Oxnard Planning Commission
225 West Third Street
Oxnard, California 93030

January 7, 1976

NOTICE OF PUBLIC HEARING:

Notice is hereby given that the Oxnard Planning Commission will consider Environmental Impact Report No. E-75-14 on the land development listed and described below on January 22, 1976.

An Amendment to the Revised 1969 General Plan in accordance with and as required by Section 65302 (f) and 65302.1 of the Government Code to include a "Seismic and Safety Element". Filed on Planning Commission Resolution of Intention No. 4644.

Subject to the State of California Environmental Quality Act of 1970, any person or group may provide input for consideration and inclusion for any required Environmental Impact Report.

The draft report will be available for examination at the Oxnard Planning Department. Worsheets for providing input are available at the same location.

Gene L. Hosford
Secretary
Planning Commission

LDW:jh

Publish one time only - Monday, January 12, 1976.
Send affidavit of publication to the Planning Department.
Charge Account No. 4003-33, City of Oxnard.

5

Oxnard Planning Commission
225 West Third Street
Oxnard, California 93030

August 29, 1975

NOTICE OF PUBLIC HEARING:

Notice is hereby given that the Oxnard Planning Commission will consider Environmental Impact Report No. E-75-14 on the land development listed and described below on September 11, 1975.

An Amendment to the Revised 1969 General Plan in accordance with and as required by Section 65302 (f) and 65302.1 of the Government Code to include a "Seismic and Safety Element". Filed on Planning Commission Resolution of Intention No. 4644.

Subject to the State of California Environmental Quality Act of 1970, any person or group may provide input for consideration and inclusion for any required Environmental Impact Report.

The draft report will be available for examination at the Oxnard Planning Department. Worksheets for providing input are available at the same location.

Gene L. Hosford
Secretary
Planning Commission

LDW:jh

Publish one time only - Monday, September 1, 1975.
Send affidavit of publication to the Planning Department.
Charge Account No. 4003-33, City of Oxnard.

AMENDED DRAFT

ENVIRONMENTAL IMPACT REPORT

E-75-11

SEISMIC SAFETY AND SAFETY ELEMENT

of the

General Plan

of the

City of Oxnard

Prepared by

City of Oxnard

January 8, 1976

TABLE OF CONTENTS

INTRODUCTION

This Environmental Impact Report (EIR) on the Seismic and Safety Element of the General Plan of the City of Oxnard derives its statutory authority from three sources of state legislation.

Firstly, the State of California, in its comprehensive planning requirements notes that cities and counties must adopt:[1]

> A safety element for the protection of the community from fires and geologic hazards including features necessary for such protection as evacuation routes, peakload water supply requirements, minimum road widths, clearances around structures, and geologic hazards mapping in areas of known geologic hazard.

Secondly, a complementary Seismic Element required the same public agencies to provide:[2]

> A Seismic Safety element consisting of an identification and appraisal of seismic hazards such as susceptibility to surface ruptures from faulting, to ground shaking, to ground failure or to the effects of seismically induced waves such as Tsunami and seiches. The Seismic safety element shall also include an appraisal of mud slides, land slides, and slope stability as necessary geologic hazards that must be considered simultaneously with other hazards such as possible surface ruptures from faulting, ground shaking, ground failure and seismically induced waves.

Thirdly, Guidelines issued for the implementation of the California Environmental Quality Act (CEQA) of 1970, required that local government produce an EIR where the following conditions existed:[3]

> An activity directly undertaken by any public agency including but not limited to public works construction and related activities, clearing or grading of land, improvements to existing structures, enactment and amendment of zoning ordinances, and the adoption and amendment of local general plans or elements thereof....

The requirement for an EIR dealing with general plan elements (underscored above) was clarified in a succeeding section of the Guidelines which stipulated that an EIR was necessary if the General Plan did not address mandatory issues raised by Article 9 of the Guidelines, or, if the general plan did not contain a special cover sheet identifying portions of the General Plan which dealt with the same mandatory issues.[4]

The present EIR on the Seismic and Safety Element of the General Plan is designed to satisfy these three legislative requirements. As a precautionary note, it should be noted that this EIR lacks the usual specificity demanded of construction projects because of the inherent generalized nature of comprehensive plan elements. Instead, specificity is confined to an identification of city-wide or planning area seismic and safety hazards, their location, recommended policy actions, and an evaluation of related impacts (CEQA-Section 15147C).

An Organizational Note

Since this EIR is premised on a Seismic and Safety Element prepared for the City of Oxnard by the County of Ventura, attention is focused on a series of crucial maps which identify hazards within the City of Oxnard and its planning area. This graphic approach is followed by a citation of recommended actions (the project as defined by CEQA) and an identification of impacts. Other sections of the EIR, such as mitigating measures, and alternatives, are treated in a general manner because of the unspecific nature of the project.

FOOTNOTES

[1]California, Government Code, Section 65302.1.

[2]Ibid, Section 65302 (F).

[3]California, Resources Code, Section]5037.

[4]Ibid, Section]5307, also see: California Council on Intergovernmental Relations, Guidelines for Local General Plans, State of California (September 20,]973), II-9-II

I. PROJECT DESCRIPTION

The proposed project consists of sets of recommended actions based on the findings of the Seismic Safety and Safety Element of the General Plan formulated for the City of Oxnard, California.[1] Relevant seismic and safety elements have been combined into a single document which is currently addressed. Consequently, identification of seismic and safety hazards existing within the City of Oxnard and actions aimed at reducing potential damage to life and property comprise the purpose of the project.

Assuming the form of a general plan element, the project (recommended) actions deal with the following topics: fault displacement, earthquakes and groundshaking, flooding, landslide/mudslide, beach erosion, liquefaction, tsunami, seiches, subsidence, expansive soils, fire hazards, and structural deficiencies. Illustrations and maps bearing on these hazards are crucial to understanding the project and, in themselves, are summaries of city-wide hazards.

It should be further noted that the proposed project is regional in scope since potential hazards are not confined in their origins to the corporate limits. As a result, the project addresses hazards from the standpoint of inter-jurisdictional, inter-agency, and institutional cooperation in areas dealing with hazard research, evaluation, and prevention of damage.

FOOTNOTES

[1]Ventura County Environmental Resources Agency, Planning Division. Seismic Safety and Safety Element of the General Plan prepared for comparisons of plan element format and content see: City of Los Angeles, Department of City Planning. Proposed Seismic Safety Plan (May 20, 1975) and Proposed Safety Plan, (April 10, 1975) Dean Armstrong, The Seismic Safety Study for the General Plan. Tri-Cities Seismic Safety and Environmental Resources Study El Cerrito, Richmond, and San Pablo, California (1 September 1973).

II. ENVIRONMENTAL SETTING

Introductory Note[1]

The environmental setting as discussed below does not contain a detailed discussion of each element of the environmental setting. Instead, it is intended that a series of maps and tables provide a concise summary of significant elements. The only exception to this approach is encountered in a discussion of the socio-economic element of the environment. This latter element is singled out for analysis because of the close integration of population distribution and housing with respective seismic and safety hazards.

A. Location

The City of Oxnard is located close to the Pacific Coastline of Southern California (119 degrees, 11' west longtitude and 34 degrees, 11' north latitude). From the regional location Map 1 it can be seen that the project site occupies a portion of an extensive alluvial plain.

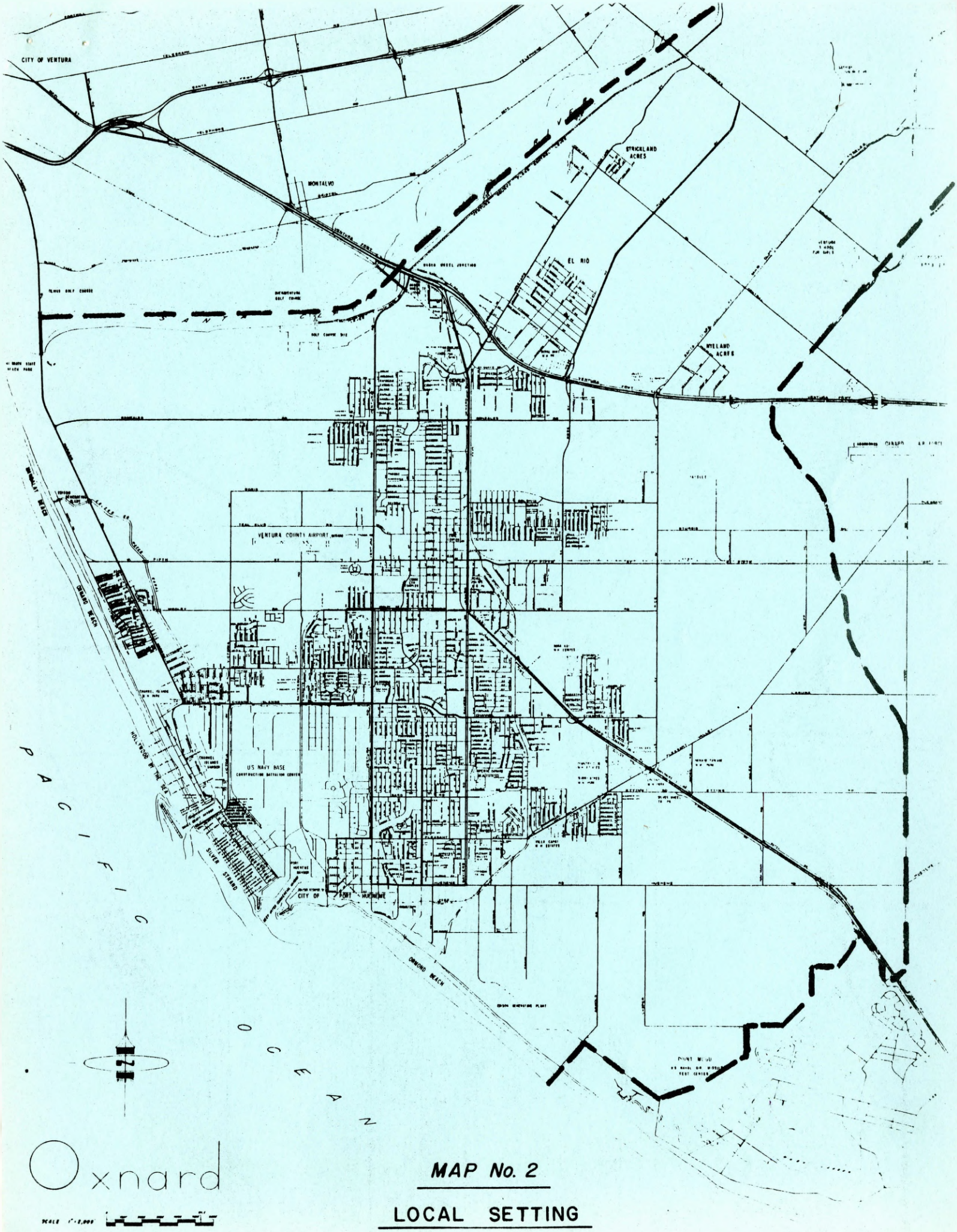
The project site may be viewed as being coterminious, with the corporate limits of Oxnard or its planning area. Respective areas (see maps 1 and 2) occupied by the City and planning area amount to 22.9 and 75 square miles approximately.

B. Landforms

The major landform of the site is a gently sloping alluvial plain

MAP No. 1

REGIONAL SETTING



Oxnard

MAP No. 2

LOCAL SETTING

which ranges in elevation from sea level to just over 100 feet. Complementary drainage features consist of the Santa Clara River, Calleguas Creek, which marks the southern margin of the plain, and a few sloughs which extend from north to south across the eastern portion of the plain.

C. Soils

Soils of the region are primarily sands, silts, and clays. As for the distribution of these soils and topographic characteristics, these are summarized in Maps 3 and 4.

D. Climate

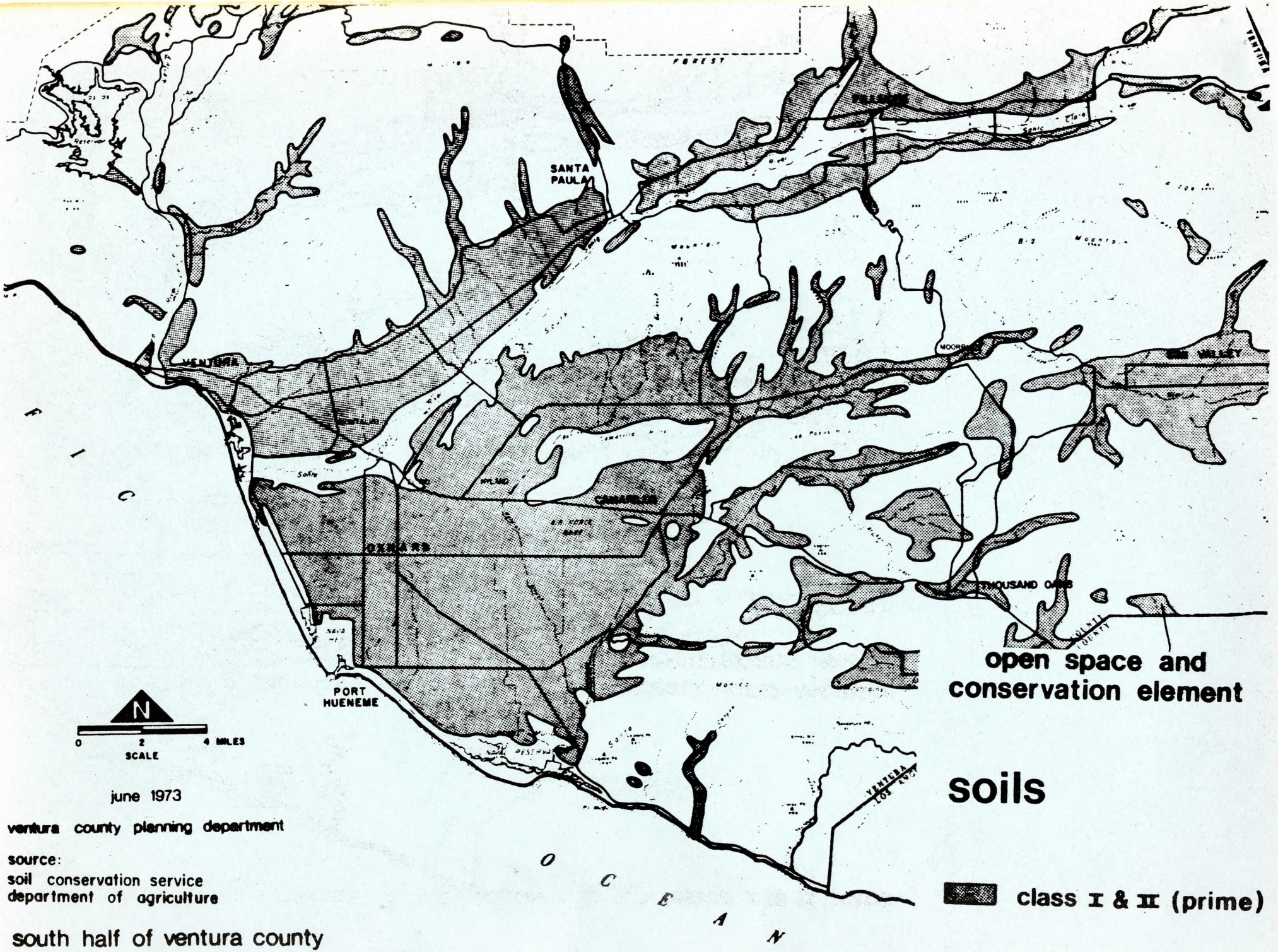
Climate of the region is quite mild and has the following characteristics which are summarized in a series of maps (5 and 6) dealing with precipitation, length of growing season, and climatological data which has been plotted in tabular and graphic form (Table 1 and Figure 1).

E. Vegetation

Vegetation on the Oxnard Plain, excepting species encountered in riverine or marsh ecosystems, is largely man-introduced or modified. The landscape of the project area is a cultivated or artificial one which makes use of few indigenous species.

F. Fauna

Faunal species tend to be highly restricted to the Santa Clara



open space and conservation element

soils

class I & II (prime)

june 1973

ventura county planning department

source:
soil conservation service
department of agriculture

south half of ventura county

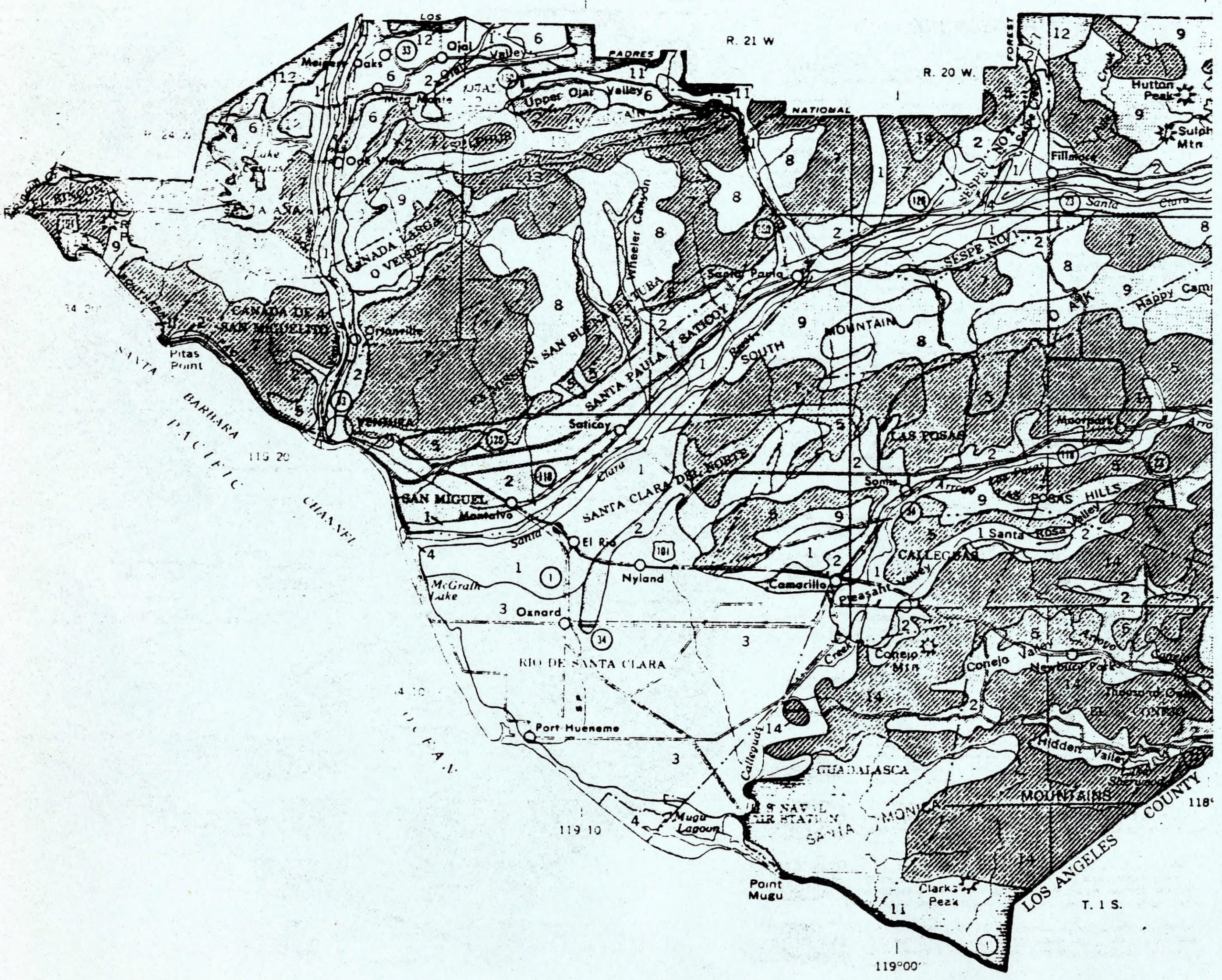
MAP No. 3

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

UNIVERSITY OF CALIFORNIA
AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP

VENTURA AREA, CALIFORNIA



MAP No. 4

SOIL ASSOCIATIONS

LEVEL TO MODERATELY SLOPING EXCESSIVELY DRAINED TO POORLY DRAINED SOILS OF THE ALLUVIAL FANS, PLAINS, AND BASINS

1	Pico-Metz-Anacapa association. Level to moderately sloping, very deep, well-drained sandy loams and very deep, somewhat excessively drained loamy sands
2	Mocho-Sorrento-Garretson association. Level to moderately sloping, very deep, well-drained loams to silty clay loams.
3	Camarillo-Hueneme-Pacheco association. Level and nearly level, very deep, poorly drained loamy sands to silty clay loams
4	Riverwash-Sandy alluvial land-Coastal beaches association. Level to gently sloping, excessively drained to poorly drained, stratified sandy, gravelly, and cobbly material.

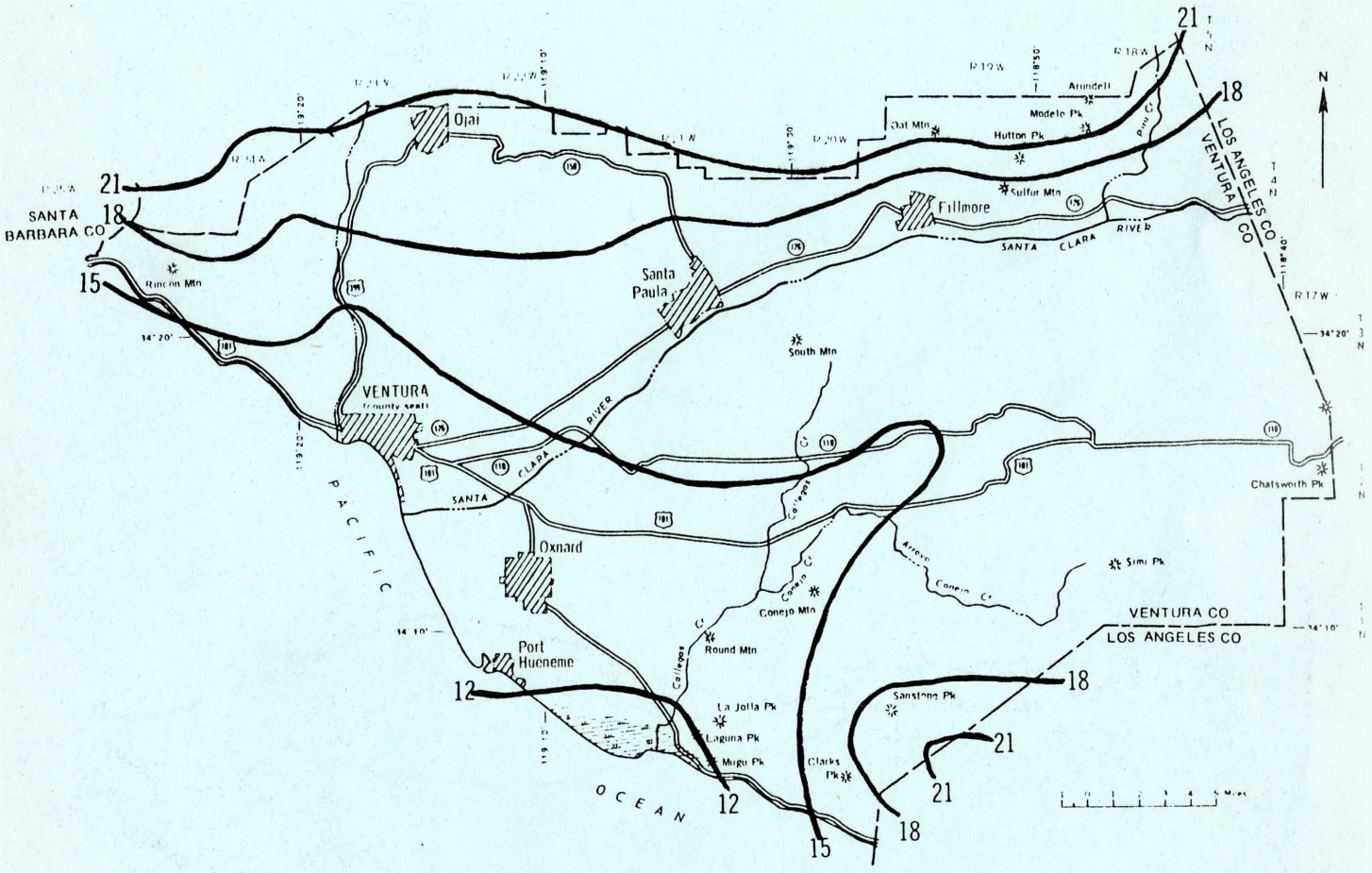
LEVEL TO MODERATELY STEEP WELL DRAINED AND MODERATELY WELL DRAINED SOILS OF THE TERRACES

5	Rincon-Huerhuero-Azule association. Level to moderately steep, very deep, well drained and moderately well drained, very fine sandy loams to silty clay loams that have a slowly and very slowly permeable sandy clay subsoil.
6	Ojai-Sorrento, heavy variant association. Level to moderately steep, very deep, well-drained very fine sandy loams and clay loams that have a slowly and moderately slowly permeable sandy clay loam and heavy clay loam subsoil.

MODERATELY SLOPING TO VERY STEEP WELL-DRAINED AND EXCESSIVELY DRAINED SOILS OF THE UPLANDS.

