Section VII

SAFETY ELEMENT

GOAL, OBJECTIVES AND POLICIES, AND IMPLEMENTATION MEASURES

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FLOODING IN CLAYTON

AIR QUALITY

FIRE

CRIME

CIRCULATION

OTHER HAZARDS

EMERGENCY PREPAREDNESS

SAFETY ELEMENT

Goal
To reduce potential risk to new development by proper planning and to minimize existing risk through coordinated City-County actions.

GEOLOGIC HAZARDS

Objective 1
To provide means to minimize geologic hazards to property from unstable hillside slopes and reclaimed areas.

Policies

1a Evaluate extensions of land uses into areas characterized by slopes of 15% and/or slopes indicating instability through geologic studies with regard to the safety hazard prior to land use decisions such as General Plan amendments, rezonings, or project approvals.

1b Restrict development on slopes over 26% as they are not suitable for types of development that require extensive grading or other land disturbance without adequate analysis.

1c Prevent contouring of slopes greater than 3:1 without special mitigation or circumstance.

1d Require hillside lots to be designed to provide a stable, buildable site and driveway and parking location.

1e Require roads constructed in slope areas to be engineered to standards to prevent excessive maintenance and repair costs.

1f Prevent slope cuts that may undermine the toe of the slope.

Objective 2
To reduce public exposure to geologic risk.

Policies

2a Identify boundaries of all known areas with geologic instability.

2b Designate as Open Space any areas with severe geologic limitations which cannot be mitigated.

2c Require soils/geologic studies for any areas with potential risk of ground failure prior to development. (Revised 6/28/95)

2d Prepare a constraints map(s) identifying the location of geologic constraints including slope instability, expansive soil and high erosion potential.

2e Cooperate with other jurisdictions to monitor changes in geologic conditions.

Objective 3
To reduce the potential for manmade hazards to interact with natural geologic hazards.

Policies

3a Consider the relationship between manmade hazards and existing geologic hazards in land use decisions.

3b Provide adequate protection to utility lines and pipelines placed in areas of geologic hazard.

3c Review placement of structures and facilities in areas of geologic hazard and the effects of construction and operation of those facilities.

Objective 4
To determine the level of risk that the community is willing to accept in the form of exposure and to identify and mitigate geologic hazards.

Policies

4a Prevent development that increases risk exposure to persons or existing development.

4b Identify the potential and level of risk for development located in areas of geologic or other constraints.

4c Develop a rigorous procedure of technical review and inspection of proposed mitigation measures in areas of geologic hazard.

4d Identify every potentially hazardous structure in the City, particularly critical facilities in high to medium risk areas for landslide, earthshaking or flooding.

SEISMIC HAZARDS

Objective 5
To continue to pursue information regarding the location of faults within the planning area.

Policies

5a Establish a development constraints map(s) with all known information regarding fault location for development reviews.

5b Require identification and mitigation studies prior to development where there is probable cause to assume the location of a fault.

Objective 6
To provide adequate identification of potential seismic effects in relation to the setting for development.

Policies
6a Identify the extent of intensity of ground shaking from vicinity faults.

6b Identify areas susceptible to liquefaction.

6c Identify areas susceptible to subsidence.

Objective 7
To establish an appropriate level of risk mitigation to seismic activity.

Policies
7a Maintain seismic standards at a level of construction commensurate with the risk.

7b Prepare an inventory of structures where structural mitigation is necessary.

7c Establish a setback for development adjacent to the fault.

7d Reinforce and anchor all parapets, chimneys, signs, appendages and facades, to withstand ground shaking.

FLOOD HAZARDS

Objective 8
To protect development in Clayton from the 100 Year Flood.

Policies
8a Use the flood maps from FEMA unless better information is available to determine area of the 100 Year Flood in approving new development.

8b Submit all subdivision and creekside development plans for review by the County Flood Control District.

8c Evaluate areas of existing development subject to flooding for risk mitigation.

8d Prevent encroachment into the flood plain subject to Federal, County and local standards and requirements.

Objective 9
To continue participation in the Federal Flood Insurance Program with continued effort to improve flood information.

Policies

9a Restrict development in floodways and flood plains in accordance with FEMA requirements.

9b Cooperate in watershed evaluations and projects developed by the County Flood Control District.

FIRE PROTECTION

Objective 10
To incorporate measures for fire protection into development proposals and city plans.

Policies

10a Identify high fire hazard areas on a development constraints map.

10b Submit all new developments for review by the Fire District so that fire-fighting needs can be estimated and services be adequately provided.

10c Require development proposals to meet standards for adequate fire flows appropriate to fire risk created.

10d Designate locations in the community disaster plan to be used in case of a large fire or disaster. The elementary school has been used in the past for assembly, and City Hall can used for communications.

10e Establish fees and assessments to support enhancement of fire protection services in cooperation with Consolidated Fire District Planning and Budgeting.
(Revised 5/6/87)

Objective 11
To reduce fire risk by promoting fire safe residences in high risk areas.

Policies

11a Construct homes located in high fire hazard areas with fire-resistant materials and landscape the surroundings with fire resistant vegetation. Attention should be given to treatment of shake roofs or alternative roofing and requirement of spark arrestors.

11b Reduce fire risk through adequate fire break, control burning and fuel removal.

EMERGENCY PREPAREDNESS

Objective 12
To employ planning measures to promote public safety.

Policies
12a Encourage the use of citizen action programs such as Neighborhood Alert and Operation Identification to reduce crime risk.

12b Provide Planning Commission and Police Department review of projects to insure that crime-inviting features are minimized.

12c Encourage communication among the public protection agencies on matters of mutual concern.

Objective 13
To evaluate the potential for disaster and to continue planning for mitigation and response to emergency.

Policies
13a Keep major arterials free for evacuation in case of a major emergency.

13b Improve circulation to and from the Town Center.

13c Support community disaster planning as an ongoing effort.

13d Develop and improve emergency communication network planning.

AIR QUALITY

Objective 14
To promote measure to improve air quality.

Policies
14a Cooperate with region and area-wide measures to improve air quality.

14b Promote TSM as a means to reduce single occupant vehicle travel.

Implementation Measures
1. Prepare geologic hazards maps.
2. Prepare list identifying hazardous structures in Clayton.
3. Update flood area maps.
4. Prepare fire hazard maps and alert residents to danger.

5. Construct roads and turn-arounds to provide enough clearance to accommodate firefighting equipment.
6. Provide yearly update to community disaster plans for all feasible emergencies including locations for relief, decision making and other aspects of thoughtful preparation. Include a review of primary exit routes.

(Revised 5/6/87)

GEOLOGIC SAFETY SETTING

The undeveloped regions of Clayton contain a number of potential geological hazards. These include slopes with unstable expansive soil, high erosion potential, evidence of springs, mudflow potential, rockslide potential and evidence of significant creep.

