply and the demand.

The City should develop a reclamation policy and plan which would ensure the full realization of any future potential. The plan should provide for:

- 1) System development
- 2) Right-of-way and easement reservation.

## **D. HYDROLOGY**

The City of Hercules is adjacent to San Pablo Bay and is influenced by its waves, tides, and salinity. Existing waterfront development around Hercules Point, including a wharf, was constructed by the Hercules Powder Company. Extensive mudflats occur in shoal areas offshore, extending over a quarter mile out in some areas. Water depths offshore are very shallow, less than 12 feet deep for almost a mile offshore. The highest tide on record is approximately 7.2 feet; however, wave heights could be substantially larger during a storm.

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<sup>1</sup> AWWF is the average flow during wet weather, including the effects of rainwater infiltrating into the system.

The City of Hercules is within three major drainage basins, all of which outfall into San Pablo Bay, and are thus subject to tidal influences. Pinole and Rodeo Creeks drain relatively small portions of the City. Refugio Creek and its tributaries drain the bulk of the City and also a significant basin upstream of the City. Pinole and Rodeo Creeks are adjacent to the north and south City boundaries and drain the neighboring communities for which they are named. Relatively small portions of the City are drained by these creeks.

The City of Hercules is located mostly in the Refugio Valley along the western shore of San Pablo Bay, on the northeast side of the San Francisco Bay Area. Much of the Refugio Valley has elevations ranging from 7.5 to 14.3 feet above mean sea level (MSL), but the high ground surrounding portions of it rises to over 200 feet above MSL in the study area and more than 500 feet above MSL on the surrounding ridge lines. Mean annual precipitation is approximately 20 inches, and mean annual runoff is about three inches. The general trend of drainage in the area is to the northwest into San Pablo Bay. Refugio Creek is the main drainage feature within the City.

Flooding is a recognized hazard in some areas of Hercules. Storm water flooding of Refugio Valley occurs during periods of heavy rainfall and runoff, coincident with high tides affecting Refugio Creek. A backwater effect is created that prevents effective flood water discharge to San Pablo Bay. Extensive flooding of Refugio Creek occurred during severe storms of January 1983, with the creek overflowing its banks. A large area west of I-80 along is within the 100-year floodplain of Refugio Creek. See the Flood Zones Map within the Safety Element. Runoff in urban areas increases with the amount of impermeable surfaces created. Drainage facilities help control this runoff. Flooding is addressed in more detail within the Safety Element.

### 1. Pinole Creek

Pinole Creek was recently improved by the Corps of Engineers and is presently operated and maintained by the Contra Costa County Flood Control District. The reach within Hercules is a trapezoidal channel located adjacent to the Hercules Pinole boundary.

In its present state, the Creek is sterile and unattractive but still has potential. The Cities of Pinole and Hercules, in cooperation with the Flood Control District, should develop a riding/hiking plan reinforced with landscaping which will enhance and permit the full utilization of this potential asset.

### 2. Refugio Creek

Refugio Creek is the primary surface water source within the City. The lower Creek is in an inadequate channel with a history of overflowing. Refugio Creek flows into San Pablo Bay. The westernmost portion of Refugio Creek is tidally influenced. Refugio Creek is not in its natural channel, apparently having been straightened, deepened, and channeled by the former Hercules Powder Company property owners in the early part of the century. The original channel of the creek is not known. A portion of Refugio Creek is culverted beneath the Creekside Shopping Center adjacent to I-80; the creek also passes through a culvert near where the Burlington

Northern and Santa Fe Railway tracks pass beneath 1-80. The upper channel is on a relatively steep gradient which causes erosion and slumping of side slopes.

### 3. Rodeo Creek

Rodeo Creek is located just east of the Hercules City boundary in the western area of the City and extends into the sphere of influence area and Franklin Canyon in the east. It is presently being improved per the requirements of the Flood Control District to increase the flood flow capacity of the Creek and provide public access. Provision has been made for increased runoff from Hercules in the design of these improvements.