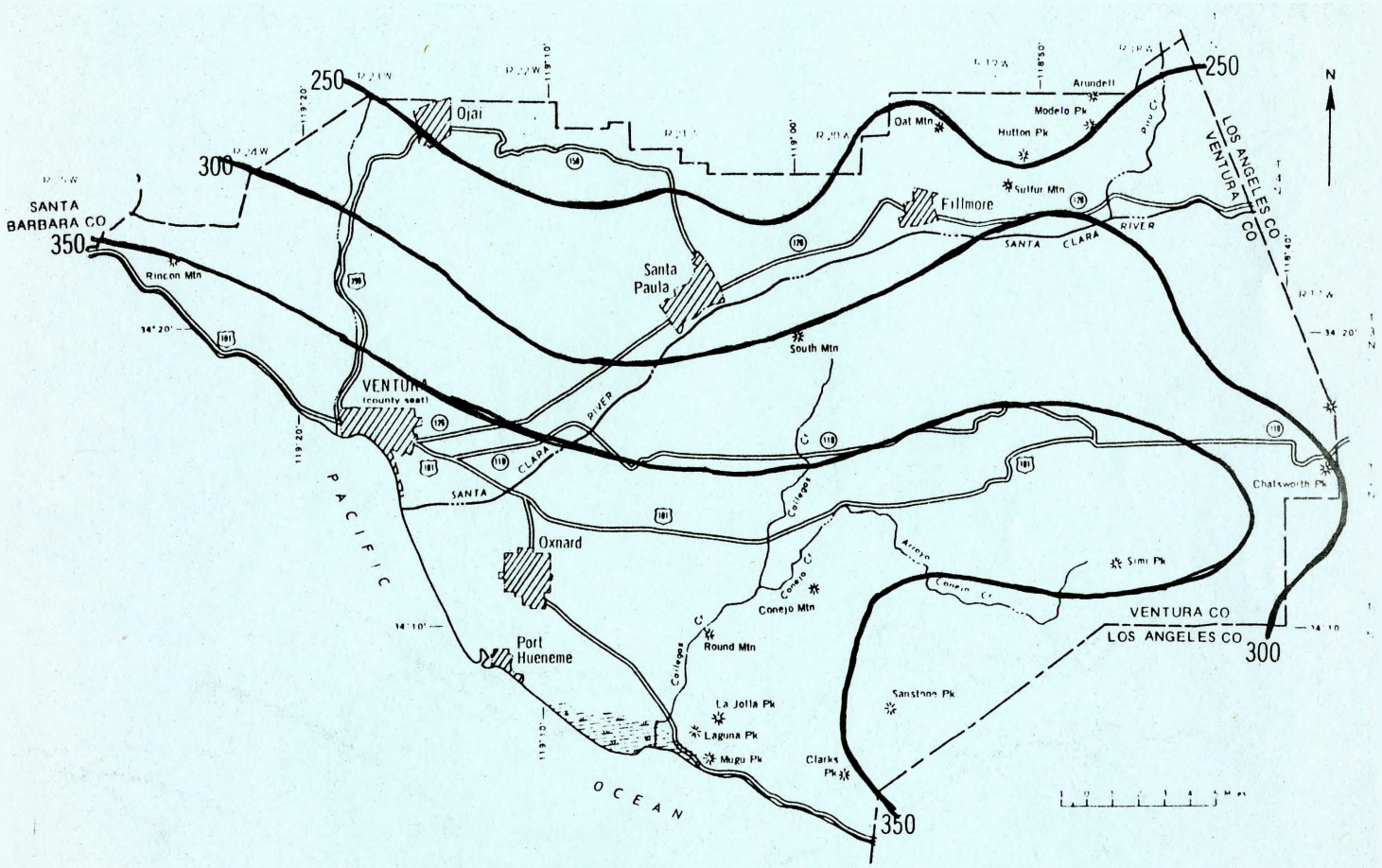
7	San Benito-Nacimiento-Linne association. Strongly sloping to very steep, well-drained clay loams and silty clay loams that are moderately deep to deep over shale or sandstone.
8	Castaic-Balcom-Saugus association. Moderately sloping to very steep, well-drained sandy loams to silty clay loams that are moderately deep to deep over sandstone and shale.
9	Calleguas-Arnold association. Strongly sloping to steep, well-drained shaly loams that are shallow over shale or sandstone, and somewhat excessively drained sands that are very deep over sandstone
10	Gazos-Santa Lucia association. Moderately steep to very steep, well-drained silty clay loams and shaly silty clay loams that are moderately deep to deep over fractured shale.
11	Millsholm-Malibu-Los Osos association. Strongly sloping to very steep, well-drained loams and clay loams that have a clay loam and clay subsoil and are shallow to deep over sandstone and shale
12	Sespe-Lodo association. Moderately steep, to very steep, well-drained clay loams that are moderately deep to deep over sandstone or shale, and somewhat excessively drained loams that are shallow over shale.
13	Sedimentary rock land-Gaviota association. Moderately steep to very steep, excessively drained rock land and well-drained sandy loams that are shallow over sandstone
14	Hambright-Igneous rock land-Gilroy association. Rock land and strongly sloping to very steep, well-drained clay loams that are shallow to moderately deep over basic igneous rock.

November 1969



MAP No. 5

AVERAGE ANNUAL PRECIPITATION



MAP No. 6

AVERAGE LENGTH OF GROWING SEASON

CLIMATOLOGICAL DATA FOR THE OXNARD REGION

Month	Temperature, °F					Precipitation, Inches	
	Mean			Extremes			
	Monthly	Daily Maximum	Daily Minimum	High	Low	Mean	Greatest Daily
January	53.3	64.5	42.1	86	32	3.33	5.96
February	53.9	65.1	42.7	91	31	2.99	3.79
March	55.2	66.5	43.9	88	34	2.27	3.30
April	57.2	67.7	46.7	90	36	1.13	1.80
May	54.4	69.2	49.6	96	42	.14	.62
June	61.5	71.0	51.9	102	42	.05	.56
July	64.8	73.8	55.8	94	48	.00	.05
August	65.2	74.0	56.4	97	49	.03	.43
September	64.5	74.5	54.5	98	45	.08	1.67
October	62.2	73.7	50.6	103	38	.40	1.46
November	58.6	69.8	47.4	97	38	1.14	4.30
December	55.2	66.8	43.7	96	34	3.20	3.59
Annual	59.3	69.7	48.8	103	31	14.75	5.96

Source: Climatic Summary of the United States, California Publication No. 86-4, U. S. Department of Commerce

TABLE No. 1

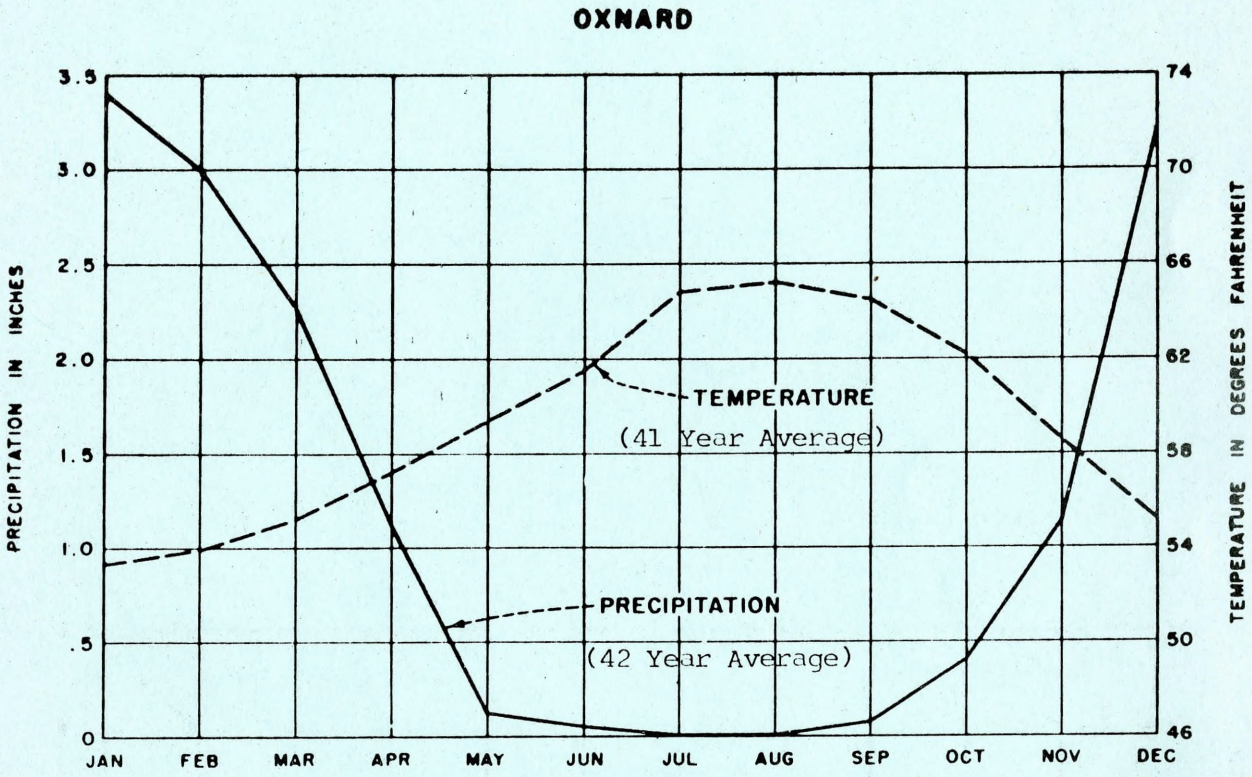


FIGURE No. 1

TEMPERATURE AND PRECIPITATION IN OXNARD

River, its floodplain, sloughs (which function as biological corridors) or coastal marshes.

G. Land use

Although land uses are depicted in Maps 7 and 8 taken from the present General Plan, a breakdown of specific uses permits a better understanding of the relationship between land use and exposure to seismic or safety hazards.

As of June, 1975, approximately 22.9 percent of the combined City and planning area was annexed, while the balance remained vacant or in agricultural and related use. Table 2 below conveys the nature of currently developed land uses in the annexed project area.

TABLE 2

Land Use in the Oxnard Planning Area

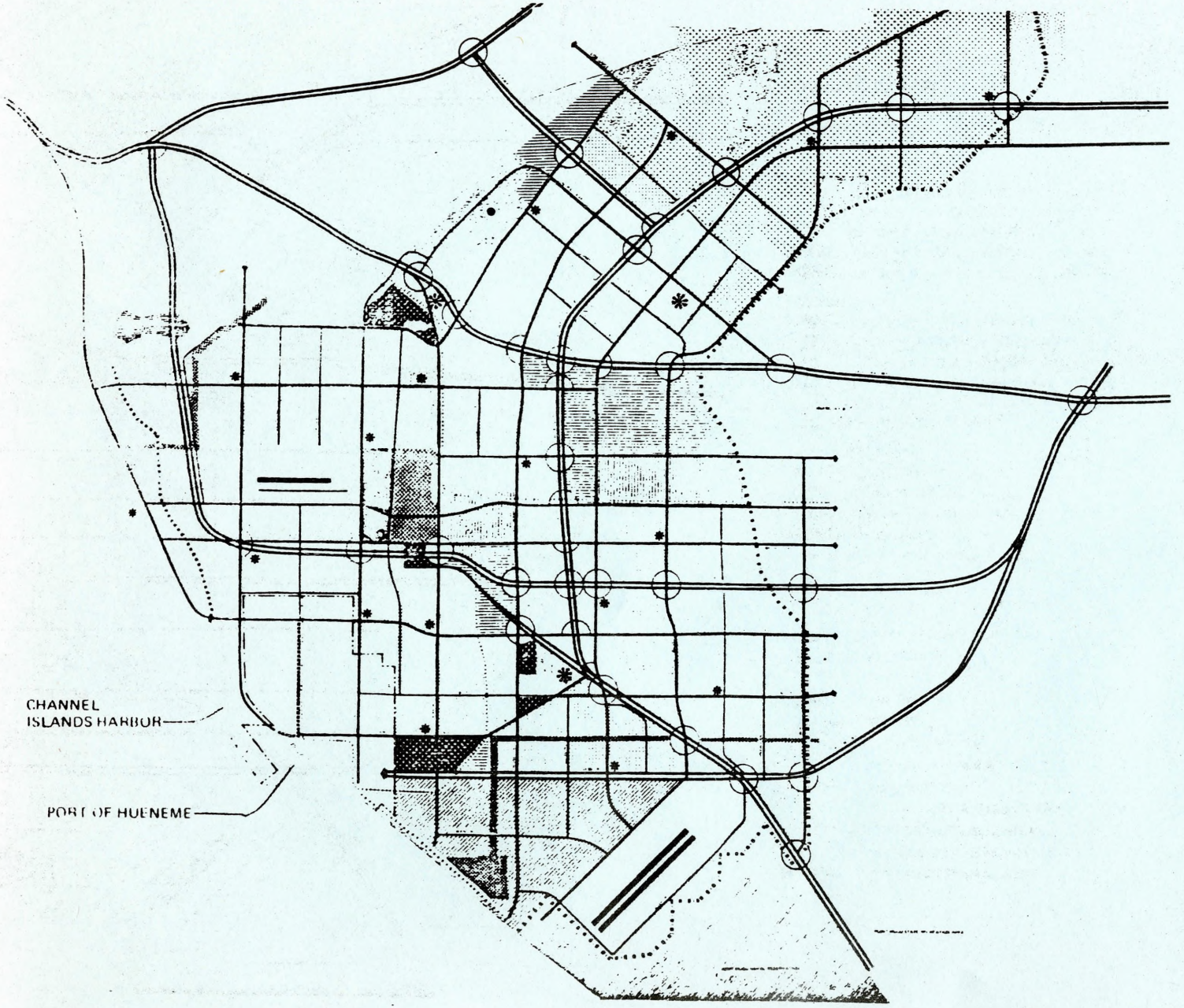
Land Use	Percent of Total	Percent Developed
Single-family	24.5	79.4
Multi-family	13.6	70.0
Commercial	7.0	77.7
Industrial	26.1	42.7
Recreational	.1	36.5
Open space	34.2	22.7

The predominance of the single-family house accounts for the lateral extension of the City, and the prevalence of fairly low population densities in most neighborhoods of the City.

H. Noise

The current level of noise exposure within the City is depicted in Table 3 and Map 9. The single-most important aspect of this

PRESENT GENERAL PLAN



LAND USE PLAN

RESIDENTIAL
- LOWER LOW DENSITY 2.5 D.U./AC.
- UPPER LOW DENSITY 7 D.U./AC.
- LOWER MED. DENSITY 13 D.U./AC.
- UPPER MED. DENSITY 20 D.U./AC.
- HIGH DENSITY 42 D.U./AC.

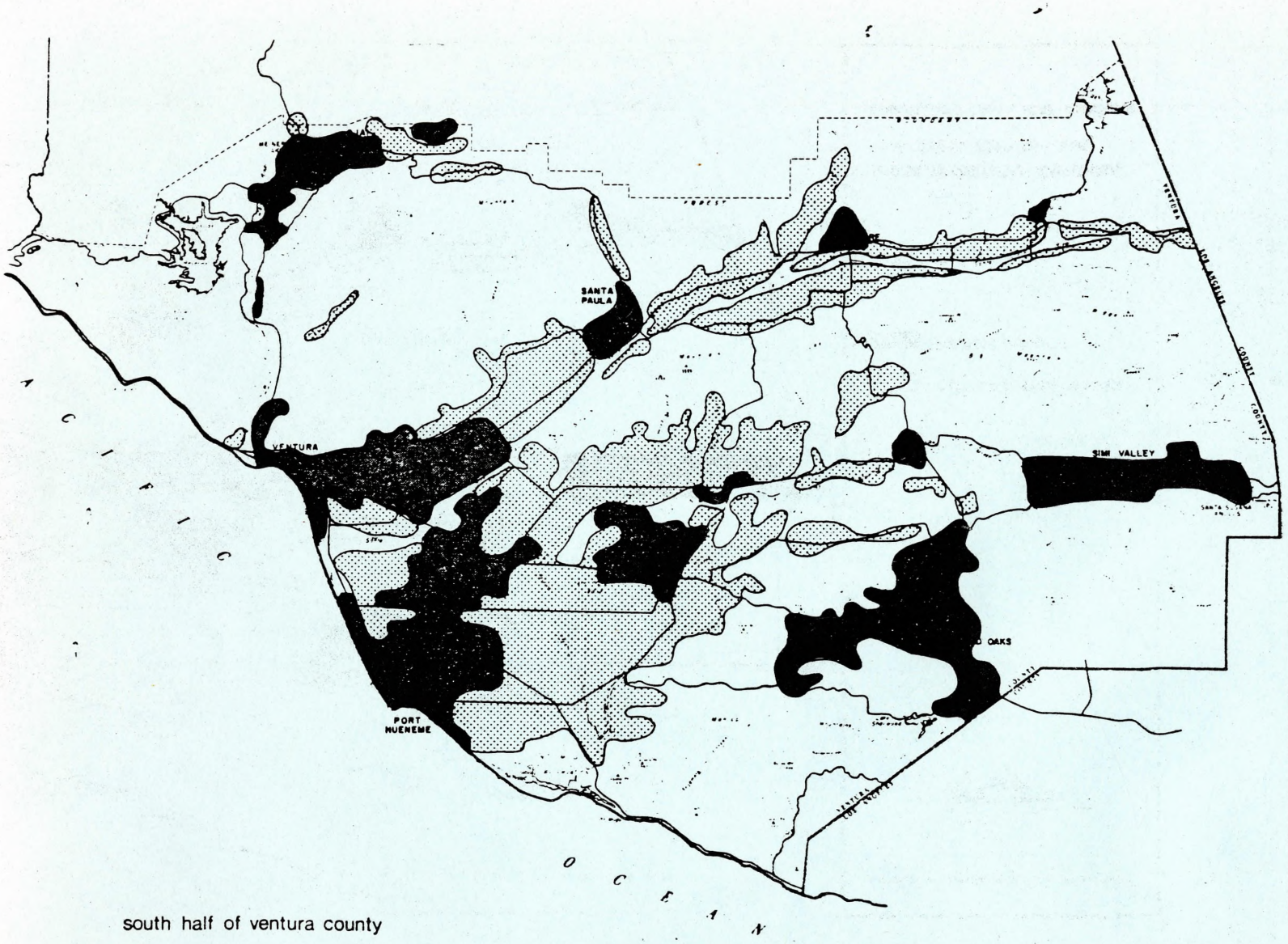
COMMERCIAL
- CENTRAL BUSINESS DISTRICT
- REGIONAL SHOPPING CENTER
- COMMUNITY COMMERCIAL
- HIGHWAY COMMERCIAL
- SPECIAL
- AIRPORT RELATED

INDUSTRIAL
- LIMITED INDUSTRIAL
- LIGHT INDUSTRIAL
- HEAVY INDUSTRIAL
- PUBLIC UTILITY
- INTERIM INDUSTRIAL

PUBLIC-SEMI PUBLIC
- PUBLIC
- PARKS & OPEN SPACE
- MILITARY

- FREEWAY
- ARTERIAL
- INTERCHANGE
- SCENIC HIGHWAY
- RAILROAD
- STUDY AREA BOUNDARY
- CITY LIMITS BOUNDARY
- PARTIAL INTERCHANGE
- GRADE SEPARATION

MAP No. 7



south half of ventura county

resources plan and program

open space and conservation element

land use

urban areas

agricultural areas

N

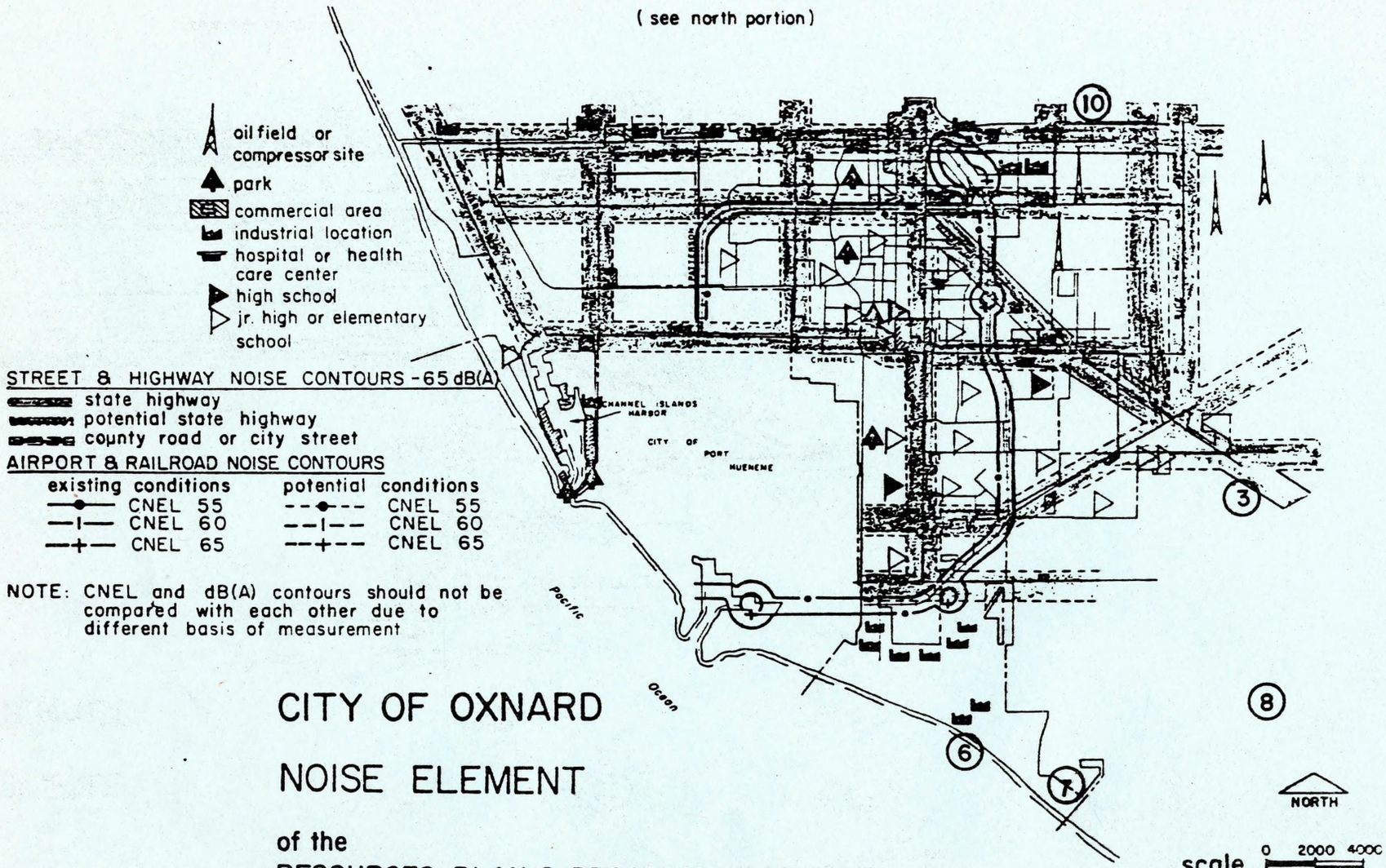
0 2 4 MILES

SCALE

june 1973

ventura county planning department

MAP No. 8



CITY OF OXNARD

NOISE ELEMENT

of the
RESOURCES PLAN & PROGRAM

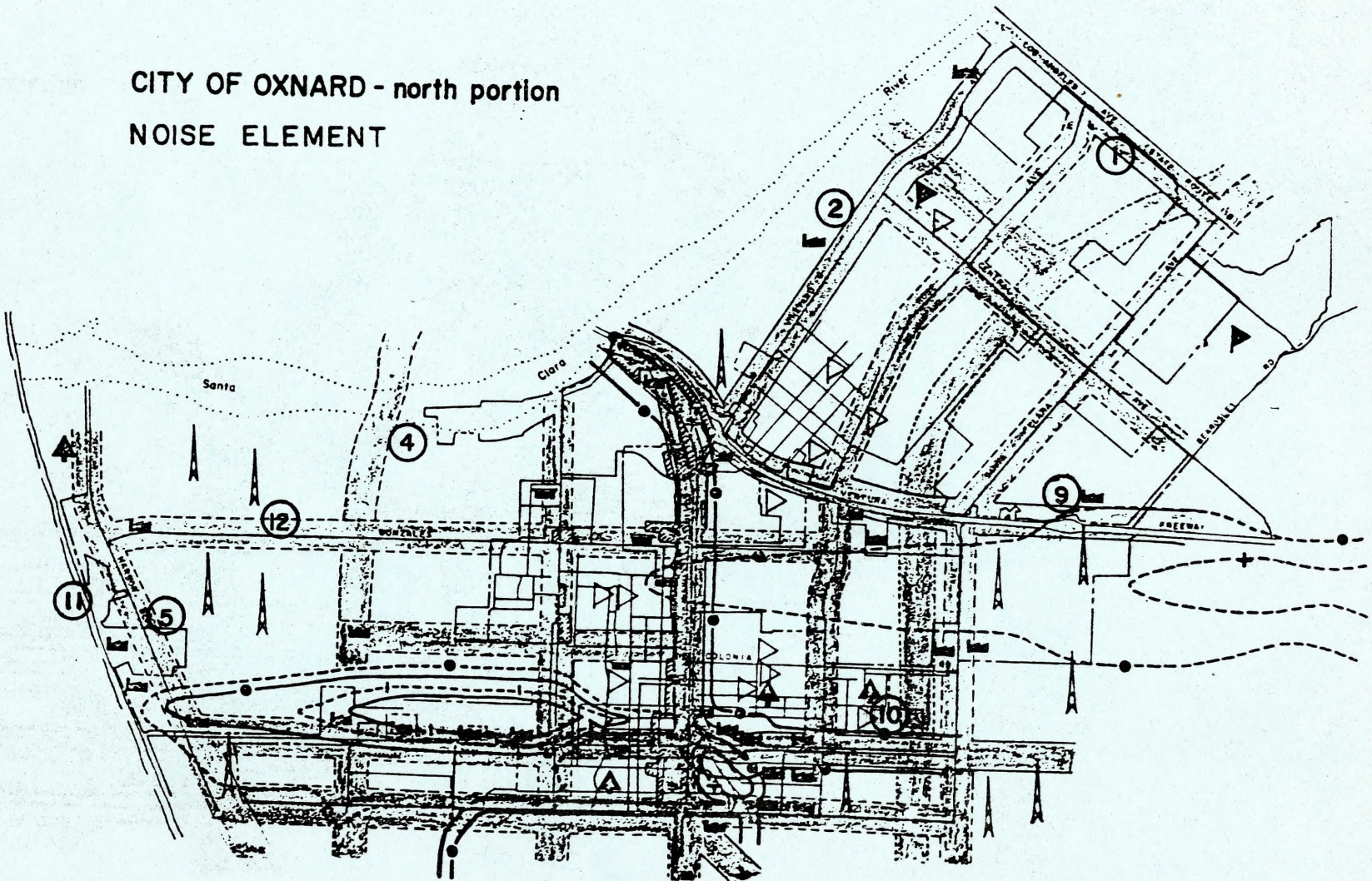
prepared by
ventura county planning department

october, 1974

MAP No. 9

CITY OF OXNARD - north portion

NOISE ELEMENT



(see south portion)

MAP No. 9

element is the close relationship between exposure to noise and seismic and safety hazards. In delineating growth management zones, noise should be considered concurrently with the Seismic and Safety Element.

TABLE 3

History of Noise in Ventura County

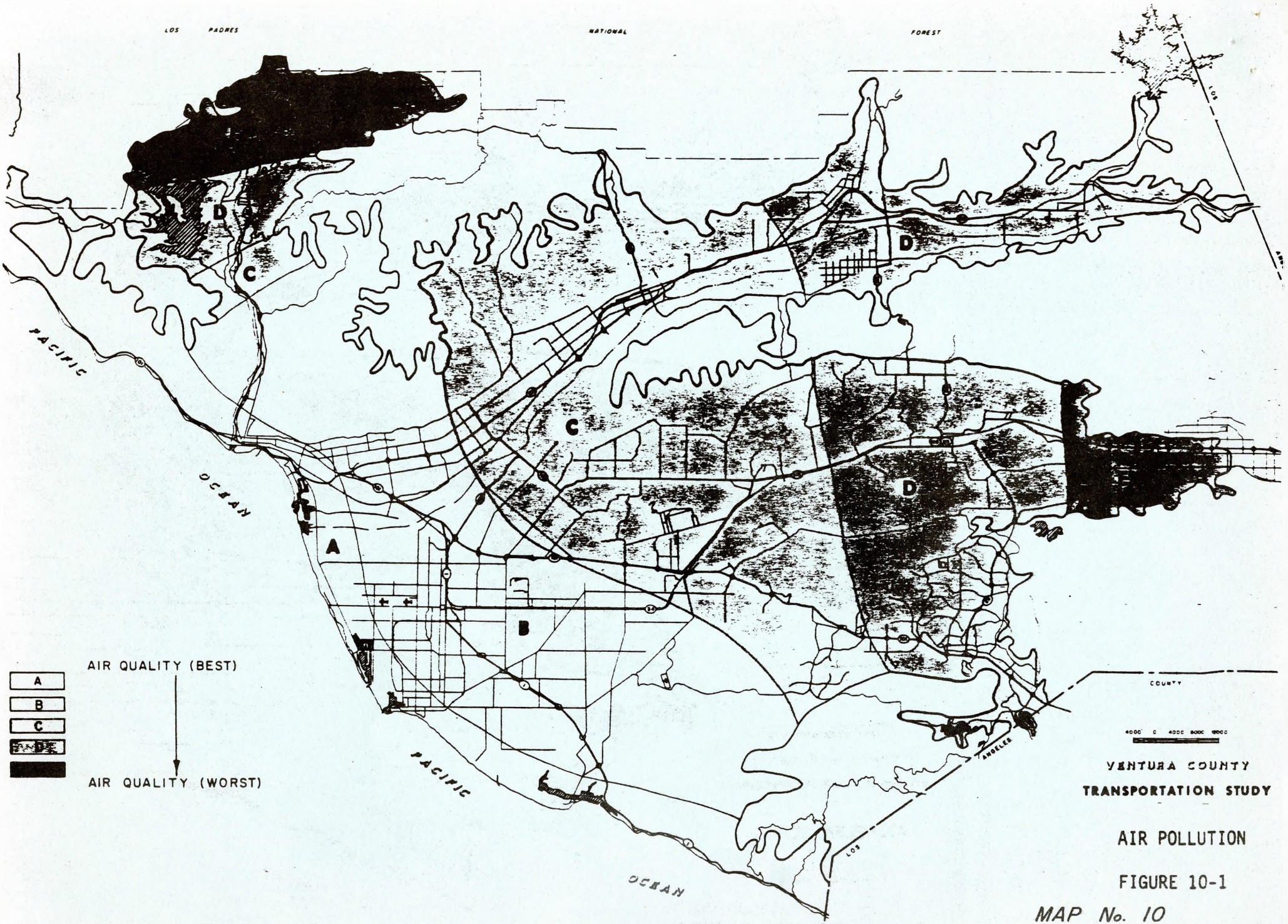
	Sound Pressure Level 1961-1962	Sound Pressure Level 1971	Change
Oxnard	55.5dB	65.0dB	+9.5dB
Ventura	52.5	61.0	+8.5
Camarillo	51.5	58.0	+6.5
Port Hueneme	54.5	58.5	+3.7
Ojai	50.0	53.75	+3.75
Point Mugu	52.5	60.0	+7.5
Camarillo State Hospital	48.5	49.0	+0.5

I. Air Quality

Air quality is summarized in Map 10 and tables 4 through 6. It can be seen from these sources that the project area is not located within zones of the worst air quality. This condition exists because of the interplay of strong land and sea breezes over the Oxnard Plain.