While landslides may occur on slopes of 15% or less in unstable areas, the risk increases with steepness of slopes. Areas of old slide deposits are most subject to continued failure. Areas of potential slope hazard are indicated in Exhibit VII-1.

Grading without engineered requirements tends to reduce slope stability so that road cuts and the cut-and-fill pads typically prepared for hillside housing carry a greater risk of slope failure than undisturbed hillsides. However, fill slopes engineered to today's standards may result in a more stable situation than in nature, particularly where smaller slide deposits are improved or arrested.

Level to 15% slopes may be found in the downtown Clayton area, and to the area immediately northeast of Clayton Road. Much of this area lies on alluvial-type soil, which can amplify ground shaking. The seismic activity possible from area faults and the reaction of alluvial soils should by considered and studied in detail for any proposed development in these areas.

The foothill areas of Clayton contain slope stability problems which may be triggered by improper grading. In addition, foothill areas may experience local slope erosion, sedimentation or drainage problems, expansive soil reaction and other development limitations requiring corrective measures prior to any grading or construction. Ground rupture or slides along the general existing or suspected fault lines is also a possibility.

In slope areas greater than 15%, density should remain low. Development should be restricted by City policy for major slope areas in excess of 26%. Some development and slope correction will be permitted on slopes over 26% within the Keller Ranch and within the Marsh Creek Road Specific Plan areas subject to site-specific city review and the demonstration that such development is in conformity with any Specific Plan or other detailed conditions developed for the subject area, the development is not visible when viewed from developed portions of the City or from major road corridors, development does not intrude on the visual integrity of Mt. Diablo, and the development does not displace any sensitive plant or animal species, riparian corridors or wetlands. In no case will development be allowed on slopes in excess of 40%.

(Revised 6/28/95)

The following geological concerns are considered in greater detail in Appendix E:

a. Geologic structure of the Clayton planning area.

b. Geologic hazards including landslides, expansive soils, liquefaction and springs.

c. Earthquake faults.

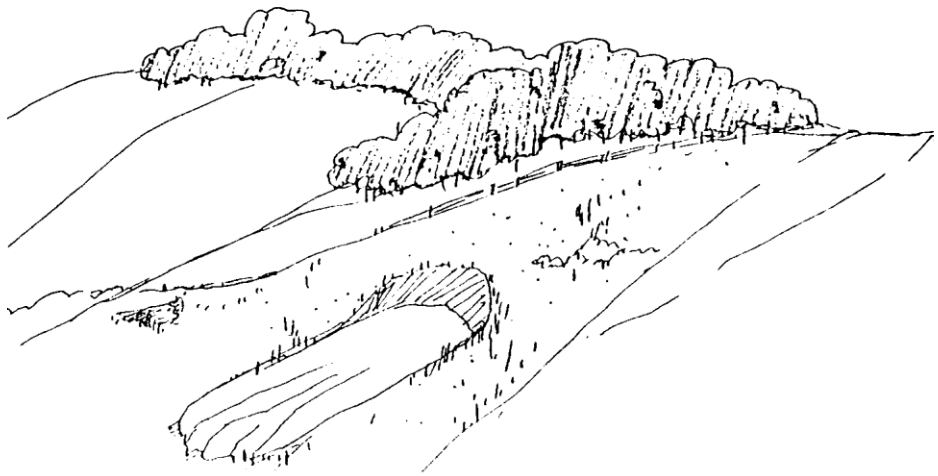
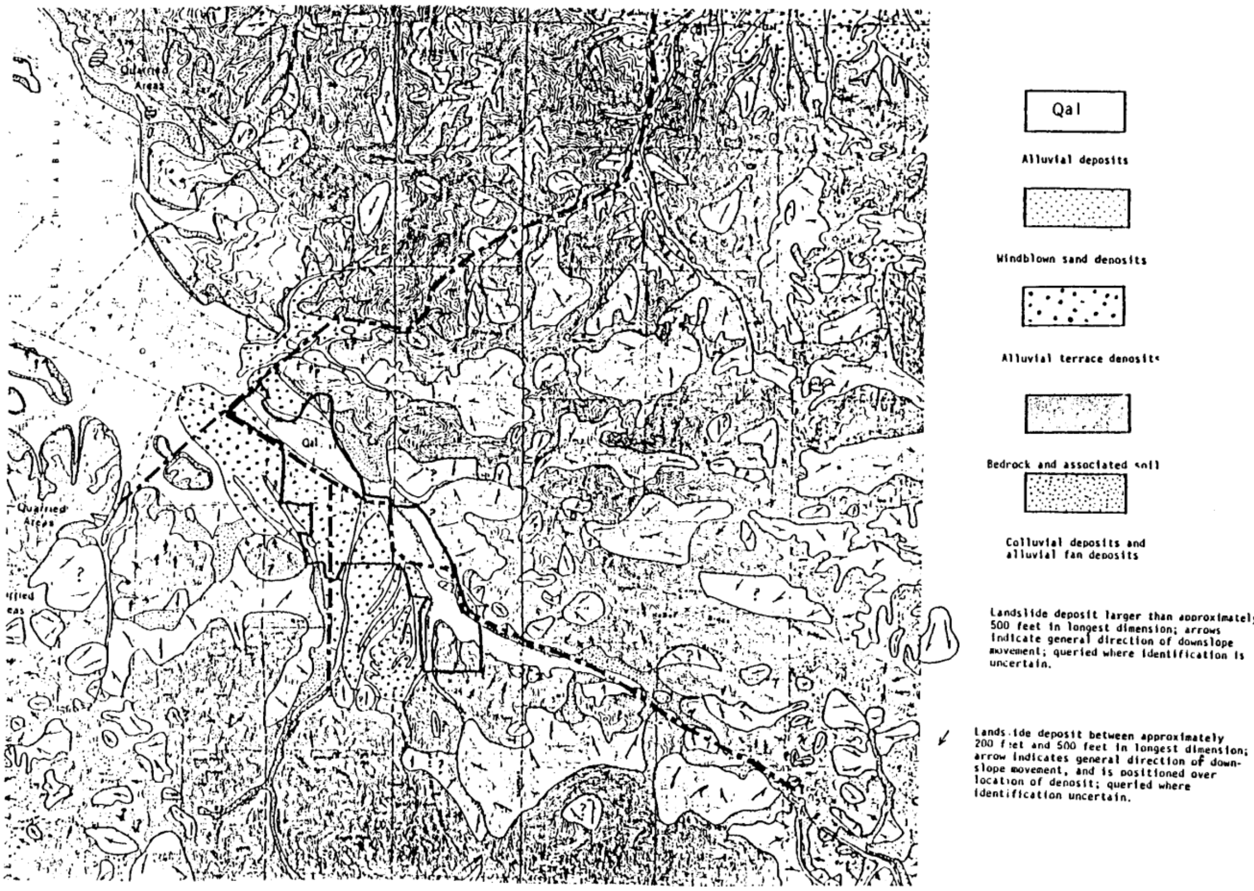


Exhibit VII-1

Slope Hazards



[Editor's note: Contact the Community Development Department for a larger scale version of this map.]