### 4. Storm Drainage

Storm drainage is collected by a storm drainage system and transported to Refugio Creek, and flows into San Pablo Bay. The Refugio Creek drainage network includes a flow storage facility in the form of an on-stream reservoir located in Refugio Park in addition to its use as a recreational and scenic amenity, the reservoir stores excess runoff water during storm. The existing drainage system in Hercules is adequate for areas that are currently developed. (See Circulation Element for maps of storm sewer mains)

Current federal National Pollutant Discharge Elimination Standards (NPDES), which regulate outfall pipe standards, could require construction of additional retention basins as well as pretreatment of existing storm waters. These standards would be implemented as new projects are developed. The City's Stormwater Management Plan contains Best Management Practices (BMPs) that would be implemented on a time frame as the City reaches physical buildout. The City's municipal permit was updated on September 15, 1993.

The City should develop a master drainage plan which provides for:

- 1) The definition and conservation of existing drainage courses of high aesthetic value.
- 2) The improvement of these channels such that adequate capacity for expected flood flows is provided.
- 3) The maximum utilization of these drainage courses for buffers, open space, pedestrian circulation, recreation, aesthetics, flood control, etc.
- 4) The enhancement of these drainage courses with landscaping, remedial measures and improved public access. The City should also develop ordinances and enforcement mechanisms which will preserve, develop and maintain these drainage courses.

### 5. Erosion

Erosion is the process where earth and soil are worn down and transported away by the motion of water. There is coastal erosion along the shoreline of Hercules due to waves. This results in hazards to structures along the shore, and siltation to the Bay. Erosion from runoff and stormwaters occurs along unvegetated hillsides and slopes, drainage channels and other areas of

bare ground. Gullying also occurs within Hercules as a result of this type of erosion. Erosion affects water quality and wildlife habitats along with slope stability and damage to property.

## 6. Groundwater

Groundwater underlies Refugio Valley at relatively shallow depths. There are likely several distinct water bearing zones in the bedded sediments in the valley, including a very shallow, but discontinuous perched zone. Throughout the lower valley, especially west of I-80, the winter water table is typically less than two to three feet deep, and declines to five to six feet during most summer months. Groundwater in the very shallow zone may be only six inches deep in the winter months of wet years. Refugio Creek is thus fed by tides and surface water runoff during winter months and by groundwater discharge during the summer months.

## **E. AIR QUALITY**

The primary factors that affect air quality are the number and locations of stationary and mobile air pollutant sources and the amounts of pollutants emitted. Meteorological and topographic conditions also important in determining the movement and dispersal of air pollutants.

Land uses considered to be relatively sensitive to air pollution include schools, hospitals, senior housing and convalescent homes, and residential areas. The Bay Area Air Quality Management District (BAAQMD) monitors air quality and enforces air quality violations in the San Francisco Bay Area. Air pollutant criteria are enforced for ozone (O<sub>3</sub>), carbon monoxide (CO), particulate matter (PM<sub>10</sub>), Nitrogen Dioxide (NO<sub>2</sub>), Sulfur Dioxide (SO<sub>2</sub>) and Lead (Pb). Odorous emissions are also regulated. The bay area has been found to be in non-attainment for state standards regarding ozone and particulate matter, and transitional for carbon monoxide. The air monitoring stations in Richmond and Vallejo have had few violations of air quality in recent years except for particulate matter and ozone.

The major contributor to air quality problems within the Bay Area is vehicle traffic which generates 45% of the air contaminants potentially affecting public health. As such, methods to decrease the vehicle traffic associated with existing and new land uses is a primary concern. The City is actively pursuing grant funding for technical feasibility studies for the location of a train station in the Lower Refugio Valley. This is anticipated to have a regional benefit in reducing vehicle trips and associated air pollution.

## **F. LAND RESOURCES**

### 1. Geology and Soils

Preliminary geologic and soils studies indicate the land within the City can be developed for the urban uses contained in the Land Use Element of the Plan. However, the presence of surface landslides, expansive soils, steep slopes and compressible valley fills will require detailed soil investigations and inspection during construction.

Alluvium in the Refugio Valley varies from about 12 feet in thickness in the southeast portion of the valley to about 80 feet in thickness near the valley. Near San Pablo Bay, a few feet of fine-grained flood plain alluvium cap weak and highly compressible bay mud deposits. The bay mud has an estimated thickness of 35 to 40 feet along the western edge of the valley, thinning out in an upvalley direction.