J. Socio-economic Setting

Table 7 provides a summary of essential social and economic characteristics of the City. The demographic and economic composition expressed here conveys the impression that Oxnard is unique among the cities within Ventura County.


LOS PADRES NATIONAL FOREST
PACIFIC OCEAN
PACIFIC OCEAN
A
B
C
D
AIR QUALITY (BEST)
AIR QUALITY (WORST)
A
B
C
D
COUNTY
VENTURA COUNTY
TRANSPORTATION STUDY
AIR POLLUTION
FIGURE 10-1
MAP No. 10

AIR QUALITY FOR JULY

POLLUTANT	Federal Air Quality Std.	Air Monitoring Stations: Camarillo		Ojai		Point Mugu		Port Hueneme		Santa Paula		Simi		1900 Oaks		Ventura	
		* Days	** Max.	- Days	-- Max.	- Days	-- Max.	- Days	-- Max.	- Days	-- Max.	- Days	-- Max.	- Days	-- Max.	- Days	-- Max.
Oxidant (Ozone)	0.08 ppm for 1 hr.	20/31	.19	30/31	.24	5/31	.10	5/31	.12	25/31	.21	29/31	.22	26/31	.18	16/31	.20
Nitrogen Dioxide (NO_2)	0.25 ppm for 1 hr. (Calif. Std.)	0/30	.09	0/31	.04	N	N	N	N	N	N	N	N	N	N	N	N
Carbon Monoxide (CO)	9 ppm-8 hr. avg.	0/31	3	N	N	N	N	N	N	N	N	N	N	N	N	0/31	3
	35 ppm for 1 hr.	0/31	4	N	N	N	N	N	N	N	N	N	N	N	N	0/31	6
Sulfur Dioxide (SO_2)	0.14 ppm 24 hr. avg.	0/31	.00	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Particulate Matter	100 ug/m³ (Calif. Std.) 24 hr. avg.	2/5	124.3	4/5	156.1	1/4	106.1	3/4	164.0	5/5	179.9	2/4	126.4	2/4	108.2	3/5	139.5

\- Days - Number of day standard exceeded/days measured.
-- Max. - Maximum reading in terms of standard.
N - No data available or no instrument for this contaminant at this station.

Ozone Alerts (1st Stage = .20 ppm hourly average)

Station	Date	Maximum Hourly Average (ppm)
Simi Valley	July 4	.20
Simi Valley	July 5	.21
Simi Valley	July 6	.21
Simi Valley	July 12	.20
Ojai Valley	July 13	.22
Simi Valley	July 13	.21
Simi Valley	July 14	.20
Simi Valley	July 16	.21
Simi Valley	July 17	.21
Ventura	July 17	.20
Ojai Valley	July 18	.22
Santa Clara Valley	July 18	.21
Simi Valley	July 18	.22
Simi Valley	July 19	.22
Ojai Valley	July 22	.22
Simi Valley	July 22	.22
Ojai Valley	July 23	.24
Simi Valley	July 23	.21
Ojai Valley	July 24	.23
Simi Valley	July 24	.23
Ojai Valley	July 25	.21
Simi Valley	July 25	.22
Ojai Valley	July 29	.22
Simi Valley	July 29	.23
Ojai Valley	July 30	.21

SOURCE: AIR POLLUTION CONTROL DISTRICT

TABLE No. 4

AIR QUALITY FOR AUGUST

POLLUTANT	Federal Air Quality Std.	Air Monitoring Stations															
		Camarillo		Ojai		Point Mugu		Port Hueneme		Santa Paula		Simi		1000 Oaks		Ventura	
		+ Days	++ Max.	+ Days	++ Max.	+ Days	++ Max.	+ Days	++ Max.	+ Days	++ Max.	+ Days	++ Max.	+ Days	++ Max.	+ Days	++ Max.
Oxidant (Ozone)	0.08 ppm for 1 hr.	24/31	.15	31/31	.22	3/30	.09	14/31	.14	22/30	.16	31/31	.24	23/31	.16	15/31	.13
Nitrogen Dioxide (NO_2)	0.25 ppm for 1 hr. (Calif. Std.)	0/30	.04	0/28	.03	N	N	N	N	N	N	N	N	N	N	N	N
Carbon Monoxide (CO)	9 ppm-8 hr. avg.	0/30	2	N	N	N	N	N	N	N	N	N	N	N	N	0/31	2
	35 ppm for 1 hr.	0/30	3	N	N	N	N	N	N	N	N	N	N	N	N	0/31	4
Sulfur Dioxide (SO_2)	0.14 ppm 24 hr. avg.	0/31	.00	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Particulate Matter	100 µg/m³ (Calif. Std.) 24 hr. avg.	2/5	128.6	3/5	149.5	1/4	137.1	3/5	173.7	5/5	214.8	1/3	115.5	1/5	113.5	2/4	108.6

\+ Days - Number of day standard exceeded days measured.
++ Max. - Maximum reading in terms of standard.
N - No data available or no instrument for this contaminant at this station.

Smog Alerts (1st Stage = .20 ppm hourly average)

Station	Date	Maximum Hourly Average (ppm)
Ojai Valley	August 1	.20
Ojai Valley	August 6	.20
Simi Valley	August 7	.21
Simi Valley	August 8	.20
Simi Valley	August 15	.20
Ojai Valley	August 18	.20
Simi Valley	August 18	.22
Simi Valley	August 19	.21
Simi Valley	August 21	.22
Simi Valley	August 22	.20
Ojai Valley	August 23	.21
Simi Valley	August 23	.24
Ojai Valley	August 24	.22
Simi Valley	August 24	.25
Simi Valley	August 25	.21
Simi Valley	August 28	.21
Simi Valley	August 29	.22

SOURCE: AIR POLLUTION CONTROL DISTRICT

TABLE No. 5

AIR QUALITY FOR SEPTEMBER

POLLUTANT	Federal Air Quality Std.	Air Monitoring Stations															
		Camarillo		Ojai		Point Mugu		Port Hueneme		Santa Paula		Simi		1000 Oaks		Ventura	
		* Days	** Max.	* Days	** Max.	* Days	** Max.	* Days	** Max.	* Days	** Max.	* Days	** Max.	* Days	** Max.	* Days	** Max.
Oxidant (Ozone)	0.08 ppm for 1 hr.	21/30	.23	30/30	.25	3/30	.11	12/29	.15	23/30	.20	28/28	.26	23/30	.20	12/30	.16
Nitrogen Dioxide (NO_2)	0.25 ppm for 1 hr. (Calif. Std.)	0/30	.07	0/28	.04	N	N	N	N	N	N	0/7	.14	N	N	N	N
Carbon Monoxide (CO)	9 ppm-8 hr. avg.	0/30	3	N	N	N	N	N	N	N	N	N	N	N	N	0/29	3
	35 ppm for 1 hr.	0/30	5	N	N	N	N	N	N	N	N	N	N	N	N	0/29	7
Sulfur Dioxide (SO_2)	0.14 ppm 24 hr. avg.	0/30	.00	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Particulate Matter	100µg/m³ (Calif. Std.) 24 hr. avg.	2/5	138.2	1/3	104.2	0/5	75.9	3/5	167.9	5/5	202.2	0/1	68.2	3/4	167.4	2/5	172.8

* Days - Number of day standard exceeded days measured.
** Max. - Maximum reading in terms of standard.
N - No data available or no instrument for this contaminant at this station.

Ozone Alerts (1st Stage = .25 ppm hourly average) - effective September 1, 1974, values had to be multiplied by 0.8 to declare a .20 ppm alert, see page of this report for full explanation.

Station	Date	Maximum Hourly Average (ppm)
Simi Valley	September 4	.25
Simi Valley	September 5	.25
Simi Valley	September 7	.26
Simi Valley	September 10	.25
Simi Valley	September 11	.26
Simi Valley	September 18	.27
Ojai Valley	September 20	.25
Simi Valley	September 20	.26

SOURCE: AIR POLLUTION CONTROL DISTRICT

TABLE No. 6

TABLE 7

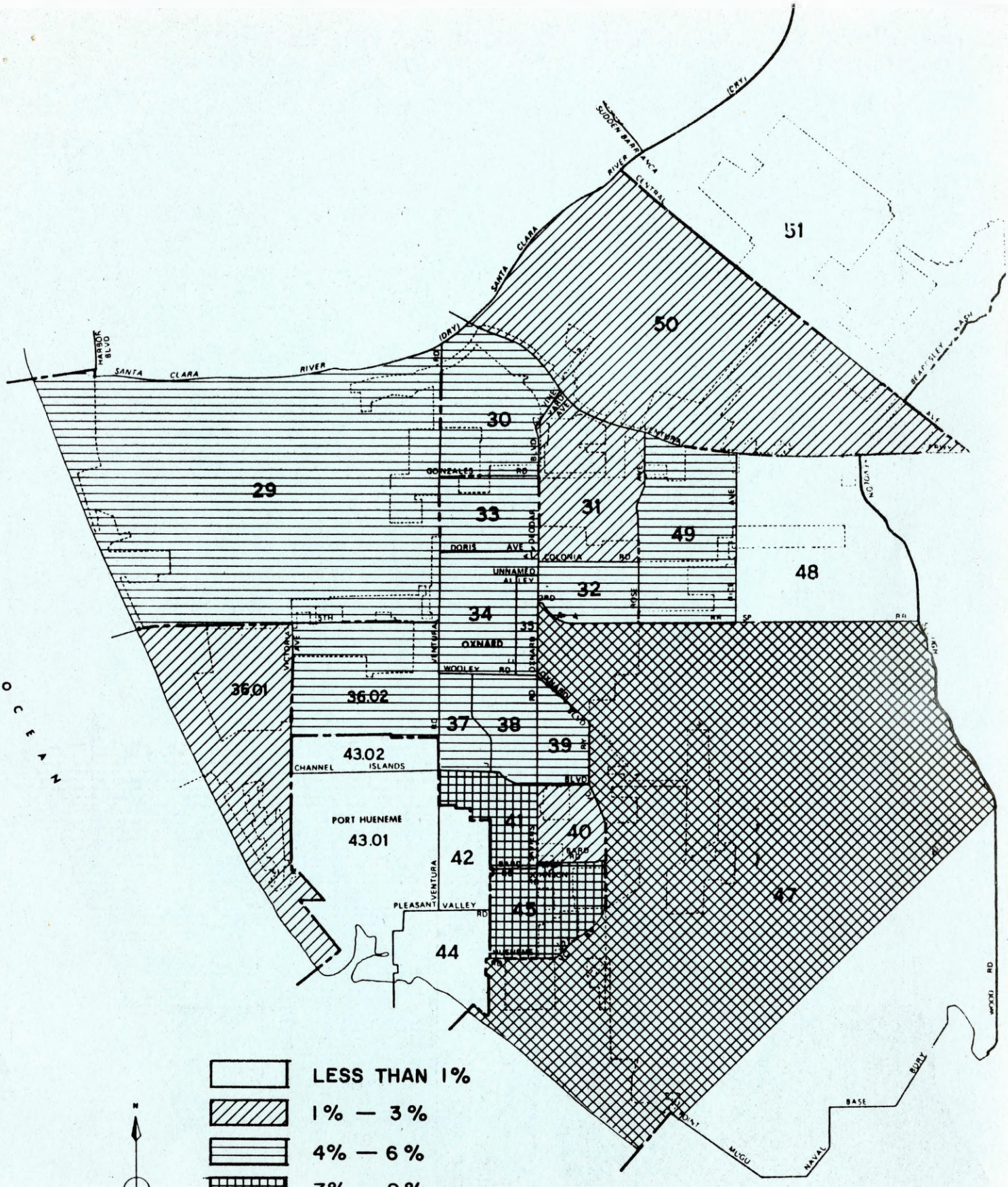
Selected Demographic Characteristics of Oxnard*

Total Population	85,104(a)
Population Density per Square Mile	3,713(a)
Average Age of the Population	24(a)
Average number of people per dwelling unit	3.2(a)
Percent Black Population	5.98(a)
Percent Spanish Surname Population	31.95(a)
Median School Years Completed	12.1(b)
Percent of families with incomes below poverty level	10.8(b)
Average annual income	$10,751(b)
Percent of population less than 18 years of age	36.89(a)
Percent of Population over 65 years of age	5.51(a)

*Data only for incorporated area only
(a) California, Department of Finance, Special Census of Oxnard, 1975
(b) U.S. Department of Commerce, Bureau of the Census, Census Tracts Oxnard, Ventura, California, Standard Metropolitan Statistical Area, 1970 Census of Population and Housing.

Supplementing Table 7 is a map (11) of the spatial distribution of population by census tracts in 1975. The distribution pattern which emerges here is a critical factor in the appreciation of seismic and safety hazards since the city population and related physical improvements can be associated spatially with each of the several hazards.

According to the choropleth map, the greatest percentage of City residents, on a census tract basis, is concentrated in the southern and southeastern peripheral areas. Except for tract 47 which is inordinately large thereby containing more population and housing units than the usual size tract, the southernmost tracts, 41 and 45 each have 7 to 9 percent of the City's population. Other tracts comprising the balance of the City appear to be somewhat



MAP No. 11

SPATIAL DISTRIBUTION OF POPULATION

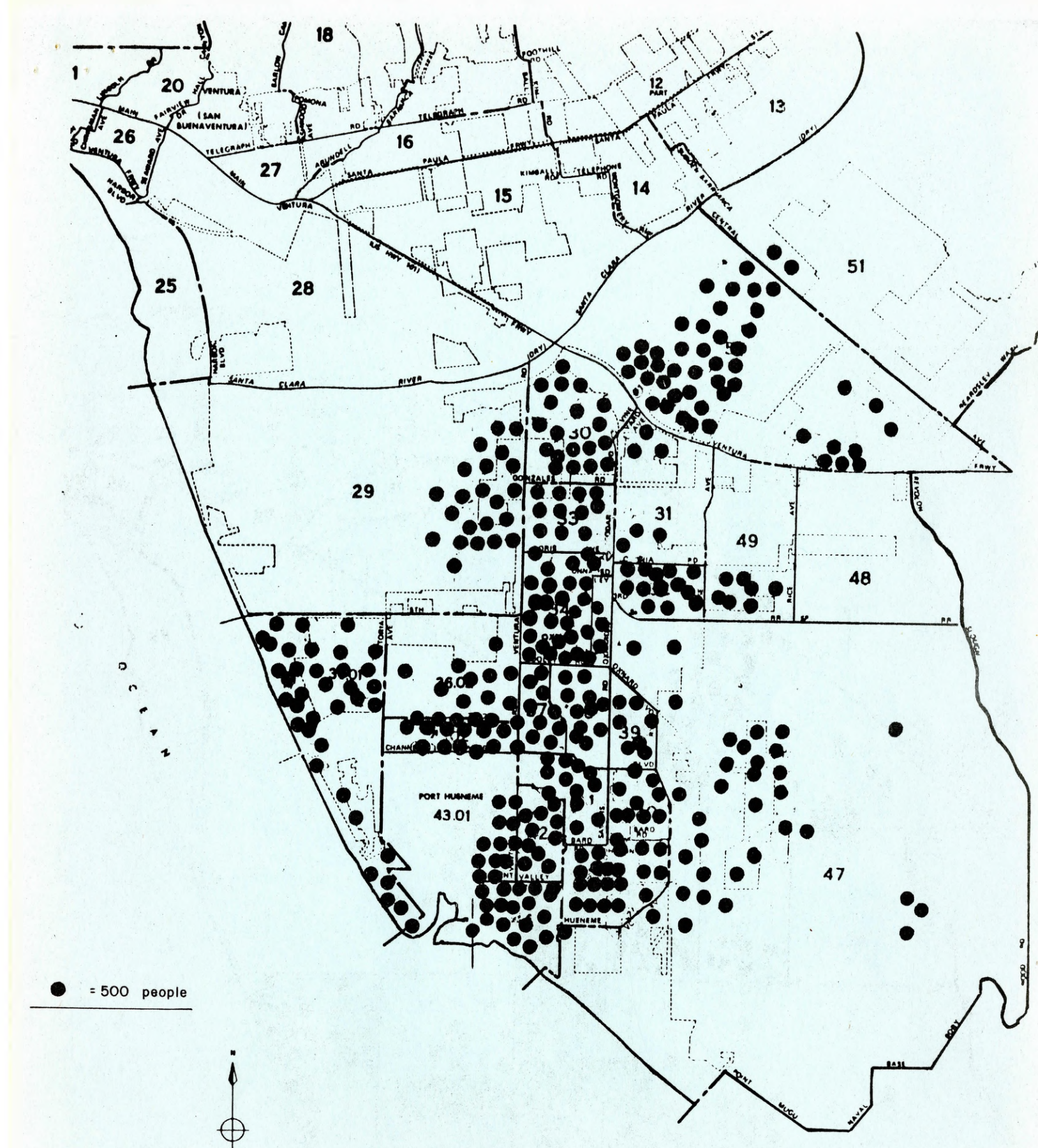
uniform in the percentage of population contained (2 to 6 percent). Only tract 35 (the central business district), and tracts 50 and 51 (El Rio and Del Norte areas) are sparsely populated. There are, however, subtle population distribution features which are obscured by choropleth mapping. To further clarify the relationship between population and the hazards mapped in the Seismic and Safety Elements, two additional maps are provided. The first of these is a dot distribution map of existing and projected population, and the second is a map of population/housing unit ratios.

According to the dot distribution Map 12, the City's population will be encountered along perpendicular axes formed by the major transportation network.[2] This map shows that a definite population gradient exists within the City although it is somewhat offset by residential development in the Channel Islands Harbor area. Again, this map of existing and projected population should be referred to in the course of reviewing environmental impacts of the project.

The second related map (13) of population and housing units shows a significant indexes which have been calculated for each census tract. These indexes (ratios) depict the number of people compared to the number of housing units per census tract. Some features emerge from this map which should be noted:

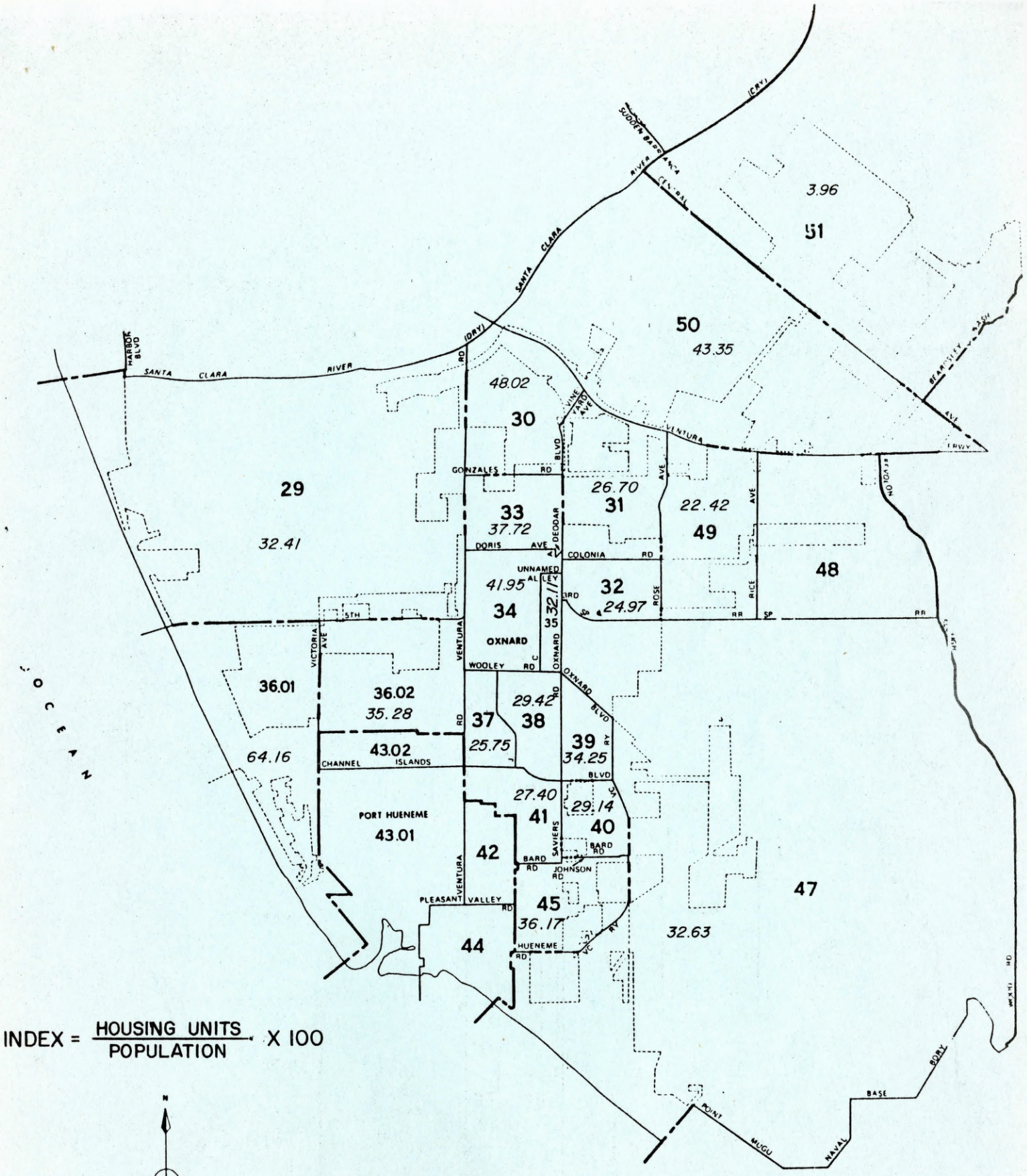
1) The number of housing units per tract may be used as a surrogate in the measurement of property investment of values.

2) The range in index values measures the number of housing units per one hundred population. This approach reveals density characteristics which indicate that tracts 36.01, 30, 50, and 34 have sizable housing supplies. In short, the lower the index value the larger the number of



MAP No. 12

OXNARD POPULATION – 1990



INDEX = $\frac{\text{HOUSING UNITS}}{\text{POPULATION}} \times 100$

MAP No. 13

POPULATION – HOUSING DISTRIBUTION

residents served by fewer dwelling units in that tract.

3) The index values also suggest something about family sizes, or stages in the family formation cycle. It can be inferred from the map that areas having lower index values are areas within the city which have young families prossessing large numbers of children.

In the aggregate the three foregoing maps serve to indicate where the city population resides and, when used in conjunction with each of the hazard maps prepared for the Seismic and Safety Element, convey the extent to which the City residents and property are exposed to various hazards.

K. Rare or Endangered Species

The following species are currently listed as endangered or rare by the California Department of Fish and Game. This list includes only those species which may spend some part of their life cycle within or immediately adjacent to the Oxnard Planning Area.

Endangered

California Brown Pelican (Pelecanus occidentalis californicus)

Distribution: Occurs on Pacific coast from Canada to Mexico. Nests on California Channel Islands, coastal islands of Baja California and the Gulf of California.

Status: California's only remaining nesting colony is on Anacapa Island. Colony is incapable of reproduction due to collapsing of thin-shelled eggs during incubation. Attributed to effects of DDT contamination. Seven young were produced from 600 nesting attempts in California in 1971. The total populaiton is approximately 32,000 birds, with 12,000 pelicans along the California coast from August through November. Pelicans are reported to be nesting normally in large colonies in the Gulf of California.

California Condor (Gymnogyps Californianus)

Distribution: Confined largely to the rugged mountains of Ventura and Santa Barbara counties. Occasionally sighted in coastal foothills north of San Buenaventura.

Status: Numbers reduced to approximately 50. Population is declining because of low recruitment of young, habitat loss, and human disturbance. Condors do not breed until 5 or 6 years old. Females lay but one egg every two years, and incubation and brooding require six months.

Southern Bald Eagle (Haliaeetus Leucocephalus Leucocephalus)

Distribution: Occurs statewide, particularly along the coast and in the interior around large lakes, reservoirs, and wetlands.

Status: Historically, bald eagles nested in abundance on the Channel Islands and along the coast; present nesting is limited to Sierra Nevada, Cascade, and Klamath mountains. Reasons for its decline include shooting, removal of nest trees, human encroachment into nesting and breeding areas, and environmental pollution and contamination of food chain by pesticides.

American Peregrine Falcon (Falco peregrinus anatum)

Distribution: Found along the coast. Nests along the coast, on Channel Islands, and in higher mountains inland.

Status: In 1940's, the breeding population was estimated at 100 pairs; in 1970, this population had declined to 10 birds, of which two pairs produced four young. Mortality exceeds recruitment. Decline primarily due to food chain contamination, human disturbance of nesting areas, occasional shooting, and illegal capture by falconers.

California Clapper Rail (Rallus longirostris obsoletus)

Distribution: Resident in the salt water marshes of San Francisco Bay, Elkhorn Slough, and the Mugu Lagoon. Occasional sighting in lagoon at the mouth of the Santa Clara River.

Status: Relatively abundant in South San Francisco Bay, but highly specialized and apparently incapable of adapting to environmental change. Bay fill along with industrial pollution and the introduced old-world rat threaten continued existence. Population in South San

Francisco Bay estimated at 1300 pairs. Populations in the Elkhorn Slough and the Mugu Lagoon unknown.

Light-Footed Clapper Rail (Rallus longirostris levipes)

Distribution: Ranges from Santa Barbara south to San Quintan Bay, Lower California. Frequents small coastal estuaries and lagoons. Several sightings have recently been made at the mouth of the Ventura River.