MEASURES OF SEISMIC ACTIVITY

Earthquakes are measured in two ways, by their physical effects and by the amount of energy released. The scale used to measure intensity (physical effects) of an earthquake is the Modified Mercalli Scale, and the scale used to measure the magnitude of earthquakes (energy released) is the Richter Scale. Mercalli and Richter scales will be described in greater detail in Appendix E.

The intensity of the physical effects of earthquakes are based on human reactions. At the low end of the Modified Mercalli Scale is the reaction "felt indoors."

SEISMIC ACTIVITY AFFECTING CLAYTON

The probability of an earthquake originating in Contra Costa County that is “felt indoors” is low to intermediate. Solid ground or rock tends to lessen ground motion due to earthquakes, while poorly consolidated or water-saturated soils tend to amplify it. The probability of earthquake effect must be measured against the bedrock and soils outlined above. Areas sitting on hard bedrock, such as the Mt. Diablo range, can be expected to perform satisfactorily under earthquake conditions, except where steep slopes, exposed or sheared surfaces and relatively unconsolidated soils might make slumping or landslides possible. The potential for physical effects is more highly probable as a result of earthquakes originating outside the County.

The most critical faults locally, according to Woodward and Lundgren, are the San Andreas, Calaveras and Hayward faults, due to their recent activity and energy potential. Nevertheless, the Antioch and Concord faults recently have produced damaging earthquakes, the latter with a 5.4 magnitude in 1955. Prominent faults of undetermined status include the Pinole, Bollinger, Las Trampas, Frankling, South Hampton, Clayton-Marsh Creek, Midland, and Mt. Diablo Faults (see Exhibit VII-2). These faults have shown inconclusive signs of activity or are associated with geologic processes and features which could result in earthquakes.

In addition there is a system of radial and concentric faults surrounding Mt. Diablo not known to be active but were created by the mountain uplift. This process still continues and its effects may become more pronounced.

The Concord fault is known to be active. It is a creeping fault, and small to moderate quakes are possible along the fault, with the capability of a 7+ magnitude.

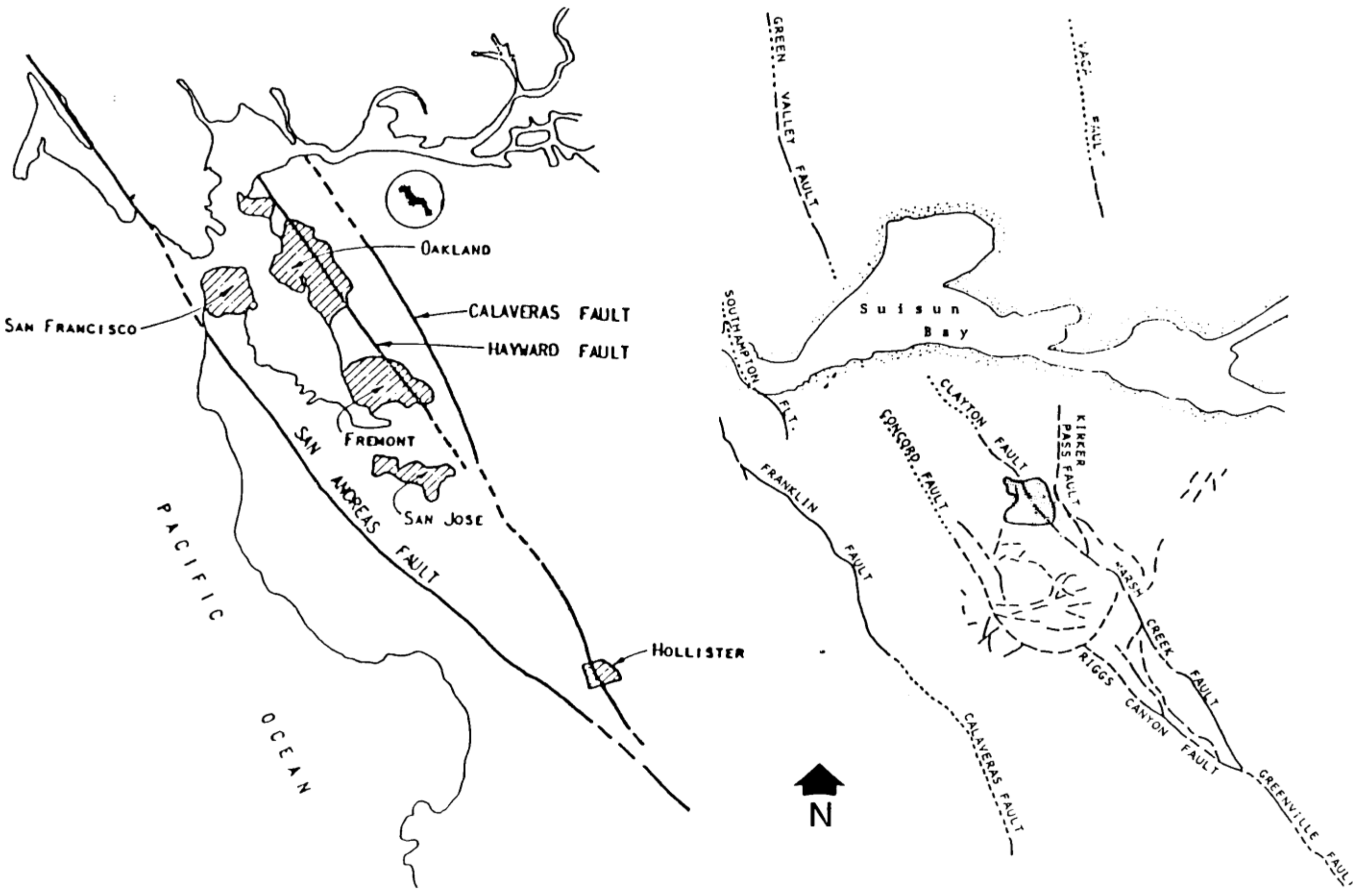
Clayton Valley does contain alluviated areas which could amplify ground shaking in the event the Concord fault shifts. The entire area is considered seismically active, and the development plans should reflect this risk factor. Soil types, topography and bedrock may serve to heighten risk or dampen it. The presence of contained water bodies within these seismically active areas raises seiches as potential hazards, which should also be addressed in development plans. The Clayton fault alignment is indicated in Exhibit VII-3. The fault is not classified as active; however, there is preliminary evidence that the fault may have displaced recent landslide materials. Due to this the fault should be treated as active unless evidence proves otherwise. The fault does not fall within the Alquist-Priolo requirements.