There are no significant active faults within the City. The several mapped in the City are believed to be inactive and their existence has never been confirmed by field explorations. Additional discussion of geology and geologic hazards is contained in the Safety/Seismic Safety Element.

## 2. Mineral Resources

The State of California adopted the Surface Mining and Reclamation Act of 1975 (SMARA) with a recognition that the extraction of minerals is essential to the continued economic well-being of the state and to the needs of society, and that the reclamation of mined lands is necessary to prevent or minimize adverse effects on the environment and to protect the public health and safety. The intent of SMARA is to establish policies for surface mining and reclamation that assure that adverse environmental effects are reduced, eliminated or avoided, and that reclamation is completed, while encouraging the continued Production and conservation of minerals. The Act further states that it does not permit a limitation on the police power of any city or county, or on the power of any city or county to regulate the use of buildings, structures and land within its jurisdiction.

SMARA requires the State Geologist to classify existing or potential mineral resource sites within areas of the state that are urbanized or subject to irreversible land uses that would preclude mineral extraction. There are four classifications of Mineral Resource Zones (MRZ) that are generally applied, the most significant of which is MRZ-2.

MRZ-1: Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that there is little likelihood exists for their presence. This zone shall be applied where the likelihood for occurrence of significant mineral deposits is nil or slight.

MRZ-2: Areas where adequate information indicates that significant mineral deposits are present or where it is judged that there is a high likelihood for their presence exists. This zone shall be applied to known mineral deposits or where the likelihood for occurrence of significant mineral deposits is high.

MRZ-3: Areas containing mineral deposits the significance of which cannot be evaluated from available data.

MRZ-4: Areas where available information is inadequate for assignment to any other MRZ zone.

Where significant mineral resources are identified and designated, SMARA requires local agencies to prepare and adopt mineral resource management policies as part of the jurisdiction's General Plan. These policies 1) recognize mineral information classified by the State Geologist, 2) assist in the management of land use which affects areas of statewide and regional significance, and 3) emphasize the conservation and development of identified mineral resources. Before their adoption, local jurisdictions must submit these policies to the State Mining and Geology Board for review and comment.

The Mineral Land Classification Map prepared by the Division of Mines and Geology for the Hercules area contains areas designated MRZ-1, MRZ-3 and MRZ-4. No significant mineral deposit areas, MRZ-2, are identified. However, the guidelines for to implement SMARA suggest the following for MRZ-3 zones:

"Prior to permitting a use which would threaten the potential to extract minerals classified by the State Geologist as MRZ-3, the lead agency may cause to be prepared an evaluation of the area in order to ascertain the statewide or regional significance of the mineral deposits known or inferred to be located therein. The results of such an evaluation shall be transmitted to the State Geologist and to the State Mining and Geology Board for review and comment.

MRZ-3 zones have been mapped for the hills to the north and south of Highway 4 east of Highway 80 and the high area north of John Muir Parkway to the west of Highway 80. However, there is no information to suggest that these areas have extractable minerals of commercial value such that existing and planned land uses would be of less benefit to the community and region.

### 3. Land Form

Property in the City is characterized by gentle to-steep grass-covered hills with trees clustered in the water courses and on the hillsides. The higher elevations provide panoramic views of San Pablo Bay.

Topographic relief consists of a series of northwest trending ridges which have a maximum elevation of about six hundred feet, and which decreases in elevation northwesterly toward the lowlands adjoining San Pablo Bay. Side slopes have been eroded by numerous steep sided gullies emptying into narrow valleys which widen as they drain northwesterly into San Pablo Bay.

The grading concept underlying the Land Use Element of the General Plan includes the grading of ridges and selective filling of valleys allowing existing side slopes to remain in their natural condition. This concept eliminates the need for high graded slopes. Sensitive contour grading and landscaping techniques will provide a transition between developed areas and the open space.

### 4. Prehistoric and Historic Resources

Prehistoric Resources: In the northwest portion of Contra Costa County, prehistoric sites are generally found near the edge of historic bay margins, on valley and midslope terraces, and in hilly areas on terraces near seasonal watercourses. Continual occupation of bay margins in this

area of Contra Costa County has yielded numerous aboriginal village and camp sites; a combination of bay shellfish and fish resources, and the presence of an environment that attracted both wildlife and birds, made these locations attractive as living areas.