Status: Breeding colonies in California limited currently to Anaheim Bay, Upper Newport Bay, Los Pensasquitos Lagoon, Tijuana River Marsh, and remain salt marshes in Mission and San Diego Bays. Planned development in these areas threaten continued existence of this small rail.

California Least Tern (Sterna albifrons browni)

Distribution: Summers along the coastline from Mexico to San Francisco. Winters in southern hemisphere and breeds along the Pacific Coast from Baja California to San Francisco Bay. In the past, it has nested in the coastal dunes immediately west of the Santa Clara and Ventura Rivers.

Status: Population is rapidly declining, primarily because of habitat destruction, human disturbance, and predation. Requires sandy beaches free from human disturbance to assure successful nesting. In 1970, 300 pairs nested in 15 sites, located mostly on southern California beaches.

Unarmored Threespined Stickleback (Gasterosteus aculeatus williamsoni)

Distribution: Originally ranged through southern California coastal streams and drainage basins. Now confined to upper portions of the Santa Clara River in Soledad Canyon, Los Angeles County. Some unconfirmed sightings in the lower Santa Clara have been reported.

Status: Populations from the Los Angeles basin streams have been exterminated. The present population in the upper Santa Clara River is threatened by increased recreational use and development in Soledad Canyon. The California Department of Fish and Game has recently transplanted 363 of these fish into San Felipe Creek, San Diego County.

Rare

California Black Rail (Laterallus Jamaicensis Conturniculus)

Distribution: Historically occurred in limited numbers in salt marshes from Tomales Bay south to Baja California, and in fresh water marshes inland, including portions of the Colorado River.

Status: Because of the secretive habits and its small numbers, the current distribution and numbers of the California Black Rail is not known. Destruction of coastal and inland wetlands through filling and drainage threaten habitat vital to the continued existence of this medium-sized rail.

California Yellow-Billed Cuckoo (Coccyzus Americanus Occidentialis)

Distribution: Historically nested along stream courses from Shasta County to southern California, and along the Colorado River. Present distribution and numbers are unknown.

Status: Very rarely seen in California today. Its habitat of streamside plant life has been destroyed by accelerated urbanization and land use changes.

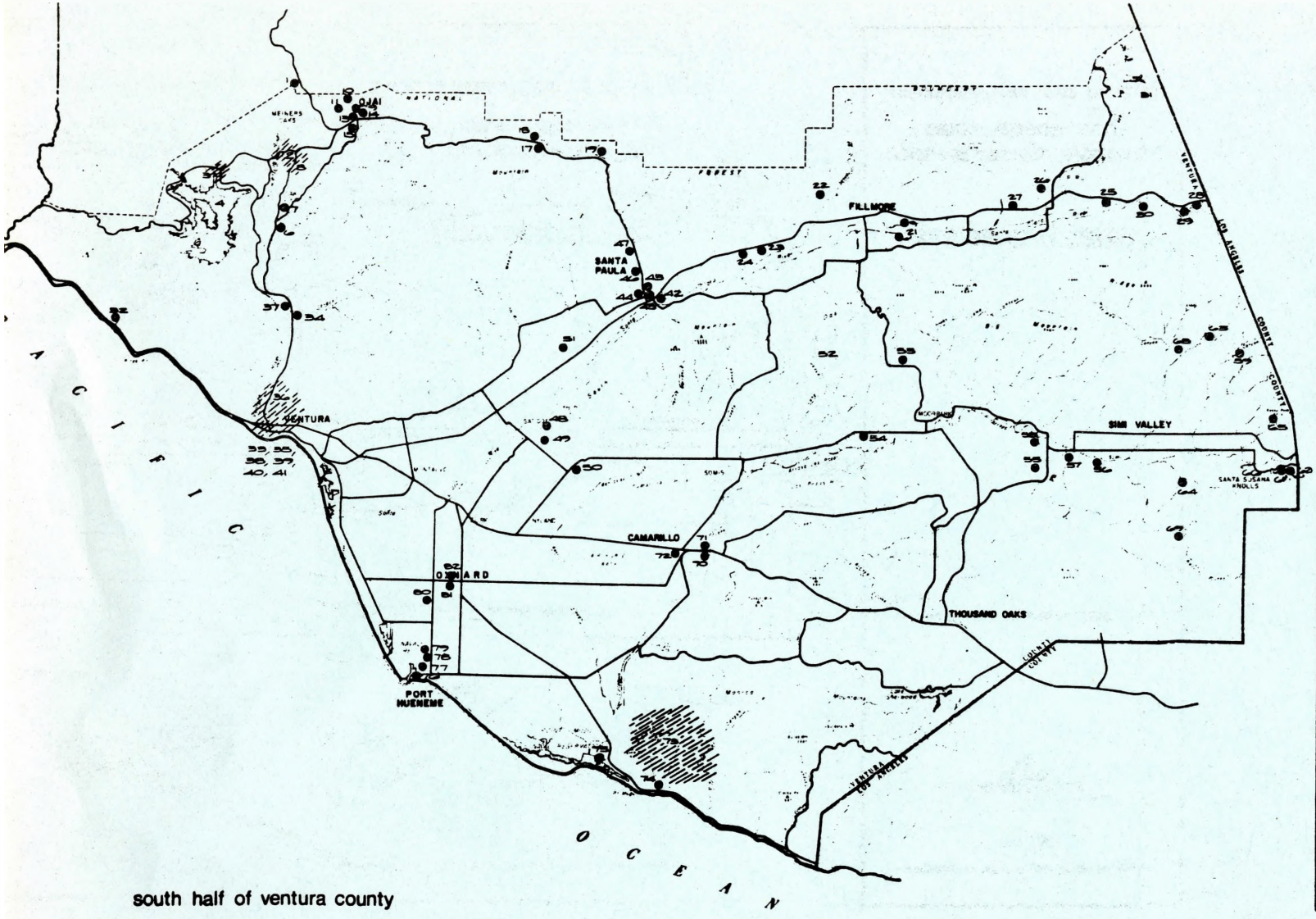
Guadalupe Fur Seal (Arctocephalus Townsendi)

Distribution: Historically occurred from Farralon Islands west of San Francisco, south to San Benito Island, Baja California. Presently confined to Guadalupe Island, Mexico.

Status: Population numbered 600 in 1965. Last reported in California waters in 1949, when a single individual was observed on San Nicolas Island. Human disturbance and illegal shooting has prevented a rapid increase in numbers.

L. Archaeological Sites or Points of Historical Interest

Historical sites are shown on Map 14, however, barring detailed surface analysis, the distribution of archaeological sites may be generally associated with historic villages (maps 15 and 16).



south half of ventura county

resources plan and program

open space and conservation element

historical sites

sorce:
ventura county cultural heritage board

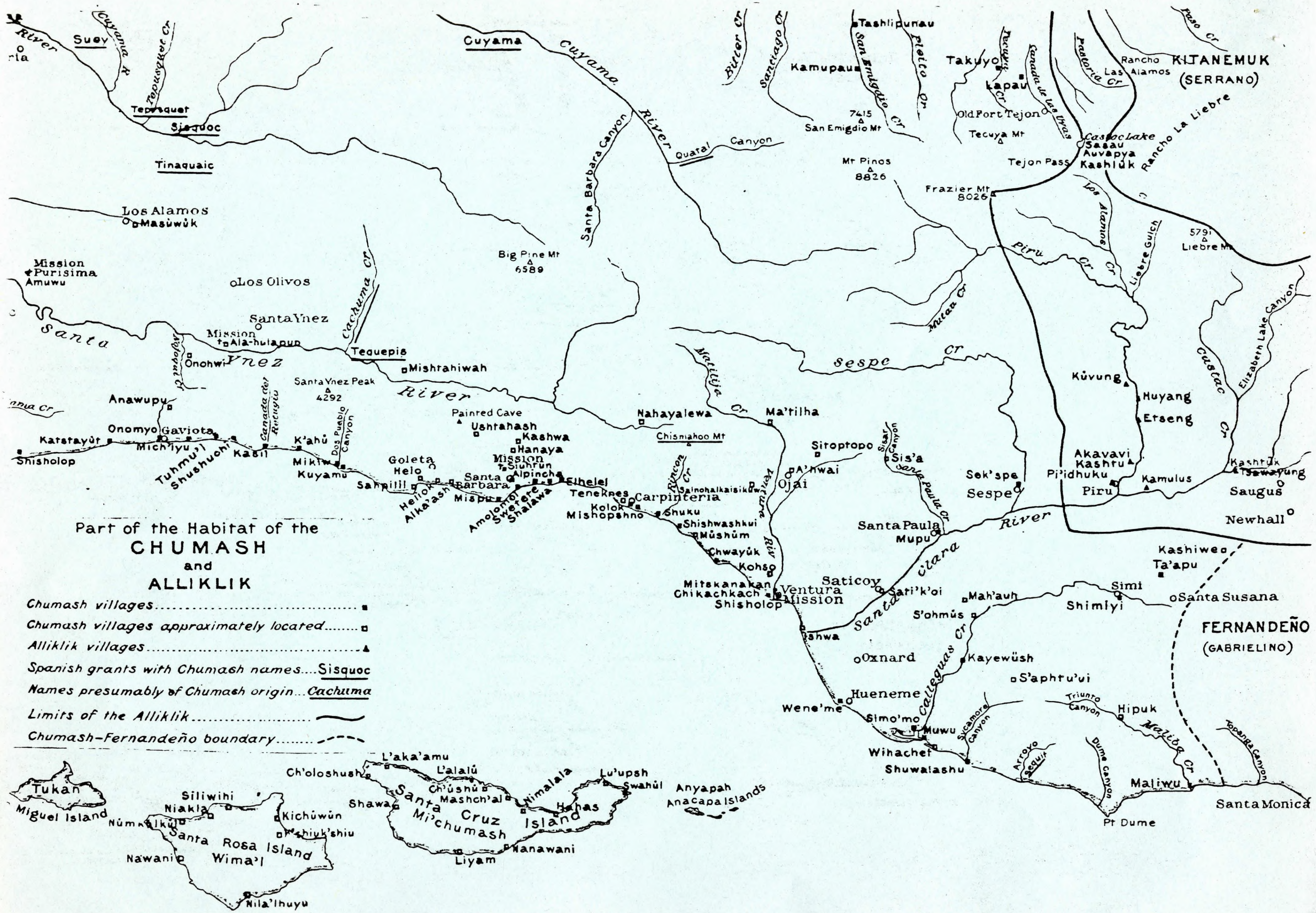
N

0 2 4 MILES
SCALE

june 1973

ventura county planning department

MAP No. 14


Part of the Habitat of the
CHUMASH
and
ALLIKLIK
Chumash villages
Chumash villages approximately located
Alliklik villages
Spanish grants with Chumash names.... Sisquoc
Names presumably of Chumash origin... Cachuma
Limits of the Alliklik
Chumash-Fernandeño boundary
KITANEMUK
(SERRANO)
FERNANDEÑO
(GABRIELINO)
Suey
Cuyama R
Tepusquet Cr
Tepusquet
Sisquoc
Tinaquaic
Los Alamos
Masuwuk
Mission Purisima
Amuwu
Los Olivos
Santa Ynez
Mission
Ala-hulapun
Cachuma Cr
Tequepis
Mishtahiwah
Santa Ynez River
Onohwi
Santa Ynez Peak
4292
Anawupu
Onomyo
Gaviota
Katstayut
Shisholop
Mich'iyu
Tuhmu'l
Shushuchi
Kasil
K'ahu
Mikiw
Kuyamu
Dos Pueblo Canyon
Goleta
Helo
Sahpilil
Heliok
Alka'ash
Santa Barbara
Mispu
Amolomol
Swetete
Shalawa
Mission
Painted Cave
Ushtahash
Kashwa
Hanaya
Elhelel
Big Pine Mt
6589
Cuyama
Cuyama River
Santa Barbara Canyon
Quatal Canyon
Nahayalewa
Chismahoo Mt
Teneknes
Kolok
Mishopshno
Carpinteria
Rincon Cr
Shuku
Shishwashkui
Mushum
Chwayuk
Kohso
Mitskanakan
Chikachkach
Ventura Mission
Shisholop
Ventura River
Matilija Cr
Ma'tilha
Ojai
A'hwai
Siroptopo
Sis'a
Santa Paula Cr
Santa Paula
Mupu
Saticoy
Sati'k'oi
Santa Clara River
Sespe Cr
Sek'spe
Sespe
Mutau Cr
Butter Cr
Santiago Cr
San Emigdio Cr
Tashlipunau
Pleito Cr
Kamupau
7415
San Emigdio Mt
Mt Pinos
8826
Takuyo
Tecuya Cr
Lapau
Old Fort Tejon
Tecuya Mt
Castac Lake
Sasau
Auvapya
Kashluk
Tejon Pass
Frazier Mt
8026
Rancho Las Alamos
Pastoria Cr
Rancho La Liebre
Los Alamos Cr
Piru Cr
Liebre Gulch
5791
Liebre Mt
Elizabeth Lake Canyon
Castac Cr
Kuvung
Huyang
Etseng
Akavavi
Kashtu
Pi'idhuku
Piru
Kamulus
Kashtuk
Tsawayung
Saugus
Newhall
Kashiwe
Ta'apu
Simi
Shimiyi
Santa Susana
Mah'auh
S'ohmus
Shwa
Oxnard
Calleguas Cr
Kayewush
S'aphtu'ui
Hueneme
Wene'me
Simo'mo
Muwu
Wihachet
Shuwalashu
Sycamore Canyon
Triunfo Canyon
Hipuk
Arroyo Sequit
Dume Canyon
Malibu Cr
Topanga Canyon
Maliwu
Pt Dume
Santa Monica
Tukan
San Miguel Island
Siliwihi
Niakla
Numkulku
Santa Rosa Island
Wima'l
Kichuwun
Nawani
Nila'lhuyu
Ch'oloshush
L'aka'amu
L'alalu
Ch'ushu
Mashch'al
Nimalala
Shawa
Santa Cruz Island
Mi'chumash
Lu'upsh
Swahul
Hahas
Nanawani
Liyam
Anyapah
Anacapa Islands

MAP No. 15

Drainage map showing location of kelp beds, historic villages, and archaeological sites.

MAP No. 16

Sta Barbara

FOOTNOTES

[1]For a general treatment of these topics see: Seismic and Safety Element, and Draft EIR for Seismic Highways Elements of the General Plan of the City of Oxnard; California Division of Mines, Geology of Southern California. Bulletin 170 (1954); United States Department of Agriculture, Soil Conservation Service in Corporation with the University of California, Agriculture Experiment Station, Soil Survey, Ventura Area, California (April 1970); United States Corps of Engineers, Flood Plain Information, Santa Clara River, Ventura County, California (June 1968). David W. Lantis, Rodney Steiner, Arthur E. Karinen, California Land of Contrasts, Dubuque, Iowa: Kendal-Hunt, 1973, Pp. 174-179.

[2]See: Ventura County Association of Governments, Ventura County Subregional Transportation Study 1974.

III. ENVIRONMENTAL IMPACTS

Environmental impacts addressed in this section are those recommended actions which constitute the project. For each seismic or safety hazard identified, the recommended set of actions is cited and environmental impacts are evaluated.

A. Fault Displacement

Recommended Action: 1. Consider all faults (whether zoned or not) shown on Hazards Plate I as potentially hazardous unless detailed seismic-geologic investigation confirms the contrary.

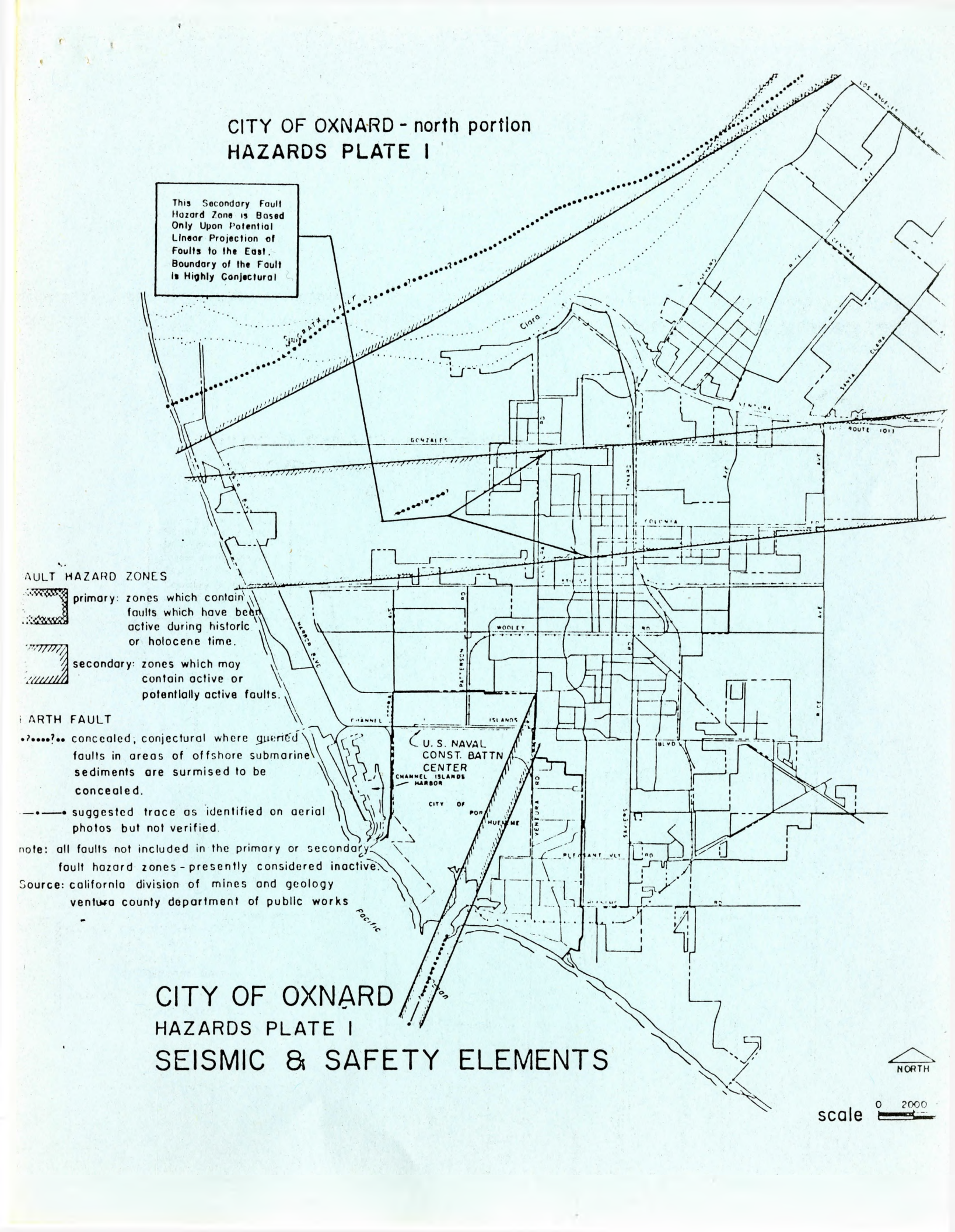
Impact: The impact of this policy is far reaching since it promotes a basic recognition of seismic hazards which may affect city residents and property. This policy should result in a more precise delimitation of areas, both in the primary and secondary hazard zones, as shown generally on Map 17. Based on the fault zones identified, the northern end of the City of Oxnard and the Port Hueneme area qualify as areas subject to intensive seismic-geologic investigation.

Related economic impacts here would be confined to limitations placed on new construction in those hazard zones which may be more precisely delineated. Should such zones be established, the obvious impact would be the perpetuation of agriculture or other forms of usable open space.

Recommended Actions: 2. Encourage and participate in regional studies by qualified Federal and State agencies such as the U. S. Geological Survey and the State Division of Mines and Geology.

3. If necessary, retain private consultants for more detailed determination and study of potential hazards.

Impacts: Impacts here are preventative in nature and are aimed at eliciting continued research on seismic hazards. While some research costs are offset by public agency services, other costs will be direct and will be incurred during the evaluation of specific construction projects. At this point, costs cannot be predicted accurately; however, some preliminary estimates are cited below.


CITY OF OXNARD - north portion
HAZARDS PLATE I
This Secondary Fault Hazard Zone is Based Only Upon Potential Linear Projection of Faults to the East. Boundary of the Fault is Highly Conjectural
AULT HAZARD ZONES
primary: zones which contain faults which have been active during historic or holocene time.
secondary: zones which may contain active or potentially active faults.
ARTH FAULT
concealed; conjectural where queried faults in areas of offshore submarine sediments are surmised to be concealed.
suggested trace as identified on aerial photos but not verified.
note: all faults not included in the primary or secondary fault hazard zones - presently considered inactive.
Source: california division of mines and geology
ventura county department of public works
U. S. NAVAL CONST. BATTN CENTER
CHANNEL ISLANDS HARBOR
CITY OF PORT HUENEME
PACIFIC
CITY OF OXNARD
HAZARDS PLATE I
SEISMIC & SAFETY ELEMENTS
NORTH
scale 0 2000

Preliminary Estimates for Geological and Seismic Investigations

Since it is virtually impossible to predict exact and total costs for geological and seismic investigations, some general figures were derived which are as follows:

Geologist's services	$30 to $35 per hour
Trenching	$40 per hour
Total costs	$70 to $100 per hour

It should be pointed out that these figures will vary considerably because of factors associated with the location of the specific project and the type of facility proposed. An obvious example would be sites which are located in the central business district and in suburban areas; the former would permit boring and/or trenching, while the latter would not. Facility types, such as a theater or an apartment complex, would also warrant different estimates because of design considerations relating to public safety.

As a measure of costs incurred where projects have been constructed, a major facility such as a community center would require the expenditure of between $50,000 and $70,000 for the appropriate studies.[2]

In order to minimize cost impact here, it is suggested that the local public agency evaluate existing geological and seismic documentation which is published and available on a regular basis.[3] Such an inventory of published data on the local site would reduce costs considerably since it is customary for geological consultants

to refer to these same sources in the absence or inability to perform large scale and detailed field investigations.

Recommended Action: 4. Utilize the latest uniform codes accepted by the State in the design of buildings and structures to resist fault displacement.

Impact: Increased costs to developers-builders, and ultimately consumers will result from utilization of uniform building codes.

Recommended Action: 5. Adopt current investigation guidelines for proposed land development within the Primary or Secondary Fault Hazard Zones and for all major projects such as those published by the Structural Engineers Association of Southern California.

Impact: Adoption of guidelines could affect growth patterns within the city. This is not to say that development will not occur, but that public safety will dictate future usable locations. One immediate impact of a highly beneficial nature will be to force development in areas of the city which have been by-passed or neglected.

Recommended Action: 6. Insure that all facilities necessary to carry out post-disaster emergency services are located, whenever possible, in areas of low seismic risk.

Impacts: Public health and safety are areas which will be affected positively by implementing this recommendation. Locating all facilities which provide emergency services in low seismic risk areas whenever possible will insure that these facilities have the best probability for surviving a major earthquake and maintaining their effectiveness through an earthquake.

Recommended Action: 7. Incorporate within the City's existing code enforcement and building inspection program a policy regarding periodic structural surveys for public and private structures within hazard zones which have been determined to be extremely likely to lead to loss of life or great property damage during a major earthquake.

Impact: This recommendation will have positive impacts in the areas of public health and safety. Long term beneficial impacts will occur in improving the quality of housing stock and other types of structures. Survey costs will constitute municipal expenditures over the long term. The incorporation of this recommendation within an already existing program should limit city expenditures to some degree.

Recommended Action: 8. Study the feasibility of adopting the "Specific Criteria Section (modified) of the Policies and Criteria of the State Mining and Geology Board and the State Geologist's Explanation of the Special Studies Zone Maps Modified" for administration of fault hazard zones (copy appended).

A. No structure for human occupancy shall be permitted to be placed across the trace of an active fault. Furthermore, the area within fifty (50) feet of an active fault shall be assumed to be underlain by active branches of that fault unless and until proven otherwise by an appropriate geologic investigation and submission of a report by a geologist registered in the State of California. This 50-foot standard is intended to represent minimum criteria only for all structures. Certain essential or critical structures, such as high-rise buildings, hospitals, and schools should be subject to more restrictive criteria at the discretion of the City and County.

B. Application for all real estate developments and structures for human occupancy within fault hazard zones shall be accompanied by a geologic report prepared by a geologist registered in the State of California, and directed to the problem of potential surface fault displacement through the site unless studies are waived pursuant to Section 2623 (State Code).

C. Requirements for geologic reports may be satisfied for a single 1 or 2 family

residence if, in the judgement of technically qualified City or County personnel, sufficient information regarding the site is available from previous studies in the same area.

D. Licensed personnel within or retained by the City or County must evaluate the geologic and engineering reports required herein and advise the body having jurisdiction and authority.

E. The City and County may establish policies and criteria which are more restrictive than those established herein. In particular, comprehensive geologic and engineering studies should be required for any "critical" or "essential" structure as previously defined whether or not it is located within a fault hazard zone.

F. Construction should not occur across the mapped traces of faults. Where it is inevitable that such construction as roads, streets, highways, utility lines, etc., must cross faults, it is important that the possibility of fault movement should be considered in their design. Critical facilities, such as hospitals, schools, utility structures and communication centers should not be planned within Primary Fault Zones. Those that may presently be in Primary Fault Hazard Zones should be replaced as soon as possible or confirmed to be safely located.

G. Those facilities which are not critical but which do have high occupancy potential such as theatres, churches, major markets, apartment complexes, etc., should not be planned within Primary Fault Zones. Those that may be presently in Primary Fault Zones should be replaced as soon as possible or confirmed to be safely located.

H. Unless entire Primary Fault Hazard Zones were to become open space, which may not be feasible, low density, well-built,

timber construction homes are an acceptable planned use within the area. However, since any construction in fault corridors presents some additional hazard to life, and certainly may result in considerable property loss, it would be best if these areas could be devoted to open space of some sort.

I. Important facilities must be kept off areas where ground ruptures and potential ground ruptures are located. When such facilities must be located in those areas, provisions must be made to accommodate the expected movement.

J. Non-critical facilities should be kept off actual breaks but could be located adjacent to them if compensation is made in the construction for the fault movement.

K. In the future, when public facilities are built within or near a Primary Fault Hazard Zone, justification should be included as to why the public facilities were deemed essential for the public welfare. Similarly, any existing public facilities in such hazardous areas should be reviewed and official statements made as to why they must continue to exist in these areas.

L. As used herein, the following definitions apply:

1. A "structure for human occupancy" is one that is regularly, habitually or primarily occupied by humans.

2. An engineering geologist certified in the State of California is deemed to be technically qualified to evaluate geologic reports to be used in the design of civil works.

3. Any engineer registered in the State of California in the appropriate specialty is deemed to be technically qualified to evaluate engineering reports in the specialty.

NOTE: Model ordinance for implementation of Special Studies Zones has been developed by the State Division of Mines and Geology.

Impact: Impacts of a highly positive sort will result from standardization of criteria used to examine potential building sites. Application of standardized guidelines, and use of license geologists and engineers will ensure a reduction of damage potential. Again, usable building sites for both critical and non-critical facilities will be determined with the consequence that current patterns of development may be altered. Moreover, existing public facilities will be evaluated as to their location and possible removal to other sites. From Map 8, it is clear that existing facilities within the primary and secondary hazard zones, will be subjected to evaluation. At a minimum, location of public facilities will require additional costs in the form of seismic studies.