Seismic activity is presented in greater detail in Appendix E.

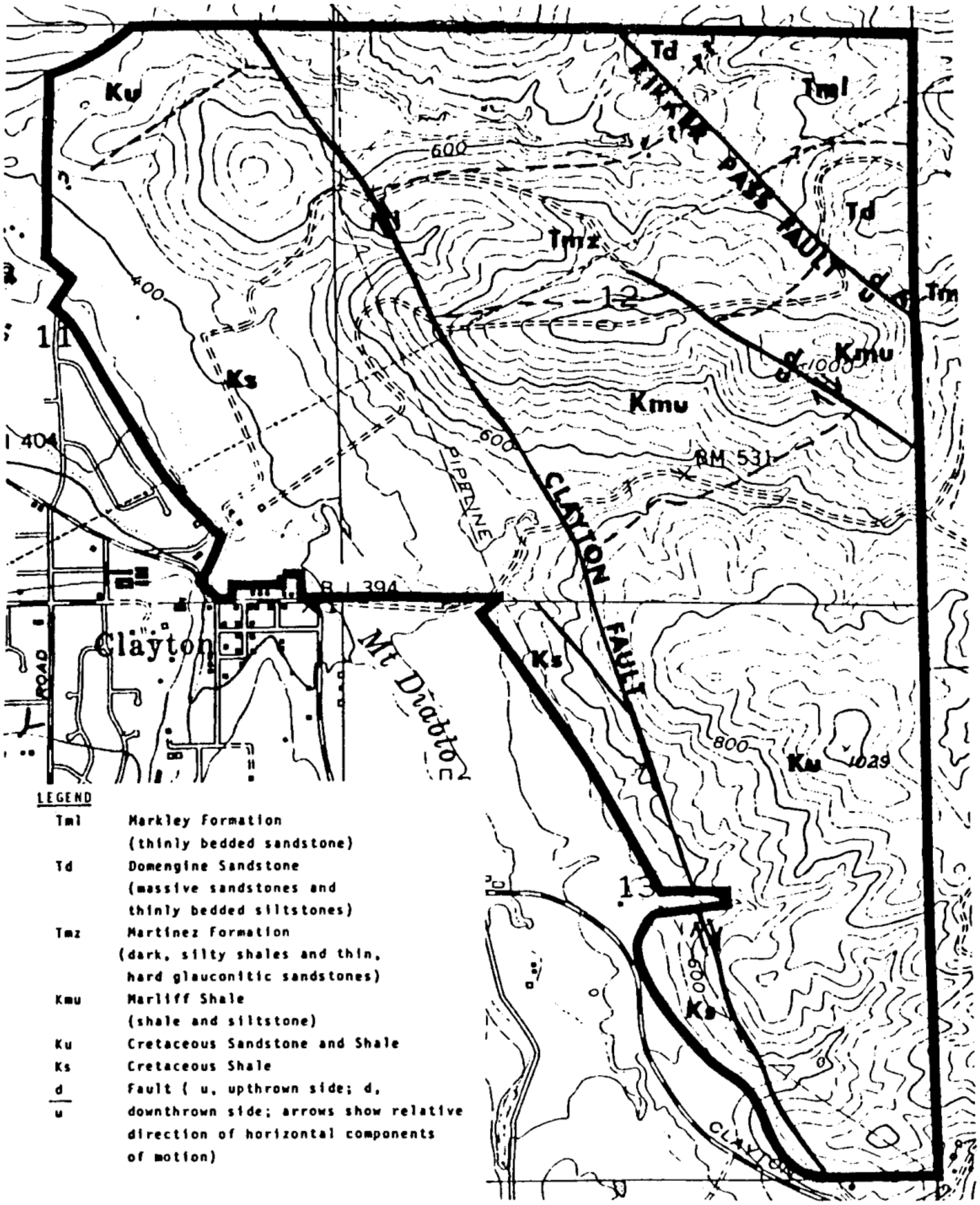
(Revised 6/28/95)

Exhibit VII-2

Regional Faulting



VII-9



it VII – 3
CLAYTON FAULT

FLOODING IN CLAYTON

The principal stream running through Clayton is Mt. Diablo Creek. It originates on the steep north slopes of the 3,849 foot Mt. Diablo. Mt. Diablo Creek drains a watershed of approximately 30 square miles. It flows northerly and westerly through the cities of Clayton and Concord, the Concord Naval Weapons Station and eventually empties into Suisun Bay. In the City of Clayton, Mt. Diablo Creek is joined by Donner and Mitchell creeks, both of which originate on the slopes of Mt. Diablo and by Peacock Creek, which flows from the Keller Ridge.

Flooding has occurred from Mt. Diablo Creek in the Town Center area of Clayton and in the flood plain between Clayton Road and Kirker Pass Road. The major floods affecting this area occurred in 1938, 1952, 1955 and 1963. The 1955 and 1963 floods both were estimated as 25-year floods.

Despite these occurrences, Mt. Diablo Creek is not considered a creek with a high flood history. Part of the reason for this is due to the long flood plain between Mt. Diablo slopes and the City limits that serves to slow down velocity and delay peak flows.

As the Mt. Diablo Creek watershed continues to develop, the potential for serious flooding increases. The proposed plan of improvements aims to accommodate the increased flows and prevent flooding. Contra Costa Flood Control District studies show that, although much of Mt. Diablo Creek has a 1,500 to 2,000 cfs (cubic feet per second) capacity, in some areas its capacity is as low as 500 cfs. Within the City of Clayton, flood waters are confined by berms and hills and directed back to the creek. There are no stream-gauging stations along Mt. Diablo Creek, therefore, no historical stream runoff data is available. The Federal Emergency Management Agency (FEMA) has developed flood plain management maps which predict that, given the present level of watershed development, a “100 year frequency” runoff event (a chance of one occurrence in a hundred years) will have a peak of 4,060 cfs at Kirker Pass Road (see Exhibit VII-4). On the basis of rainfall data and known characteristics of the watershed, a “synthetic flood hydrograph” has been computed. The development level of the watershed was estimated to the year 2030, using the General Plans of the cities of Clayton and Concord. Based on the above data, the estimated peak flows at Bailey Road in Concord are 6,420 cfs and 7,170 cfs for the 50-year and 100-year runoff events (see Exhibit VII-5).

Mt. Diablo Creek, within its confined limits, is already incapable of providing adequate flood protection. Even if land development within the watershed came to a complete halt, the statistical probability of serious flooding would be considerable. The limitation of land development, the utilization of flood plains, and the construction of engineered improvements are the most useful methods for controlling floods.

No serious problems have occurred to date but unless some type of flood control project is undertaken in the near future, the limited capacity of Mt. Diablo Creek will soon cause serious flooding problems.