In the late 1800's, Native Americans who lived in the Hercules vicinity spoke the Xucyun Ohlone language. One confirmed prehistoric site (CA-CCO-370) is located within the area west of I-80. Preservation of the site has been facilitated by the conservation of a number of buildings in the City's Historic District which overlay the resource. An unconfirmed site which was described in 1910 as "a scant deposit of what was once probably a large village" is supposed to be located west of I-80 inland of Hercules Point. The general vicinity of the site was disturbed by the construction of a nearby dam.

Historic Resources: Located within the Pinole land-grant, Hercules was established in the late 1800s as a company town of the Hercules Powder Company. At the company's height, the company's land was 3,000 acres and included the use of many gullies for mixing and packing explosives. The gullies separated mixing and packing operations and provided a safety feature for possible explosions. Properties located partially or entirely in gullies and may contain archaeological deposits such as dynamite magazines.

Several Hercules Powder Company buildings and Victorian-style homes remain from the historic company town. The Powder Company buildings include an administrative center, office and various plant buildings. The company administrative offices are listed in the National Register of Historic Places. The City recognizes the other buildings as being an important historical resource. Other remaining Powder Company structures which include rusted industrial frameworks, pipelines and tanks are not regarded as an important historical resources.

In 1977, the City commissioned an architectural evaluation of the Hercules Powder Company buildings and Victorian-style company homes. As a result of the study, the City designated buildings that would be considered for conservation or demolition, and subsequently expanded the Historic District. The company homes were renovated and relocated to the expanded Historic District area, south of the former administrative center. In 1980, the company homes were listed in the National Register of Historic Places.

## **G. VEGETATION AND WILDLIFE**

### 1. Vegetation

Natural vegetation communities are recurring combinations of species that reflect parallel responses to similar combinations of environmental conditions, as defined by the California Native Plant Society (CNPS). Plant communities play an important role in the ecosystem as they provide water, food, shelter, and foraging grounds for a variety of wildlife species as well as improving water quality and preventing soil erosion.

Salt Marsh and Freshwater Wetlands: Salt marsh is a transitional community occurring along margins of bays, lagoons and estuaries sheltered from excessive wave action. The upper part of

estuaries grade into brackish and freshwater marshes. Within the City of Hercules this habitat occurs on Hercules Point and Refugio Valley.

Coast and valley freshwater marsh is dominated by perennial, emergent monocots, often forming completely closed canopies. This community prefers areas lacking strong currents that are permanently flooded with freshwater. Typical species found in this community also includes sedges, spike-rush, tule, and cattail. Due to the regional loss of habitat and potential for this community to support a number of special status plant and wildlife species, freshwater marsh is considered a community of concern by the California Department of Fish and Game (CDFG).

Riparian: The willow scrub riparian community is an open to dense, broadleaf, winter-deciduous streamside thicket dominated by any of several willow species, usually as small trees or shrubs. Arroyo willow is the dominant canopy species occurring in this riparian community throughout Hercules. The remaining willow community in Hercules occurs along the main channel of Refugio Creek east of I-80.

Central Coast live oak riparian forest forms a low, riparian forest dominated by coast live oak. The understory in this community is generally composed of fairly extensive native bunchgrasses and non-native grasses along with scrub and chaparral species. This community occurs along the banks of drainages in the southeastern portion of Hercules and the hillsides of Refugio Valley.

The east branch of Refugio Creek, which flows from the southeastern portion of Hercules to the northwest and joins with the main channel of Refugio Creek, contains a diverse flora composed of California bay, coast live oak, and arroyo willow, with the dominant species being willow. This riparian community commonly occurs in outer floodplains along perennial and ephemeral streams.

Non Native Trees: Eucalyptus groves are the dominant non native tree masses within Hercules, and are predominately blue gum. Shade created by the eucalyptus canopy, combined with volatile chemicals contained in the large amount of bark and leaf litter deposited by eucalyptus, create poor growing conditions for most understory species. The City has considered removing some of the eucalyptus trees because of concern over fire hazard and safety hazard from falling limbs and trees. Fallen eucalyptus debris also presents a street and storm drain maintenance problem.