Summary

Environmental impacts stemming from recommended fault displacement actions are summarized in the simplified matrix below. Most of the impacts are long-term of a primary nature and affect land use, components of public facilities, and obviously public health and safety.

Overall, the impacts affect the timing and spatial distribution of future construction within the City. The major primary impact will be the delinatation of land use management zones based on the existence of seismic-geologic hazards. Such zones could result in a higher ratio of open space to developed land within the City. Secondary impacts bear on costs associated with appraisal of new projects and benefits associated with the adoption of the uniform building code.

P - PRIMARY
S - SECONDARY

RECOMMENDED ACTION - FAULT DISPLACEMENT	PROPOSED PROJECT
	SOILS
	TOPOGRAPHY
	SUBSURFACE CONDITIONS
	CLIMATE
	VEGETATION
	WILDLIFE
P	LAND USE
S	WATER SUPPLY
S	SEWAGE
S	SOLID WASTE
S	DRAINAGE
	ENERGY
P	TRANSPORTATION
	AIR POLLUTION
	NOISE POLLUTION
S	WATER POLLUTION
	SCHOOL FACILITIES
P	PUBLIC SAFETY
P	PUBLIC HEALTH
P	RECREATION FACILITIES
S	EMPLOYMENT OPPORTUNITIES
P	OTHER - RESEARCH COSTS
P	OTHER - CONSTRUCTION
	OTHER
	OTHER
	OTHER
	OTHER

B. Earthquakes and Groundshaking

Recommended Actions:

1. Encourage and participate in regional studies by qualified Federal and State agencies such as the U. S. Geological Survey and the State Division of Mines and Geology, or private research firms in order to more accurately determine areas of potential hazardous groundshaking.

2. If necessary, retain private consultants for more detailed study and determination of areas of potential hazardous groundshaking.

3. Utilize the latest uniform codes accepted by the State in the design of buildings and structures to resist groundshaking.

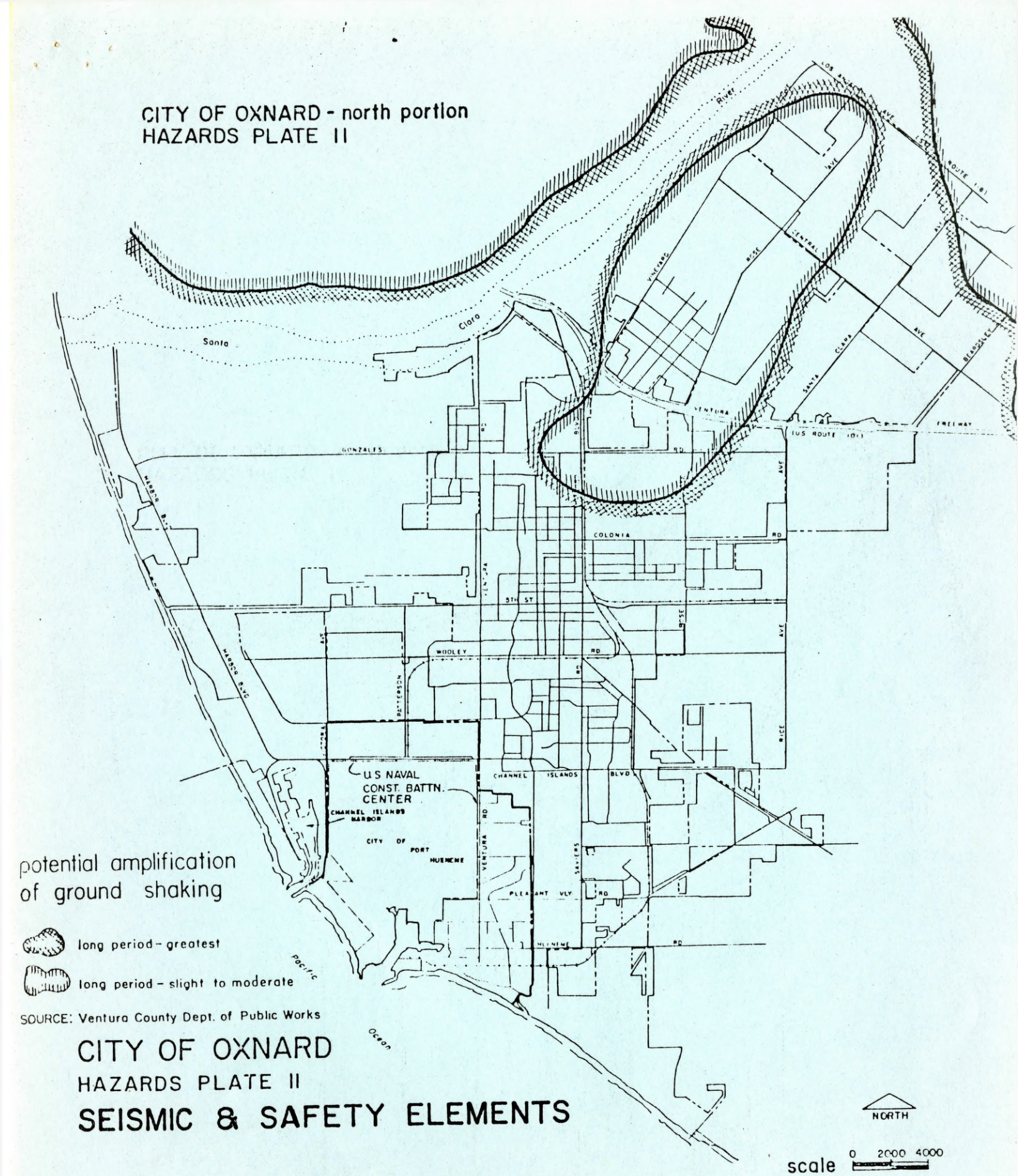
4. Require that major new public and private structures whose failure could cause great loss of life or great property damage be designed to withstand groundshaking from a major earthquake, based on detailed geologic-soils investigations of the site.

Impacts: Impacts generated by these actions center on additional costs for research and development services, and the ultimate delineation of earthquake and groundshaking zones. This latter action is reflected in a highly generalized fashion in Map 18. Since the entire city lies within zones A and B, areas subject to long-period great and moderated amplification, delineation of zones is not as critical as is the structural evaluation of existing buildings and development of new building standards to resist earthquakes and groundshaking.

Immediate impacts consist of costs to developers for detailed geologic-soils investigations of individual sites, along with higher building costs for buildings designed to withstand groundshaking from a major earthquake. These costs would be passed on to the public in the form of higher purchase prices. Beneficial impacts are related to increased public safety.

Recommended Actions:

5. Evaluate disaster plan demands and



CITY OF OXNARD
HAZARDS PLATE II
SEISMIC & SAFETY ELEMENTS

MAP No. 18

may, 1974

potential effectiveness in terms of various earthquake intensities. Create County-wide systematic review by Emergency Preparedness organizations and Police Departments on contingency disaster plans and programs.

6. Refine information and criteria at the micro-scale to mitigate groundshaking effects: land use compatibility, building location, evacuation routes, circulation, utility location, fire prevention, and emergency communications systems.

7. Require evaluation of the mounting and restraint of equipment and appliances in critical buildings such as hospitals, schools and power plants, and in buildings used as places of public assembly, with particular emphasis on equipment to be used in emergencies.

Impacts: Public health and safety are areas which will be affected positively by an implementation of these recommendations. In the event of earthquake or groundshaking, measures advocated here will provide for orderly and effective disaster response, building safety measures, and application of more rational activity location criteria. Still, the postulated impacts depend on implementation procedures which are, as yet, unspecified.

Summary

As in the preceding matrix, environmental impacts are largely primary in nature and affect land use and building construction activities.

P - PRIMARY
S - SECONDARY

ENVIRONMENTAL IMPACTS

RECOMMENDED ACTION - EARTHQUAKES & GROUNDSHAKING	PROPOSED PROJECT
	SOILS
	TOPOGRAPHY
	SUBSURFACE CONDITIONS
	CLIMATE
	VEGETATION
	WILDLIFE
P	LAND USE
P	WATER SUPPLY
P	SEWAGE
P	SOLID WASTE
P	DRAINAGE
	ENERGY
P	TRANSPORTATION
	AIR POLLUTION
	NOISE POLLUTION
S	WATER POLLUTION
P	SCHOOL FACILITIES
P	PUBLIC SAFETY
P	PUBLIC HEALTH
P	RECREATION FACILITIES
S	EMPLOYMENT OPPORTUNITIES
P	OTHER - RESEARCH COSTS
P	OTHER - CONSTRUCTION COSTS
	OTHER
	OTHER
	OTHER
	OTHER

C. Flooding

Recommended Action: 1. Develop a master plan for mitigating flooding within Oxnard and its growth area.

Impact: The development of a master plan to mitigate flooding will have a beneficial impact on public health and safety. The initial cost for developing such a plan would be approximately $50,000.00.* Over the long term, such a plan could have a beneficial impact on municipal expenditures, since costs associated with eliminating flooding incrementally may be considerably higher than eliminating flooding based on a well conceived master plan.

*Source: Public Works Department of the City of Oxnard.

Recommended Actions:

2. Designate all areas of the City that are subject to inundation from a 100-year flood* as Flood Plain Zones.

3. Obtain the assistance of the Flood Control District to establish Flood Plain Zones in the City's growth areas.

4. Establish a City policy to comply with the National Flood Insurance Regulations to require protection for developed areas from a 100-year storm.*

5. Establish a City policy of requiring new developments to:

   a. Accept historical runoff from upstream.

   b. Convey historical and newly created runoff safely downstream.

   c. Contain a 10-year storm runoff within the street area.

   d. Protect all structures from a 100-year flood.*

   e. Eliminate localized street flooding and pooling during yearly storms.

*100-year storm based on the National Flood Insurance definition.

Impacts: Impacts occurring as a result of these actions will affect land use activities in portions of the Oxnard Plain subject to intermediate regional floods (100 years). It is apparent that managed growth or development of the flood plain areas will follow the implementation of National Flood Insurance Regulations.

Specific policy impacts include a variety of measures undertaken by the City in order to comply with National Flood Insurance Program. Some measures which will be affected include: identification of flood plain zones, installation of flood control improvements and changes in future subdivision map approval procedures to reflect the need for flood improvements.

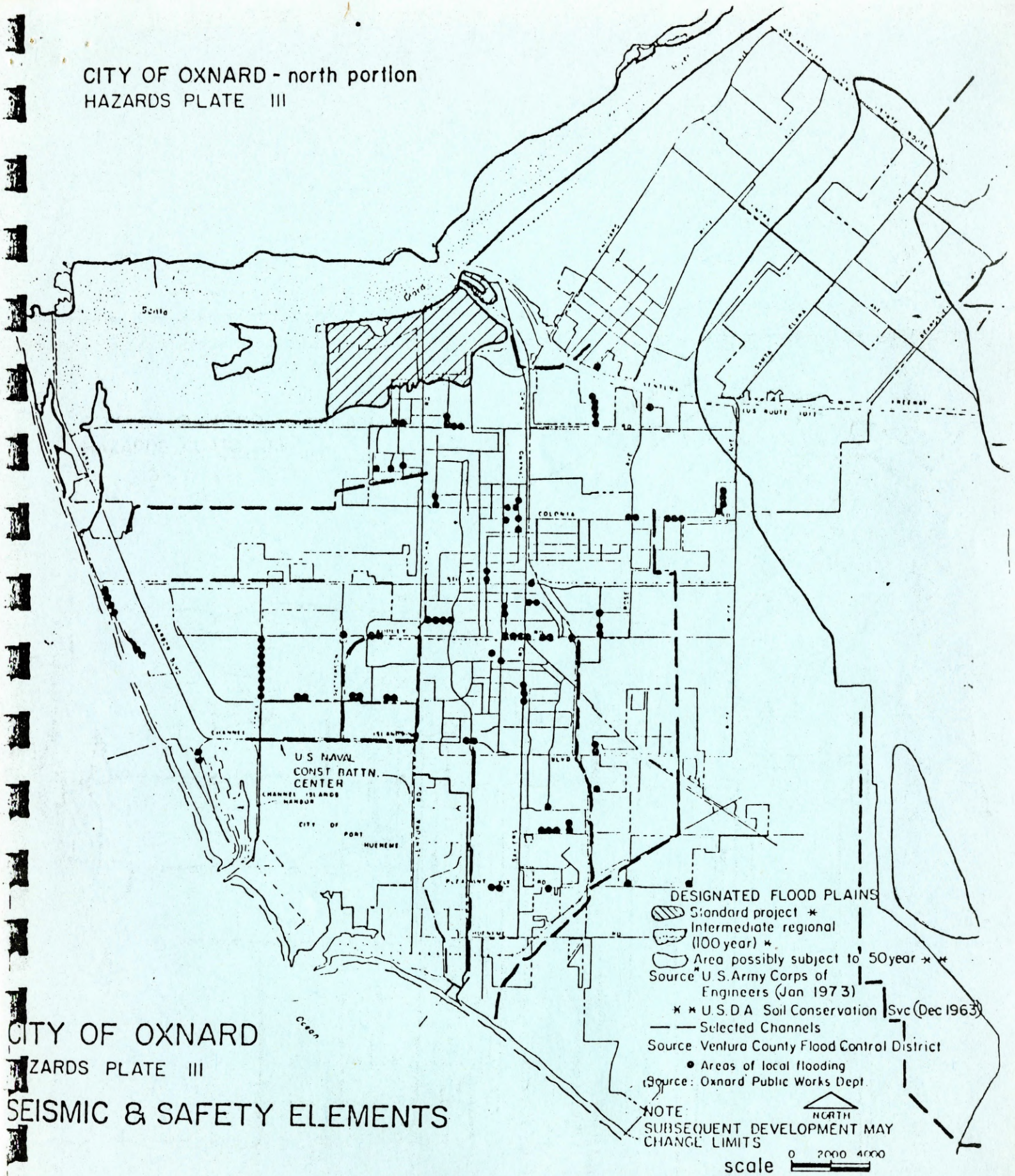
Recommended Action: 6. Continue a City program to eliminate major localized street flooding and major pooling during yearly storms, and so indicate problem areas on the City of Oxnard Hazard Plate III - Areas of Local Flooding.

Impact: City subdivision procedures and capital improvement programs will be affected by these rather specific actions. Necessarily, public health and safety will be promoted, while the major impacts will be felt in City-wide benefits conferred by extension of the Santa Clara River levee and in improving areas subject to local flooding as designated on Map 19.

Summary

According to the following matrix, impacts will be largely of a primary nature. Public health and safety, land use management research and construction costs are among the critical impacts. Costs associated with the impacts are summarized below.

CITY OF OXNARD - north portion
HAZARDS PLATE III



CITY OF OXNARD
HAZARDS PLATE III
SEISMIC & SAFETY ELEMENTS

City Addition

NOTE: THE PENDING REVISION OF THE NATIONAL FLOOD INSURANCE ADMINISTRATION HAZARD MAP WILL UPDATE THIS PLATE.

ared by
rd planning department

october 1974

ACTION	ESTIMATED COST
Levee	$11.9 million*
Local flood area improvements	2.0 million**
Total Estimated Costs	$13.9 million

Sources:

*U. S. Corps of Engineers
**Oxnard City PUblic Works Department

RECOMMENDED ACTION - FLOODING	PROPOSED PROJECT
	SOILS
P	TOPOGRAPHY
S	SUBSURFACE CONDITIONS
	CLIMATE
	VEGETATION
	WILDLIFE
P	LAND USE
	WATER SUPPLY
	SEWAGE
	SOLID WASTE
P	DRAINAGE
	ENERGY
P	TRANSPORTATION
	AIR POLLUTION
	NOISE POLLUTION
	WATER POLLUTION
	SCHOOL FACILITIES
P	PUBLIC SAFETY
P	PUBLIC HEALTH
P	RECREATION FACILITIES
S	EMPLOYMENT OPPORTUNITIES
P	OTHER - RESEARCH
P	OTHER - CONSTRUCTION COSTS
	OTHER
	OTHER
	OTHER
	OTHER

P - PRIMARY
S - SECONDARY

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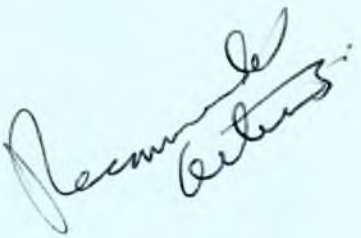


D. Landslide/Mudslide

Recommended Actions:

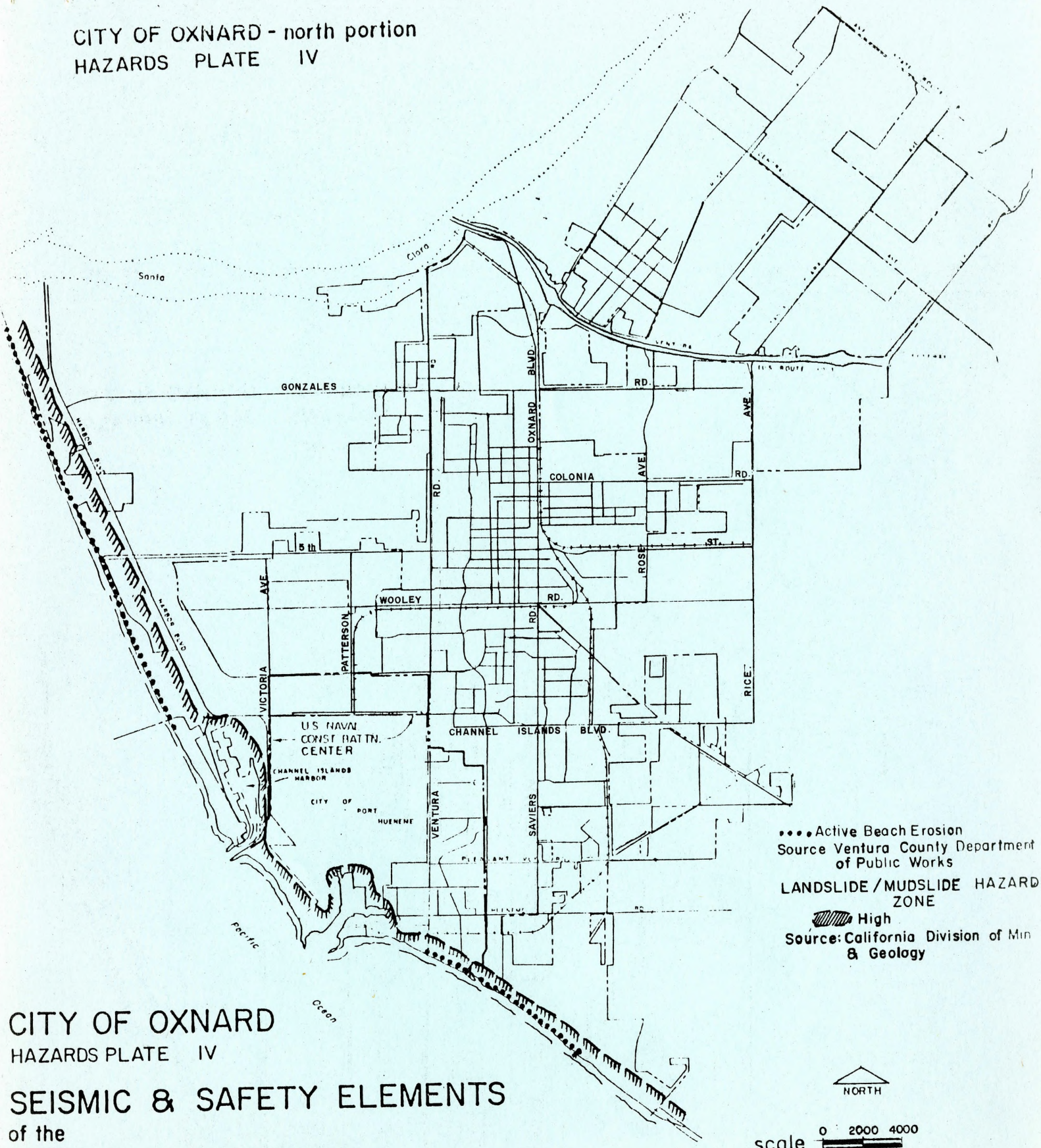
1. Require that any proposed development within the Existing Landslide Areas or areas of High or Intermediate Hazard indicated on Hazards Plate IV be evaluated by qualified personnel retained by the local agency to determine if engineering, geologic, or soils engineering feasibility studies are necessary prior to approval of proposed land uses and require such a report where necessary.

2. Require each proposal for land development to be reviewed by qualified personnel registered by the State, such as professional engineers or geologists, and include a recommendation to the City as to the safety of the proposed development.

3. Achieve adequate enforcement through establishing qualified staff or retaining private consultants.

Impacts: These actions are largely administrative and bear upon technical studies prior to approval of land use. While public health and safety are logical impacts, it should be noted that the landslide/mudslide areas outlined on Map 20 are relatively free from such hazards, except for those areas along the coast subject to low angle landsliding or bank failure caused by soil liquefaction during earthquake shaking, since mass movements are normally associated with hillsides or steep slopes.

CITY OF OXNARD - north portion
HAZARDS PLATE IV



CITY OF OXNARD
HAZARDS PLATE IV

SEISMIC & SAFETY ELEMENTS
of the
RESOURCES PLAN & PROGRAM

MAP No. 20

P - PRIMARY
S - SECONDARY

ENVIRONMENTAL IMPACTS

RECOMMENDED ACTION - LANDSLIDE/ MUDSLIDE	PROPOSED PROJECT
	SOILS
	TOPOGRAPHY
	SUBSURFACE CONDITIONS
	CLIMATE
	VEGETATION
	WILDLIFE
P	LAND USE
	WATER SUPPLY
	SEWAGE
	SOLID WASTE
	DRAINAGE
	ENERGY
	TRANSPORTATION
	AIR POLLUTION
	NOISE POLLUTION
	WATER POLLUTION
	SCHOOL FACILITIES
P	PUBLIC SAFETY
P	PUBLIC HEALTH
	RECREATION FACILITIES
S	EMPLOYMENT OPPORTUNITIES
P	OTHER - RESEARCH COSTS
	OTHER
	OTHER
	OTHER
	OTHER
	OTHER

E. Beach Erosion

Recommended Action: 1. Establish a procedure for City review of any proposals for direct alteration of shoreline configuration, or structures which protrude into the ocean, to insure that the detrimental effects to natural processes, which includes increased erosion of downcurrent beaches, are avoided. This should be completed before substantial financial commitments are made.

Impact: This recommendation has definite policy implications for the city in the area of shoreline planning and establishment of a review process. While the area is subject to planning procedures authorized by the Coastal Zone Act, this action clearly states a need for city review of construction activities along the shoreline. Such a review will require a customary application and review process. As for the timing of the review, subsequent liabilities resulting from financial commitments made prior to review cannot be avoided.[7]

Recommended Action: 2. Utilize structures which impede beach erosion and/or wave activity, such as groins, jetties, and seawalls, only where property is clearly in danger of being destroyed or eliminated, or where overriding public benefit clearly demonstrates the need for additional marine installations. These structures should be designed in such a way as to minimize erosion seaward of the structures and at adjacent points along the shore.

Impact: Construction costs are the major impacts here. Typical costs of various marine installations are summarized below:

Estimated Costs of Shoreline Protection Improvements*

Groins	$500/linear foot
Jetties	$1500/linear foot
Seawalls	$350/linear foot

*Source: U.S. Corps of Engineers

Since groins range between 400 and 800 feet in length, construction costs can range between $200,000 and $320,000. Similar construction costs can be generated for jetties and seawalls or revetments.

Recommended Action: 3. Establish a working relationship with the proper County agency (County Flood Control District) to monitor sediment production, including riverbed mining

operations, as to their effects upon sediment transport. Establish criteria for the amount of mining permitted and the amount of sediment for stream transport.

Impact: Although monitoring of river sediment production and transportation is a primary impact requiring on-going expenses, regulation of mining appears as a major and complicated impact.

Regulation of associated sand and gravel industries is an impact which carries several drawbacks. Firstly, there is the matter of a municipality regulating the activities of a private industry. Secondly, there are difficulties inherent in setting limits to the amount of mining permitted upstream on the Santa Clara River. Moreover, theoretical obstacles exist in the form of determining what amount of bed load or suspended material is required for beach replenishment.

Recommended Action: 4. Investigate the feasibility of preserving existing sand dunes to serve as protective barriers against erosion and tidal flooding. Stabilize existing dunes via surface vegetation and construct artificial dunes where appropriate.

Impact: Implementation of this recommendation has the positive benefits of preserving a highly aesthetic area characterized by sand dunes and the pragmatic function of preventing tidal flooding. Costs would necessarily be incurred in the process of dune stabilization through planting or man-made artifices. Some typical costs associated with dune stabilization are as follows:

Dune Stabilization

Technique	Cost
Planting (seeding)	10-15¢/square foot*
Construction (fencing with chain link)	$49/100 feet**

* Bruce Cowan, Asilomar Dunes - Recreation Versus Nature (California State Park System, N.D.)

**Inter-office memorandum, Asilomar (California State Park System, November 21, 1969)

Recommended Action: 5. Keep land uses which are subject to serious property damage from beach erosion out of beach erosion hazard zones. Control the siting and design of uses in erosion hazard zones to minimize the danger of property damage from erosion, such as requiring deep pilings for houses.

Impact: In the absence of conventional land use planning controls the recommended action here will have far reaching impacts on shoreline construction activities. A logical impact will be the prevention of construction in beach areas subject to wave erosion or tidal flooding. Considerable savings in terms of property investment should occur. Moreover, appropriate design and siting controls, as recommended, should prevent damage in potentially dangerous areas.

Recommended Action: 6. Until the adoption of regulations controlling land use specifically in the beach erosion hazard zone, afford owners of hazard zone property all available information which serves to warn them of the threat of hazard within the zone.

Impact: As a substitute for weak or non-existent land use controls, the establishment of an information base regarding beach erosion would benefit potential and current residents of the area who may seek to engage in new construction activities.

Summary

Essential impacts are related to the following: prevention of beach erosion; preservation of aesthetic features associated with coastal sand dunes; prevention of top soil loss, especially in the Ormond Beach area; protection of industrial, residential, and recreational facilities and related public improvements. As depicted in the accompanying matrix, other impacts will be felt in the regulation of the sand and gravel industry in an attempt to monitor sediment transportation and consequent beach preservation.

RECOMMENDED ACTION - BEACH EROSION	PROPOSED PROJECT
S	SOILS
P	TOPOGRAPHY
	SUBSURFACE CONDITIONS
	CLIMATE
	VEGETATION
	WILDLIFE
P	LAND USE
S	WATER SUPPLY
S	SEWAGE
	SOLID WASTE
P	DRAINAGE
	ENERGY
P	TRANSPORTATION
	AIR POLLUTION
	NOISE POLLUTION
	WATER POLLUTION
	SCHOOL FACILITIES
P	PUBLIC SAFETY
P	PUBLIC HEALTH
	RECREATION FACILITIES
	EMPLOYMENT OPPORTUNITIES
	OTHER - RESEARCH COSTS
P	OTHER - CONSTRUCTION COSTS
S	OTHER - REGULATION OF SAND & GRAVEL INDUSTRY
P	OTHER - CONTROL OF RIVER SEDIMENTS
	OTHER
	OTHER

P - PRIMARY
S - SECONDARY

F. Liquefaction

Recommended Actions:

1. Encourage performance of regional studies by qualified Federal and State agencies such as the U. S. Geological Survey and the State Division of Mines and Geology, or private research firms, in order to more accurately determine areas of potential soil liquefaction hazards and the probability of occurrence.