Flood Protection Measures

The primary objective of flood protection measures is to modify Mt. Diablo Creek to provide sufficient capacity to carry the estimated 50-year frequency runoff event with standard freeboard and the 100-year event without overtopping the banks. Other objectives include the following:

a. Keep the extent of right-of-way acquisitions and the relocation of residents to a minimum.
b. Minimize channel improvement costs in order for the project to be feasible.
c. Design channel improvements to be as environmentally and aesthetically acceptable as possible.

Presently, flood protection measures are some earthen levees in the housing tract north of Clayton Road downstream from the confluence of Mitchell and Mt. Diablo Creek and at the Westwood development where the creek was widened.

Flood protection can be achieved in two ways. The first is to determine the extent of the 100-year flood and to establish that area as setback for any uses that will be adversely affected by inundation. Encroachment into flood plains by placement of fill reduces the flood-carrying capacity and increases flood heights, thus increasing flood hazards in areas beyond the area of the specific encroachment. Such encroachment is prevented under the flood insurance program. An aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. The National Flood Insurance Program uses the concept of a floodway as a tool to assist local communities in the setback aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent flood plain areas that must be kept free of encroachment in order that the 100-year flood be carried without substantial increases in flood heights. As minimum standards, the Federal Insurance Administration limits such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. Flood fringe is the area that becomes ponded in event of bank overflow. Development can occur in these areas under restrictions and with flood insurance.

The second method of flood control is to provide creek alterations that will increase capacity. Structures and alterations include concrete block energy dissipaters, concrete channels, drop structures, berms, earth channels, culverts, inlet structures and similar measures. The Contra Costa County Flood Control District prepared an engineering report and a series of design alternatives in August 1983 to be considered and implemented by the cities of Clayton and Concord.

As part of the General Plan implementation process, it will be necessary for the City of Clayton to establish an overall flood control plan and continue to participate in the Federal Flood Insurance Program and to require project EIR's to identify contribution to flooding and provide adequate mitigation. Since the county does not participate in the regular program there are no corresponding FIRM maps for the Keller Ranch. As a part of approval, Clayton's FIRM maps will have to be expanded. (Revised 5/6/87)

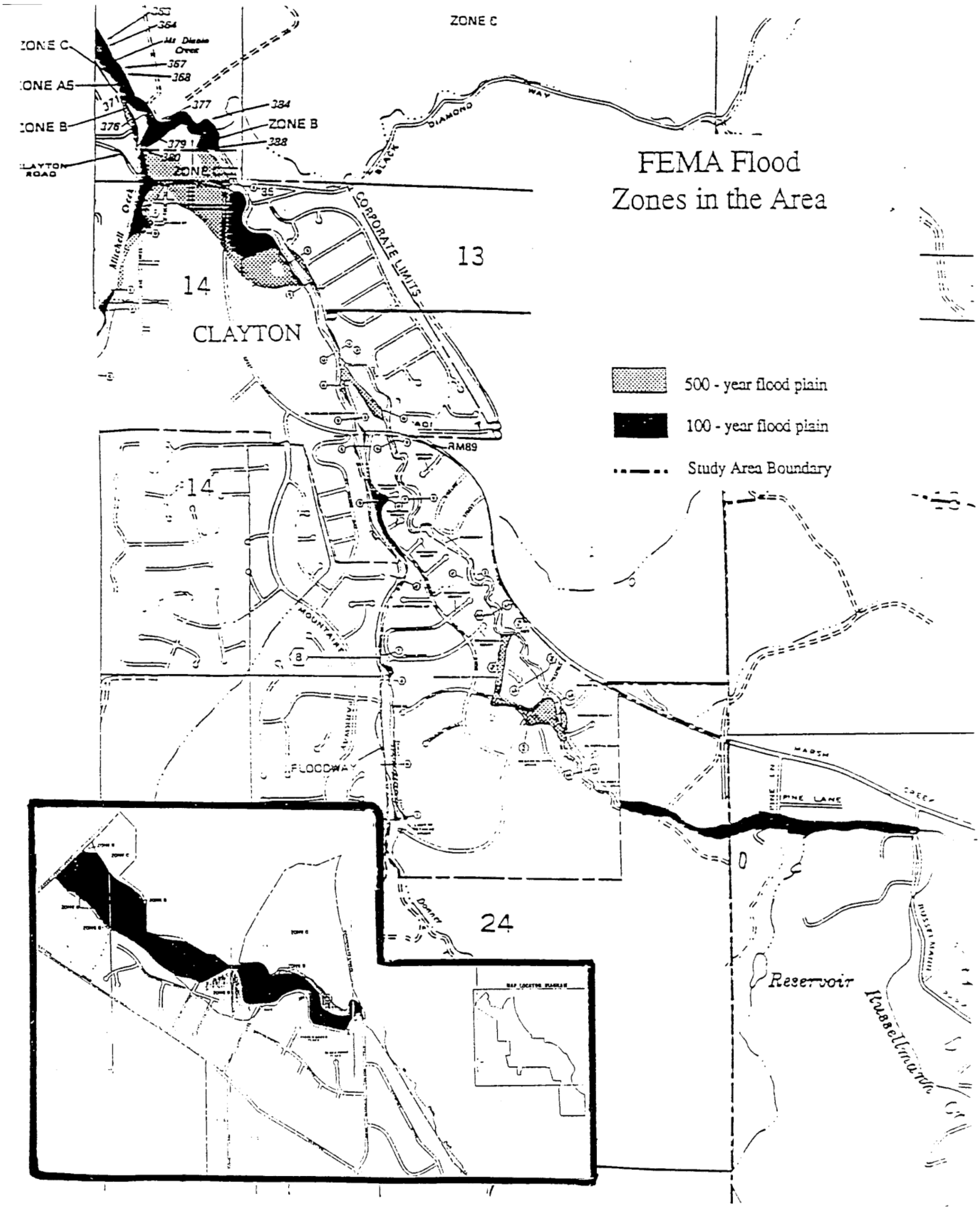


FIGURE 4

(Revised 6/28/95)
Page VII-13
from Growth Management

Exhibit VII – 4B

KEY TO FLOOD PLAIN EXHIBIT

500-Year Flood Boundary	ZONE B
100-Year Flood Boundary	
Zone Designations* With Date of Identification e.g., 12/2/74	
100-Year Flood Boundary	
500-Year Flood Boundary	ZONE B
Base Flood Elevation Line With Elevation In Feet**	513
Base Flood Elevation in Feet Where Uniform Within Zone**	(EL 987)
Elevation Reference Mark	RM7 ×
River Mile	• M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