Grassland: Non-native grassland, found in valleys and on hillsides throughout most of Hercules, is dominated by non-native species. Johnny jump-ups and California poppies are an integral part of this community's floral mosaic producing showy "blooms" during spring and early summer. Non-native grassland is commonly found on fine-textured (often clay) soils, which are moist or waterlogged during the winter rainy season, and dry during the summer/fall drought. Oak woodlands and riparian forests are often adjacent.

Wildland fire hazards associated with the open space areas of natural and introduced vegetation are addressed in the Seismic Safety/Safety Element.

## 2. Wildlife Habitats

Wildlife habitats are not as delineated as vegetation communities, which are defined by certain plant species adapted to specific environmental conditions. Wildlife habitats consist of an area or place where an organism lives, composed of various vegetation communities creating different areas for different life cycle needs, such as foraging areas, nesting areas, and shelter from predators.

**Salt Marsh:** The salt marsh is an important ecosystem providing food and cover for a variety of species including nesting endemic bird and mammal species, such as California clapper rail, California black rail, salt marsh harvest mouse and wandering vagrant shrew. These species, because of their restriction to salt marshes, are listed as endangered. Common species, such as herons and egrets, use the salt marsh for foraging while nesting in nearby riparian areas. Waterfowl use salt marshes during the winter and spring migrations along the Pacific Flyway.

**Fresh Emergent Wetland:** This transitional habitat occurs between terrestrial and aquatic systems where water tables are near the surface or land is covered by shallow water. Grass-like plants, which emerge from the water, form a dense canopy in this type of habitat. Fresh emergent wetland habitat is the same as the freshwater wetland community. This community, mostly found along and in the vicinity of Refugio Creek and its tributaries, is one of the most productive habitats for wildlife in that it offers water, food and cover for a variety of species.

**Willow Riparian:** This habitat is a low shrubby tree structure that can cover an entire watercourse, with an impenetrable understory and includes fallen limbs and other debris. This habitat is the same as the Willow scrub community. Within the City of Hercules this habitat occurs along Refugio Creek east of 1-80, with pockets along the Western Branch of Refugio.

The willow riparian habitat attracts bird species that hover while catching insects, such as warbling vireo, and black phoebe. Other species such as mallards and snowy egrets use the shallow quiet waters of the stream to forage for vegetation and small fish. Predators, such as sharp-shinned hawks and red-shouldered hawks, nest in the high canopy and feed on the smaller birds and amphibians. Omnivores, such as the raccoon and striped skunk, forage on invertebrate species, plant parts, amphibians and fruits.

**Coast Live Oak Riparian:** This habitat is an open, low, evergreen forest. Found in canyon bottoms and the drier outer floodplains, the understory for this habitat is blackberry bushes and wild rose in the wetter areas and often grasses in the drier areas. Within the City of Hercules this habitat occurs along the southeastern portion of the City. As with other riparian habitats, coast live oak riparian provides water, foraging, nesting, cover, and migrating and dispersal corridors for a variety of wildlife species.

**Non-Native Grassland:** This habitat is based largely on cattle grazing which opens up the land to non-native grasses, annual grasses that grow during the winter and spring and die during the summer. Annual grassland now supports wildlife species that were once found in native grasslands. Within the City of Hercules this habitat occurs in most areas that are undeveloped.

### **III. THE OPEN SPACE/CONSERVATION PLAN**

The Open Space and Conservation Element provides for the comprehensive and long-range conservation, and enhancement of the environmental resources within the City. The Open Space and Conservation Plan map shows the distribution of the following types of open space:

- Public open spaces
- City parks
- School athletic fields
- Baylands
- Regional Hiking Trails
- Regional Riding Trails
- Local Trails

#### **A. GOALS**

The basic goal of the Open Space and Conservation Element is to provide for both human and environmental needs in creating a natural environment compatible with urban development by the wise use and enhancement of natural resources within the City.

Subgoals are to:

- a. Develop a plan to preserve and maintain open space within the community.
- b. Establish a management program for the conservation and enhancement of the natural amenities in the City.
- c. Incorporate conservation areas such as drainage courses, areas of natural vegetation and baylands into the open space system.
- d. Provide for the linkage of public and private open spaces throughout the community.