2. Encourage and participate in cooperative studies with the above agencies.

3. Encourage State or Federal agencies and universities, as well as private groups such as the Structural Engineers Association and the American Society of Civil Engineers, to undertake or sponsor research in design and construction to develop methods of providing greater resistance of structures to withstand the effects of soil liquefaction.

4. Utilize the latest uniform codes accepted by the State in the design of buildings and structures to resist liquefaction damage.

Impacts: Encouragement of regional studies of, and research on liquefaction, together with adoption of uniform codes are preventative measures which have long-term beneficial impacts. Costs, however, associated with the identification of precise hazard zones are unknown at this time and cannot be estimated with any degree of accuracy.

Recommended Action:

5. Evaluate water management plans and programs as to their effect on perched water tables as a factor of liquefaction. Make recommendations to appropriate agencies in areas where problems are identified to minimize liquefaction.

Impact: The impact of water management plans and programs is very significant since it is generally believed that fluctuations in water table correlate strongly with ground water recharge, and over-draughting for agricultural purposes. There are consequently, several aspects of the liquefaction issue (saturated soils, seismic activity, saltwater intrusion) which must be discussed.

Attention should be directed to pattern of agricultural land use change on the Oxnard Plain and commensurate groundwater pumping.

While it is commonly recognized that urbanization of farm land usually results in reduced ground water pumping for agriculture, a somewhat anomalous condition exists on the Oxnard Plain. Here changes in crop types, accompanied by multiple cropping practices have resulted in an overdraught of one of the two aquifers underlying the plain. Pumpage figures for the years 1956-57 and 1964-65 confirm the extent of overdraughting (Table 8). Although overdraughting of groundwater would appear to reduce the threat of liquefaction, two negative conditions persist. Firstly, salt water has intruded into the void created by overdraughting. This intrusion has been documented for at least three decades.[8] Secondly, intruding salt water has the same potential to saturate soils.

One other consideration which is suggested in reviewing the policies suggested in this section deals with groundwater levels. Groundwater management plans aimed at reduction of groundwater levels should produce an ideal situation wherein the sheer resistance of soils is increased by allowing an optimal amount of moisture to remain in the soil. Maintenance of low groundwater levels can, therefore, help to reduce the tendency for mass movement.[9]

Summary

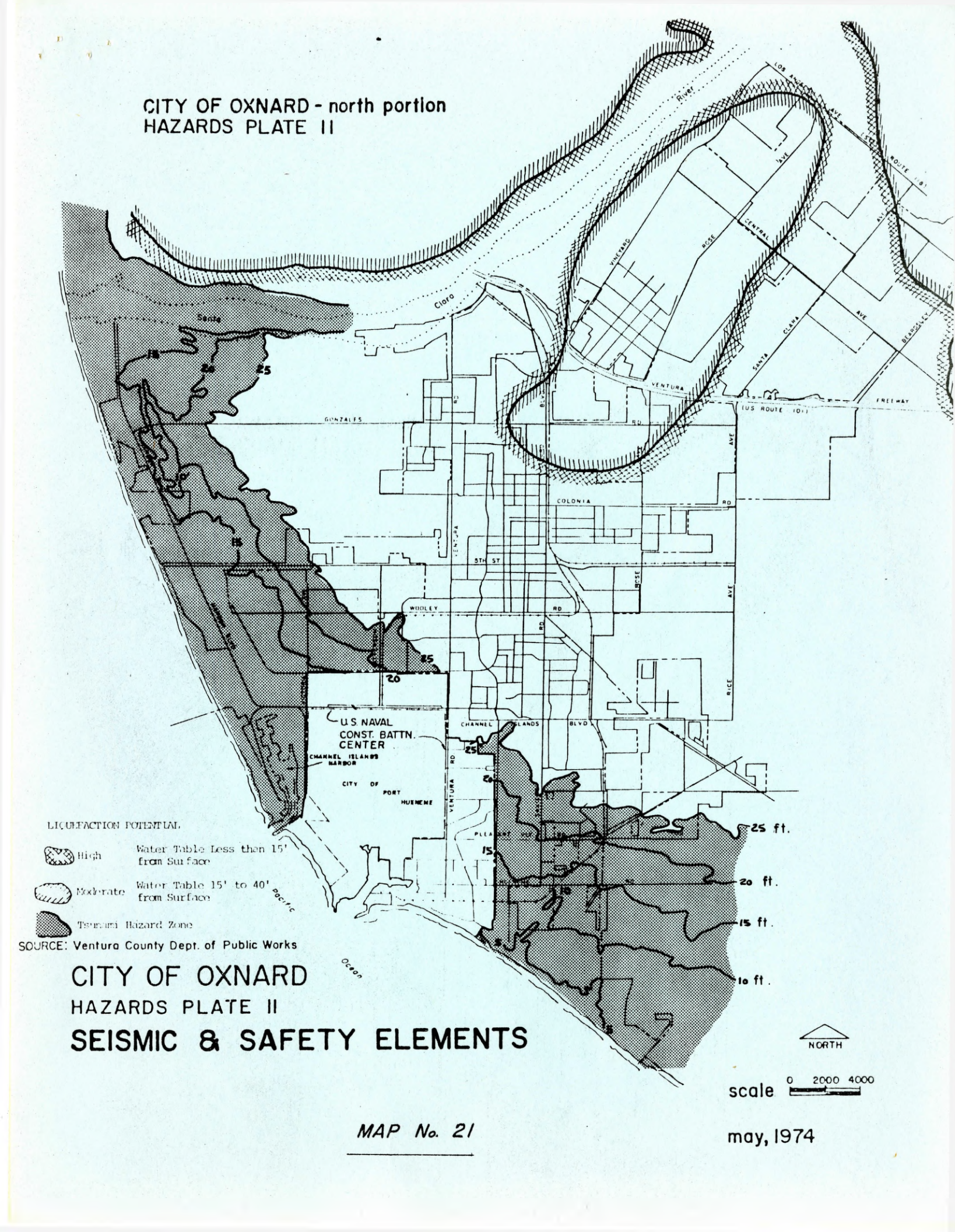
Since the entire City of Oxnard lies within the zone of high water tables (subject to at least moderate hazards) the range of impacts as shown in the matrix will be quite varied. Primary impacts of a beneficial nature will be registered in areas of public health and safety, land use, and water supply. Secondary impacts associated with costs of research and planning will occur with the result that subsurface conditions can be altered to minimize the effects of liquefaction.

TABLE 8

Groundwater Extractions Within the United Water Conservation District Service Area*

Basin of Aquifer	Average Annual Extraction
Oxnard - Upper	72,959 acre feet
Oxnard - Lower	6,203 acre feet
	79,162 acre feet

*Based on data for the years 1956-57 and 1964-65 as cited in United Water Conservation District, Report on Proposed Quality Management Pipeline and Oat Mountain Diversion (March, 1974).



CITY OF OXNARD
HAZARDS PLATE II
SEISMIC & SAFETY ELEMENTS

MAP No. 21

may, 1974

RECOMMENDED ACTION - LIQUEFACTION	PROPOSED PROJECT
	SOILS
P	TOPOGRAPHY
P	SUBSURFACE CONDITIONS
	CLIMATE
	VEGETATION
	WILDLIFE
P	LAND USE
P	WATER SUPPLY
S	SEWAGE
	SOLID WASTE
S	DRAINAGE
	ENERGY
	TRANSPORTATION
	AIR POLLUTION
	NOISE POLLUTION
	WATER POLLUTION
	SCHOOL FACILITIES
P	PUBLIC SAFETY
P	PUBLIC HEALTH
	RECREATION FACILITIES
	EMPLOYMENT OPPORTUNITIES
S	OTHER - RESEARCH COSTS
S	OTHER - PLANNING COSTS
	OTHER
	OTHER
	OTHER
	OTHER

P - PRIMARY
S - SECONDARY

G. Tsunami

Recommended Action: 1. Develop a contingency plan for tsunami and update if necessary. Include consideration of areas to be warned and evacuated under the Tsunami Warning Plan and contingency plans for alerting boat owners so that boats can be moved to the open sea.

Impact: Development of a contingency plan as recommended in this action would appear to be a redundant measure. While the general impact of this action is beneficial, it should be noted that a Basic Plan - Tidal Wave Warning - Evacuation already exists.[10]

According to this plan the desired action is "to minimize the loss of life, injury and property which could result from a tidal wave."[11] Essential aspects of this plan include: traffic control; mutual aid in services, equipment and facilities; issuance of warnings; evacuation; and de-alert.

Within the City of Oxnard, implementation of this plan is given to the Police Department (refer to attached excerpts of Tidal Wave plan and Map 22).

If implemented, the plan will provide protection to the zone inclusive of the shoreline up to the 20 foot contour line. Major facilities within this zone include: McGrath Beach State Park; the Harbor Boulevard bridge; the Mandalay Bay Beach Generating plant; local oil producing or storage facilities; residential and recreational facilities (refer to Map 22).

Recommended Action: 2. Investigate the feasibility of a program to protect existing sand dunes as possible barriers to tsunami inundation.

Impact: Research will require the expenditure of City manpower resources for an undetermined period of time. Enactment of such a program is clearly beneficial; nevertheless, some evaluation of costs is warranted.

With regard to immediate costs some figures below represent time spent on proposed ordinance revisions. These estimates are conservative and highly tentative.

TIDAL WAVE PLAN
Annex 2 - Supplement
PUBLIC WARNING

Warning

(Agencies responsible for warning by areas)

Agencies responsible should prepare standing operating procedure to accomplish their responsibility. Areas extend inland to include all land that is less than 20 feet above mean high tide and within 1 mile of the coast (see Mission, Annex 2)

Area #	Description	Warning Agency	Estimated Contact
1	Santa Barbara County line to Ventura City's west boundary.	Vta. County Fire Dept.	450
2	Ventura City area between Ventura River & Santa Clara River.		
	Unincorporated area on beach side of Pierpont Blvd. between Bangor Lane on west to Greenock Lane on east.	Sheriff's Dept.	1000
3	Unincorporated area between Santa Clara River and Channel Island Blvd.	Sheriff's Dept.	6
	Oxnard City area between Santa Clara River and Channel Islands Blvd.	City of Oxnard	
4	Unincorporated area between Channel Islands Blvd. and east boundary of City of Port Hueneme.	Sheriff's Dept.	1500
	City of Port Hueneme.	City of Port H.	
	USN-CBC	U.S. Navy	
5	Unincorporated area between east boundary of Port Hueneme and Mugu Rock, inland between Hueneme Road and Pacific Coast Hiway.	Sheriff's Dept.	15
	Oxnard City area between Port Hueneme and Mugu Rock.	City of Oxnard	
	Point Mugu NAMTC	U.S. Navy	
6	Unincorporated area along Pacific Coast Hiway between Mugu Rock and L.A. County line.	Sheriff's Dept.	100

NOTE: Estimated beach population will vary with season and time of day. County and State Divisions of Beaches and Parks will assist in their areas of responsibility.

TIDAL WAVE PLAN
Annex 2

Warning

Purpose.

To specify actions to be taken to notify all persons in our beach areas that a warning has been received from a responsible governmental agency that a Tidal Wave has been generated and there is a possibility of this Tidal Wave striking the Ventura County coast at a specified time.

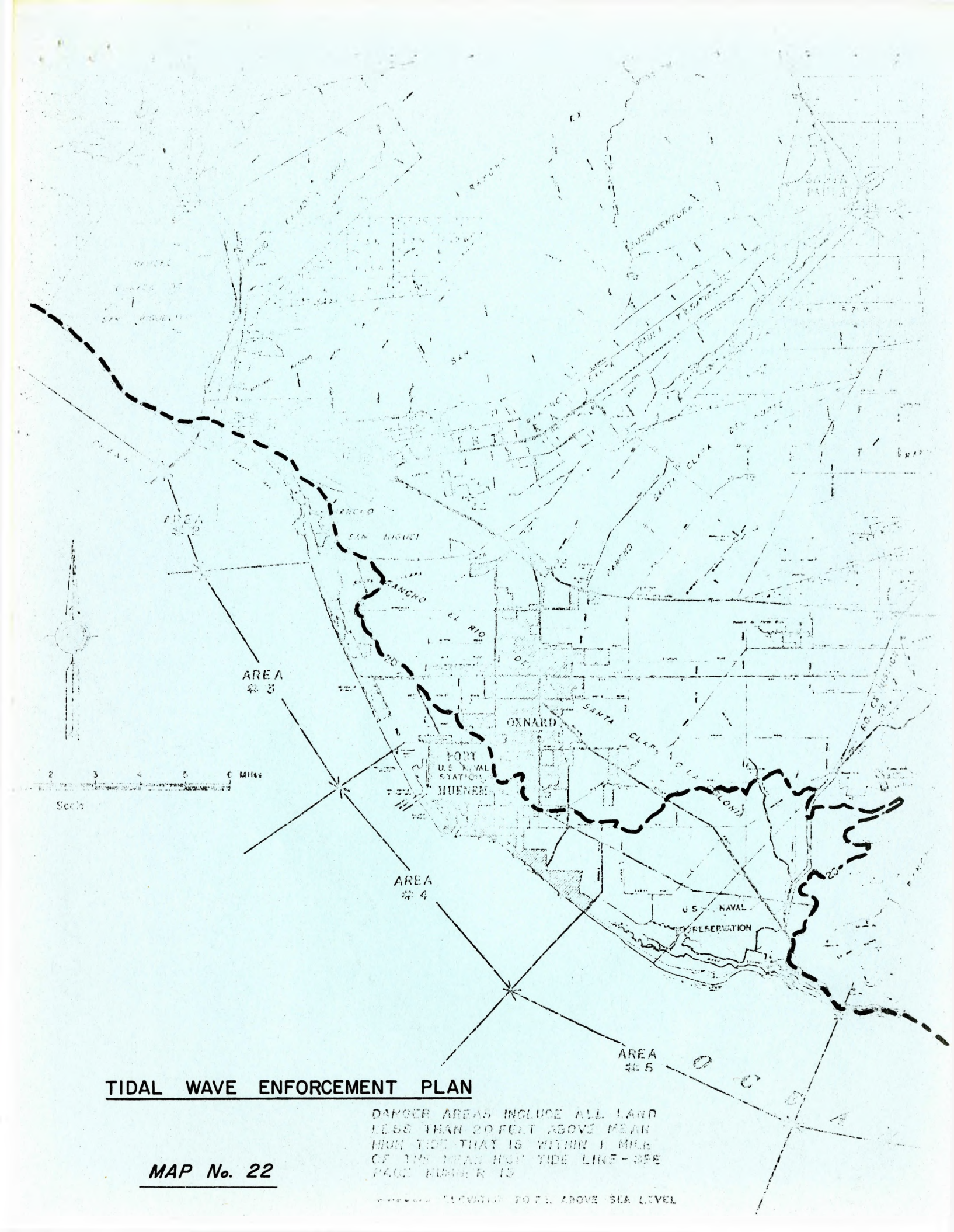
Alert all persons in our coastal areas that are less than 20 feet above and within one mile of mean high tide, immediately after the warning and estimated time of arrival is received. Advise that their radios be tuned to local radio stations for further information and suggested action.

Actions.

1. When warning is received at the Sheriff's Department, the Watch Commander has the responsibility of immediately notifying the following officials and agencies who have Warning, operational or Supporting responsibilities according to the Sheriff's S.O.P.

Group 1	Group 2	Group 3
Sheriff	Radio Station Mgrs.	County Executive
Fire Chief	Hueneme C.B.C.	County Safety Off.
Calif. Hiway Patrol	USN,Point Mugu	Am. Red Cross
Oxnard Police Dept.	Co. Harbor Dept.	Co. Welfare Dir.
Port Huneme Police Dept.	State Div. of Beaches	Co. Personnel Dir.
Ventura Police Dept.	Co. Parks Division	Co. Purchasing Agent
County C.D. Coordinator		Co. Communications Dir.

2. Activate Sheriff's Standing Operating Procedure to accomplish the mission.



TIDAL WAVE ENFORCEMENT PLAN

DANGER AREAS INCLUDE ALL LAND LESS THAN 20 FEET ABOVE MEAN HIGH TIDE THAT IS WITHIN 1 MILE OF THE MEAN HIGH TIDE LINE - SEE PAGE NUMBER 13

ELEVATIONS IN F.T. ABOVE SEA LEVEL

MAP No. 22

Estimated Ordinance Revision Costs*

Activity	Hours	Hourly Wage	Cost
Drafting	8	6.15	49.20
Advertising			12.00
Professional Planning Staff	100	7.50	750.00
Secretarial	20	4.56	91.20
City Attorney	18	----	180.00
Estimated total cost			$1,082.40

*Source: City of Oxnard, Classification and Salary Schedule (June 29, 1975)

Recommended Action: 3. Insure that the existing jetties and breakwaters adjacent to Channel Islands Harbor are maintained at the minimum of the existing levels, or improve based on changes in the state of the art.

Impact: The immediate impacts here are purportedly beneficial in nature since they involve protection of Channel Island Harbor and its supportive facilities. Maintenance of jetties and breakwaters adjacent to Channel Island Harbor may, however, carry some negative, although secondary impacts.

Negative impacts here, can be ascribed to the interruption of sand transportation southwards along the shoreline by long-shore drift. The current jetties which have been installed at the harbor have unquestionably contributed to the build-up of sand on the northside of the harbor entrance, while serving to erode the beach in the Silver Strand area.[12]

Other related impacts can be measured in support for continuing research on jetty or breakwater improvements.

Summary

The primary impacts resulting from these actions will be in the protection of land use facilities and residents within the 11 square

mile area included within the 20 foot contour line. Other impacts, largely secondary in nature, involve on-going maintenance and research costs.

P - PRIMARY
S - SECONDARY

RECOMMENDED ACTION - TSUNAMI	PROPOSED PROJECT
P	SOILS
P	TOPOGRAPHY
	SUBSURFACE CONDITIONS
	CLIMATE
	VEGETATION
	WILDLIFE
P	LAND USE
	WATER SUPPLY
P	SEWAGE
	SOLID WASTE
S	DRAINAGE
	ENERGY
P	TRANSPORTATION
	AIR POLLUTION
	NOISE POLLUTION
	WATER POLLUTION
	SCHOOL FACILITIES
P	PUBLIC SAFETY
P	PUBLIC HEALTH
P	RECREATION FACILITIES
	EMPLOYMENT OPPORTUNITIES
	OTHER
	OTHER
	OTHER
	OTHER
	OTHER
	OTHER

H. Seiches

Recommended Action: 1. Insure that the existing jetties and breakwaters adjacent to Channel Islands Harbor are maintained at the minimum of the existing levels, or improve based on changes in the state of the art.

Impact: Continued maintenance costs associated with harbor improvements constitute the main impacts registered by this action. Since the likelihood of seiches occurring within Channel Islands Harbor is remote, the impact of this action will be minimal.

P - PRIMARY
S - SECONDARY

RECOMMENDED ACTION - SEICHES	PROPOSED PROJECT
	SOILS
	TOPOGRAPHY
	SUBSURFACE CONDITIONS
	CLIMATE
	VEGETATION
	WILDLIFE
P	LAND USE
	WATER SUPPLY
	SEWAGE
	SOLID WASTE
	DRAINAGE
	ENERGY
	TRANSPORTATION
	AIR POLLUTION
	NOISE POLLUTION
	WATER POLLUTION
	SCHOOL FACILITIES
P	PUBLIC SAFETY
P	PUBLIC HEALTH
P	RECREATION FACILITIES
S	EMPLOYMENT OPPORTUNITIES
P	OTHER - MAINTENANCE COSTS
	OTHER
	OTHER
	OTHER
	OTHER
	OTHER

I. Subsidence

Recommended Actions:

1. In cooperation with the County Surveyor and National Ocean Survey, develop a program to fully monitor subsidence activity in Oxnard and its immediately adjacent areas.

2. Maintain a full, up-to-date library of data concerning the geology of the Oxnard Plain, particularly those portions lying within the Oxnard sphere of influence. This data should include all available information derived from past oil and water well drilling activities.

3. Assemble and analyze such information concerning groundwater management and oil production operations in Oxnard and its vicinity as available from past completed studies. Obtain and regularly review all related future studies. Regularly secure current data on:

   a. Water well levels and water management, and,

   b. Petroleum production operations.

4. Take such actions that may be appropriate to insure that the necessity of control of land sinkage is an important consideration in water management recommendations that are included in the current study being conducted by the California Department of Water Resources. Support implementation of the water management program recommended as a result of this study to insure that water replenishment measures are sufficient to substantially restore and maintain water tables in the southwestern area of the Oxnard Plain, and monitor results from the standpoint of control of land subsidence.

Impacts: Implementation of these recommendations would result in the protection of property affected directly by subsidence as well as the other hazards which operate in conjunction with subsidence. Flooding is a prime example of a related hazard which is exacerbated by subsidence.[13] On the other hand, it is important to note that the general remedial actions proposed here are complicated by the existence of

other hazards which require dissimilar approaches. Specifically, the impact of maintaining groundwater levels may be inconsistent with actions proposed to alleviate the threat of liquefaction.

Secondary impacts pertaining to an on-going review of data which are related to causes of subsidence pose some difficulties. A fundamental question arises in the area of assembling and analyzing data on fluid extraction activities. The U. S. Geological Survey, the State Department of Water Resources, the State Division of Oil and Gas, the U. S. Coast and Geodetic Survey, and the County of Ventura all provide data through existing monitoring programs. If the City develops a monitoring plan, as suggested in this recommended action, the action may prove to be redundant. Furthermore, no particular City agency or personnel have been entrusted with the task of securing and analyzing current data.

If the recommendations are implemented, some duplication of services on the part of a City agency will result. A related built-in liability of requiring such City services is the absence of City personnel who possess technical expertise on the topic of fluid extraction and subsidence.

Recommended Action: 5. If analysis of oil production operations indicates any significant potential cause of past and future subsidence, restoration and maintenance of oil reservoir pressures will be required.

Impact: Two aspects of the action here deserve commentary. Firstly, the State notes that subsidence due to oil and gas withdrawal is being adequately controlled.[14] If control procedures are accepted as being adequate, then the recommended action is of little consequence. Secondly, if subsidence on the Oxnard Plain can be related to oil extraction, then "restoration and maintenance of oil reservoir pressures," is an action which has highly beneficial consequences.

With regard to repressurization, associated costs and benefits can be surmised from the Long Beach, California, experience:[15]

> ..., much effort and expense has been required to repair and maintain oil field structures, especially oil wells, affected by subsidence and horizontal movements...as damage in the Wilmington field rose to over $100 million, the U. S. Department of Justice attempted to close the oil operations. The oil companies responded by trying to reduce effective stresses in the compacting reservoir systems. Attempts to increase fluid pressure in the Wilmington field began in 1958 with the injection of water from shallow aquifers into the oil reservoir zones. It is interesting to note that a major economic motivation for this remedial measure was the belief that repressurization would cause an increase in oil yield. The efforts have been successful both in affecting subsidence and in increasing oil yield.

Summary

Since fluid extraction is identified as a probable cause of subsidence on the Oxnard Plain, studies of ground water and oil removal and their correlation with subsidence will have long-term beneficial impacts. There are, however, aspects of the recommended action which tend to minimize any beneficial impacts:

1) No vehicle exists for the City's accumulation and analysis of relevant data.

2) There will be a redundancy of services should the City monitor subsidence activity. In addition, monitoring requires the hiring of personnel with appropriate skills.

3) While ground water management aimed at reducing subsidence may be feasible, certain contradictory actions must be reconciled. Chief among these contradictory actions are measures taken to reduce ground water levels to minimize the threat of liquefaction and action taken to maintain ground water levels to prevent subsidence.

4) Control of land sinkage associated with oil production operations is hindered by the confidential nature of oil reservoir locations.

RECOMMENDED ACTION - SUBSIDENCE	PROPOSED PROJECT
	SOILS
P	TOPOGRAPHY
P	SUBSURFACE CONDITIONS
	CLIMATE
	VEGETATION
	WILDLIFE
P	LAND USE
S	WATER SUPPLY
S	SEWAGE
	SOLID WASTE
S	DRAINAGE
	ENERGY
	TRANSPORTATION
	AIR POLLUTION
	NOISE POLLUTION
	WATER POLLUTION
P	SCHOOL FACILITIES
P	PUBLIC SAFETY
P	PUBLIC HEALTH
P	RECREATION FACILITIES
	EMPLOYMENT OPPORTUNITIES
	OTHER
	OTHER
	OTHER
	OTHER
	OTHER
	OTHER

P - PRIMARY
S - SECONDARY

J. Expansive Soils

Recommended Action: 1. Within Oxnard, the control procedures should be maintained at present levels. Projecting this performance into the future indicates adequate protection will be provided by this level of service.

Impact: Although the greater portion of the City is exposed to at least moderate hazards associated with expansive soils (see Map 23) the impact of this recommendation is limited to an area comprising approximately 4,000 acres (Map 24) which are located chiefly in the Del Norte area.

The nature of expansive soils encountered in the Del Norte and other areas is summarized as follows:[16]

> In general, the soil that has the highest clay content shrinks and swells the most. For some soils, however, the kind of clay is a more important factor than the amount.

Furthermore, the 4,000 acres identified contain highly expansive soils about which it is noted:[17]

> As the shrink-swell potential increases, the soil becomes less suitable. Detailed investigation of a site is needed if the estimate for shrink-swell potential is moderate or high.

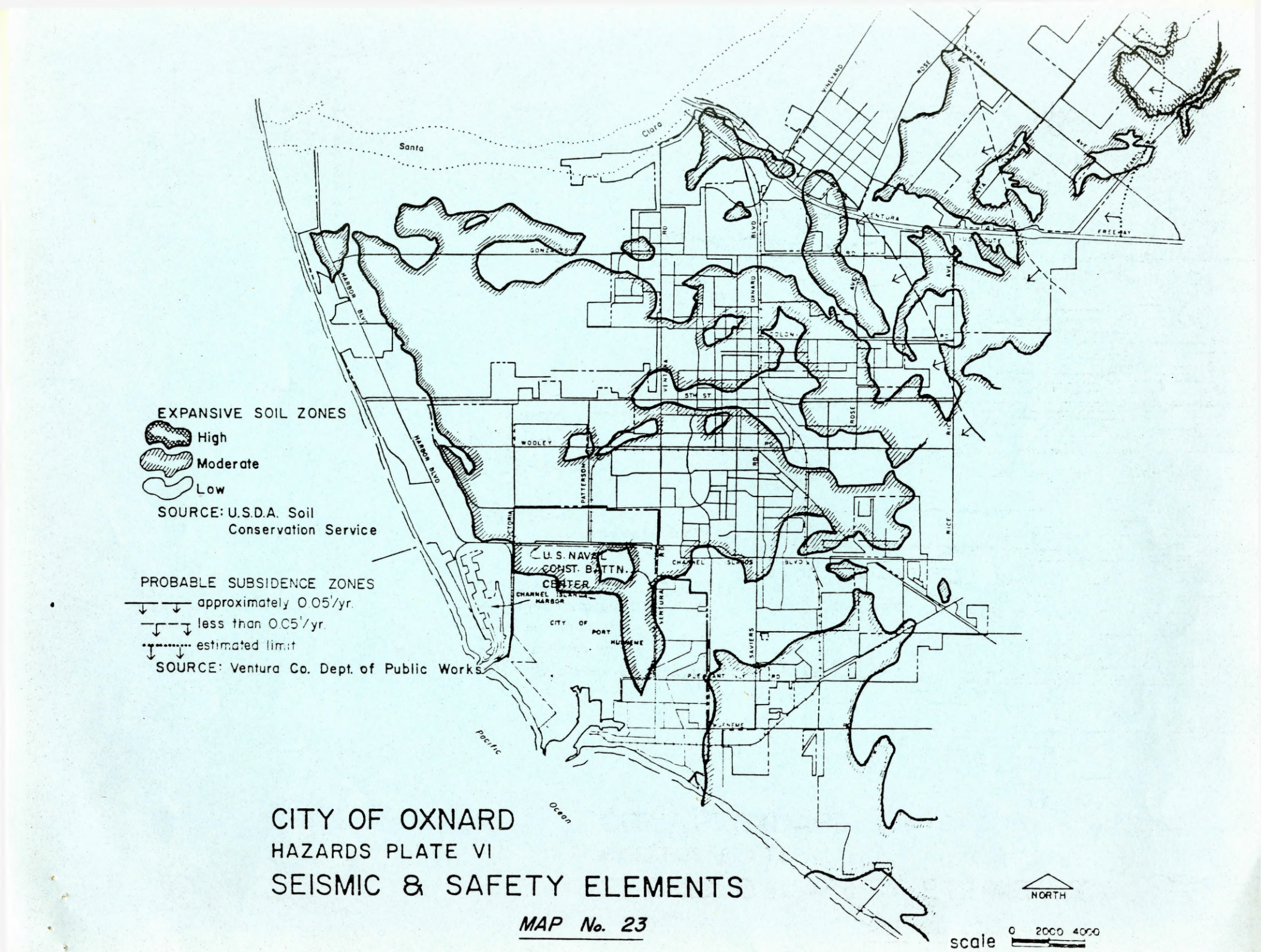
It is clear that full implementation of the recommended action will prevent severe damage to residential and other types of buildings.