Cert in areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

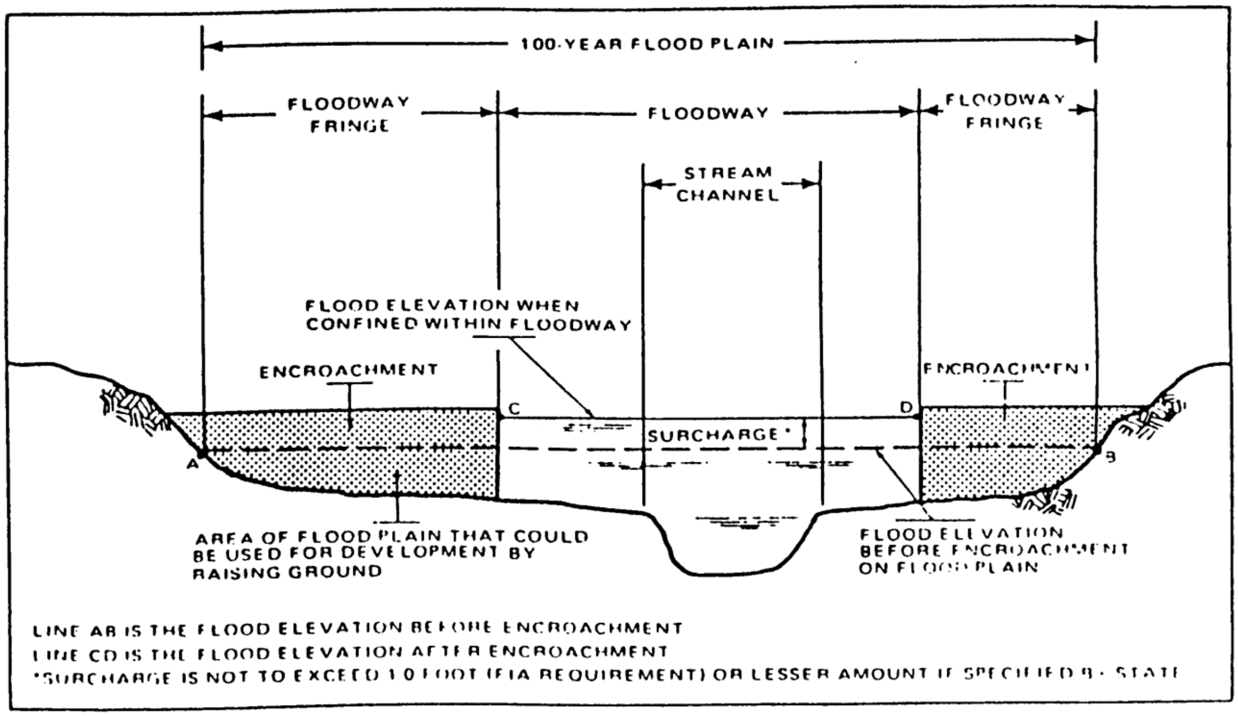
ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION (FT. NGVD)	DESCRIPTION OF LOCATION
RM1	298.84	A brass tag in the top of south headwall on the west corner of the headwall; 0.3 mile northeast on Kirker Pass Road from intersection of Clayton Road. Established by Contra Costa County.
RM2	331.48	A brass disk in a monument box in the centerline of North Lydia Lane; 88 feet northwest of Casey Glen County. Established by Tudor/Towill Engineering.
RM3	431.27	A bronze azimuth disk set in the top of a concrete monument; 0.3 mile northwest along Clayton Road from the post office; 48 feet northwest of the centerline of Mt. Zion Drive; 0.05 mile southeast of the "Y" junction of Mitchell Canyon Road; and 18 feet from the centerline of Clayton Road. Established by U.S. Coast and Geodetic Survey.
RM4	393.90	A bronze disk in the top of a concrete post; at the "T" of Clayton Road (Main Street) and Marsh Creek Road leading south, 36 feet south of the centerline of Clayton Road (Main Street), 5.4 feet south of a fireplug, 1.9 feet west of the fence corner post and 2.0 feet southeast of a witness post. Established by U.S. Coast and Geodetic Survey.
RM5	395.32	A bronze cap riveted on top of a 3½ inch iron pipe projecting 0.7 foot above the ground, southwest of the southwest corner of the south end of the west concrete abutment of the Black Diamond Way bridge over Mt. Diablo Creek. Established by U.S. Coast and Geodetic Survey.
RM6	438.08	A concrete fastener and tag set near the southeast end of the headwall of a double box culvert on Donner Creek approximately 60 feet easterly of the intersection of Mt. Wilson Way on Marsh Creek Road. Established by Contra Costa County.
RM7	534.34	A fastener and tag set on the center of top of drop inlet on south side of Marsh Creek Road approximately 500 feet westerly of Saint Anthony Claret Road. Established by Contra Costa County.
RM8	489.85	A brass disk in a monument box in the centerline of Herriman Drive; 66 feet south of Tiffin Drive; east of a fire hydrant; 500 feet east of the corporate limits of Clayton. Established by Tudor/Towill Engineering.
RM9*	573.93	A brass disk located in the top of the northeast corner of the concrete foundation for the scales at the Clayton Plant No. 135 of Pacific Coast Aggregates Inc.; 0.9 mile south along Mitchell Canyon Road from the junction with Clayton Road, 104.5 feet west of the centerline of Mitchell Canyon Road and 12.4 feet east of the northeast corner of the office. Established by U.S. Coast and Geodetic Survey.
RM10	509.94	A brass disk in a monument box in the cul-de-sac of Weatherly Drive in the Regency Woods Subdivision. It is the offset monument for the center of the cul-de-sac in the City of Clayton. Established by Tudor/Towill Engineering.

*OUTSIDE CORPORATE LIMITS

Exhibit VII-4C

Floodplain Cross Section



AIR QUALITY

Air quality in Clayton is primarily determined by meteorologic and topographic conditions. Clayton is located in the upper reaches of Clayton Valley. In general, valleys with box-end configurations such as this have a greater susceptibility to poor air quality because they tend to trap air and usually there is a greater potential for temperature inversions. Since surrounding ridges and mountains block winds, these areas lack the flushing action that winds give to coastal and estuarine areas.

The air pollution potential of the plan area vicinity is mostly influenced by air quality in the adjacent Concord area. Concord is particularly susceptible to air pollution due to regional airflow patterns in conjunction with upwind emission sources. When southwesterly or northwesterly winds occur, pollutants from the South Bay/Livermore area or North Bay are carried into the Concord area. South-southwesterly winds predominate about 40% of the time while northwesterly winds occur 5% - 10% of the time. Pollutant concentrations can also increase further during relatively calm periods because of local emission sources. Calm conditions occur about 30% of the time (Department of Water Resources, 1978). Depending on meteorological conditions at the time, pollutants in the Concord area would tend to migrate and possibly accumulate in the upper portion of the Clayton Valley at or near the project site.