Evaluation of existing control procedures indicates that expansive soils are singled-out for consideration:[18]

> If the preliminary soil report indicates the presence of critically expansive soils or other soil problems which, if not corrected, would lead to structural defects, a soil investigation of each lot in the subdivision shall be prepared by a civil engineer who is registered by the State. The soil investigation shall recommend corrective action which is likely to prevent structural damage to each dwelling proposed to be constructed on the expansive soil.

In combination with equally applicable sections of the Uniform Building Code, structural damage occurring on expansive soils can be avoided.

As a corollary, attention is directed to the additional costs which arise as a result of extensive soil investigations. While these investigations may appear as direct costs to the landowner/developer, they are, in actuality, borne ultimately by the consumer; that is, the future homeowner or occupant of the site.

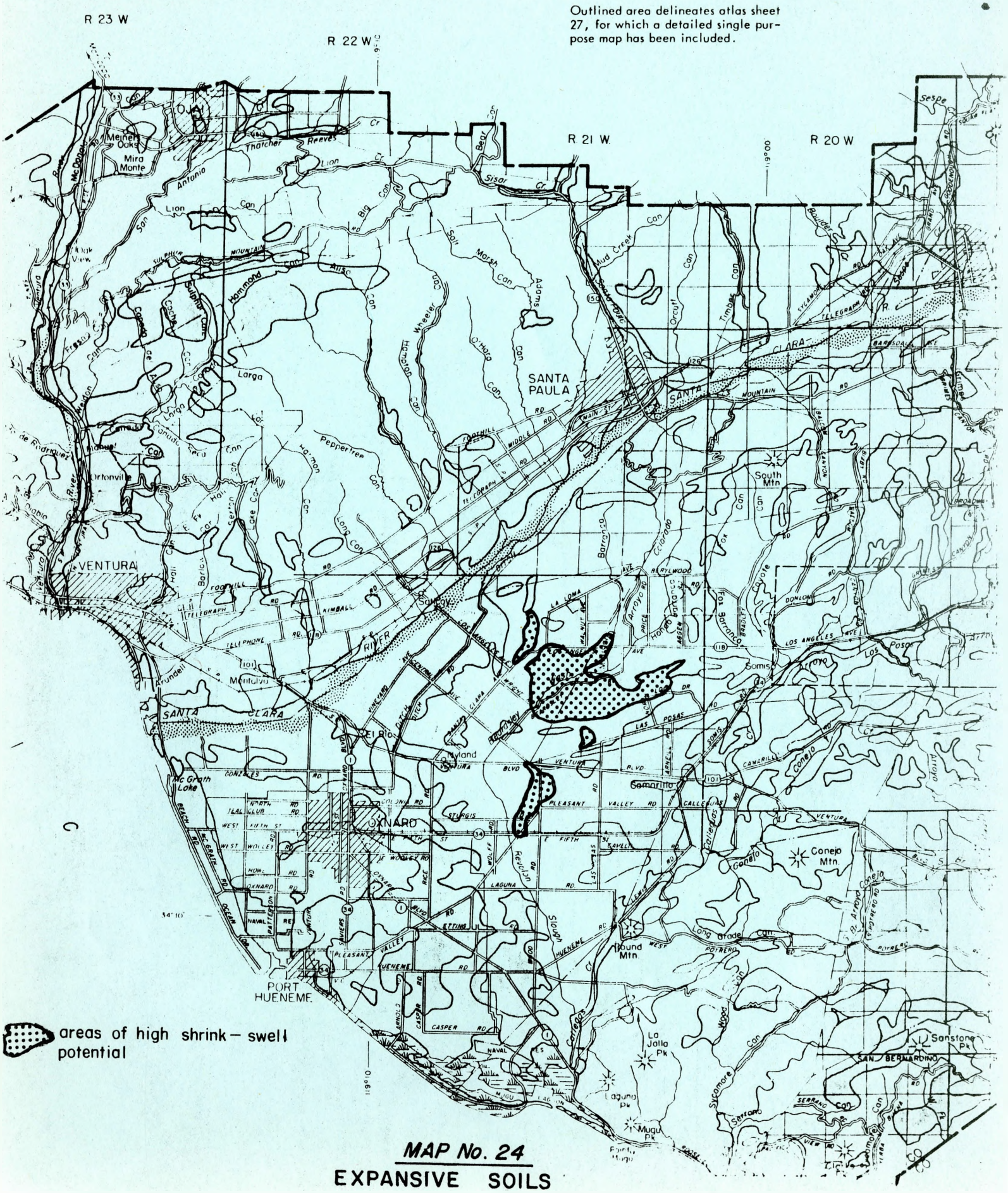


CITY OF OXNARD

HAZARDS PLATE VI

SEISMIC & SAFETY ELEMENTS

MAP No. 23



MAP No. 24

EXPANSIVE SOILS

Summary

According to Map 24, approximately 4,000 acres of land contain soils of the Cropley Clay series which is subject to swelling and contraction during alternating wet and dry periods. In the long run, hazards associated with construction activities can be avoided through implementation of the recommended action. An example of the beneficial impacts rendered here can be seen in the example of the Park Oaks tract in Thousand Oaks, which was developed without adequate evaluations of soil characteristics and sufficiently protective building codes.

P - PRIMARY
S - SECONDARY

RECOMMENDED ACTION - EXPANSIVE SOILS	PROPOSED PROJECT
	SOILS
	TOPOGRAPHY
	SUBSURFACE CONDITIONS
	CLIMATE
	VEGETATION
	WILDLIFE
P	LAND USE
P	WATER SUPPLY
P	SEWAGE
P	SOLID WASTE
P	DRAINAGE
	ENERGY
	TRANSPORTATION
	AIR POLLUTION
	NOISE POLLUTION
P	WATER POLLUTION
P	SCHOOL FACILITIES
P	PUBLIC SAFETY
P	PUBLIC HEALTH
P	RECREATION FACILITIES
	EMPLOYMENT OPPORTUNITIES
	OTHER - ADMINISTRATIVE COSTS
	OTHER
	OTHER
	OTHER
	OTHER
	OTHER

K. Fire Hazards

Recommended Actions: 1. The most viable vehicle to implement the processes required to meet our goal to minimize life loss potential and property loss due to fire is to formulate a Master Plan for Fire Protection. The "Master Plan for Fire Protection" will be utilized to:

a. State the fire protection goals of our community.

b. Specify current and planned community environment in which fire protection is to be provided.

c. Describe current and planned fire services.

d. Identify needs for, and program allocation of, fire protection resources.

e. Promulgate inter- and intra-departmental policies and operational procedures with assigned responsibilities and authority.

f. Formulate and implement management policy. The plan will include typical Fire Department goals such as:

1) Establishment of an acceptable level of fire protection.

2) Identify and articulate benefits.

3) Formulate methods of measuring risk and performance.

4) Provide methods for community participation in formulation of the plan.

5) State level of required resource needs.

6) Provide a basis for inter-departmental programming and budgeting.

7) Assign fire protection responsibilities.

8) Determine priorities for action.

9) Design a system of effective management.

Implementation of a Master Plan for Fire Protection will necessitate legislative action by the City Council to establish standards for built-in fire protection systems. This legi-

slation should require that large facilities be designed to incorporate systems to furnish fire protection to the degree that these facilities will not require the general taxpayer to subsidize fire protection for the benefit of the few owners of the large facilities.

2. Several additional elements that should be specified in a Master Plan for Fire Protection are:

   a. Fire Prevention:

      1) An informed and concerned public is the most important factor in eliminating causative and contributive fire hazards. Only through an intensive program of dissemination of information and education can the public understand the problem and set personal objectives to eliminate fire hazards. The Fire Department must continue to improve its public information on the elimination of fire ignition and fire hazard is to be accomplished.

      2) Community-oriented neighborhood action programs should be encouraged in all neighborhoods to eliminate causative and contributive fire hazards. The currently organized Neighborhood Councils could be a valuable asset in this effort.

      3) The current program of engine company fire prevention inspections should be intensified in the enforcement of the Uniform Fire Code to reduce life hazard, fire ignition and fire loading factors that cannot be eliminated through public education and cooperative approaches.

      4) The Uniform Fire Code and the Uniform Building Code should be periodically reviewed in concert with the Master Plan with the intent of minimizing the size of public fire protection forces. Built-in fire protection systems have long been recognized as the best approach to standby fire protection in the most equitable and economical manner.

   b. Fire Detection and Reporting:

      1) All large multiple family residential occupancies and all large non-residential structures should be designed to incorporate an approved automatic fire detection

(products of combustion) system that will connect directly to an emergency reporting system.

2) A sophisticated public safety emergency reporting system is mandatory if we are to overcome the time lag between the recognition of an emergency situation and the dispatch of the appropriate emergency agency. The time lapse caused by indecision, wrong numbers, or locating the appropriate emergency number is a critical factor. One method to modify this critical factor is to employ mandatory operational standards applicable to a sophisticated 911 system of emergency reporting. Inter-agency cooperation between governmental jurisdictions and telephone companies' central offices to insure an "immediate call routing" capability is necessary. The ability to hold the reporting party on the line, to ring back the party, to selectively or automatically route calls, automatic number identification and automatic location identification are all critical requirements of a sophisticated 911 system.

3) The 911 system should be incorporated into the City's emergency system at the earliest possible date.

c. Fire Control

1) The current practice of continual update of information relating to optimum location of fire station sites in conformance with the General Plan should be continued. The General Plan, properly implemented, will assure that fire stations will be located to provide timely response of emergency fire services to citizens in need.

2) Every large non-residential structure should be provided with automatic fire sprinkler systems. When activated by fire, an alarm shall be automatically transmitted to an emergency dispatch center.

3) As more modern equipment becomes available, obsolete Fire Department

equipment should be replaced. This type of replacement program will contribute to a favorable cost benefit ratio.

4) Consideration should be given to continuing consolidation of response areas in Ventura County, Ventura City, and Oxnard City. These jurisdictions could gain through thoughtful consideration of the benefits to the taxpayer that may be derived.

Summary: The foregoing recommendations were designed to lower life and property loss potential and to transfer the major cost of fire protection to those who create the greatest need for such protection. Placing the major cost of fire protection on the individual developer and/or landowner rather than allocating it to property tax funds more equitably places the cost upon those who receive the most benefit. The main objective is to reduce the discovery time of fires, insure reliable means of transmitting the alarm, and control all fires before they exceed the fire control capabilities of the on-duty fire combat forces.

Fire protection systems should be included in construction to minimize manpower and equipment required to prevent large losses. An active code enforcement program by the Fire and Building Departments should be intensified to insure that maximum precautions are taken to minimize the ignition and spread of fire.

The City of Oxnard's goals in the Safety Element regarding Fire Protection are:

1. Maintain a fire prevention and fire protection system that benefits all Oxnard residents equitably.

2. Provide protection and relief to residents in the event of uncontrolled major disasters.

3. Safeguard the economy and well-being of the community through fire protection and immediate and temporary medical assistance.

To accomplish these goals, the following objectives and programs are planned:

1. Prevent fires from starting - objective: development of an intensified fire prevention activity. Programs:

a. Continue intensive fire prevention training for all companies.

b. Intensify the current public fire prevention educational activity.

c. Continue the comprehensive home inspection activity.

d. Intensify commercial fire prevention inspections.

e. Develop budgetary support for increased fire prevention activities.

f. Upgrade local ordinances through continuous review of applicable standards.

g. Upgrade fire and arson investigative capacity.

2. Hold to an acceptable minimum, life and property loss as to unpreventable fires and major disasters - objective: implementation of a master fire plan. Programs:

a. Design and cause to be implemented local legislation to provide for self protection and alarm notification for privately-owned structures.

b. Upgrade communications.

c. Upgrade apparatus and equipment.

d. Strategically locate men and equipment.

e. Upgrade traffic signal devices (for quicker fire response).

f. Make a new list of priorities of the Fire Department function, giving greater emphasis to fire prevention.

g. Institute intensified training:

1) Joint training with mutual aid partners

2) Expanded local fire fighter training

3) Expanded Emergency Medical Training

h. Recruit the best qualified and most highly motivated fire fighters.

i. Intensify fire pre-plan activity.

j. Intensify disaster training (area-wide).

k. Continuously upgrade response maps and run cards.

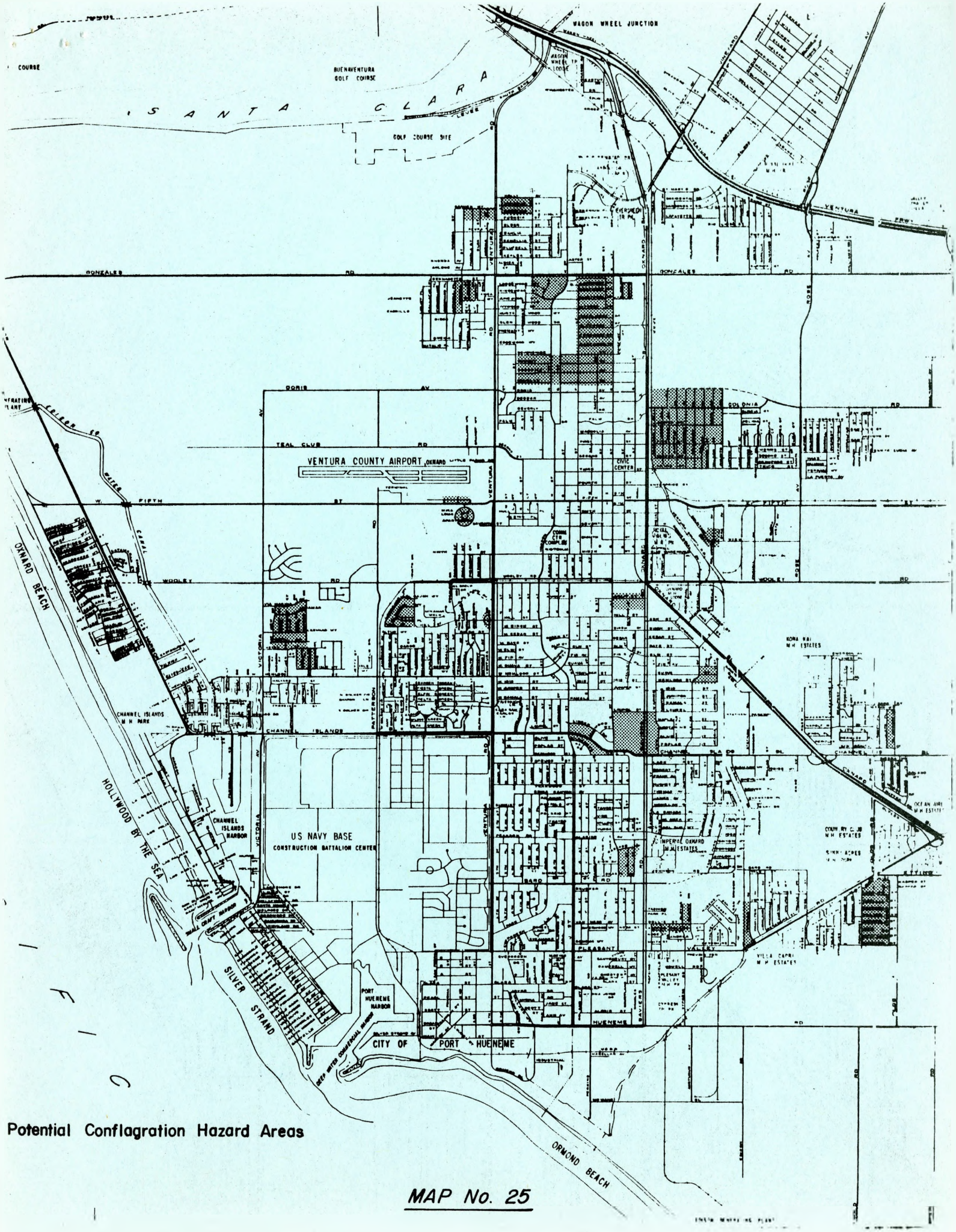
Impacts: Fundamentally, the recommendations bearing on fire hazards are highly positive and long-term in nature. The primary impacts (refer to matrix) will be in the area of protecting lives and property within the City of Oxnard. There are, nevertheless, adverse impacts (costs) associated with the provision of wide-spread beneficial programs.

Summary

Some of the costs involved in implementing these recommendations stem from activities in the following areas: maintaining and providing new fire fighting equipment; provision of public or community education programs; training of fire department personnel; increased manpower demands of the fire department; research and planning activities; perpetuation of fire inspection programs; and provision of related fire prevention activities. While exact costs are difficult to identify, the general fiscal nature of impacts is conveyed in the table below:

FIRE HAZARD NEEDS

TYPE	COST
Public Information - Education Program	$13,498 annually
Inspections	$2,200 annually
Training Programs -	$500 annually
Training Facility	$150,000/5 yr. period
Equipment Needs	FY 76-77 2 pumpers $160,000/5 yr. period



Potential Conflagration Hazard Areas

MAP No. 25

P - PRIMARY
S - SECONDARY

RECOMMENDED ACTION - FIRE HAZARDS	PROPOSED PROJECT
	SOILS
	TOPOGRAPHY
	SUBSURFACE CONDITIONS
	CLIMATE
	VEGETATION
	WILDLIFE
P	LAND USE
S	WATER SUPPLY
	SEWAGE
	SOLID WASTE
	DRAINAGE
	ENERGY
	TRANSPORTATION
	AIR POLLUTION
	NOISE POLLUTION
	WATER POLLUTION
P	SCHOOL FACILITIES
P	PUBLIC SAFETY
P	PUBLIC HEALTH
P	RECREATION FACILITIES
S	EMPLOYMENT OPPORTUNITIES
P	OTHER - PLANNING COSTS
P	OTHER - TRAINING COSTS
P	OTHER - PUBLIC EDUCATION
P	OTHER - CAPITAL IMPROVEMENTS
P	OTHER - EQUIPMENT COSTS
	OTHER

L. Structural Deficiencies

Recommended Actions:

1. Survey structures constructed, on a statistical basis, to identify and evaluate possible hazards.

2. a. Survey structures constructed after 1933, by sampling techniques, to identify and evaluate existing hazards.

   b. Identify and survey all structures constructed prior to 1933 to identify and evaluate existing hazards.

3. Identify and survey places of public assembly, such as hospitals, schools, fire stations, churches, and buildings that could expose a large number of persons to injury in case of structural failure.

Impacts: As in all of the succeeding recommended actions of this section, positive impacts occur in the areas of public health and safety. The actions under consideration help create these long-term beneficial impacts through continual surveying of structures. Survey costs, nevertheless, constitute a source of long-term municipal expenditures.

Of immediate importance is the identification of buildings which house large numbers of people and which could be subject to structural failure. The recommended action would, if carried out immediately, prevent large-scale injury.

Recommended Actions:

4. Eliminate the most hazardous structures through the removal or reinforcement of the structures against seismic forces. Make allowances to protect and preserve buildings of historical interest. Priorities should be decided based on these criteria:

   a. Those facilities whose continued performance is critical immediately after an earthquake.

   b. Those structures whose failure would cause significant numbers of injuries and perhaps substantial loss of life.

   c. Those structures whose failure would result in an unacceptable level of potential economic loss.

5. Adopt a "parapet" ordinance whereby existing hazardous parapets must be removed or reinforced.

Impacts: These actions are aimed at reducing structural deficiencies in existing buildings. The net impact of the actions will increase costs to the owner of the structure and the city itself. Respective costs are attributable to construction actions required to remedy deficiencies, and structural surveys and inspections carried out by City personnel. In addition some displacement of residents is possible which would involve undetermined relocation costs.

Recommended Actions:

6. Continue to adopt building codes which reflect the most recent findings in the field of structural seismic safety.

7. Support any means to insure the general availability of earthquake insurance.

Impacts: Adoption of these actions has policy ramifications. These recommendations convey a need to revise continually building codes in the light of recent research and to exert pressure on the insurance industry to make earthquake insurance available. The latter action is particularly tenuous.

Recommended Action:

8. Maintain on a continuing basis a specific current list of:

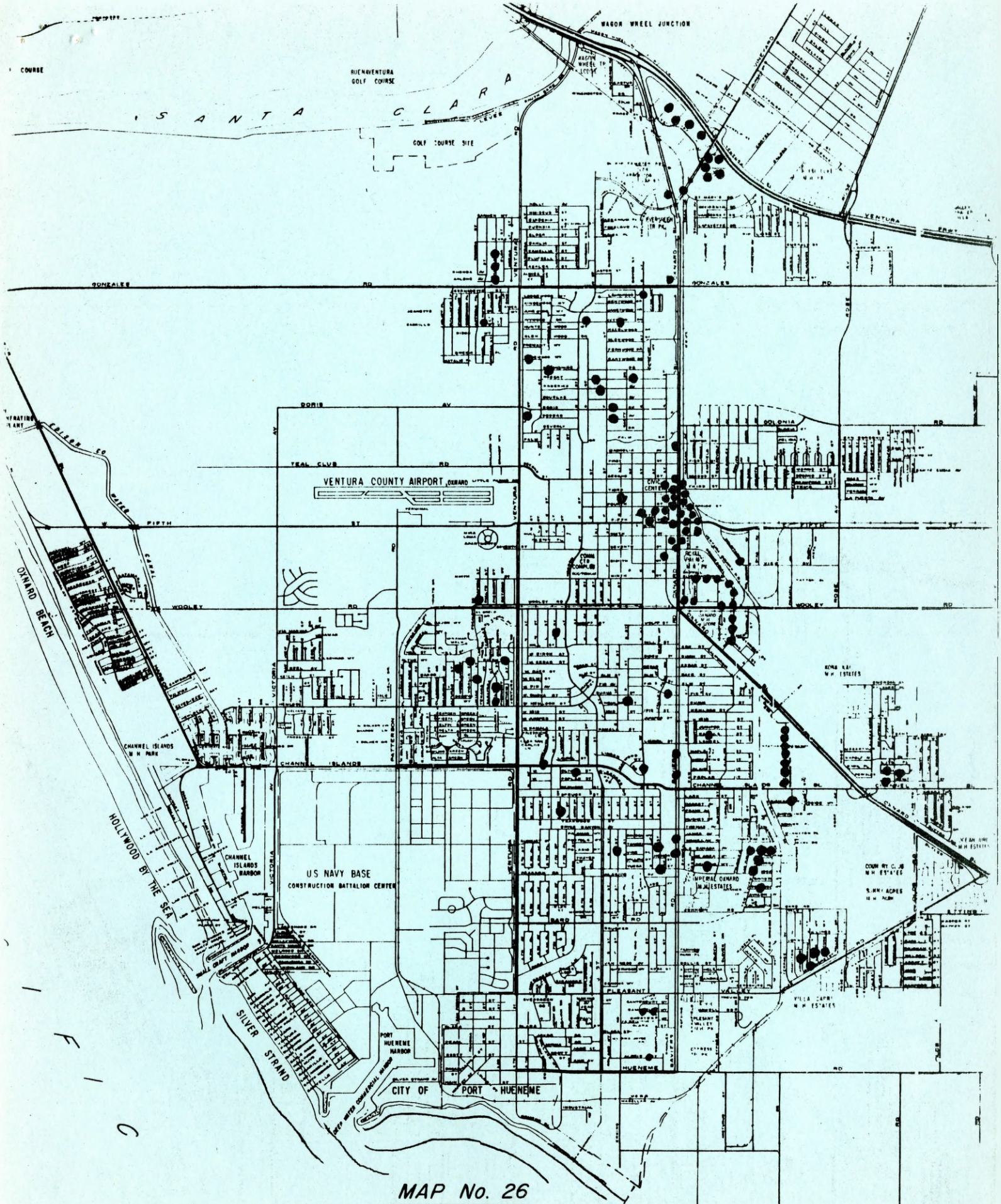
   a. Those facilities whose continued performance is critical immediately after an earthquake.

   b. Those structures whose failure would cause significant numbers of injuries and perhaps substantial loss of life.

   c. Those structures whose failure would result in an unacceptable level of potential economic loss.

   d. Those facilities or structures identified as a hazard in regard to structural deficiencies survey.

Impact: Compiling a list of susceptible structures and facilities within the City, is a preventative action with immediate benefits, however, costs will be attributed to continual surveying and monitoring costs. In this regard, the impact of this recommended action can be better understood by referring to the following map which shows the distribution of earthquake damage complaints after the 1973 earthquake.



MAP No. 26

DISTRIBUTION OF EARTHQUAKE DAMAGE COMPLAINTS

NOVEMBER, 1973

Several observations about the effectiveness of the recommended action can be made on the basis of this map:

1) The distribution of damaged buildings is focused in the central area of the City which contains most of the older buildings which are given to commercial or industrial use.

2) Damage sustained in outlying areas was associated mainly with residential buildings.

3) The distribution of damage should reflect proximity to fault hazard areas, however, it is possible to conclude that damage was sustained in structures which are characterized by poor initial construction or poor maintenance.

4) The impact of this action may be amplified by confining surveying and monitoring to the damaged areas, especially commercial and industrial ones, depicted on the map.

Summary

Recommended actions bearing on structural deficiencies, as summarized in the accompanying matrix, emphasize structural surveys, monitoring of building conditions, the altering of structures to correct deficiencies before or after earthquakes, and relocation costs. The long-term nature of these impacts is clearly beneficial, while the costs which are linked to implementation appear to be minimal (regarding these costs refer to the foregoing section dealing with earthquakes and groundshaking hazards).

P - PRIMARY
S - SECONDARY

ENVIRONMENTAL IMPACTS

RECOMMENDED ACTION - STRUCTURAL DEFICIENCIES	PROPOSED PROJECT
	SOILS
	TOPOGRAPHY
	SUBSURFACE CONDITIONS
	CLIMATE
	VEGETATION
	WILDLIFE
S	LAND USE
	WATER SUPPLY
	SEWAGE
	SOLID WASTE
	DRAINAGE
	ENERGY
	TRANSPORTATION
	AIR POLLUTION
	NOISE POLLUTION
	WATER POLLUTION
	SCHOOL FACILITIES
P	PUBLIC SAFETY
P	PUBLIC HEALTH
	RECREATION FACILITIES
S	EMPLOYMENT OPPORTUNITIES
P	OTHER - SURVEY AND INSPECTION COSTS
S	OTHER - NEW CONSTRUCTION COSTS
P	OTHER - RELOCATION COSTS
	OTHER
	OTHER
	OTHER

M. Seismic and Safety Final Recommendations

Recommended Actions:

1. When appropriate, revise all General Plan Elements which may be affected by the Seismic and Safety Element.

2. Include appropriate requirements and procedures for all City programs, including but not limited to zoning, subdivision and site development regulations, and building codes, as necessary to implement the approved Seismic and Safety Element and associated programs.

Impacts: The action specified here embodies an attempt to create an integrated approach to urban land use planning tools. General Plan Elements, zoning, subdivision, and building codes will be affected in an attempt to coordinate efforts. Implementation of these actions should create a synthetic and rational approach to land use problems within the planning area.

As a related observation on the impacts here, it should be pointed out that all hazards which have been mapped, as well as the maps of population distribution and other recommended study maps, be overlaid or viewed in sequence to measure or appreciate the full extent of the impacts. The major consequence of this technique will be the identification of zones of acute seismic and safety hazards.

Recommended Action:

3. Establish and enforce criteria and standards to eliminate unacceptable levels of risk.

Impact: Criteria and standards useful in eliminating unacceptable levels of risk (level of risk above which specific action by government is deemed necessary to protect life and property), may be established by implementation of the foregoing recommended actions (1 and 2). Still, mitigation of hazards identified may not be feasible, with the consequence that some elements of unacceptable risk will remain. More precisely, the action proposed here may be realized only partially since implementation devolves upon the municipality and its ability to allocate scarce resources.

Recommended Action:

4. Categorize, update, and maintain the disaster planning process to reflect data and policy considerations of the Seismic and Safety Element and contingency planning in the field.

Impact: The obvious impact here will be the integration of disaster planning activities and the Seismic and Safety Element.

Recommended Action: 5. Encourage State or Federal agencies and universities, as well as private groups such as the structural Engineers Association and the American Society of Civil Engineers, to undertake or sponsor research in design and construction to develop methods of providing greater resistance of structures to withstand the effects of seismic and natural hazards.

Impact: The impact of this action is beneficial, yet the immediate ramifications are unclear since it is not stated how respective agencies, universities, and private groups will be encouraged to undertake research. As a policy statement, this action is weak since there is no identifiable means of implementation.

Recommended Action: 6. That all people affected by a potential hazard or imminent danger receive a general notification.

Impact: The impact here will be positive since it is aimed at saving lives and protecting property. As a corollary, it should be noted that such notification will have a definite, if not immediate, impact upon land use, property values, and ultimately the distribution of population within the City. Furthermore, aside from the tsunami warning system, a means of notification is not specified, however, it can be assumed that the municipality will devise other methods to notify all City residents affected by danger or hazards.

Recommended Action: 7. Institute a Major Disasters Education Program.

Impact: Devising and carrying out an education program would entail considerable planning and training expenditures. It is impossible to estimate the costs of such a program.

IV. ANY ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED IF THE PROPOSAL IS IMPLEMENTED

Adverse environmental empacts associated with this project are confined to the following general areas:

1) Implementing surveys, monitoring, research programs, and educational programs will produce direct costs to the City and indirectly to City residents.

2) Costs to the City to maintain or replace equipment required to minimize or eliminate seismic or safety hazards.

3) Costs to the City to implement disaster relief plans.

4) Demolition and construction costs associated with structural surveys and growth management plans.

5) Costs to the City associated with capital improvements.

6) Displacement of land use activities and residents located in hazard zones, and related construction/relocation costs.

7) Potential loss in tax revenues associated with higher density uses which may be displaced or relocated.

8) Budget sufficient funds to carry out the recommendations of this element.

While some of the costs are indicated as estimates in the preceeding sections dealing with specific impacts, it should be noted that costs are incurred in the course of extracting a tradeoff which involves protection from hazards as opposed to costs of providing protection.

V. MITIGATION MEASURES PROPOSED TO MINIMIZE THE IMPACT

There is little that can be done to mitigate costs associated with the project. If public health and safety are to be assured, then some fiscal or social costs must be borne by the City and its residents. As is noted previously, City residents will not share equally in project benefits and costs due to differences in exposure to various hazards and socio-economic makeup.

The one plausible mitigation measure which is of minor consequence is the lessening of survey or research costs. Where existing federal, state or county agencies have established programs, or where universities have engaged in relevant research, some services and publications can be obtained free. Use of these existing resources would tend to lessen costs.

VI. ALTERNATIVES TO THE PROPOSED ACTION

There are only two alternatives which warrant consideration: no project and the devising of new policies.

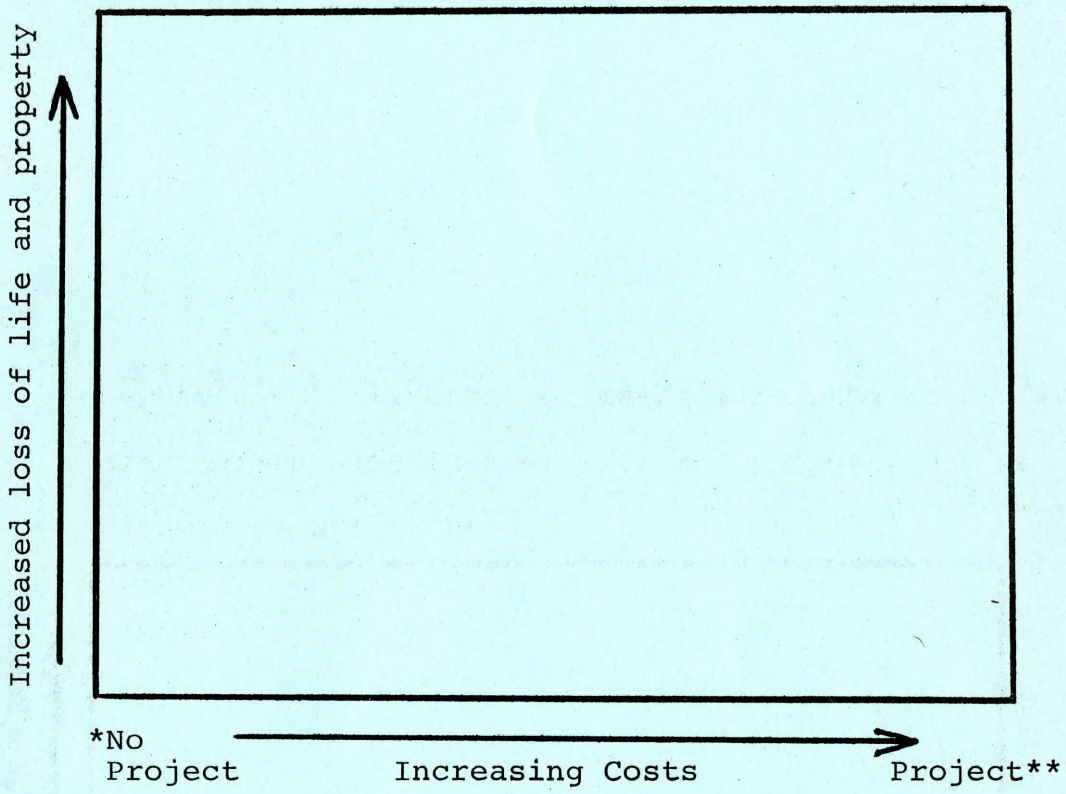
A. No Project. The no project alternative, although complicated by the requirements of State planning law, would result in the persistence of growth patterns, distribution of population and human activities in areas subject to seismic and safety hazards. While the no project alternative is certainly feasible from an economic standpoint, definite liabilities exist in the area of public health and safety.

The overriding consideration in the evaluation of this alternative is the matter of protecting lives and property. Whether or not the no project alternative is an acceptable one can, perhaps, be determined best by a consideration of subjective tradeoff analysis.

From a fiscal standpoint, the failure to implement the project will not produce immediate costs. As depicted in the following graph, the curve represents a willingness to avoid implementation costs (changes in land use patterns, effectuation of growth management plans, research, fire fighting equipment, ...) while sustaining risk to lives and property. The tradeoff represented by the no project alternative is based largely on community-wide perception of the various hazards and past policies which have not recognized the existence of these hazards.

B. Devising New Policies. There are several aspects of this alternative which are feasible and highly desirable. These aspects can be summarized as follows:

Hypothetical illustration associating the No Project Alternative with loss of life and property due to seismic or safety hazard.



*No Project Alternative, increases likelyhood of loss of life and property to residents of the City.

**Implementation of the project (final recommendations of Seismic and Safety Element) will increase the costs to the City government.

FIGURE No. 2

1) A closer integration of the recommended actions in the Seismic and Safety Element with other required elements (e.g. noise, and open space), would result in more comprehensive and effective environmental considerations. For example, areas of the City subject to seismic or related hazards, so identified, may then be placed under suitable land use controls.

2) New policies or sets of recommended actions would avoid a duplication of federal, state, and local governmental services where actions are implemented. In general, other agencies of government which possess technical expertise and manpower have already performed adequate analysis. New policies would establish a more clear-cut system of consultation between agencies.

3) New or amended policies would identify, with greater precision, those City departments charged with implementing recommended actions. This implementation might also be accompanied by cost estimates.

4) New or amended policies would provide a mechanism for the accumulation, analysis, and distribution of seismic/safety information.

5) New policies can identify how project benefits and expenditures will be distributed throughout the City; which sub-areas or socio-economic groups will be most affected by project implementation.

In evaluating the Seismic and Safety Element, a highly systematic approach is required. One recommended form of systematic program analysis is cited below:[19]

1) An unambiguous statement of the specific problem that the program is designed to solve.

2) Identification of criterion objectives upon which the impact of the program is measured.

3) Determination of the impact measures (that is, criterion measures) which form the analytical benchmarks for measuring both the singular and relative impacts of program action. Given the objectives of the program, this would generally entail a multiple indicator approach which was sensitive to both tangible (for example, social indicators) and non-tangible (for example, attitudes) measures of impact.

4) Delineation of the main program components which differentiate between alternative programs directed toward common policy objectives. The differentiating components may consist of different delivery systems, personnel training levels of contact, and so forth; any factors which provide an operational distinction between programs.

5) Estimates of the main effects, both social and economic, of each program alternative relative to the relevant criterion measures. This calculation must be sensitive to both the immediate and future effects. Any limitations in this estimation process should be clearly stated.

6) A statement of the major assumptions underlying the analysis should be stated along with estimates of the interactive component between the assumptions and the determination of main program effects. A crucial example would be the measurement of assumptions (for example, scale of measurement) contained in the selection of impact indicators. Thus, how sensitive is the analysis to the scale of measurement assumed in the selection of criterion measures?

7) Specification of the type of uncertainties which are contained in the analysis. That is, what is the extent of uncontrolled error which may be present in the analysis? These are elements in the overall study which may contribute to the effects observed but which are beyond the control of the researcher. A disaster within the target community during program implementation would be an example. The research design should be sensitive to these possibilities and allow for an estimate even if only partially correct of the uncertainty error present in the impact design.

Utilization of this form of analysis would allow the various recommended actions to be compared and brought into consistency.

VII. THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Two major effects of the proposed project can be identified here: the element's function to protect resources and population and its function to enhance land use patterns.

The first of these effects involves the protection of lives and property through the delineation of hazard zones, protection from various hazards, and the implementation of disaster relief procedures. Where immediate action is taken, some existing patterns of land use may be altered.

Enhancement of land use patterns results from the development of programs and policies as recommended. Specifically, the allocation of land uses within the City will be altered according to the distribution of hazard zones. Residential densities, commercial, industrial and other land uses will be re-evaluated and new long-term growth patterns established. Perhaps those land uses which will be affected most critically are residential and those existing and planned capital improvements.

Implicit in the use changes of land use patterns is some loss in value assigned to land located in hazard zones. While some short-term economic dislocation could result from the project, a real value and suitable use will be assigned to the land.

VIII. ANY IRREVERSIBLE ENVIRONMENTAL CHANGES WHICH WOULD BE INVOLVED IN THE PROPOSED ACTION SHOULD IT BE IMPLEMENTED

None

IX. GROWTH-INDUCING IMPACT OF THE PROPOSED ACTION

The two major impacts can be identified here: the impact on population distribution and the allocation of land uses.

Although it is impossible to forecast the effect of the project on population growth, some assumptions can be made about trends in population growth and subsequent distribution. Application of the various policies will affect the City population unequally. Property owners of yet undeveloped land located in hazard zones may be forced to retain these areas in open space or space extensive uses which do not involve significant population densities. Consequently, these areas of the City or contiguous but unincorporated areas may not be developed in keeping with current trends established by the General Plan while other developed land may be reassigned uses.

Another impact will be registered in complying with structural evaluations and the design of earthquake resisting structures, or other structures designed to sustain hazardous conditions. Where research and design costs are incurred because of local hazards, these costs will be integrated into the price of the structure. Accordingly, any appreciable rise in the building costs will affect market participation by lower socio-economic households. In turn,

low to moderate income housing needs may not be satisfied.

As an overall assumption regarding the impact on population growth, it can be maintained that safety, and the protection of investments made in real estate, will accomodate if not encourage future population growth. Still, the rates of in-migration and natural increase, which comprise population growth, can only be associated with the project in a most tenuous manner.

With regard to the related allocation of land uses, the various holding capacities assigned to areas of the City will need to be re-calculated in view of existing hazards. For example, in the determination of current capacity of a community a determination of loading factors based on future demands has been identified:[20]

1) On-site natural resource capacity such as well-water supply, septic-tank capacity, erosion potential, and flood potential.

2) Existing infrastructure providing natural-resource related capacity to a site such as water supply, sewer capacity, solid waste disposal, and energy.

3) Existing infrastructure providing non-natural resource-related capacity to a site such as roads, schools, etc.

Since the Seismic Safety and Safety Elements are inherently tied to both natural and non-natural resource distribution by way of hazard zone delineation and related resource management programs, development limits will be set. Land development must be consistent with the above loading factors which form the basis for rational zoning.

Referring to the following simple model of growth-inducing impacts stemming from the project, some conclusions can be reached. In spite of the need to make assumptions about components of popu-

GROWTH INDUCING IMPACTS

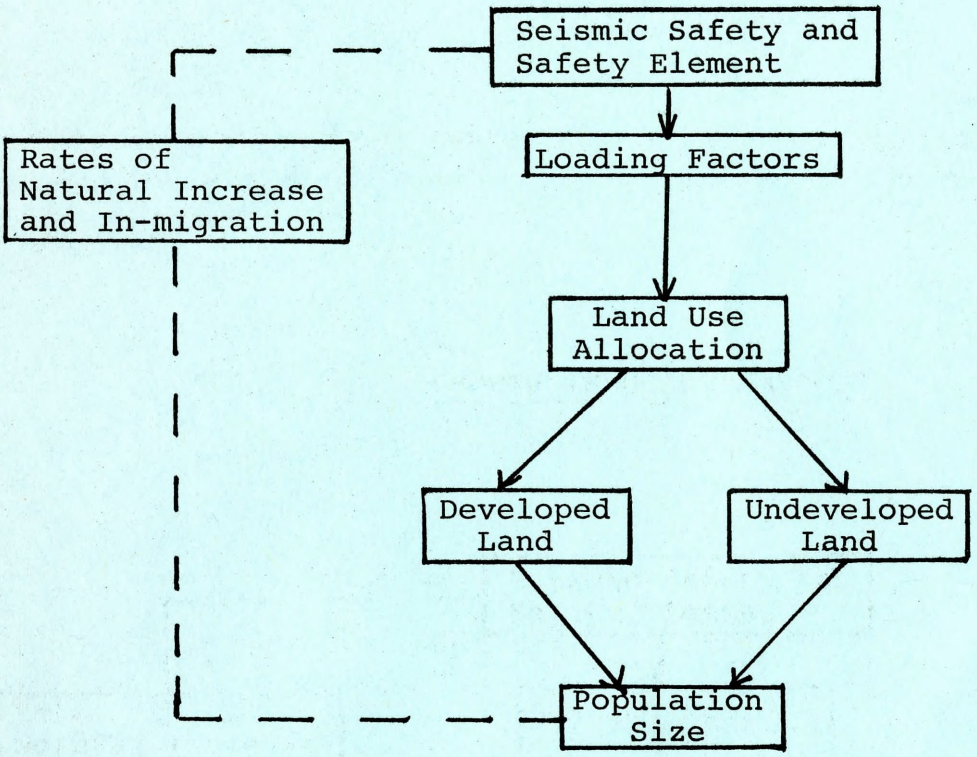


FIGURE No. 3

lation increase, it can be maintained that land use and associated holding capacities can be determined by the project. Less certain are those factors arising from public health and safety measures attributed to the project which may induce a higher rate of in-migration or influence natural increase. Again, it should be pointed out that perception of natural and related hazards has had little impact in determining areas suitable for human occupance.

X. WATER QUALITY ASPECTS

No significant direct impacts.

FOOTNOTES

1. Geotechnical Consultants, Ventura, California (Aug. 12, 1975).

2. Ibid.

3. For example see: George L. Quick, "Preliminary Microzomation for Surface Faulting in the Ventura, California, Area". Geology, Seismicity and Environmental Impact, Association of Engineering and Geologists, Special Publication (1973) 257-262; W. L. Ellsworth, R. H. Campbell, D. P. Hill and R. A. Page, "Point Mugu, California, Earthquake of 21 February 1973 and its aftershocks," Science 182 (December 14, 1973), 1127-1129; California, Division of Mines and Geology, Urban Geology Master Plan for California, Bulletin 198, Sacramento, 1973.

4. California Council on Intergovernmental Relations, General Plan Guidelines (September, 1973), IV-37.

5. Robert W. Kates, "The Perception of Storm Hazard on the Shores of Megalopolis", in David Lowenthal, Environmental Perception and Behavior, Chicago; University of Chicago, Department of Geology Research Paper 109 (1967), p. 67.

6. Thomas R. Dye, Understanding Public Policy, Englewood Cliffs, New Jersey: Prentice-Hall, Inc. C. 1972, p. 30ff.

7. For a related analysis see: City of Oxnard, Environmental Impact Report No. 1, Oxnard Shores Subdivision, Tract 2264.

8. See: State of California Department of Water Resources, Division of Resources Planning, Salt Water Intrusion in California Bulletin No. 63 (November 1958), p. 33; State of California, Resources Agency, Department of Water Resources, Sea Water Intrusion: Oxnard Plain of Ventura County (October 1965), p. 7ff.

9. See: State of California, Department of Public Works, Division of Highways. Seismicity and Dynamic Response Analysis: Proposed Highway Interchange, State Routes 1 - 101 - 232, Oxnard, California, Los Angeles: Woodnard - McNiell and Associates, Consulting Engineers and Geologists, 20 April 1973.

10. County of Ventura, Sheriff's Department and the County of Ventura, Office of Civil Defense and Disaster Relief, Basic Plan - Tidal Wave Warning - Evacuation: Directory for Activating Departments With Assigned Tasks. . . . . (1971).

11. Ibid., p. 3.

12. See related EIR No. 1, Oxnard Shores Subdivision - Tract 2264, pp. 12-15.

13. For further commentary on land subsidence see: B. E. Lofgeen and R. L. Klausing "Land Subsidence Due to Groundwater Withdrawal, Tulare - Wasco area, California, U. S. Geological Survey Professional Paper, 437-B (1969) 103 pp.; J. F. Poland, "Land Subsidence in Western United States", in R. A. Olson and M. M. Wallace, EDS. Geologic Hazards and Public Problems. Santa Rosa, California: Office of Emergency Preparedness Region 7, (1969), 77-96; J. F. Poland and G. H. Davis, "Land Subsidence Due to Withdrawal of Fluids," in D. J. Varmes and G. Kiersch, EDS, Reviews in Engineering Geology, 2 (1969) 187-269.

14. California, Division of Mines and Geology, Urban Geology Master Plan for California, Bulletin 198, Sacramento: (1973), p. 11.

15. R. V. Cooke and J. C. Doornkamp, Geomorphology in Environmental Management. Oxford: Clarendon Press, (1974), pp. 175-176.

16. U. S. Department of Agriculture, Soil Conservation Service and the University of California, Agricultural Experiment Station, Soil Survey, Ventura Area, California (April 1970) p. 61.

17. Ibid., for further reference to soil hazards and urban planning implications see: American Society of Planning Officials, Soils and Land Use Planning, papers presented at the ASPO National Planning Conference. Philadelphia: April 17-21, 1966, 44 pp.; U. S. Department of Housing and Urban Development and the Department of the Interior, Environmental Planning and Geology. Washington, D. C.: G. P. O., 1971, 204 pp.; R. S. Libling and P. F. Kerr, "Observations on Quick Clay," Geological Society of America Bulletin 76 (1965), 853-878; P. F. Kerr, "Quick Clay," Scientific American 209 (1963), 132-142; P. F. Kerr and I. M. Drew, "Clay Mobility, Portuguese Bend, California," California Division of Mines and Geology, Special Report 100 (1969); State of California, Public Hearing of Joint Senate Local Government Committee and Senate Select Committee on Urban Affairs, California Legislature, Premature Subdivisions. Sacramento: December 8-9, 1970, pp. 137-138; Raymond E. Connors, V. Conejo Valley Development Co., et. al. Superior Court of the State of California for the County of Ventura, December 7, 1962.

18. Oxnard City Code, Sections 27-52, 2 to 27-54.4.

19. Harry B. Hatry, "Overview of Modern Program Analysis Characteristics and Techniques," reprint, the Urban Institute. Washington, D. C.; 1969, p. 39.

20. B. Budd Chavooshian, George H. Nieswant, and Thomas Normand, Esq., Growth - Management Program . . . A Proposed New Approach to Local Planning and Zoning, New Brunswick: Cooperative Extension Service, Cook College, Rutgers, The State University of New Jersey at New Brunswick, 1975, p. 7.

XI. LIST OF PERSONS AND ORGANIZATIONS CONSULTED

PERSONS

Dr. Jim Barry	California Department of Parks and Recreation	Sacramento
R. A. Brendler	Agricultural Extension Service, University of California and Ventura County	Ventura
Todd Collart	Ventura County Environmental Resources Agency	Ventura
Rick Farnsworth	United Water Conservation District	Santa Paula
Dave Gonzales	U.S. Corps of Engineers	Los Angeles
Joe Gonzales	Geotechnical Consultants, Inc.	Ventura
Karl Hinderer	Ventura County Environmental Resources Agency	Ventura
Dr. Robert Howard	Department of Geography, California State University, Northridge	Northridge
Jack Kalarin	U.S. Corps of Engineers	Los Angeles
Chris Naglar	California Department of Water Resources	Los Angeles
Roma Philbrook	Asilomar Conference Grounds, California State Park System	Pacific Grove
Richard Warden	Environmental Review Section, Los Angeles City Planning Department	Los Angeles

ORGANIZATIONS

California Division of Mines and Geology	Los Angeles
Jennings, Bartlett and Associates	Ventura
Oxnard City Building, Fire, Library, and Public Works Departments	Oxnard

Ventura County Archaeological Society	Ventura
Ventura County Harbor Department	Ventura
Ventura County Public Works Department	Ventura

Ventura County Archaeological Society	Ventura
Ventura County Harbor Department	Ventura
Ventura County Public Works Department	Ventura

ADDENDUM I

WRITTEN COMMENTS

PUBLIC WORKS AGENCY
county of ventura

Director
A. P. Stokes

Deputy Directors
D. A. Bettach
Roads & Surveyor
E. D. Shinavar
Field Operations
G. J. Nowak
Flood Control & Drainage
H. P. Nilmeier
Water & Sanitation
T. M. Morgan
Special Projects
D. B. Perry
Management Services
C. R. Handy
Staff Services

September 18, 1975

City of Oxnard
305 West Third Street
Oxnard, California 93030

Attention: Mr. Gene Hosford
Planning Director

Subject: SEISMIC SAFETY AND SAFETY ELEMENT
OF THE GENERAL PLAN - CITY OF OXNARD

Dear Mr. Hosford:

The Flood Control District staff has received a draft of the subject report from the County Environmental Resource Agency for review and comment. In addition to our objection expressed through the Environmental Resource Agency to many changes that have been made apparently by your City staff in the body of the flooding and beach erosion sections, we feel that it is appropriate for us to offer comments on the recommended actions proposed in these two sections. The primary reason for this is that the Flood Control District does have jurisdictional responsibility to all residents in the City of Oxnard as a portion of Flood Zone II.

FLOODING

In regard to recommended actions proposed in the flooding section, since the City of Oxnard is in the Federal Flood Insurance Program, it will be mandatory that the City comply with FIA regulations for building and land use within special flood hazard areas. These areas will be defined by FIA following extensive hydrologic, hydraulic, and topographic studies. However, one factor that must be considered in utilizing the FIA flood plain information, is that it is based on a 100-year flood under essentially present day watershed conditions and does not consider planned future development. Whereas, the Flood Control District criteria in determining flood magnitude and flood plain limits is based on planned future development of the watershed. In the Oxnard Plain, there is usually major increase in runoff as a result of development, and this should be considered in evaluating flood hazard and designing protection measures.

The proposals to establish City policies to comply with FIA regulations, protection of new development, and a plan to eliminate local street flooding are highly commendable and the District staff stands ready to assist and cooperate with you in developing your proposals. However, proposed action #6 is not consistent with District and other cities' drainage planning and design criteria and may not be in the best interest of the City. It is recommended that this proposal be deleted pending further study of FIA and local agency criteria. The District staff has been involved with a committee composed of representatives from various cities in the development of uniform drainage standards for use throughout Ventura County. The new Hydrology Manual which has been accepted for use by most of the cities in the County is the first step in this effort.

Proposed recommendation #8 speaks to extending the Santa Clara River levee to the proposed Victoria Avenue bridge. This work has been included in the bridge project plans and is under construction at this time; therefore, it is suggested that this recommendation be deleted.

BEACH EROSION

In the beach erosion section, your recommended action #3 proposes establishing a working relationship with the proper County agency to monitor sediment production. Please be advised that the Flood Control District is the agency which has assumed responsibility for cooperating with other agencies in studying and monitoring sediment production and transport as it may affect sand supply for beach building purposes. Cooperative studies with the U. S. Geological Survey are being conducted to better define the problems and develop proposed solutions.

The District has also become the responsible agency for conducting all investigations pertaining to beach erosion. Section 7 of the Ventura County Flood Control Act was recently amended to include the power to cooperate and act in conjunction with or to contribute funds to other agencies for the purpose of protecting and restoring beaches and shorelines. The District staff will be working closely with the Corps of Engineers in their beach erosion investigation and also plan to conduct periodic bathymetric surveys to determine changes in the beach profiles in various areas along the County shoreline. The District staff should be consulted in developing regulations for land use and reviewing plans for protection in areas subject to beach erosion, and when providing information on shoreline conditions and

plans for a comprehensive beach management program. In regard to recommended action #6, it is suggested that the words "in the absence of regulations" be changed to "until the adoption of regulations". This implies a more positive approach to establishing regulations within the erosion hazard zones.

If you have any questions, please feel free to call.

Very truly yours,

G. J. Nowak

G. J. Nowak, Deputy Director
Flood Control & Drainage Department

WGF:clc