Ambient air quality standards for California are provided in Exhibit VII-5.

hibit VII-5

AMBIENT AIR QUALITY STANDARDS IN CALIFORNIA[1]			
Pollutant	Averaging Time	Concentration	Agency
Oxidant	1 hour	0.12 ppm	Federal
Carbon Monoxide (CO)	8 hours 1 hour	9 ppm (10 mg/m^3) 35 ppm (40 mg/m^3)	Federal Federal
Nitrogen Dioxide (NO_2)	1 hour	0.25 ppm	State
Sulfur Dioxide (SO_2)[2]	24 hours	0.04 ppm	State
Total Suspended Particulates (TSP)	annual geometric mean 24 hours	60 $\mu g/m^3$ 100 $\mu g/m^3$	State State
Lead (Pb)	30 days	1.5 $\mu g/m^3$	State
Sulfates	24 hours	25 $\mu g/m^3$	State
Non-Methane Hydrocarbons (NMHC)	3 hours (6-9 a.m.)	0.24 ppm	State
Hydrogen Sulfide (H_2S)	1 hour	0.03 ppm	State
Visibility Reducing Particles	1 observation	Insufficient amount to reduce the prevailing visibility to less than 10 miles	State

[1]The table shows only the more stringent of the Federal or California air quality standards. Federal standards are not to be exceeded more than once per year; California standards are never to be equalled or exceeded.

[2]In September 1977, the State Air Resources Board (ARB) adopted a new SO_2 air quality standard. The standard is 0.05 ppm during 24 hours in combination with oxidant levels over the state one hour standard of 0.10 ppm or particulate matter in excess of the State 24 hour standard of 100 $\mu g/m^3$.

Air quality in the region is measured by the Bay Area Air Quality Management District (BAAQMD). The closest monitoring station is located in Concord. Air quality data collected at this station from 1978 through 1983 is shown in Exhibit VII-6.

Ozone and nitrogen oxides (NOx) are more regionally-oriented pollutants and their levels have decreased in the Concord area since 1978. At the same time, more localized pollutants (e.g., carbon monoxide (CO), sulfur dioxide (SO_2), and total suspended particulates (TSP) experienced a peak in 1981 and have decreased since then.

Light and heavy duty motor vehicles are the primary sources of carbon monoxide, nitrogen oxides, and hydrocarbons. Industrial operations are the primary sources of sulfur dioxide. Suspended particulate matter is produced from many diverse sources with no single or primary sources.

EXHIBIT VII-6

AIR QUALITY DATA FOR 1978 to 1983

Station	OX		CO		NO2		SO2		TSP***	
	MAX*	#DAYS**	MAX	#DAYS	MAX	#DAYS	MAX	#DAYS	MAX	#DAYS
1978 Concord	20	11	7.5	0	16	0	.011	0	45	8.5
1979 Concord	12	0	10.0	1	15	0	.008	0	45	2
1980 Concord	14	3	6.9	0	15	0	.019	0	49	8
1981 Concord	13	2	5.1	0	12	0	.017	0	44	1
1982 Concord	13	1	6.4	0	10	0	.010	0	41	2
1983 Concord	15	4	5.6	0	10	0	.012	0	38	0

Source: Bay Area Air Pollution Control District.

* Maximum hourly average level attained during year for O3 and NO2 in parts per hundred million, maximum 8-hour average for CO in parts per million, maximum 24-hour average for SO2 in parts per million, annual geometric mean for TSP in micrograms per cubic meter.

** Number of days State standards were exceeded

*** Refers to percent of observed days State standards were exceeded

Projections for the immediate future do not indicate a substantial increase in SO_2; therefore, Federal standards will not be exceeded. TSP levels are projected to increase steadily between 1975 and 2000. Regional CO levels are projected to decline steadily despite the increase in vehicle miles traveled but this decline is not expected to be sufficient to meet CO standards. Nitrogen oxides are estimated to remain relatively constant from 1975 to 2000 while hydrocarbon emissions are expected to decline moderately by 1985 and rise back to the 1975 level by the year 2000. These projections suggest that oxidant levels will be moderately reduced by 1985 but this improvement will not be maintained through the year 2000.

The Bay Area Air Quality Plan (1979) provides direct controls for mobile and stationary pollutant sources. More indirect controls for land use management were not included in the adopted Plan. However, the objective of the land use management program is to reduce the number and length of the automobile trips and to increase transit use in order to decrease the amount of regional automobile travel. This could be accomplished by achieving more compact development in the region by year 2000.

As jobs are being generated in the Concord, Walnut Creek and Danville areas, an inadequate balance of residences is creating pressure on communities such as Clayton. Clayton is closer than East County but further than a brisk non-polluting walk to work. Car pool, park and ride and transit are measures that need greater attention in Clayton provided there is support on a regional basis. Currently Contra Costa Transit has a route through Clayton. An express commuter bus to BART is also being tried on a trail basis.

Another form of air pollution is dust generated by development. During construction of new development, grading activities turn dust and increase suspended particulate matter in the project region. Based on field tests conducted at construction sites, an average dust emission rate of 1.2 tons per acre occurs for every month of active construction (US Environmental Protection Agency, 1975). Assuming 60 percent of the generated dust is of particle sizes greater than 30 micrometers, approximately 40% of the dust generated would settle out in the first few hundred feet while the remaining 60% could remain suspended indefinitely. Increased dust levels would be most noticeable to existing residents located near areas where cutting and filling will occur.

Diesel-powered construction equipment emits nitrogen oxides, carbon monoxide, sulfur oxides, hydrocarbons and particulates; however these emissions only increase local concentrations slightly and do not measurably increase the frequency of violation of air quality standards.

Long-term air quality impacts due to the area build out will result primarily from increased vehicle emissions. Daily emissions of carbon monoxides, hydrocarbons and nitrogen oxides from city buildout generated traffic are shown in Exhibit VII-7. Although increases in these pollutants due to the project would not be considered significant when compared to emissions for the entire San Francisco Bay region, they could be substantial enough to affect local air quality under adverse meteorological conditions. Such situations could arise when winds carry pollutants from upwind sources into the Concord-Clayton Valley area and temperature inversions (calm conditions) trap these pollutants in this area. With pollutant levels already high, local emissions due to existing development and new development will aggravate the poor air quality conditions.

EXHIBIT VII-7

ESTIMATED DAILY EMISSIONS GENERATED BY NEW DEVELOPMENT *6

Pollutant Type	VMT *1 (Mi./day)	1985 *2 Emissions (grams/mile)	1995 Emissions (grams/mile)	1985 *3 Present Conditions Emissions (tons/day)	1990 Daily Project Emissions (tons/day)	1995 Daily Project Emissions	Projected 2000 Veh. Emissions for SF Bay Region (tons/day) *4
Carbon monoxide	$9.55x10^{4}$	16.62	11.16	-	1.09	1.08	1,497.0
Nitrogen oxides	$9.55x10^{4}$	2.20	1.42	-	0.24	0.15	77.1
Sulfur oxides	$9.55x10^{4}$	0.21	0.21	-	0.03	0.03	13.2
Particulates	$9.55x10^{4}$	2.33	2.30 *5	-	0.24	0.24	22.3
Total Hydrocarbons	$9.55x10^{4}$	1.33	1.00	-	0.15	0.12	160.6

*1 Assumes 22,200 trips/day from the project at 4.3 miles/trip = daily project vehicle miles travelled. Full buildout mileage used for both 1990 and 1995 columns.

*2 Emission factors are from the EMFAC 6c emissions program as provided by the Bay Area Air Quality Management District (1981). Average speed is assumed to be 35 mph.

*3 There is assumed to be no project development (implementation of the General Plan) in 1985.

*4 Light-duty automobile emissions projected for the San Francisco Bay Region. This area would consist of the nine-county Bay Area Air Quality Management District.

*5 Includes particulates emitted by auto exhaust, tire wear and dust entrainment from paved roadways.

*6 The Emfac 6 model does not include the benefits of smog certificate inspections which are projected to reduce emission levels between 16% and 25% for hydrocarbons and carbon monoxide for vehicles and light duty trucks.

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Carbon monoxide is a localized pollutant and it is a useful indicator of the direct impact of development on air quality along local roadways and in the immediate project vicinity. Road-side and area-wide carbon monoxide concentrations were calculated at Kirker Pass using existing and projected traffic volumes as well as modeling techniques specified by BAAQMD. Results of these calculations are shown in Exhibit VII-8. With build out Clayton would increase area-wide carbon monoxide one –and-eight hour concentrations by 12 percent. Carbon monoxide concentrations along Concord Boulevard (west of Kirker Pass Road) would increase by 127 percent at buildout of the area. New development would increase CO levels along Clayton Road by 57 percent at buildout of the area. Increases along Concord Boulevard would be considered significant due to the amount of increase resulting from the project and the proximity of sensitive receptors (e.g., residential units) along most of Concord Boulevard. However, carbon monoxide generated by existing traffic and traffic resulting from buildout would not exceed standards and therefore would not present significant health hazards. Although CO concentrations in Exhibit VII-8 do not threaten Federal standards, these concentrations do not include CO generated upwind or in close proximity to the study area not do these concentrations reflect variable meteorological conditions. Therefore, CO concentrations in the Clayton regions would actually be higher when emissions from upwind sources are carried to the Concord-Clayton area.

Cumulative residential occupancy would add to air pollution. Combustion of natural gas for heating and cooking would generate small amounts of pollutants (primarily nitrogen oxides). Use of fireplaces in project residences would also increase particulate levels. In addition increased demand for sewage treatment would indirectly increase atmospheric discharges from treatment plant operations.

With the control efforts of air quality agencies, it does not appear likely that levels of pollution witnessed in Southern California will occur in this area. However, vehicle exhaust is likely to be the highest polluter in this portion of Contra Costa County and solutions to limit vehicle miles of internal combustion engines are needed.

Air quality degradation affect weaker members of society including the elderly, children and persons with respiratory ailments. As a safety issue it may not be perceived as an immediate threat, but it remains a danger exemplified by air quality alerts experienced in other regions.

EXHIBIT VII-8

ESTIMATED AREAWIDE AND ROADSIDE CARBON MONOXIDE (CO) CONCENTRATIONS

AREAWIDE CO CONCENTRATIONS *

Averaging Time	Concentration (ppm)			
	Existing	With Project	At Buildout	Federal Standard
1-hour	3.2	4.9	5.2	35
8-hour	1.8	2.8	2.9	9

ROADSIDE CO CONCENTRATIONS (ONE-HOUR AVERAGING TIME)

Roadway	Concentration (ppm)		
	Existing	With Project	At Buildout
Concord Boulevard			
W. of Kirker Pass Rd.	2.2	4.8	5.0
E. of Kirker Pass Rd.	4.8	7.1	7.5
Clayton Road			
W. of Kirker Pass Rd.	5.1	7.0	7.5
E. of Kirker Pass Rd.	4.8	7.1	7.5

* Areawide concentrations were estimated based on a one-square-kilometer area centered on the Clayton/Ygnacio Valley/Kirker Pass Roads intersection. This intersection was chosen since this intersection and its vicinity would receive the highest concentration of project traffic.

Source: Contra Costa County
Keller Ranch EIR 1980

FIRE

Because the natural vegetation in the trail system and adjacent parklands is extremely flammable during the summer and fall, wildfire is a serious hazard in the City of Clayton. Slopes, high winds, and difficulty in access increase the hazards. Traffic congestion in the case of fire can hinder fire fighting. Isolated homes set in wooded canyons or on ridge tops with only one narrow, winding, or steep road are subject to a high fire hazard. Fire services are provided by the Contra Costa Fire District. A station is located on Mitchell Canyon and Clayton Road.

It is important that the City ensure that there exists: 1) adequate peak load water supply for fire fighting, 2) all-weather road construction adequate for fire fighting equipment, and 3) that construction be built to proper code standards.

It is important to establish a program to reduce the amount of dry brush with the Greenbelt System.

CRIME

Crime is low for all categories in the City of Clayton. The Police Department is supporting new programs such as "Neighborhood Watch" to encourage citizens to help keep crime low. Developments need to be reviewed to ensure crime prevention measures are incorporated into the design.

CIRCULATION

Circulation to Town Center needs to be improved to reduce the possibility of the town being cut off by blockage of Clayton Road. Alternative emergency routes need to be identified and plans for road improvements supported on the basis of safety.

OTHER HAZARDS

There are no special or unusual hazards in Clayton. There is the possibility of disruption of service lines. This includes PG & E transmission lines, gas lines and the Getty pipeline. The lines are identified in Exhibit IX-4. At present it is not known whether hazardous materials or waste pass through the community. Such information should be pursued and appropriate action taken.

EMERGENCY PREPAREDNESS

Public protection services for fire, police and medical emergencies are essential to the community in day-to-day emergencies. These services are provided by a variety of agencies so that a high degree of communication and coordination of activities is required to prepare for potential disaster conditions. Because of the community development pattern and the nature of traffic circulation through the community, evacuation and the free movement of emergency vehicles could be severely impeded in event of a disaster by traffic congestion in key areas. Options need to be developed based on different disaster scenarios.

Citizens' action programs such as Neighborhood Alert and Operation Identification have been shown to be effective in reducing theft and crimes of violence. Medical emergency services are provided by the fire District, ambulances and two hospitals.

Primary exit routes out of Clayton to the north are Pine Hollow Road, Clayton Road, and Concord Boulevard. To the south, the primary route is Marsh Creek Road. As financing opportunities occur, Clayton must evaluate the safety benefits related to cross connections between the evacuation routes. Such evaluation and update shall be coordinated with the Mt. Diablo School District.

(Revised 5/6/87)